

**Kentucky State Board on Electric Generation and Transmission Siting
Henderson County Solar, LLC – Case No. 2020-00391
Application – Exhibit 14
Volume 2, Tab 14**

Additional Information

Respondent: Chris Killenberg

As part of the investigation of the suitability of the proposed site for the Project, the Applicant commissioned additional studies which are summarized below and included as attachments to the Application.

Wetlands Delineation Report

A Wetland Delineation, Stream Assessment, and Open Waters Report of the proposed Project site (“Wetland Delineation”) was performed by Wetland Services, 3880 Trigg-Turner Rd., Corydon, KY 42406. The Wetland Delineation is dated February 2021.

An Approved Jurisdictional Determination (AJD) was issued by the US Army Corps of Engineers on May 18, 2021.

The Wetlands Delineation and AJD identified a number of jurisdictional aquatic features on the proposed Project site. The Site Plan for the proposed facility avoids new encroachment on these jurisdictional features. Where existing stream crossings may need to be improved or repaired, the Applicant will seek the necessary permits.

A copy of the Wetlands Determination and AJD is provided as Exhibit 14 Attachment 14.1.

Phase I Environmental Site Assessment Report

A Phase I Environmental Site Assessment (“Phase I ESA”) of the proposed Project site was performed by AECOM, 1000 Corporate Centre Drive, Suite 250, Franklin, TN 37067.

A Phase I ESA for the majority of the proposed Project site was completed in June 2020. A Phase I ESA for some additional land that was later added to the proposed Project site was completed in January 2021.

No recognized environmental conditions (RECs), controlled RECs (CRECs), or historical RECs (HRECs) were identified during either Phase I ESA.

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(14.1 – 237 pages; 14.2 – 51 pages; 14.3 – 17 pages; 14.4 - 125 pages)**

A copy of both Phase I Environmental Site Assessment Reports is provided as Exhibit 14 Attachment 14.2.

Cultural Resources

A Cultural Resources Desktop Review and Field Assessment (“Cultural Assessment”) was performed by AECOM, 1000 Corporate Centre Drive, Suite 250, Franklin, TN 37067. The related report is dated April 19, 2021.

The Cultural Assessment concludes:

“The Project Site locations display the potential for the presence of both archaeological deposits within the proposed limits of construction and extant aboveground historic-age resources in the surrounding viewshed. While no archaeological sites have been inventoried within either Project Site area, the preliminary field assessment encountered both prehistoric and historic archaeological specimens within the southern extent of the Project, and the characteristics of landforms in the northern portion of the Site appear conducive for the presence of prehistoric archaeological sites.”

“Should Section 106 consultation be required for the Project Site, the KY SHPO will likely request some level of field investigations to consider the potential for impacts to both archaeological and aboveground resources.”

At the completion of the harvest of the crops that are currently in cultivation on the proposed Project site, when the site is physically accessible for further study, the Applicant intends to conduct more rigorous field investigations. If cultural resources deemed eligible for protection are located on the proposed Project site, the Applicant intends to avoid disturbance of any such resources.

A copy of the Cultural Resources Desktop Review and Field Assessment is provided as Exhibit 14 Attachment 14.3.

Endangered Species Assessment

An Endangered Species Assessment of the proposed Project site was performed by AECOM, 1000 Corporate Centre Drive, Suite 250, Franklin, TN 37067.

An Endangered Species Assessment for the majority of the proposed Project site was completed in July 2020. An Endangered Species Assessment for some additional land that was later added to the proposed Project site was completed in April 2021.

The Endangered Species Assessments identified potential roosting and maternity habitat on the proposed Project site for two species of bat. Potential effects to these species can be mitigated through project-specific conservation and mitigation methods (i.e., tree cutting avoidance or

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time-of-year restrictions). The Applicant intends to observe these conservation and mitigation methods.

A copy of the Endangered Species Assessment is provided as Exhibit 14 Attachment 14.4.

Cumulative Environmental Assessment

A Cumulative Environmental Assessment (“CEA”) of the proposed Project site was performed by Copperhead Environmental Consulting, Inc., 471 Main St., Paint Lick, KY 40461. The CEA is dated June 17, 2021.

The CEA concludes:

- Air Pollutants
 - Potential impacts to air quality from construction-related activities for the Project will be minor
 - Operation of the Project will result in a net benefit to local and regional air quality
- Water Pollutants
 - The operations and maintenance of the solar facility will have little impact on surface water
 - No direct adverse impacts to groundwater will be anticipated as a result of the Project
- Wastes
 - No adverse effects from waste are anticipated
- Water Withdrawal
 - Operation of solar electricity generating facilities is not water-use intensive

A copy of the Cumulative Environmental Assessment is provided as Exhibit 13 Attachment.

The Cumulative Environmental Assessment was submitted to the Kentucky Energy and Environment Cabinet on June 17, 2021.

EXHIBIT 14
ATTACHMENT 14.1

<p>Wetland Services</p> <p>I n c o r p o r a t e d</p> <p>3880 Trigg-Turner Road Corydon, Ky. 42406 270-860-8141 www.wetlandservices.net</p>	<p>Regulatory</p> <ul style="list-style-type: none">Delineation ◇Permitting ◇Mitigation ◇Monitoring ◇ <p>Restoration</p> <ul style="list-style-type: none">Site Analysis ◇Survey & Design ◇Construction ◇Planting ◇Maintenance ◇
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26FEB21

To: Sam Werner
U.S. Army Corps of Engineers
6855 State Road 66
Newburgh, Indiana 47630

From: Keith Michalski
Wetland Services, Inc.

Re: Henderson County Solar LLC (HCS), Henderson, KY

Hello Sam:

Please note the enclosed Jurisdictional Determination Report and associated information for Henderson County Solar LLC. I am enclosing the report in pdf format bookmarked for your convenience: 1) JD Narrative, 2) Summary Tables, 3) Assessments, 4) Location and Topo Map, JD Map and, 5) Approved JD form.

We are requesting a site visit and an Approved JD (AJD). Once a Project Manager has been assigned, please let us know if we can assist in expediting the process.

Thank you for your time,

Keith Michalski
Biologist
km@wetland.services
216-647-1641

CC: Chris Killenberg, Henderson County Solar LLC

Appendix 1 - REQUEST FOR CORPS JURISDICTIONAL DETERMINATION (JD)

To: **Louisville District**

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

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

*Signature: **see original signed** _____

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

Daytime phone no.: _____
Email address: _____

***Authorities:** Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Program of the U.S. Army Corps of Engineers; Final Rule for 33 CFR Parts 320-332.
Principal Purpose: The information that you provide will be used in evaluating your request to determine whether there are any aquatic resources within the project area subject to federal jurisdiction under the regulatory authorities referenced above.
Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public, and may be made available as part of a public notice as required by federal law. Your name and property location where federal jurisdiction is to be determined will be included in the approved jurisdictional determination (AJD), which will be made available to the public on the District's website and on the Headquarters USACE website.
Disclosure: Submission of requested information is voluntary; however, if information is not provided, the request for an AJD cannot be evaluated nor can an AJD be issued.

**Wetland Delineation, Stream Assessment, and Open Waters Report
(JD Report)**

Henderson County Solar

February, 2021

Henderson, KY

For:

**Henderson County Solar LLC
Community Energy, Inc.
Three Radnor Corporate Center, Suite 300
Radnor, PA 19087
866-946-3123**

By:

**Wetland Services
3880 Trigg-Turner RD
Corydon, KY 42406
270-860-8141**

JD REPORT

Introduction and Location: An Army Corps of Engineers (ACOE) jurisdictional wetland delineation and stream assessment was conducted at the request of Henderson County Solar LLC c/o Community Energy, Inc. A total of 544 acres was assessed from May 1 to October 26, 2020.

The project is located southwest of Henderson, KY in the vicinity of the Hwy 425 bypass. To access the north JD area from Henderson, KY proceed southwest on Hwy 60 (South Green Street), turn left onto ALT 41A and veer right onto Collier Rd. Turn left onto Lovers Lane and access is available after crossing Canoe Creek. N 37.79842, W -87.62613. To access the south JD area from Henderson, KY proceed southwest on Hwy 60 (South Green Street) and turn left onto ALT 41A . Turn right onto Henderson Bypass 425, proceed 1 mile west where the JD area can be accessed at multiple locations off the 425 Bypass. The site can also be accessed off ALT 41A and Wilson Station Road to the south. N 37.78453, W -87.62989.

As the regulating authority of Section 404 of the Clean Water Act, ACOE must make the final determination as to the jurisdictional status of this site. Kentucky Division of Water (KDOW) has jurisdiction over “Waters of the Commonwealth”.

Regulatory Definitions :

“Waters of the United States” (WOUS): WOUS are regulated by ACOE based on authority from Section 404 of the Clean Water Act. The Navigable Waters Protection Rule, published in the Federal Register April 21, 2020, re-defined WOUS and became effective June 22, 2020. The final rule recognizes that WOUS are waters within the ordinary meaning of the term, such as oceans, rivers, streams, lakes, ponds, and wetlands. The determinations made for this delineation are based on the new rule.

A “tributary” is defined in the final rule as a river, stream, or similar naturally occurring surface water channel that contributes surface water flow to a territorial sea or traditional navigable water (TNW) in a typical year either directly or indirectly through other tributaries, jurisdictional lakes, ponds, or impoundments, or adjacent wetlands. A tributary must be perennial or intermittent in a typical year.

Lakes, ponds, and impoundments of jurisdictional waters are defined as standing bodies of open water that contribute surface water flow in a typical year to a territorial sea or TNW either directly or through a tributary, another jurisdictional lake, pond, or impoundment, or an adjacent wetland.

The final rule defines “adjacent wetlands” as wetlands that abut a territorial sea or TNW, a tributary, or a lake, pond, or impoundment of a jurisdictional water; are inundated by flooding from a territorial sea or TNW, a tributary, or a lake, pond, or impoundment of a jurisdictional water in a typical year; are physically separated from a territorial sea or TNW, a tributary, or a lake, pond, or impoundment of a jurisdictional water only by a natural berm, bank, dune, or similar natural feature; or are physically separated from a territorial sea or TNW, a tributary, or a lake, pond, or impoundment of a jurisdictional water only by an artificial dike, barrier, or similar artificial structure so long as that structure allows for a direct hydrological surface connection to the territorial sea or TNW, tributary, or lake, pond, or impoundment of a jurisdictional water in a typical year, such as through a culvert, flood or tide gate, pump, or similar artificial feature.

Waters of the Commonwealth: Waters of the Commonwealth are regulated by KDOW based on authority from Section 401 of the Clean Water Act 33USC 1314 and KRS 224.16-070. They are defined as Section 404 jurisdictional wetlands and solid or dashed blue-line streams on the most recent version of the USGS 1:24,000 topographic map. Activities that include a physical disturbance to “Waters of the Commonwealth” will require a KDOW 401 Water Quality Certification.

Technical Definitions:

Wetlands: Wetlands are defined as 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. They are identified based on the three-parameter approach outlined in the *Corps of Engineers Wetland Delineation Manual (1987)* as amended by the Eastern Mountains and Piedmont Regional Supplement - Piedmont Central Subregion ERDC/EL TR-10-9. The three criteria include hydrophytic vegetation, hydric soils, and wetland hydrology. All three criteria must be present to make a positive wetland determination. The criteria are defined as follows:

Hydrophytic vegetation: Hydrophytic vegetation, due to morphological, physiological, and/or reproductive adaptation(s), has the ability to grow, effectively compete, reproduce, and/or persist in anaerobic soil conditions. Individual species have been assigned indicator status by the United States Fish & Wildlife Service (USFWS) - National Wetland Inventory and the National Plant List Panel. Vegetation is considered hydric when *more than 50%* of the dominant species from all strata are OBL, FACW, or FAC based on the dominance test. A prevalence index of 3.0 or less indicates hydrophytic vegetation. Vegetation is also present if either the dominance test or the prevalence test is passed according to morphological adaptations. If all dominants are FAC, the vegetation criterion is disregarded and the determination is based on soil and hydrology criteria.

Indicator Status	Probability of Occurrence in Wetlands
Obligate Wetland - OBL	> 99%
Facultative Wetland - FACW	67-99%
Facultative- FAC	34-66%
Facultative Upland - FACU	1-33%
Obligate Upland - UPL	<1%

Secondary vegetation rules include observed physiological adaptations, plants growing in saturated soils, and the FAC neutral test.

Hydric soils: Hydric soils are present when they develop anaerobic in the upper part during the growing season. Hydric soils in this report are identified by various combinations of soil colors, depths, organic matter, and redox features.

Hydrology: Hydrology in wetlands occurs in areas inundated permanently or periodically at mean water depths ≤6.6-feet, or if the soil is saturated to the surface for 14-days consecutively during the growing season of the prevalent vegetation. Wetland hydrology indicators may be present above or below the surface. Primary indicators include surface water, high water table, saturation, water marks, sediment deposits, drift deposits, algal mat or crust, iron deposits, inundation visible from aerial imagery, water stained leaves, aquatic fauna, true aquatic plants, hydrogen sulfide odor, oxidized rhizospheres on living roots, presence of reduced iron, recent iron reduction in tilled soils, and thin muck surface.

Secondary indicators (two or more required) include surface soil cracks, sparsely vegetated concave surface, drainage patterns, moss trim lines, dry-season water table, crayfish burrows, saturation visible on aerial imagery, stunted or stressed plants, geomorphic position, shallow aquitard, microtopographic relief, and FAC neutral test.

Streams: Streams were assessed according to criteria set forth in the new rule. Perennial and intermittent tributaries are identified as contributing surface water flow directly or indirectly to a territorial sea or a TNW water in a typical year. Ephemeral features including ephemeral streams, swales, gullies, rills, and/or pools are excluded waters, but were mapped and illustrated to thoroughly document features on-site. Swales, gullies, rills, etc. are denoted as surface connections, or 'SC', followed by the appropriate Unit ID as outlined below in the Unit ID labeling system.

Methods and Materials

Wetland Delineation

Soils: Soil colors were determined using the standard Munsell Soil Color Charts. Colors were determined with soil moist on an undisturbed ped face. Unless otherwise stated samples were taken using a tile spade and/or an Oakfield 7/8"x10" soil probe.

Vegetation: Vegetation was classified using the USFWS National List of Plant Species that Occur in Wetlands, Region 1, East, Eastern Mountains and Piedmont Regional Supplement. The 50/20 rule was applied to determine the dominant species in applying the dominance test. If the dominance test failed and the site had indicators of hydric soil and wetland hydrology, the prevalence index was applied. If the prevalence index failed, the morphological adaptations rule was applied.

Hydrology: Hydrology was determined by field indicators, and any reliable source of available gage data. Local soil survey data were also considered.

Stream Assessment: Assessments were conducted using the Rosgen stream assessment protocol and EPA RBP physical characterization and habitat parameter forms. Additional information was added to the standard Rosgen data sheet. These data include length, distance, sinuosity, area, vegetation width on both banks, additional Altered Channel descriptors and a check box for Step-Pool Series.

Unit ID Labeling System: For accurate record-keeping purposes a unit specific labeling system has been developed i.e.:

1NS2A1-1=Unit ID

1=watershed (any drain that solely leaves the permit boundary)

N=Landuse (Natural, Reclaimed, PreLaw, Ag, Mixed eXcavated, Logged, Urban)

S=Unit type (Stream, Wetland, Open Water)

2=Unit number (2nd stream assessed in watershed 1)

A=1st branch of stream 2

1=1st branch of stream 2A etc.

-1=Subsequent assessment on stream 2A1

Clarification of Terms: Watershed size is the area within the project boundary, drainage area is the size of each on-site watershed, and review area is identified as the stream in conjunction with all associated wetlands. Occasionally an on-site unit has connection to a TNW by an off-site unit. In such cases, a visual observation of the unit is made from the project boundary and an “Off-site” assessment is made to facilitate documentation.

Site Description

Background Information: Information on this site was gathered from the USDA/NRCS Web Soil Survey, USGS Quadrangle Map, available statewide NWI/NHD layers, various aerial photos, and LiDAR elevation data. These data sets were studied and utilized to make a formal assessment between May 1 and October 26, 2020. According to the Antecedent Precipitation Tool derived from Henderson County, KY precipitation at the time of assessment during spring and fall was normal.

Physiographic Setting: The area resides in Ecoregion 72a, Wabash-Ohio Bottomlands. The region is composed of nearly level, poorly drained floodplains, undulating terraces, and low ridges. Landuse is dominated by agriculture with forested areas remaining in bottomland and hillslope locations. The Henderson County Solar JD area is dominated by row crop agriculture with forested areas remaining along Wilson and Canoe Creek. The majority of the JD area resides on flat terraces above active floodplains. The Henderson County Solar project is within the Wilson Creek-Canoe Creek watershed and drains north to the Ohio River. HUC 051402020405.

Vegetation: Forested areas along Wilson and Canoe Creek are dominated by a riparian species community. Dominant tree species include, *Fraxinus* sp., *Celtis* sp., *Acer* sp., *Ulmus* sp., and lesser extents of *Quercus bicolor*, *Q. macrocarpa*, *Juglans nigra*, and *Carya* sp. Recent selective cut timber removal has decreased hard mast oak and hickory along Wilson Creek (2MS1). Canopy cover has been decreased resulting in a robust herbaceous understory. Forest understory shrubs encountered include; *Lindera benzoin*, *Asimina triloba* and *Ilex decidua*. A high diversity of herbaceous species were observed in the understory with dominant species being *Laportea canadense*, *Elymus* sp., and *Carex* sp. Observed non-native/invasive species included: *Lonicera japonica*, *Achyranthes japonica*, and *Phalaris arundinacea*. Land use in row crop agriculture was planted in corn and soybeans at the time of assessment.

Streams: The primary hydrologic input for streams on site is precipitation and ground water intercept. Wilson and Canoe Creek are perennial waters with tributaries being intermittent and ephemeral. Wilson Creek has incised due to Canoe Creek dredging, but still accesses its floodplain irregularly and will back water with moderate to high Ohio River flooding. Intermittent tributary streams on-site have been extensively channelized and straightened and do not access their historic floodplains. Stream beds have cut down to hard pan clay with fine gravel, sand, and silt substrates being highly mobile during storm events. Erosion potential is high. Rosgen stream channel types recorded included G, E, and B. Historic floodplains and terraces are drained extensively via drain tile and cross contour diversions are in place to control and direct surface water runoff to streams. Where surface water runoff has not been controlled, multiple ephemeral, gully-like streams have formed along Wilson and Canoe Creek.

Wetlands: The observed primary hydrologic input for wetlands on-site was precipitation, overbank flooding, surface ponding, and high-water tables. At the time of assessment,

wetlands displayed surface water, high water tables, and saturation to varying degrees; along with drift deposits, sediment deposits, water stained leaves, sparse vegetated concave surfaces, true aquatic plants, aquatic fauna, saturation visible from aerial imagery, drainage patterns, crayfish burrows, geomorphic position, and FAC neutral test. A depleted matrix was the dominant hydric soil indicator across the site. Soils were loamy to clayey in texture. The majority of mapped wetlands are located in bottomland, or flat terraces above the active floodplain. Headwater, hillside seep wetlands are also present.

Timber harvest activity has disturbed wetland soils and hydrology due to extensive rutting of the surface in some areas, resulting in reduced surface drainage and increased soil compaction. Wetlands on-site can be described as discharge and/or recharge wetlands.

Surface Connections: Surface connections are mapped features that transmit surface water from wetland or streams to downstream waters but do not have stream or wetland characteristics. These features are grassed waterways, diversions, or gullies that have been created or developed in uplands and often incorporate man-made structures for grade stabilization.

Jurisdictional Waters: An itemized summary of all existing waters is listed below.

Table 1: Itemized Summary of Jurisdictional Waters		
TYPE	INDIVIDUAL UNITS	**TOTAL AMOUNT
Jurisdictional Wetlands	6	0.75-acres
Non-Jurisdictional Wetlands	5	0.37-acres
Jurisdictional Streams	15	(17,387-Linear ft) 3.47-acre*
Non-Jurisdictional Streams	19	5,086-Linear ft
Jurisdictional Open Waters	0	0.0-acres
Non-Jurisdictional Open Waters	0	0.0-acres
TOTAL Jurisdictional Area		4.22-acres
TOTAL Non-Jurisdictional Area		0.37-acres
*Stream area calculated by multiplying stream linear footage x "width Stream Bottom". Da channel area calculated by multiplying stream linear footage x "Wfpa"		**Areas rounded to the nearest 0.01 (hundredth) acre.

Summary Tables

Stream	Latitude	Longitude	Perennial Linear Feet	Intermittent Linear Feet	Excluded Waters ((b)(1) - (b)(12)) Linear Feet	Class of Aquatic Resource
1MS1	37.80201	-87.62741	2,000	0	0	Non-Section 10, non-tidal
1MS1A	37.80330	-87.63178	184	0	0	
1MS1B	37.80176	-87.63108	0	0	378	
1MS1B-1	37.80141	-87.63081	0	0	197	
1MS1C	37.80191	-87.62975	0	0	151	
1MS1C-1	37.80158	-87.62979	0	0	105	
1MS1D	37.80190	-87.62732	0	0	239	
1MS1E	37.80192	-87.62695	0	0	507	
1MS1F	37.80213	-87.62621	0	0	131	
1MS1G	37.80106	-87.62496	0	729	0	
1MS1G1	37.80000	-87.62523	0	0	153	
2AS1F	37.78741	-87.64021	0	770	0	
2AS1F1	37.78876	-87.63840	0	0	35	
2AS1F-1	37.78918	-87.64422	0	2,852	0	
2AS1F2	37.78894	-87.63835	0	17	0	
2AS1L3A	37.77994	-87.62812	0	748	0	
2ASC1F4	37.78978	-87.64062	0	0	1,741	
2ASC1L3B	37.77863	-87.62927	0	0	644	
2MS1	37.78741	-87.62783	1,987	0	0	
2MS1-1	37.78518	-87.63714	780	0	0	
2MS1A	37.78752	-87.62620	0	0	51	
2MS1B	37.78720	-87.62802	0	0	47	
2MS1C	37.78675	-87.62907	0	0	41	
2MS1F3	37.78805	-87.64140	0	412	0	
2MS1I	37.78629	-87.62774	0	0	208	
2MS1L	37.78248	-87.63264	687	0	0	
2MS1L-1	37.77949	-87.63468	0	2,313	0	
2MS1L2	37.78302	-87.63232	0	48	0	
2MS1L-2	37.77345	-87.63566	0	1,439	0	
2MS1L3	37.78131	-87.63165	0	2,421	0	
2MS1L3C	37.77743	-87.62680	0	0	194	
2MS1L4	37.77897	-87.63469	0	0	118	
2MS1L5	37.77918	-87.63500	0	0	124	
2MS1O6	37.79183	-87.62699	0	0	22	
Total			5,638	11,749	5,086	

Wetland	Latitude	Longitude	Cowardin Class	Adjacent Wetland Acres	Excluded Waters (b)(1)-(b)(12)) Acres	Class of Aquatic Resource	
1MW1	38.80247	-87.63102	PFO	0.14	0	Non-Section 10, Non-Tidal	
1MW2	37.80309	-87.63149	PFO	0.14	0		
1MW3	37.80167	-87.62983	PFO	0	0.07		
1MW4	37.80200	-87.62681	PFO	0.04	0		
1MW5	37.80187	-87.62629	PFO	0	0.08		
1MW6	37.80175	-87.62544	PFO	0.26	0		
2MW1	37.00000	87.62570	PUBG	0.11	0		
2MW10	37.78871	-87.63366	PSS	0	0.03		
2MW13	37.78765	-87.64251	PEM	0.06	0		
2MW14	37.79076	-87.64378	PFO	0	0.17		
2MW30	37.79211	-87.62700	PEM	0	0.02		
Total				0.75	0.37		

Henderson County Solar Stream Assessment Worksheet

Stream 1MS1	Date: 5/4/2020	Inv.: Keith Michalski	Entry: Keith Michalski
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Latitude:	37.80201	N
Longitude:	-87.62741	W
Length:	2000	
Distance:	1788	
Sinuosity:	1.12	
FlowType:	Perennial	
Area In Acres:	4.13	
Slope %:	1	

Level II - Stream Morphological Description		
Width at Bottom of Stream:	20.00	
Bankfull Surface Width:	90.00	
Width of Flood Prone Area:	200.00	
Bankfull Mean Depth:	15.00	
Entrenchment Ratio:	2.22	
Width / Depth Ratio:	6.00	
Stream Type:	E6	

Level III - Stream State or Condition Morphological Description		
Primary Riparian Left:	10b	100
Primary Riparian Right:	3b	30
Secondary Riparian Left:		
Secondary Riparian Right:	10b	70
Stream Flow Regime:	P2	
Stream Size:	S-7	
Depositional Features:	B-2,B-4	
Meander Patterns:	M-1	
Stream Channel Debris:	D3	
Stream Bank Erosion:	High	
Stream Aggradation:	Stable	
Channel Stability:	Fair	
Altered Channel:	DG,PI	
Percent Riffle:	25	
Percent Run:	35	
Percent Pool:	40	
Step Pool:	<input type="checkbox"/>	

Altered Channel Key
CH = Channelized
CV = Culvert
DAM = Weir, Dam, or Rock Checks
DG = Dredged
LWC = Low Water Crossing
NA = Not applicable
OT = Other (See Comments)
PI = Pipe
RSC = Road Side Channel

Comments: Canoe Creek back watered by Ohio River at time of assessment.



Riparian Buffer: Primary and Secondary Riparian Buffer widths and vegetation types are delineated out to 100 ft (or the watershed divide if less) under the Level III criteria. Non-buffering land uses such as agriculture and roadways are disregarded.

Henderson County Solar Stream Assessment Worksheet

Stream 1MS1A	Date: 5/4/2020	Inv.: Ryan Winka	Entry: Keith Michalski
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Latitude:	37.80330	N
Longitude:	-87.63178	W
Length:	184	
Distance:	175	
Sinuosity:	1.05	
FlowType:	Perennial	
Area In Acres:	0.11	
Slope %:	1	

Level III - Stream State or Condition Morphological Description		
Primary Riparian Left:	10b	40
Primary Riparian Right:	10b	90
Secondary Riparian Left:	4c	60
Secondary Riparian Right:	4c	10
Stream Flow Regime:	P2	
Stream Size:	S-4	
Depositional Features:	B-2,B-4	
Meander Patterns:	M-1	
Stream Channel Debris:	D3	
Stream Bank Erosion:	High	
Stream Aggradation:	SI deg	
Channel Stability:	Fair	
Altered Channel:	CH	
Percent Riffle:	40	
Percent Run:	20	
Percent Pool:	40	
Step Pool:	<input type="checkbox"/>	

Altered Channel Key
CH = Channelized
CV = Culvert
DAM = Weir, Dam, or Rock Checks
DG = Dredged
LWC = Low Water Crossing
NA = Not applicable
OT = Other (See Comments)
PI = Pipe
RSC = Road Side Channel

Level II - Stream Morphological Description	
Width at Bottom of Stream:	10.00
Bankfull Surface Width:	25.00
Width of Flood Prone Area:	35.00
Bankfull Mean Depth:	3.00
Entrenchment Ratio:	1.40
Width / Depth Ratio:	8.33
Stream Type:	G6c

Comments: Stream measurements estimated due to Ohio River back water conditions in stream.



Riparian Buffer: Primary and Secondary Riparian Buffer widths and vegetation types are delineated out to 100 ft (or the watershed divide if less) under the Level III criteria. Non-buffering land uses such as agriculture and roadways are disregarded.

Henderson County Solar Stream Assessment Worksheet

Stream 1MS1B	Date: 5/4/2020	Inv.: Scott Mitchell	Entry: Keith Michalski
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Latitude:	37.80275	N
Longitude:	-87.63112	W
Length:	378	
Distance:	275	
Sinuosity:	1.37	
FlowType:	Ephemeral	
Area In Acres:	0.03	
Slope %:	3	

Level III - Stream State or Condition Morphological Description

Primary Riparian Left:	10b	100
Primary Riparian Right:	10b	100
Secondary Riparian Left:		0
Secondary Riparian Right:		0
Stream Flow Regime:	E2	
Stream Size:	S-2	
Depositional Features:	NA	
Meander Patterns:	M-1	
Stream Channel Debris:	D3	
Stream Bank Erosion:	Low	
Stream Aggradation:	Stable	
Channel Stability:	Good	
Altered Channel:	PI	

Altered Channel Key
CH = Channelized
CV = Culvert
DAM = Weir, Dam, or Rock Checks
DG = Dredged
LWC = Low Water Crossing
NA = Not applicable
OT = Other (See Comments)
PI = Pipe
RSC = Road Side Channel

Level II - Stream Morphological Description

Width at Bottom of Stream:	1.00
Bankfull Surface Width:	3.50
Width of Flood Prone Area:	5.00
Bankfull Mean Depth:	0.30
Entrenchment Ratio:	1.43
Width / Depth Ratio:	11.67
Stream Type:	B6

Percent Riffle:	60
Percent Run:	30
Percent Pool:	10
Step Pool:	<input type="checkbox"/>

Comments: Lower portion of stream backwaters from Ohio River.



Riparian Buffer: Primary and Secondary Riparian Buffer widths and vegetation types are delineated out to 100 ft (or the watershed divide if less) under the Level III criteria. Non-buffering land uses such as agriculture and roadways are disregarded.

Henderson County Solar Stream Assessment Worksheet

Stream 1MS1B-1	Date: 5/4/2020	Inv.: Ryan Harris	Entry: Keith Michalski
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Latitude:	37.80178	N
Longitude:	-87.63108	W
Length:	197	
Distance:	190	
Sinuosity:	1.04	
FlowType:	Ephemeral	
Area In Acres:	0.03	
Slope %:	1	

Level III - Stream State or Condition Morphological Description		
Primary Riparian Left:	10b	10
Primary Riparian Right:	10b	30
Secondary Riparian Left:	RV 1	90
Secondary Riparian Right:	RV 1	70
Stream Flow Regime:	E2	
Stream Size:	S-3	
Depositional Features:	NA	
Meander Patterns:	M-1	
Stream Channel Debris:	D3	
Stream Bank Erosion:	Low	
Stream Aggradation:	Stable	
Channel Stability:	Good	
Altered Channel:	NA	
Percent Riffle:	60	
Percent Run:	35	
Percent Pool:	5	
Step Pool:	<input type="checkbox"/>	

Altered Channel Key
CH = Channelized
CV = Culvert
DAM = Weir, Dam, or Rock Checks
DG = Dredged
LWC = Low Water Crossing
NA = Not applicable
OT = Other (See Comments)
PI = Pipe
RSC = Road Side Channel

Level II - Stream Morphological Description	
Width at Bottom of Stream:	2.50
Bankfull Surface Width:	6.20
Width of Flood Prone Area:	20.00
Bankfull Mean Depth:	0.30
Entrenchment Ratio:	3.23
Width / Depth Ratio:	20.67
Stream Type:	C6

Comments: Stream segment runs parallel to Rail line.



Riparian Buffer: Primary and Secondary Riparian Buffer widths and vegetation types are delineated out to 100 ft (or the watershed divide if less) under the Level III criteria. Non-buffering land uses such as agriculture and roadways are disregarded.

Henderson County Solar Stream Assessment Worksheet

Stream 1MS1C	Date: 5/4/2020	Inv.: Ryan Winka	Entry: Keith Michalski
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Latitude:	37.80191	N
Longitude:	-87.62975	W
Length:	151	
Distance:	130	
Sinuosity:	1.16	
FlowType:	Ephemeral	
Area In Acres:	0.01	
Slope %:	4	

Level III - Stream State or Condition Morphological Description		
Primary Riparian Left:	10b	100
Primary Riparian Right:	10b	100
Secondary Riparian Left:		0
Secondary Riparian Right:		0
Stream Flow Regime:	E2	
Stream Size:	S-2	
Depositional Features:	NA	
Meander Patterns:	M-1	
Stream Channel Debris:	D4	
Stream Bank Erosion:	High	
Stream Aggradation:	Deg	
Channel Stability:	Poor	
Altered Channel:	NA	
Percent Riffle:	60	
Percent Run:	20	
Percent Pool:	20	
Step Pool:	<input type="checkbox"/>	

Altered Channel Key
CH = Channelized
CV = Culvert
DAM = Weir, Dam, or Rock Checks
DG = Dredged
LWC = Low Water Crossing
NA = Not applicable
OT = Other (See Comments)
PI = Pipe
RSC = Road Side Channel

Level II - Stream Morphological Description	
Width at Bottom of Stream:	2.00
Bankfull Surface Width:	3.70
Width of Flood Prone Area:	5.00
Bankfull Mean Depth:	0.50
Entrenchment Ratio:	1.35
Width / Depth Ratio:	7.40
Stream Type:	G6

Comments:



Riparian Buffer: Primary and Secondary Riparian Buffer widths and vegetation types are delineated out to 100 ft (or the watershed divide if less) under the Level III criteria. Non-buffering land uses such as agriculture and roadways are disregarded.

Henderson County Solar Stream Assessment Worksheet

Stream 1MS1C-1	Date: 5/4/2020	Inv.: Ryan Winka	Entry: Keith Michalski
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Latitude:	37.80158	N
Longitude:	-87.62979	W
Length:	105	
Distance:	101	
Sinuosity:	1.04	
FlowType:	Ephemeral	
Area In Acres:	0.01	
Slope %:	1.5	

Level II - Stream Morphological Description	
Width at Bottom of Stream:	1.20
Bankfull Surface Width:	2.80
Width of Flood Prone Area:	4.00
Bankfull Mean Depth:	0.40
Entrenchment Ratio:	1.43
Width / Depth Ratio:	7.00
Stream Type:	G6c

Level III - Stream State or Condition Morphological Description		
Primary Riparian Left:	10b	100
Primary Riparian Right:	10b	30
Secondary Riparian Left:		
Secondary Riparian Right:	RV 1	70
Stream Flow Regime:	E2	
Stream Size:	S-2	
Depositional Features:	B-1	
Meander Patterns:	M-1	
Stream Channel Debris:	D2	
Stream Bank Erosion:	Moderate	
Stream Aggradation:	SI deg	
Channel Stability:	Fair	
Altered Channel:	NA	
Percent Riffle:	40	
Percent Run:	50	
Percent Pool:	10	
Step Pool:	<input type="checkbox"/>	

Altered Channel Key
CH = Channelized
CV = Culvert
DAM = Weir, Dam, or Rock Checks
DG = Dredged
LWC = Low Water Crossing
NA = Not applicable
OT = Other (See Comments)
PI = Pipe
RSC = Road Side Channel

Comments:



Riparian Buffer: Primary and Secondary Riparian Buffer widths and vegetation types are delineated out to 100 ft (or the watershed divide if less) under the Level III criteria. Non-buffering land uses such as agriculture and roadways are disregarded.

Henderson County Solar Stream Assessment Worksheet

Stream 1MS1D	Date: 5/4/2020	Inv.: Ryan Winka	Entry: Keith Michalski
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Latitude:	37.80190	N
Longitude:	-87.62732	W
Length:	239	
Distance:	224	
Sinuosity:	1.07	
FlowType:	Ephemeral	
Area In Acres:	0.02	
Slope %:	3	

Level III - Stream State or Condition Morphological Description		
Primary Riparian Left:	10b	50
Primary Riparian Right:	10b	100
Secondary Riparian Left:		
Secondary Riparian Right:		
Stream Flow Regime:	E2	
Stream Size:	S-2	
Depositional Features:	B-1	
Meander Patterns:	M-1	
Stream Channel Debris:	D2	
Stream Bank Erosion:	Moderate	
Stream Aggradation:	SI deg	
Channel Stability:	Fair	
Altered Channel:	DAM	

Altered Channel Key
CH = Channelized
CV = Culvert
DAM = Weir, Dam, or Rock Checks
DG = Dredged
LWC = Low Water Crossing
NA = Not applicable
OT = Other (See Comments)
PI = Pipe
RSC = Road Side Channel

Level II - Stream Morphological Description	
Width at Bottom of Stream:	0.70
Bankfull Surface Width:	3.20
Width of Flood Prone Area:	4.50
Bankfull Mean Depth:	0.35
Entrenchment Ratio:	1.41
Width / Depth Ratio:	9.14
Stream Type:	G6

Percent Riffle:	60
Percent Run:	30
Percent Pool:	10
Step Pool:	<input type="checkbox"/>

Comments: Rock/debris weir at edge of crop field to prevent further head cutting.



Riparian Buffer: Primary and Secondary Riparian Buffer widths and vegetation types are delineated out to 100 ft (or the watershed divide if less) under the Level III criteria. Non-buffering land uses such as agriculture and roadways are disregarded.

Henderson County Solar Stream Assessment Worksheet

Stream 1MS1E	Date: 5/4/2020	Inv.: Ryan Winka	Entry: Keith Michalski
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Latitude:	37.80192	N
Longitude:	-87.62695	W
Length:	507	
Distance:	480	
Sinuosity:	1.06	
FlowType:	Ephemeral	
Area In Acres:	0.06	
Slope %:	2	

Level III - Stream State or Condition Morphological Description		
Primary Riparian Left:	10b	100
Primary Riparian Right:	10b	100
Secondary Riparian Left:		0
Secondary Riparian Right:		0
Stream Flow Regime:	E2	
Stream Size:	S-3	
Depositional Features:	B-1	
Meander Patterns:	M-1	
Stream Channel Debris:	D3	
Stream Bank Erosion:	High	
Stream Aggradation:	SI deg	
Channel Stability:	Poor	
Altered Channel:	DAM	

Altered Channel Key
CH = Channelized
CV = Culvert
DAM = Weir, Dam, or Rock Checks
DG = Dredged
LWC = Low Water Crossing
NA = Not applicable
OT = Other (See Comments)
PI = Pipe
RSC = Road Side Channel

Level II - Stream Morphological Description	
Width at Bottom of Stream:	1.80
Bankfull Surface Width:	5.20
Width of Flood Prone Area:	8.10
Bankfull Mean Depth:	0.40
Entrenchment Ratio:	1.56
Width / Depth Ratio:	13.00
Stream Type:	B6

Percent Riffle:	60
Percent Run:	20
Percent Pool:	20
Step Pool:	<input type="checkbox"/>

Comments: Rock weir at head of stream to prevent headcutting into crop field has failed.



Riparian Buffer: Primary and Secondary Riparian Buffer widths and vegetation types are delineated out to 100 ft (or the watershed divide if less) under the Level III criteria. Non-buffering land uses such as agriculture and roadways are disregarded.

Henderson County Solar Stream Assessment Worksheet

Stream 1MS1F	Date: 5/4/2020	Inv.: Ryan Winka	Entry: Keith Michalski
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Latitude:	37.80213	N
Longitude:	-87.62621	W
Length:	131	
Distance:	131	
Sinuosity:	1.00	
FlowType:	Ephemeral	
Area In Acres:	0.01	
Slope %:	2	

Level III - Stream State or Condition Morphological Description		
Primary Riparian Left:	10b	100
Primary Riparian Right:	10b	100
Secondary Riparian Left:		0
Secondary Riparian Right:		0
Stream Flow Regime:	E2	
Stream Size:	S-2	
Depositional Features:	NA	
Meander Patterns:	M-1	
Stream Channel Debris:	D2	
Stream Bank Erosion:	Low	
Stream Aggradation:	SI deg	
Channel Stability:	Good	
Altered Channel:	NA	
Percent Riffle:	60	
Percent Run:	30	
Percent Pool:	10	
Step Pool:	<input type="checkbox"/>	

Altered Channel Key
CH = Channelized
CV = Culvert
DAM = Weir, Dam, or Rock Checks
DG = Dredged
LWC = Low Water Crossing
NA = Not applicable
OT = Other (See Comments)
PI = Pipe
RSC = Road Side Channel

Level II - Stream Morphological Description	
Width at Bottom of Stream:	0.80
Bankfull Surface Width:	2.10
Width of Flood Prone Area:	3.00
Bankfull Mean Depth:	0.40
Entrenchment Ratio:	1.43
Width / Depth Ratio:	5.25
Stream Type:	G6

Comments:



Riparian Buffer: Primary and Secondary Riparian Buffer widths and vegetation types are delineated out to 100 ft (or the watershed divide if less) under the Level III criteria. Non-buffering land uses such as agriculture and roadways are disregarded.

Henderson County Solar Stream Assessment Worksheet

Stream 1MS1G	Date: 5/4/2020	Inv.: Ryan Winka	Entry: Keith Michalski
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Latitude:	37.80106	N
Longitude:	-87.62496	W
Length:	729	
Distance:	602	
Sinuosity:	1.21	
FlowType:	Intermittent	
Area In Acres:	0.15	
Slope %:	1	

Level III - Stream State or Condition Morphological Description		
Primary Riparian Left:	10b	100
Primary Riparian Right:	10b	100
Secondary Riparian Left:		0
Secondary Riparian Right:		0
Stream Flow Regime:	I2	
Stream Size:	S-3	
Depositional Features:	B-1,B-4	
Meander Patterns:	M-1	
Stream Channel Debris:	D3	
Stream Bank Erosion:	Moderate	
Stream Aggradation:	SI deg	
Channel Stability:	Fair	
Altered Channel:	DAM,PI	
Percent Riffle:	40	
Percent Run:	30	
Percent Pool:	30	
Step Pool:	<input type="checkbox"/>	

Altered Channel Key
CH = Channelized
CV = Culvert
DAM = Weir, Dam, or Rock Checks
DG = Dredged
LWC = Low Water Crossing
NA = Not applicable
OT = Other (See Comments)
PI = Pipe
RSC = Road Side Channel

Level II - Stream Morphological Description	
Width at Bottom of Stream:	2.40
Bankfull Surface Width:	9.00
Width of Flood Prone Area:	13.00
Bankfull Mean Depth:	0.75
Entrenchment Ratio:	1.44
Width / Depth Ratio:	12.00
Stream Type:	B6c

Comments:



Riparian Buffer: Primary and Secondary Riparian Buffer widths and vegetation types are delineated out to 100 ft (or the watershed divide if less) under the Level III criteria. Non-buffering land uses such as agriculture and roadways are disregarded.

Henderson County Solar Stream Assessment Worksheet

Stream 1MS1G1	Date: 5/4/2020	Inv.: Ryan Winka	Entry: Keith Michalski
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Latitude:	37.80000	N
Longitude:	-87.62523	W
Length:	153	
Distance:	145	
Sinuosity:	1.06	
FlowType:	Ephemeral	
Area In Acres:	0.01	
Slope %:	2	

Level III - Stream State or Condition Morphological Description		
Primary Riparian Left:	10b	25
Primary Riparian Right:	10b	25
Secondary Riparian Left:	RV 1	75
Secondary Riparian Right:	RV 1	75
Stream Flow Regime:	E2	
Stream Size:	S-2	
Depositional Features:	NA	
Meander Patterns:	M-1	
Stream Channel Debris:	D3	
Stream Bank Erosion:	Moderate	
Stream Aggradation:	SI deg	
Channel Stability:	Fair	
Altered Channel:	PI	

Altered Channel Key
CH = Channelized
CV = Culvert
DAM = Weir, Dam, or Rock Checks
DG = Dredged
LWC = Low Water Crossing
NA = Not applicable
OT = Other (See Comments)
PI = Pipe
RSC = Road Side Channel

Level II - Stream Morphological Description	
Width at Bottom of Stream:	2.00
Bankfull Surface Width:	4.25
Width of Flood Prone Area:	6.35
Bankfull Mean Depth:	0.30
Entrenchment Ratio:	1.49
Width / Depth Ratio:	14.17
Stream Type:	B6

Percent Riffle:	40
Percent Run:	50
Percent Pool:	10
Step Pool:	<input type="checkbox"/>

Comments:



Riparian Buffer: Primary and Secondary Riparian Buffer widths and vegetation types are delineated out to 100 ft (or the watershed divide if less) under the Level III criteria. Non-buffering land uses such as agriculture and roadways are disregarded.

Henderson County Solar Stream Assessment Worksheet

Stream 2AS1F	Date: 5/7/2020	Inv.: Ryan Harris	Entry: Scott Mitchell
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Latitude:	37.78741	N
Longitude:	-87.64021	W
Length:	770	
Distance:	740	
Sinuosity:	1.04	
FlowType:	Intermittent	
Area In Acres:	0.17	
Slope %:	1	

Level III - Stream State or Condition Morphological Description		
Primary Riparian Left:	3b	10
Primary Riparian Right:	3b	10
Secondary Riparian Left:	RV 1	90
Secondary Riparian Right:	RV 1	90
Stream Flow Regime:	I2	
Stream Size:	S-3	
Depositional Features:	B-3,B-4	
Meander Patterns:	M-1	
Stream Channel Debris:	D1	
Stream Bank Erosion:	High	
Stream Aggradation:	SI deg	
Channel Stability:	Poor	
Altered Channel:	CH,DG,PI	
Percent Riffle:	20	
Percent Run:	60	
Percent Pool:	20	
Step Pool:	<input type="checkbox"/>	

Altered Channel Key
CH = Channelized
CV = Culvert
DAM = Weir, Dam, or Rock Checks
DG = Dredged
LWC = Low Water Crossing
NA = Not applicable
OT = Other (See Comments)
PI = Pipe
RSC = Road Side Channel

Level II - Stream Morphological Description	
Width at Bottom of Stream:	4.10
Bankfull Surface Width:	9.40
Width of Flood Prone Area:	14.00
Bankfull Mean Depth:	3.00
Entrenchment Ratio:	1.49
Width / Depth Ratio:	3.13
Stream Type:	G6c

Comments:



Riparian Buffer: Primary and Secondary Riparian Buffer widths and vegetation types are delineated out to 100 ft (or the watershed divide if less) under the Level III criteria. Non-buffering land uses such as agriculture and roadways are disregarded.

Henderson County Solar Stream Assessment Worksheet

Stream 2AS1F1	Date: 5/7/2020	Inv.: Keith Michalski	Entry: Scott Mitchell
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Latitude:	37.78872	N
Longitude:	-87.63843	W
Length:	35	
Distance:	35	
Sinuosity:	1.00	
FlowType:	Ephemeral	
Area In Acres:	0.00	
Slope %:	2.5	

Level II - Stream Morphological Description		
Width at Bottom of Stream:	1.50	
Bankfull Surface Width:	2.70	
Width of Flood Prone Area:	3.60	
Bankfull Mean Depth:	0.40	
Entrenchment Ratio:	1.33	
Width / Depth Ratio:	6.75	
Stream Type:	G6	

Level III - Stream State or Condition Morphological Description		
Primary Riparian Left:	7b	40
Primary Riparian Right:	7b	20
Secondary Riparian Left:		0
Secondary Riparian Right:	RV 1	80
Stream Flow Regime:	E2	
Stream Size:	S-2	
Depositional Features:	NA	
Meander Patterns:	M-1	
Stream Channel Debris:	D2	
Stream Bank Erosion:	Moderate	
Stream Aggradation:	SI deg	
Channel Stability:	Fair	
Altered Channel:	CH,RSC	
Percent Riffle:	20	
Percent Run:	70	
Percent Pool:	10	
Step Pool:	<input type="checkbox"/>	

Altered Channel Key
CH = Channelized
CV = Culvert
DAM = Weir, Dam, or Rock Checks
DG = Dredged
LWC = Low Water Crossing
NA = Not applicable
OT = Other (See Comments)
PI = Pipe
RSC = Road Side Channel

Comments: Jurisdiction is questionable. Rail/Road side channel.



Riparian Buffer: Primary and Secondary Riparian Buffer widths and vegetation types are delineated out to 100 ft (or the watershed divide if less) under the Level III criteria. Non-buffering land uses such as agriculture and roadways are disregarded.

Henderson County Solar Stream Assessment Worksheet

Stream 2AS1F-1	Date: 5/7/2020	Inv.: Ryan Harris	Entry: Scott Mitchell
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Latitude:	37.78918	N
Longitude:	-87.64422	W
Length:	2852	
Distance:	2828	
Sinuosity:	1.01	
FlowType:	Intermittent	
Area In Acres:	0.65	
Slope %:	1	

Level III - Stream State or Condition Morphological Description

Primary Riparian Left:	3b	2
Primary Riparian Right:	3b	10
Secondary Riparian Left:	RV 1	98
Secondary Riparian Right:	RV 1	90
Stream Flow Regime:	I2	
Stream Size:	S-3	
Depositional Features:	B-4	
Meander Patterns:	M-1	
Stream Channel Debris:	D1	
Stream Bank Erosion:	Very High	
Stream Aggradation:	SI deg	
Channel Stability:	Fair	
Altered Channel:	CH,DG,PI	

Altered Channel Key
CH = Channelized
CV = Culvert
DAM = Weir, Dam, or Rock Checks
DG = Dredged
LWC = Low Water Crossing
NA = Not applicable
OT = Other (See Comments)
PI = Pipe
RSC = Road Side Channel

Level II - Stream Morphological Description

Width at Bottom of Stream:	4.80
Bankfull Surface Width:	10.00
Width of Flood Prone Area:	14.70
Bankfull Mean Depth:	2.00
Entrenchment Ratio:	1.47
Width / Depth Ratio:	5.00
Stream Type:	G5c

Percent Riffle:	20
Percent Run:	70
Percent Pool:	10
Step Pool:	<input type="checkbox"/>

Comments:



Riparian Buffer: Primary and Secondary Riparian Buffer widths and vegetation types are delineated out to 100 ft (or the watershed divide if less) under the Level III criteria. Non-buffering land uses such as agriculture and roadways are disregarded.

Henderson County Solar Stream Assessment Worksheet

Stream 2AS1F2	Date: 5/7/2020	Inv.: Ryan Harris	Entry: Scott Mitchell
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Latitude:	37.78884	N
Longitude:	-87.63857	W
Length:	17	
Distance:	17	
Sinuosity:	1.00	
FlowType:	Intermittent	
Area In Acres:	0.00	
Slope %:	2	

Level II - Stream Morphological Description	
Width at Bottom of Stream:	3.20
Bankfull Surface Width:	8.50
Width of Flood Prone Area:	13.50
Bankfull Mean Depth:	1.80
Entrenchment Ratio:	1.59
Width / Depth Ratio:	4.72
Stream Type:	G6

Level III - Stream State or Condition Morphological Description	
Primary Riparian Left:	3b 10
Primary Riparian Right:	10b 15
Secondary Riparian Left:	RV 1 90
Secondary Riparian Right:	RV 1 85
Stream Flow Regime:	I2
Stream Size:	S-3
Depositional Features:	B-4
Meander Patterns:	M-1
Stream Channel Debris:	D2
Stream Bank Erosion:	High
Stream Aggradation:	SI deg
Channel Stability:	Fair
Altered Channel:	CH,CV,PI,RSC
Percent Riffle:	20
Percent Run:	40
Percent Pool:	40
Step Pool:	<input type="checkbox"/>

Altered Channel Key
CH = Channelized
CV = Culvert
DAM = Weir, Dam, or Rock Checks
DG = Dredged
LWC = Low Water Crossing
NA = Not applicable
OT = Other (See Comments)
PI = Pipe
RSC = Road Side Channel

Comments:



Riparian Buffer: Primary and Secondary Riparian Buffer widths and vegetation types are delineated out to 100 ft (or the watershed divide if less) under the Level III criteria. Non-buffering land uses such as agriculture and roadways are disregarded.

Henderson County Solar Stream Assessment Worksheet

Stream 2AS1L3A	Date: 5/11/2020	Inv.: Scott Mitchell	Entry: Ryan Winka
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Latitude:	37.77994	N
Longitude:	-87.62812	W
Length:	748	
Distance:	745	
Sinuosity:	1.00	
FlowType:	Intermittent	
Area In Acres:	0.06	
Slope %:	1.5	

Level III - Stream State or Condition Morphological Description		
Primary Riparian Left:	4b	10
Primary Riparian Right:	7a	10
Secondary Riparian Left:	RV 1	90
Secondary Riparian Right:	RV 1	90
Stream Flow Regime:	I2	
Stream Size:	S-2	
Depositional Features:	NA	
Meander Patterns:	M-1	
Stream Channel Debris:	D1	
Stream Bank Erosion:	Moderate	
Stream Aggradation:	Stable	
Channel Stability:	Fair	
Altered Channel:	CH,CV,PI	

Altered Channel Key
CH = Channelized
CV = Culvert
DAM = Weir, Dam, or Rock Checks
DG = Dredged
LWC = Low Water Crossing
NA = Not applicable
OT = Other (See Comments)
PI = Pipe
RSC = Road Side Channel

Level II - Stream Morphological Description	
Width at Bottom of Stream:	0.60
Bankfull Surface Width:	3.50
Width of Flood Prone Area:	4.50
Bankfull Mean Depth:	0.80
Entrenchment Ratio:	1.29
Width / Depth Ratio:	4.38
Stream Type:	G6c

Percent Riffle:	40
Percent Run:	55
Percent Pool:	5
Step Pool:	<input type="checkbox"/>

Comments:



Riparian Buffer: Primary and Secondary Riparian Buffer widths and vegetation types are delineated out to 100 ft (or the watershed divide if less) under the Level III criteria. Non-buffering land uses such as agriculture and roadways are disregarded.

Henderson County Solar Stream Assessment Worksheet

Stream 2ASC1F4	Date: 5/7/2020	Inv.: Keith Michalski	Entry: Scott Mitchell
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Latitude:	37.78978	N
Longitude:	-87.64062	W
Length:	1741	
Distance:	1735	
Sinuosity:	1.00	
FlowType:	Non Jurisdictional	
Area In Acres:	0.00	
Slope %:	1	

Level III - Stream State or Condition Morphological Description	
Primary Riparian Left:	<input type="text"/> <input type="text"/>
Primary Riparian Right:	<input type="text"/> <input type="text"/>
Secondary Riparian Left:	<input type="text"/> <input type="text"/> 0
Secondary Riparian Right:	<input type="text"/> <input type="text"/> 0
Stream Flow Regime:	<input type="text"/>
Stream Size:	S-1
Depositional Features:	<input type="text"/>
Meander Patterns:	M-1
Stream Channel Debris:	<input type="text"/>
Stream Bank Erosion:	<input type="text"/>
Stream Aggradation:	<input type="text"/>
Channel Stability:	<input type="text"/>
Altered Channel:	<input type="text"/>
Percent Riffle:	<input type="text"/> 0
Percent Run:	<input type="text"/> 0
Percent Pool:	<input type="text"/> 0
Step Pool:	<input type="checkbox"/>

Altered Channel Key
CH = Channelized
CV = Culvert
DAM = Weir, Dam, or Rock Checks
DG = Dredged
LWC = Low Water Crossing
NA = Not applicable
OT = Other (See Comments)
PI = Pipe
RSC = Road Side Channel

Level II - Stream Morphological Description	
Width at Bottom of Stream:	<input type="text"/> 0.00
Bankfull Surface Width:	<input type="text"/> 0.00
Width of Flood Prone Area:	<input type="text"/> 0.00
Bankfull Mean Depth:	<input type="text"/> 0.00
Entrenchment Ratio:	<input type="text"/> 0.00
Width / Depth Ratio:	<input type="text"/> 0.00
Stream Type:	Swale

Comments: Feature is hillside diversion.



Riparian Buffer: Primary and Secondary Riparian Buffer widths and vegetation types are delineated out to 100 ft (or the watershed divide if less) under the Level III criteria. Non-buffering land uses such as agriculture and roadways are disregarded.

Henderson County Solar Stream Assessment Worksheet

Stream 2ASC1L3B	Date: 5/11/2020	Inv.: Scott Mitchell	Entry: Ryan Winka
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Latitude:	37.77863	N
Longitude:	-87.62927	W
Length:	644	
Distance:	640	
Sinuosity:	1.01	
FlowType:	Non Jurisdictional	
Area In Acres:	0.00	
Slope %:	2	

Level III - Stream State or Condition Morphological Description		
Primary Riparian Left:		
Primary Riparian Right:		
Secondary Riparian Left:		0
Secondary Riparian Right:		0
Stream Flow Regime:		
Stream Size:	S-1	
Depositional Features:		
Meander Patterns:	M-1	
Stream Channel Debris:		
Stream Bank Erosion:		
Stream Aggradation:		
Channel Stability:		
Altered Channel:		
Percent Riffle:	0	
Percent Run:	0	
Percent Pool:	0	
Step Pool:	<input type="checkbox"/>	

Altered Channel Key
CH = Channelized
CV = Culvert
DAM = Weir, Dam, or Rock Checks
DG = Dredged
LWC = Low Water Crossing
NA = Not applicable
OT = Other (See Comments)
PI = Pipe
RSC = Road Side Channel

Level II - Stream Morphological Description	
Width at Bottom of Stream:	0.00
Bankfull Surface Width:	0.00
Width of Flood Prone Area:	0.00
Bankfull Mean Depth:	0.00
Entrenchment Ratio:	0.00
Width / Depth Ratio:	0.00
Stream Type:	Gulley

Comments: Watershed entirely in agriculture production.



Riparian Buffer: Primary and Secondary Riparian Buffer widths and vegetation types are delineated out to 100 ft (or the watershed divide if less) under the Level III criteria. Non-buffering land uses such as agriculture and roadways are disregarded.

Henderson County Solar Stream Assessment Worksheet

Stream 2MS1	Date: 5/5/2020	Inv.: Keith Michalski	Entry: Ryan Harris
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Latitude:	037.78741	N
Longitude:	-87.62783	W
Length:	1987	
Distance:	1755	
Sinuosity:	1.13	
FlowType:	Perennial	
Area In Acres:	1.28	
Slope %:	1	

Level III - Stream State or Condition Morphological Description		
Primary Riparian Left:	10b	100
Primary Riparian Right:	10b	60
Secondary Riparian Left:		0
Secondary Riparian Right:	RV 1	40
Stream Flow Regime:	P2	
Stream Size:	S-4	
Depositional Features:		
Meander Patterns:	M-1	
Stream Channel Debris:	D3	
Stream Bank Erosion:	High	
Stream Aggradation:	Stable	
Channel Stability:	Fair	
Altered Channel:	PI	
Percent Riffle:	20	
Percent Run:	50	
Percent Pool:	30	
Step Pool:	<input type="checkbox"/>	

Altered Channel Key
CH = Channelized
CV = Culvert
DAM = Weir, Dam, or Rock Checks
DG = Dredged
LWC = Low Water Crossing
NA = Not applicable
OT = Other (See Comments)
PI = Pipe
RSC = Road Side Channel

Level II - Stream Morphological Description	
Width at Bottom of Stream:	14.00
Bankfull Surface Width:	28.00
Width of Flood Prone Area:	200.00
Bankfull Mean Depth:	4.60
Entrenchment Ratio:	7.14
Width / Depth Ratio:	6.09
Stream Type:	E6

Comments: Stream accesses floodplain irregularly and may backwater flood.



Riparian Buffer: Primary and Secondary Riparian Buffer widths and vegetation types are delineated out to 100 ft (or the watershed divide if less) under the Level III criteria. Non-buffering land uses such as agriculture and roadways are disregarded.

Henderson County Solar Stream Assessment Worksheet

Stream 2MS1-1	Date: 5/6/2020	Inv.: Ryan Winka	Entry: Ryan Harris
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Latitude:	37.78477	N
Longitude:	-87.63895	W
Length:	780	
Distance:	677	
Sinuosity:	1.15	
FlowType:	Perennial	
Area In Acres:	0.54	
Slope %:	1.5	

Level III - Stream State or Condition Morphological Description		
Primary Riparian Left:	10b	100
Primary Riparian Right:	10b	50
Secondary Riparian Left:		0
Secondary Riparian Right:	RV 1	50
Stream Flow Regime:	P1	
Stream Size:	S-5	
Depositional Features:	B-1,B-4	
Meander Patterns:	M-1	
Stream Channel Debris:	D3	
Stream Bank Erosion:	High	
Stream Aggradation:	SI deg	
Channel Stability:	Poor	
Altered Channel:	NA	
Percent Riffle:	30	
Percent Run:	40	
Percent Pool:	30	
Step Pool:	<input type="checkbox"/>	

Altered Channel Key
CH = Channelized
CV = Culvert
DAM = Weir, Dam, or Rock Checks
DG = Dredged
LWC = Low Water Crossing
NA = Not applicable
OT = Other (See Comments)
PI = Pipe
RSC = Road Side Channel

Level II - Stream Morphological Description	
Width at Bottom of Stream:	15.00
Bankfull Surface Width:	30.00
Width of Flood Prone Area:	200.00
Bankfull Mean Depth:	4.00
Entrenchment Ratio:	6.67
Width / Depth Ratio:	7.50
Stream Type:	E6

Comments: Evidence of past overbank flooding.



Riparian Buffer: Primary and Secondary Riparian Buffer widths and vegetation types are delineated out to 100 ft (or the watershed divide if less) under the Level III criteria. Non-buffering land uses such as agriculture and roadways are disregarded.

Henderson County Solar Stream Assessment Worksheet

Stream 2MS1A	Date: 5/6/2020	Inv.: Keith Michalski	Entry: Ryan Harris
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Latitude:	37.78752	N
Longitude:	-87.62620	W
Length:	51	
Distance:	48	
Sinuosity:	1.06	
FlowType:	Ephemeral	
Area In Acres:	0.00	
Slope %:	4	

Level III - Stream State or Condition Morphological Description

Primary Riparian Left:	10c	50
Primary Riparian Right:	10c	50
Secondary Riparian Left:	RV 1	50
Secondary Riparian Right:	RV 1	50
Stream Flow Regime:	E2	
Stream Size:	S-2	
Depositional Features:	None	
Meander Patterns:	M-1	
Stream Channel Debris:	D2	
Stream Bank Erosion:	High	
Stream Aggradation:	Deg	
Channel Stability:	Poor	
Altered Channel:	NA	

Altered Channel Key
CH = Channelized
CV = Culvert
DAM = Weir, Dam, or Rock Checks
DG = Dredged
LWC = Low Water Crossing
NA = Not applicable
OT = Other (See Comments)
PI = Pipe
RSC = Road Side Channel

Level II - Stream Morphological Description

Width at Bottom of Stream:	1.00
Bankfull Surface Width:	2.80
Width of Flood Prone Area:	3.40
Bankfull Mean Depth:	0.40
Entrenchment Ratio:	1.21
Width / Depth Ratio:	7.00
Stream Type:	G6

Percent Riffle:	0
Percent Run:	0
Percent Pool:	0
Step Pool:	<input checked="" type="checkbox"/>

Comments: Gully like steam drains crop field.



Riparian Buffer: Primary and Secondary Riparian Buffer widths and vegetation types are delineated out to 100 ft (or the watershed divide if less) under the Level III criteria. Non-buffering land uses such as agriculture and roadways are disregarded.

Henderson County Solar Stream Assessment Worksheet

Stream 2MS1B	Date: 5/6/2020	Inv.: Keith Michalski	Entry: Ryan Harris
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Latitude:	37.78720	N
Longitude:	-87.62802	W
Length:	47	
Distance:	40	
Sinuosity:	1.18	
FlowType:	Ephemeral	
Area In Acres:	0.00	
Slope %:	3	

Level III - Stream State or Condition Morphological Description		
Primary Riparian Left:	10c	50
Primary Riparian Right:	10c	50
Secondary Riparian Left:	RV 1	50
Secondary Riparian Right:	RV 1	50
Stream Flow Regime:	E2	
Stream Size:	S-2	
Depositional Features:	NA	
Meander Patterns:	M-1	
Stream Channel Debris:	D2	
Stream Bank Erosion:	High	
Stream Aggradation:	SI deg	
Channel Stability:	Poor	
Altered Channel:	NA	
Percent Riffle:	20	
Percent Run:	80	
Percent Pool:	0	
Step Pool:	<input type="checkbox"/>	

Altered Channel Key
CH = Channelized
CV = Culvert
DAM = Weir, Dam, or Rock Checks
DG = Dredged
LWC = Low Water Crossing
NA = Not applicable
OT = Other (See Comments)
PI = Pipe
RSC = Road Side Channel

Level II - Stream Morphological Description	
Width at Bottom of Stream:	1.20
Bankfull Surface Width:	2.60
Width of Flood Prone Area:	3.50
Bankfull Mean Depth:	0.40
Entrenchment Ratio:	1.35
Width / Depth Ratio:	6.50
Stream Type:	G6

Comments: Gully like stream drains crop field.



Riparian Buffer: Primary and Secondary Riparian Buffer widths and vegetation types are delineated out to 100 ft (or the watershed divide if less) under the Level III criteria. Non-buffering land uses such as agriculture and roadways are disregarded.

Henderson County Solar Stream Assessment Worksheet

Stream 2MS1C	Date: 5/6/2020	Inv.: Keith Michalski	Entry: Ryan Harris
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Latitude:	37.78675	N
Longitude:	-87.62907	W
Length:	41	
Distance:	40	
Sinuosity:	1.02	
FlowType:	Ephemeral	
Area In Acres:	0.00	
Slope %:	3	

Level III - Stream State or Condition Morphological Description		
Primary Riparian Left:	10c	20
Primary Riparian Right:	3a	20
Secondary Riparian Left:	RV 1	80
Secondary Riparian Right:	RV 1	80
Stream Flow Regime:	E2	
Stream Size:	S-2	
Depositional Features:	B-1	
Meander Patterns:	M-1	
Stream Channel Debris:	D2	
Stream Bank Erosion:	High	
Stream Aggradation:	SI deg	
Channel Stability:	Poor	
Altered Channel:	NA	
Percent Riffle:	20	
Percent Run:	75	
Percent Pool:	5	
Step Pool:	<input type="checkbox"/>	

Altered Channel Key
CH = Channelized
CV = Culvert
DAM = Weir, Dam, or Rock Checks
DG = Dredged
LWC = Low Water Crossing
NA = Not applicable
OT = Other (See Comments)
PI = Pipe
RSC = Road Side Channel

Level II - Stream Morphological Description	
Width at Bottom of Stream:	1.00
Bankfull Surface Width:	2.40
Width of Flood Prone Area:	3.40
Bankfull Mean Depth:	0.30
Entrenchment Ratio:	1.42
Width / Depth Ratio:	8.00
Stream Type:	G6

Comments: Gully like stream drains crop field.



Riparian Buffer: Primary and Secondary Riparian Buffer widths and vegetation types are delineated out to 100 ft (or the watershed divide if less) under the Level III criteria. Non-buffering land uses such as agriculture and roadways are disregarded.

Henderson County Solar Stream Assessment Worksheet

Stream 2MS1F3	Date: 5/7/2020	Inv.: Ryan Winka	Entry: Scott Mitchell
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Latitude:	37.78805	N
Longitude:	-87.64140	W
Length:	412	
Distance:	410	
Sinuosity:	1.00	
FlowType:	Intermittent	
Area In Acres:	0.02	
Slope %:	1.5	

Level II - Stream Morphological Description		
Width at Bottom of Stream:	1.40	
Bankfull Surface Width:	2.60	
Width of Flood Prone Area:	3.70	
Bankfull Mean Depth:	0.25	
Entrenchment Ratio:	1.42	
Width / Depth Ratio:	10.40	
Stream Type:	G6c	

Level III - Stream State or Condition Morphological Description		
Primary Riparian Left:	10b	30
Primary Riparian Right:	8a	5
Secondary Riparian Left:	RV 1	70
Secondary Riparian Right:	RV 1	95
Stream Flow Regime:	I2	
Stream Size:	S-2	
Depositional Features:	NA	
Meander Patterns:	M-1	
Stream Channel Debris:	D2	
Stream Bank Erosion:	Low	
Stream Aggradation:	SI deg	
Channel Stability:	Fair	
Altered Channel:	CH,RSC	
Percent Riffle:	35	
Percent Run:	55	
Percent Pool:	10	
Step Pool:	<input type="checkbox"/>	

Altered Channel Key
CH = Channelized
CV = Culvert
DAM = Weir, Dam, or Rock Checks
DG = Dredged
LWC = Low Water Crossing
NA = Not applicable
OT = Other (See Comments)
PI = Pipe
RSC = Road Side Channel

Comments:



Riparian Buffer: Primary and Secondary Riparian Buffer widths and vegetation types are delineated out to 100 ft (or the watershed divide if less) under the Level III criteria. Non-buffering land uses such as agriculture and roadways are disregarded.

Henderson County Solar Stream Assessment Worksheet

Stream 2MS11	Date: 5/7/2020	Inv.: Ryan Winka	Entry: Scott Mitchell
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Latitude:	37.78665	N
Longitude:	-87.62786	W
Length:	208	
Distance:	197	
Sinuosity:	1.06	
FlowType:	Ephemeral	
Area In Acres:	0.02	
Slope %:	2	

Level II - Stream Morphological Description		
Width at Bottom of Stream:	1.40	
Bankfull Surface Width:	3.90	
Width of Flood Prone Area:	5.60	
Bankfull Mean Depth:	0.20	
Entrenchment Ratio:	1.44	
Width / Depth Ratio:	19.50	
Stream Type:	B6	

Level III - Stream State or Condition Morphological Description		
Primary Riparian Left:	10b	100
Primary Riparian Right:	10b	100
Secondary Riparian Left:		0
Secondary Riparian Right:		0
Stream Flow Regime:	E2	
Stream Size:	S-2	
Depositional Features:	B-4	
Meander Patterns:	M-1	
Stream Channel Debris:	D4	
Stream Bank Erosion:	Low	
Stream Aggradation:	Stable	
Channel Stability:	Good	
Altered Channel:	OT	
Percent Riffle:	25	
Percent Run:	55	
Percent Pool:	20	
Step Pool:	<input type="checkbox"/>	

Altered Channel Key
CH = Channelized
CV = Culvert
DAM = Weir, Dam, or Rock Checks
DG = Dredged
LWC = Low Water Crossing
NA = Not applicable
OT = Other (See Comments)
PI = Pipe
RSC = Road Side Channel

Comments: Large amounts of slash throughout stream due to past logging.



Riparian Buffer: Primary and Secondary Riparian Buffer widths and vegetation types are delineated out to 100 ft (or the watershed divide if less) under the Level III criteria. Non-buffering land uses such as agriculture and roadways are disregarded.

Henderson County Solar Stream Assessment Worksheet

Stream 2MS1L	Date: 5/11/2020	Inv.: Keith Michalski	Entry: Ryan Winka
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Latitude:	37.78248	N
Longitude:	-87.63264	W
Length:	687	
Distance:	653	
Sinuosity:	1.05	
FlowType:	Perennial	
Area In Acres:	0.26	
Slope %:	1.5	

Level III - Stream State or Condition Morphological Description		
Primary Riparian Left:	10b	20
Primary Riparian Right:	10b	30
Secondary Riparian Left:	RV 1	80
Secondary Riparian Right:	RV 1	70
Stream Flow Regime:	I2	
Stream Size:	S-4	
Depositional Features:	B-1	
Meander Patterns:	M-1	
Stream Channel Debris:	D2	
Stream Bank Erosion:	High	
Stream Aggradation:	Stable	
Channel Stability:	Fair	
Altered Channel:	CV	
Percent Riffle:	25	
Percent Run:	40	
Percent Pool:	35	
Step Pool:	<input type="checkbox"/>	

Altered Channel Key
CH = Channelized
CV = Culvert
DAM = Weir, Dam, or Rock Checks
DG = Dredged
LWC = Low Water Crossing
NA = Not applicable
OT = Other (See Comments)
PI = Pipe
RSC = Road Side Channel

Level II - Stream Morphological Description	
Width at Bottom of Stream:	6.20
Bankfull Surface Width:	16.80
Width of Flood Prone Area:	26.00
Bankfull Mean Depth:	3.80
Entrenchment Ratio:	1.55
Width / Depth Ratio:	4.42
Stream Type:	G5c

Comments:



Riparian Buffer: Primary and Secondary Riparian Buffer widths and vegetation types are delineated out to 100 ft (or the watershed divide if less) under the Level III criteria. Non-buffering land uses such as agriculture and roadways are disregarded.

Henderson County Solar Stream Assessment Worksheet

Stream 2MS1L-1	Date: 5/12/2020	Inv.: Ryan Harris	Entry: Keith Michalski
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Latitude:	37.77949	N
Longitude:	-87.63468	W
Length:	2313	
Distance:	2032	
Sinuosity:	1.14	
FlowType:	Intermittent	
Area In Acres:	0.76	
Slope %:	1	

Level III - Stream State or Condition Morphological Description		
Primary Riparian Left:	10b	50
Primary Riparian Right:	10b	20
Secondary Riparian Left:	RV 1	50
Secondary Riparian Right:	RV 1	80
Stream Flow Regime:	I2	
Stream Size:	S-3	
Depositional Features:	B-1,B-4	
Meander Patterns:	M-1	
Stream Channel Debris:	D3	
Stream Bank Erosion:	High	
Stream Aggradation:	Stable	
Channel Stability:	Fair	
Altered Channel:	CH,PI	
Percent Riffle:	30	
Percent Run:	40	
Percent Pool:	30	
Step Pool:	<input type="checkbox"/>	

Altered Channel Key
CH = Channelized
CV = Culvert
DAM = Weir, Dam, or Rock Checks
DG = Dredged
LWC = Low Water Crossing
NA = Not applicable
OT = Other (See Comments)
PI = Pipe
RSC = Road Side Channel

Level II - Stream Morphological Description	
Width at Bottom of Stream:	6.90
Bankfull Surface Width:	14.30
Width of Flood Prone Area:	22.00
Bankfull Mean Depth:	3.10
Entrenchment Ratio:	1.54
Width / Depth Ratio:	4.61
Stream Type:	G4c

Comments:



Riparian Buffer: Primary and Secondary Riparian Buffer widths and vegetation types are delineated out to 100 ft (or the watershed divide if less) under the Level III criteria. Non-buffering land uses such as agriculture and roadways are disregarded.

Henderson County Solar Stream Assessment Worksheet

Stream 2MS1L2	Date: 5/11/2020	Inv.: Keith Michalski	Entry: Ryan Winka
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Latitude:	37.78302	N
Longitude:	-87.63232	W
Length:	48	
Distance:	46	
Sinuosity:	1.04	
FlowType:	Intermittent	
Area In Acres:	0.00	
Slope %:	3	

Level III - Stream State or Condition Morphological Description		
Primary Riparian Left:	10b	20
Primary Riparian Right:	10b	20
Secondary Riparian Left:	RV 1	80
Secondary Riparian Right:		0
Stream Flow Regime:	I2	
Stream Size:	S-2	
Depositional Features:	NA	
Meander Patterns:	M-1	
Stream Channel Debris:	D3	
Stream Bank Erosion:	High	
Stream Aggradation:	Deg	
Channel Stability:	Poor	
Altered Channel:	DAM,OT,PI	
Percent Riffle:	40	
Percent Run:	55	
Percent Pool:	5	
Step Pool:	<input type="checkbox"/>	

Altered Channel Key
CH = Channelized
CV = Culvert
DAM = Weir, Dam, or Rock Checks
DG = Dredged
LWC = Low Water Crossing
NA = Not applicable
OT = Other (See Comments)
PI = Pipe
RSC = Road Side Channel

Level II - Stream Morphological Description	
Width at Bottom of Stream:	1.60
Bankfull Surface Width:	3.10
Width of Flood Prone Area:	4.00
Bankfull Mean Depth:	0.60
Entrenchment Ratio:	1.29
Width / Depth Ratio:	5.17
Stream Type:	G6

Comments: Old trash has been dumped in stream.



Riparian Buffer: Primary and Secondary Riparian Buffer widths and vegetation types are delineated out to 100 ft (or the watershed divide if less) under the Level III criteria. Non-buffering land uses such as agriculture and roadways are disregarded.

Henderson County Solar Stream Assessment Worksheet

Stream 2MS1L-2	Date: 5/12/2020	Inv.: Ryan Harris	Entry: Keith Michalski
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Latitude:	37.77345	N
Longitude:	-87.63566	W
Length:	1439	
Distance:	1413	
Sinuosity:	1.02	
FlowType:	Intermittent	
Area In Acres:	0.44	
Slope %:	1	

Level III - Stream State or Condition Morphological Description		
Primary Riparian Left:	10b	30
Primary Riparian Right:	10b	20
Secondary Riparian Left:	RV 1	70
Secondary Riparian Right:	RV 1	80
Stream Flow Regime:	I2	
Stream Size:	S-3	
Depositional Features:	B-2	
Meander Patterns:	M-1	
Stream Channel Debris:	D2	
Stream Bank Erosion:	High	
Stream Aggradation:	Stable	
Channel Stability:	Fair	
Altered Channel:	CH,CV,OT,PI	
Percent Riffle:	30	
Percent Run:	60	
Percent Pool:	10	
Step Pool:	<input type="checkbox"/>	

Altered Channel Key
CH = Channelized
CV = Culvert
DAM = Weir, Dam, or Rock Checks
DG = Dredged
LWC = Low Water Crossing
NA = Not applicable
OT = Other (See Comments)
PI = Pipe
RSC = Road Side Channel

Level II - Stream Morphological Description	
Width at Bottom of Stream:	10.80
Bankfull Surface Width:	13.30
Width of Flood Prone Area:	19.00
Bankfull Mean Depth:	2.00
Entrenchment Ratio:	1.43
Width / Depth Ratio:	6.65
Stream Type:	G5c

Comments: Old farm trash throughout stream segment.



Riparian Buffer: Primary and Secondary Riparian Buffer widths and vegetation types are delineated out to 100 ft (or the watershed divide if less) under the Level III criteria. Non-buffering land uses such as agriculture and roadways are disregarded.

Henderson County Solar Stream Assessment Worksheet

Stream 2MS1L3	Date: 5/11/2020	Inv.: Ryan Harris	Entry: Ryan Winka
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Latitude:	37.78131	N
Longitude:	-87.63165	W
Length:	2421	
Distance:	2381	
Sinuosity:	1.02	
FlowType:	Intermittent	
Area In Acres:	0.66	
Slope %:	1.5	

Level III - Stream State or Condition Morphological Description		
Primary Riparian Left:	10b	20
Primary Riparian Right:	10b	20
Secondary Riparian Left:	RV 1	80
Secondary Riparian Right:	RV 1	80
Stream Flow Regime:	I2	
Stream Size:	S-3	
Depositional Features:	B-4	
Meander Patterns:	M-1	
Stream Channel Debris:	D3	
Stream Bank Erosion:	High	
Stream Aggradation:	SI deg	
Channel Stability:	Fair	
Altered Channel:	CH,CV,PI	
Percent Riffle:	30	
Percent Run:	40	
Percent Pool:	30	
Step Pool:	<input type="checkbox"/>	

Altered Channel Key
CH = Channelized
CV = Culvert
DAM = Weir, Dam, or Rock Checks
DG = Dredged
LWC = Low Water Crossing
NA = Not applicable
OT = Other (See Comments)
PI = Pipe
RSC = Road Side Channel

Level II - Stream Morphological Description	
Width at Bottom of Stream:	5.90
Bankfull Surface Width:	11.90
Width of Flood Prone Area:	15.50
Bankfull Mean Depth:	2.80
Entrenchment Ratio:	1.30
Width / Depth Ratio:	4.25
Stream Type:	G5c

Comments:



Riparian Buffer: Primary and Secondary Riparian Buffer widths and vegetation types are delineated out to 100 ft (or the watershed divide if less) under the Level III criteria. Non-buffering land uses such as agriculture and roadways are disregarded.

Henderson County Solar Stream Assessment Worksheet

Stream 2MS1L3C	Date: 5/12/2020	Inv.: Ryan Harris	Entry: Keith Michalski
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Latitude:	37.77743	N
Longitude:	-87.62680	W
Length:	194	
Distance:	191	
Sinuosity:	1.02	
FlowType:	Ephemeral	
Area In Acres:	0.02	
Slope %:	1.5	

Level II - Stream Morphological Description	
Width at Bottom of Stream:	2.20
Bankfull Surface Width:	5.10
Width of Flood Prone Area:	8.10
Bankfull Mean Depth:	1.60
Entrenchment Ratio:	1.59
Width / Depth Ratio:	3.19
Stream Type:	G6c

Level III - Stream State or Condition Morphological Description	
Primary Riparian Left:	3b 5
Primary Riparian Right:	3b 5
Secondary Riparian Left:	RV 1 95
Secondary Riparian Right:	RV 1 95
Stream Flow Regime:	E2
Stream Size:	S-3
Depositional Features:	NA
Meander Patterns:	M-1
Stream Channel Debris:	D2
Stream Bank Erosion:	High
Stream Aggradation:	Stable
Channel Stability:	Poor
Altered Channel:	CH,DAM,LWC
Percent Riffle:	20
Percent Run:	60
Percent Pool:	20
Step Pool:	<input type="checkbox"/>

Altered Channel Key
CH = Channelized
CV = Culvert
DAM = Weir, Dam, or Rock Checks
DG = Dredged
LWC = Low Water Crossing
NA = Not applicable
OT = Other (See Comments)
PI = Pipe
RSC = Road Side Channel

Comments:



Riparian Buffer: Primary and Secondary Riparian Buffer widths and vegetation types are delineated out to 100 ft (or the watershed divide if less) under the Level III criteria. Non-buffering land uses such as agriculture and roadways are disregarded.

Henderson County Solar Stream Assessment Worksheet

Stream 2MS1L4	Date: 5/12/2020	Inv.: Ryan Harris	Entry: Keith Michalski
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Latitude:	37.77897	N
Longitude:	-87.63469	W
Length:	118	
Distance:	110	
Sinuosity:	1.07	
FlowType:	Ephemeral	
Area In Acres:	0.01	
Slope %:	1.5	

Level III - Stream State or Condition Morphological Description		
Primary Riparian Left:	10b	15
Primary Riparian Right:	10b	10
Secondary Riparian Left:	RV 1	85
Secondary Riparian Right:	RV 1	90
Stream Flow Regime:	E2	
Stream Size:	S-2	
Depositional Features:	B-4	
Meander Patterns:	M-1	
Stream Channel Debris:	D2	
Stream Bank Erosion:	High	
Stream Aggradation:	Stable	
Channel Stability:	Fair	
Altered Channel:	DAM,PI	
Percent Riffle:	30	
Percent Run:	60	
Percent Pool:	10	
Step Pool:	<input type="checkbox"/>	

Altered Channel Key
CH = Channelized
CV = Culvert
DAM = Weir, Dam, or Rock Checks
DG = Dredged
LWC = Low Water Crossing
NA = Not applicable
OT = Other (See Comments)
PI = Pipe
RSC = Road Side Channel

Level II - Stream Morphological Description	
Width at Bottom of Stream:	1.80
Bankfull Surface Width:	3.70
Width of Flood Prone Area:	5.20
Bankfull Mean Depth:	0.60
Entrenchment Ratio:	1.41
Width / Depth Ratio:	6.17
Stream Type:	G6c

Comments:



Riparian Buffer: Primary and Secondary Riparian Buffer widths and vegetation types are delineated out to 100 ft (or the watershed divide if less) under the Level III criteria. Non-buffering land uses such as agriculture and roadways are disregarded.

Henderson County Solar Stream Assessment Worksheet

Stream 2MS1L5	Date: 5/12/2020	Inv.: Ryan Winka	Entry: Keith Michalski
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Latitude:	37.77918	N
Longitude:	-87.63500	W
Length:	124	
Distance:	120	
Sinuosity:	1.03	
FlowType:	Ephemeral	
Area In Acres:	0.01	
Slope %:	1.5	

Level III - Stream State or Condition Morphological Description		
Primary Riparian Left:	10b	50
Primary Riparian Right:	10b	50
Secondary Riparian Left:	RV 1	50
Secondary Riparian Right:	RV 1	50
Stream Flow Regime:	E2	
Stream Size:	S-2	
Depositional Features:	NA	
Meander Patterns:	M-1	
Stream Channel Debris:	D3	
Stream Bank Erosion:	Moderate	
Stream Aggradation:	SI deg	
Channel Stability:	Fair	
Altered Channel:	NA	
Percent Riffle:	40	
Percent Run:	55	
Percent Pool:	5	
Step Pool:	<input type="checkbox"/>	

Altered Channel Key
CH = Channelized
CV = Culvert
DAM = Weir, Dam, or Rock Checks
DG = Dredged
LWC = Low Water Crossing
NA = Not applicable
OT = Other (See Comments)
PI = Pipe
RSC = Road Side Channel

Level II - Stream Morphological Description	
Width at Bottom of Stream:	1.00
Bankfull Surface Width:	3.20
Width of Flood Prone Area:	4.40
Bankfull Mean Depth:	0.40
Entrenchment Ratio:	1.38
Width / Depth Ratio:	8.00
Stream Type:	G6c

Comments:



Riparian Buffer: Primary and Secondary Riparian Buffer widths and vegetation types are delineated out to 100 ft (or the watershed divide if less) under the Level III criteria. Non-buffering land uses such as agriculture and roadways are disregarded.

Henderson County Solar Stream Assessment Worksheet

Stream 2MS106	Date: 10/26/2020	Inv.: Ryan Harris	Entry: Ryan Harris
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Latitude:	37.79163	N
Longitude:	-87.62754	W
Length:	22	
Distance:	22	
Sinuosity:	1.00	
FlowType:	Ephemeral	
Area In Acres:	0.00	
Slope %:	1	

Level III - Stream State or Condition Morphological Description

Primary Riparian Left:	10b	20
Primary Riparian Right:	10a	20
Secondary Riparian Left:	3b	80
Secondary Riparian Right:	RV 1	80
Stream Flow Regime:	E2	
Stream Size:	S-3	
Depositional Features:	NA	
Meander Patterns:	M-1	
Stream Channel Debris:	D2	
Stream Bank Erosion:	Moderate	
Stream Aggradation:	Stable	
Channel Stability:	Fair	
Altered Channel:	CH,PI,RSC	

Altered Channel Key
CH = Channelized
CV = Culvert
DAM = Weir, Dam, or Rock Checks
DG = Dredged
LWC = Low Water Crossing
NA = Not applicable
OT = Other (See Comments)
PI = Pipe
RSC = Road Side Channel

Level II - Stream Morphological Description

Width at Bottom of Stream:	2.80
Bankfull Surface Width:	5.30
Width of Flood Prone Area:	8.20
Bankfull Mean Depth:	0.50
Entrenchment Ratio:	1.55
Width / Depth Ratio:	10.60
Stream Type:	G4c

Percent Riffle:	20
Percent Run:	70
Percent Pool:	10
Step Pool:	<input type="checkbox"/>

Comments:



Riparian Buffer: Primary and Secondary Riparian Buffer widths and vegetation types are delineated out to 100 ft (or the watershed divide if less) under the Level III criteria. Non-buffering land uses such as agriculture and roadways are disregarded.

Project ID: Henderson County Solar		Stream Class: Perennial Exhibit 14 Attachment 14.1	
Stream ID: 1MS1		Location: HENDERSON KY Page 45 of 237	
Lat: 37.80201	Long: -87.62741	River Basin Ohio	
Investigators: Keith Michalski			
Signature:		Date: 04-May-20	Reason for Survey:
		Time: 2:10 PM	404 functional Assessment:
WEATHER CONDITIONS	Current	Past 24 Hour	Heavy rain in last 7 days
	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input checked="" type="checkbox"/> Cloud Cover % <input type="text" value="30"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input checked="" type="checkbox"/> Showers (Intermittent) <input type="checkbox"/> Cloud Cover % <input type="text" value="50"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes Air Temp F <input type="text" value="75"/> Air Temp C <input type="text" value="24"/> Other <input type="text"/>
STREAM CHARACTERIZATION	Stream Subsystem		Stream Type
	<input checked="" type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral		<input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater
Stream Origin		Catchment Area	
<input type="checkbox"/> Upland Runoff <input checked="" type="checkbox"/> Mixture of Origins <input type="checkbox"/> Spring-fed/Ground Water <input type="checkbox"/> Wetland <input type="checkbox"/> Other <input type="text"/>		Mile ² <input type="text" value="116.00"/>	Km ² <input type="text" value="300.44"/>
WATERSHED FEATURES	Surrounding Land Use & Percentage		Local Watershed NPS Pollution
	<input checked="" type="checkbox"/> Forest <input type="text" value="35"/> <input type="checkbox"/> Field/Pasture <input type="text" value="0"/> <input checked="" type="checkbox"/> Agriculture <input type="text" value="50"/> <input checked="" type="checkbox"/> Residential <input type="text" value="15"/>	<input type="checkbox"/> Commercial <input type="text" value="0"/> <input type="checkbox"/> Other <input type="text" value="0"/>	<input type="checkbox"/> No evidence <input type="checkbox"/> Some potential sources <input checked="" type="checkbox"/> Obvious sources
RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present		Dominant Species
	<input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbs <input type="checkbox"/> None		<input type="text" value="Mixed mast."/>
INSTREAM FEATURES	Est Reach Length	ft <input type="text" value="100"/> m <input type="text" value="30"/>	Canopy Cover
	Est Stream Width	ft <input type="text" value="90.0"/> m <input type="text" value="27.4"/>	<input type="checkbox"/> Open <input type="checkbox"/> Partly Open <input type="checkbox"/> Shaded <input checked="" type="checkbox"/> Partly Shaded
	Sampling Reach Area	ft ² <input type="text" value="9000.0"/> m ² <input type="text" value="836.1"/>	High Water Mark
	Sampling Area	mile ² <input type="text" value="0.000330"/> km ² <input type="text" value="0.000836"/>	ft <input type="text" value="15.00"/>
	Est Water Depth	in <input type="text" value="80.0"/> m <input type="text" value="2.0"/>	m <input type="text" value="4.57"/>
	Surface Velocity	ft/s <input type="text" value="0.1"/> m/s <input type="text" value="0.0"/>	% of Stream Morphology
	Channelized	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> Riffle % <input type="text" value="25"/> <input checked="" type="checkbox"/> Pool % <input type="text" value="40"/>
	Dam Present	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Run % <input type="text" value="35"/> <input type="checkbox"/> Glide Pool <input type="checkbox"/> Step Pool Series
LARGE WOODY DEBRIS	LWD	<input type="text" value="0.9"/> m ² <input type="text" value="10"/> ft ²	
	Density of LWD	m ² /km ² <input type="text" value="0.0000009290"/>	ft ² /mile ² <input type="text" value="0.0000003587"/>
AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present		Portion of the reach with aquatic vegetation present:
	<input type="checkbox"/> Rooted Emergent <input type="checkbox"/> Rooted Submergent <input type="checkbox"/> Rooted Floating <input type="checkbox"/> Free Floating <input type="checkbox"/> Attached Algae <input type="checkbox"/> Floating Algae	<input checked="" type="checkbox"/> None	<input type="text" value="0"/>
WATER QUALITY	No Water Present	Temperature <input type="text" value="21"/> °C <input type="text" value="69"/> °F	Water Odors
	No Flow Present	Conductivity <input type="text" value="457"/> μs/cm	<input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic
	Total Dissolved Solids	<input type="text" value="229"/> mg/l	Do: <input type="text" value="5.79"/> mg/L
	pH	<input type="text" value="7.2"/>	Water Surface Oils
	Turbidity	<input type="checkbox"/> Clear <input checked="" type="checkbox"/> Slightly Turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other	<input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globs <input type="checkbox"/> Flecks <input type="checkbox"/> Other

SEDIMENT/ SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other	Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper Fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relic Shells <input type="checkbox"/> Other
	Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	
	Looking at stones which are not deeply embedded, are undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

INORGANIC SUBSTRATE COMPONENTS			ORGANIC SUBSTRATE COMPONENTS		
Substrate Type	Diameter	% Composite in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock		0	Dietritus	Sticks, wood, coarse plant material	10
Boulder	>10"	0			
Cobble	2.5 - 10"	0	Muck-Mud	Black, very fine organic matter	0
Gravel	0.1 - 2.5"	10			
Sand	gritty	15	Marl	Grey, shell fragments	0
Silt	goeoy	50			
Clay	slick	25			

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADIENT STREAMS				
	Optimal	SubOptimal	Marginal	Poor	
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.	
Score	9	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input checked="" type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom: little or no root mat: no submerged vegetation.	Hardpan clay or bedrock: no root mat or vegetation.	
Score	11	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input checked="" type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
3. Pool Variability	Even mix of large shallow, large-deep, small shallow, small-deep pools present.	Majority of pools large-deep; very few shallow	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.	
Score	9	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input checked="" type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.	
Score	11	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input checked="" type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			

5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and most reaches as standing pools.	
Score	18	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input checked="" type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.	
Score	10	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input checked="" type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.	
Score	7	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input checked="" type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.	
Note: determine left or right side by facing downstream.					
Score (LB)	3	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	3	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.	
Note: determine left or right side by facing downstream.					
Score (LB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.	
Note: determine left or right side by facing downstream.					
Score (LB)	6	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	8	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Total Score	103				

Project ID: Henderson County Solar	Stream Class: Perennial Exhibit 14 Attachment 14.1
Stream ID: 1MS1A	Location: HENDERSON KY Page 48 of 237
Lat: 37.80330 Long: -87.63178	River Basin Ohio

Investigators: Ryan Winka

Signature: _____ Date: 04-May-20 Reason for Survey: _____
 Time: 9:30 AM 404 functional Assessment: _____

WEATHER CONDITIONS	Current	Past 24 Hour	Heavy rain in last 7 days
	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input type="checkbox"/> Cloud Cover % <input type="text" value="0"/> <input checked="" type="checkbox"/> Clear/Sunny	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input checked="" type="checkbox"/> Showers (Intermittent) <input type="checkbox"/> Cloud Cover % <input type="text"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes Air Temp F <input type="text" value="65"/> Air Temp C <input type="text" value="18"/> Other <input type="text"/>

STREAM CHARACTERIZATION	Stream Subsystem	Stream Type
	<input checked="" type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral Stream Origin <input type="checkbox"/> Upland Runoff <input checked="" type="checkbox"/> Mixture of Origins <input type="text"/> <input type="checkbox"/> Spring-fed/Ground Water <input type="checkbox"/> Wetland <input type="checkbox"/> Other <input type="text"/>	<input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater Catchment Area Mile ² <input type="text" value="2.89"/> Km ² <input type="text" value="7.49"/>

WATERSHED FEATURES	Surrounding Land Use & Percentage	Local Watershed NPS Pollution
	<input checked="" type="checkbox"/> Forest <input type="text" value="50"/> <input type="checkbox"/> Commercial <input type="text" value="0"/> <input type="checkbox"/> Field/Pasture <input type="text" value="0"/> <input type="checkbox"/> Other <input type="text" value="0"/> <input checked="" type="checkbox"/> Agriculture <input type="text" value="50"/> <input type="text"/> <input type="checkbox"/> Residential <input type="text" value="0"/>	<input type="checkbox"/> No evidence <input checked="" type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious sources Local Watershed Erosion <input type="checkbox"/> None <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy

RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present	Dominant Species
	<input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbs <input type="checkbox"/> None	<input type="text" value="Soft Mast species"/>

INSTREAM FEATURES	Est Reach Length	ft <input type="text" value="100"/> m <input type="text" value="30"/>	Canopy Cover
	Est Stream Width	ft <input type="text" value="25.0"/> m <input type="text" value="7.6"/>	<input type="checkbox"/> Open <input type="checkbox"/> Partly Open <input checked="" type="checkbox"/> Shaded <input type="checkbox"/> Partly Shaded
	Sampling Reach Area	ft ² <input type="text" value="2500.0"/> m ² <input type="text" value="232.3"/>	High Water Mark
	Sampling Area	mile ² <input type="text" value="0.000092"/> km ² <input type="text" value="0.000232"/>	ft <input type="text" value="3.00"/> m <input type="text" value="0.91"/>
	Est Water Depth	in <input type="text" value="60.0"/> m <input type="text" value="1.5"/>	% of Stream Morphology
	Surface Velocity	ft/s <input type="text" value="0.2"/> m/s <input type="text" value="0.1"/>	<input checked="" type="checkbox"/> Riffle % <input type="text" value="40"/> <input checked="" type="checkbox"/> Run % <input type="text" value="20"/> <input checked="" type="checkbox"/> Pool % <input type="text" value="40"/> <input type="checkbox"/> Glide Pool <input type="checkbox"/> Step Pool Series
	Channelized	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
	Dam Present	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

LARGE WOODY DEBRIS	LWD	<input type="text" value="0.9"/> m ² <input type="text" value="10"/> ft ²
	Density of LWD	m ² /km ² <input type="text" value="0.0000009290"/> ft ² /mile ² <input type="text" value="0.0000003587"/>

AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present	Portion of the reach with aquatic vegetation present:
	<input type="checkbox"/> Rooted Emergent <input type="checkbox"/> Rooted Submergent <input type="checkbox"/> Rooted Floating <input checked="" type="checkbox"/> None <input type="checkbox"/> Free Floating <input type="checkbox"/> Attached Algae <input type="checkbox"/> Floating Algae	<input type="text" value="0"/>

WATER QUALITY	No Water Present	Temperature	<input type="text" value="20"/> °C <input type="text" value="68"/> °F	Water Odors
	No Flow Present	Conductivity	µs/cm <input type="text" value="419"/>	<input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic
	Total Dissolved Solids	<input type="text" value="210"/> mg/l	Do:	<input type="text" value="5.76"/> mg/L
	pH	<input type="text" value="6.86"/>	Water Surface Oils	<input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globbs <input type="checkbox"/> Flecks <input type="checkbox"/> Other
	Turbidity	<input type="checkbox"/> Clear <input checked="" type="checkbox"/> Slightly Turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other		

SEDIMENT/ SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other	Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper Fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relic Shells <input type="checkbox"/> Other
	Looking at stones which are not deeply embedded, are undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	

INORGANIC SUBSTRATE COMPONENTS			ORGANIC SUBSTRATE COMPONENTS		
Substrate Type	Diameter	% Composite in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock		0	Dietritus	Sticks, wood, coarse plant material	5
Boulder	>10"	0			
Cobble	2.5 - 10"	0	Muck-Mud	Black, very fine organic matter	0
Gravel	0.1 - 2.5"	0			
Sand	gritty	0	Marl	Grey, shell fragments	0
Silt	goeoy	80			
Clay	slick	20			

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADIENT STREAMS				
	Optimal	SubOptimal	Marginal	Poor	
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.	
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom: little or no root mat: no submerged vegetation.	Hardpan clay or bedrock: no root mat or vegetation.	
Score	7	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input checked="" type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
3. Pool Variability	Even mix of large shallow, large-deep, small shallow, small-deep pools present.	Majority of pools large-deep; very few shallow	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.	
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.	
Score	13	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input checked="" type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			

5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and many pools as standing pools.
Score	13	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input checked="" type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
Score	13	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input checked="" type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
Score	5	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Note: determine left or right side by facing downstream.				
Score (LB)	3	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
Note: determine left or right side by facing downstream.				
Score (LB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
Note: determine left or right side by facing downstream.				
Score (LB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	6	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Total Score	88			

Project ID: Henderson County Solar	Stream Class: Ephemeral Exhibit 14 Attachment 14.1
Stream ID: 1MS1B	Location: HENDERSON KY Page 51 of 237
Lat: 37.80275 Long: -87.63112	River Basin: Ohio

Investigators: Scott Mitchell

Signature: _____ Date: 04-May-20 Reason for Survey: _____
Time: 11:00 AM 404 functional Assessment: _____

WEATHER CONDITIONS	Current	Past 24 Hour	Heavy rain in last 7 days
	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input type="checkbox"/> Cloud Cover % <input type="text" value="0"/> <input checked="" type="checkbox"/> Clear/Sunny	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input checked="" type="checkbox"/> Showers (Intermittent) <input type="checkbox"/> Cloud Cover % <input type="text" value="0"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes Air Temp F <input type="text" value="70"/> Air Temp C <input type="text" value="21"/> Other <input type="text"/>

STREAM CHARACTERIZATION	Stream Subsystem	Stream Type
	<input type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input checked="" type="checkbox"/> Ephemeral Stream Origin <input type="checkbox"/> Upland Runoff <input checked="" type="checkbox"/> Mixture of Origins <input type="text"/> <input type="checkbox"/> Spring-fed/Ground Water <input type="checkbox"/> Wetland <input type="checkbox"/> Other <input type="text"/>	<input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater Catchment Area Mile ² <input type="text" value="0.01"/> Km ² <input type="text" value="0.03"/>

WATERSHED FEATURES	Surrounding Land Use & Percentage	Local Watershed NPS Pollution
	<input checked="" type="checkbox"/> Forest <input type="text" value="60"/> <input type="checkbox"/> Commercial <input type="text" value="0"/> <input type="checkbox"/> Field/Pasture <input type="text" value="0"/> <input type="checkbox"/> Other <input type="text" value="0"/> <input checked="" type="checkbox"/> Agriculture <input type="text" value="40"/> <input type="checkbox"/> Residential <input type="text" value="0"/>	<input type="checkbox"/> No evidence <input checked="" type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious sources Local Watershed Erosion <input type="checkbox"/> None <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy

RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present	Dominant Species
	<input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbs <input type="checkbox"/> None	<input type="text" value="Soft mast"/>

INSTREAM FEATURES	Est Reach Length	ft <input type="text" value="100"/> m <input type="text" value="30"/>	Canopy Cover
	Est Stream Width	ft <input type="text" value="3.5"/> m <input type="text" value="1.1"/>	<input type="checkbox"/> Open <input type="checkbox"/> Partly Open <input checked="" type="checkbox"/> Shaded <input type="checkbox"/> Partly Shaded
	Sampling Reach Area	ft ² <input type="text" value="350.0"/> m ² <input type="text" value="32.5"/>	High Water Mark
	Sampling Area	mile ² <input type="text" value="0.000013"/> km ² <input type="text" value="0.000032"/>	ft <input type="text" value="0.30"/> m <input type="text" value="0.09"/>
	Est Water Depth	in <input type="text" value="0.0"/> m <input type="text" value="0.0"/>	% of Stream Morphology
	Surface Velocity	ft/s <input type="text" value="0.0"/> m/s <input type="text" value="0.0"/>	<input checked="" type="checkbox"/> Riffle % <input type="text" value="60"/> <input checked="" type="checkbox"/> Run % <input type="text" value="30"/> <input checked="" type="checkbox"/> Pool % <input type="text" value="10"/> <input type="checkbox"/> Glide Pool <input type="checkbox"/> Step Pool Series
	Channelized	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Dam Present	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

LARGE WOODY DEBRIS	LWD	<input type="text" value="0.2"/> m ² <input type="text" value="2"/> ft ²
	Density of LWD	m ² /km ² <input type="text" value="0.0000001858"/> ft ² /mile ² <input type="text" value="0.0000000717"/>

AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present	Portion of the reach with aquatic vegetation present:
	<input type="checkbox"/> Rooted Emergent <input type="checkbox"/> Rooted Submergent <input type="checkbox"/> Rooted Floating <input checked="" type="checkbox"/> None <input type="checkbox"/> Free Floating <input type="checkbox"/> Attached Algae <input type="checkbox"/> Floating Algae	<input type="text" value="0"/>

WATER QUALITY	<input checked="" type="checkbox"/> No Water Present Temperature <input type="text" value="0"/> °C <input type="text" value="0"/> °F <input type="checkbox"/> No Flow Present Conductivity <input type="text" value="0"/> μs/cm Total Dissolved Solids <input type="text" value="0"/> mg/l pH <input type="text" value="0"/>	Water Odors <input type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic Do: <input type="text"/> mg/L
	Turbidity <input type="checkbox"/> Clear <input type="checkbox"/> Slightly Turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other	Water Surface Oils <input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globs <input type="checkbox"/> Flecks <input type="checkbox"/> Other

SEDIMENT/ SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other	Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper Fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relic Shells <input type="checkbox"/> Other
	Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	
	Looking at stones which are not deeply embedded, are undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

INORGANIC SUBSTRATE COMPONENTS			ORGANIC SUBSTRATE COMPONENTS		
Substrate Type	Diameter	% Composite in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock		0	Dietritus	Sticks, wood, coarse plant material	5
Boulder	>10"	0			
Cobble	2.5 - 10"	0	Muck-Mud	Black, very fine organic matter	0
Gravel	0.1 - 2.5"	0			
Sand	gritty	5	Marl	Grey, shell fragments	0
Silt	goeoy	95			
Clay	slick	0			

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADIENT STREAMS				
	Optimal	SubOptimal	Marginal	Poor	
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.	
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom: little or no root mat: no submerged vegetation.	Hardpan clay or bedrock: no root mat or vegetation.	
Score	10	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input checked="" type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
3. Pool Variability	Even mix of large shallow, large-deep, small shallow, small-deep pools present.	Majority of pools large-deep; very few shallow	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.	
Score	5	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.	
Score	15	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input checked="" type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			

5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and many pools as standing pools.	
Score	2	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.	
Score	16	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input checked="" type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.	
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.	
Note: determine left or right side by facing downstream.					
Score (LB)	7	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input checked="" type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	7	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input checked="" type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.	
Note: determine left or right side by facing downstream.					
Score (LB)	8	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	8	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.	
Note: determine left or right side by facing downstream.					
Score (LB)	6	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	9	<input type="checkbox"/> 10 <input checked="" type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Total Score	105				

Project ID: Henderson County Solar	Stream Class: Ephemeral Exhibit 14 Attachment 14.1
Stream ID: 1MS1B-1	Location: HENDERSON KY Page 54 of 237
Lat: 37.80178 Long: -87.63108	River Basin: Ohio

Investigators: Ryan Harris

Signature: _____ Date: 04-May-20 Reason for Survey: _____
 Time: 11:30 AM 404 functional Assessment: _____

WEATHER CONDITIONS	Current	Past 24 Hour	Heavy rain in last 7 days
	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input type="checkbox"/> Cloud Cover % <input type="text" value="0"/> <input checked="" type="checkbox"/> Clear/Sunny	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input checked="" type="checkbox"/> Showers (Intermittent) <input type="checkbox"/> Cloud Cover % <input type="text" value="0"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes Air Temp F <input type="text" value="70"/> Air Temp C <input type="text" value="21"/> Other <input type="text"/>

STREAM CHARACTERIZATION	Stream Subsystem	Stream Type
	<input type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input checked="" type="checkbox"/> Ephemeral	<input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater
	Stream Origin	Catchment Area
	<input type="checkbox"/> Upland Runoff <input checked="" type="checkbox"/> Mixture of Origins <input type="checkbox"/> Spring-fed/Ground Water <input type="checkbox"/> Wetland <input type="checkbox"/> Other <input type="text"/>	Mile ² <input type="text" value="0.01"/> Km ² <input type="text" value="0.03"/>

WATERSHED FEATURES	Surrounding Land Use & Percentage	Local Watershed NPS Pollution
	<input checked="" type="checkbox"/> Forest <input type="text" value="20"/> <input type="checkbox"/> Commercial <input type="text" value="0"/> <input type="checkbox"/> Field/Pasture <input type="text" value="0"/> <input checked="" type="checkbox"/> Other <input type="text" value="10"/> <input checked="" type="checkbox"/> Agriculture <input type="text" value="60"/> Rail line <input type="text"/> <input type="checkbox"/> Residential <input type="text" value="0"/>	<input type="checkbox"/> No evidence <input type="checkbox"/> Some potential sources <input checked="" type="checkbox"/> Obvious sources
		Local Watershed Erosion
		<input type="checkbox"/> None <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy

RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present	Dominant Species
	<input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbs <input type="checkbox"/> None	<input type="text" value="Soft mast."/>

INSTREAM FEATURES	Est Reach Length	ft <input type="text" value="100"/> m <input type="text" value="30"/>	Canopy Cover
	Est Stream Width	ft <input type="text" value="6.2"/> m <input type="text" value="1.9"/>	<input type="checkbox"/> Open <input type="checkbox"/> Partly Open <input checked="" type="checkbox"/> Shaded <input type="checkbox"/> Partly Shaded
	Sampling Reach Area	ft ² <input type="text" value="620.0"/> m ² <input type="text" value="57.6"/>	High Water Mark
	Sampling Area	mile ² <input type="text" value="0.000023"/> km ² <input type="text" value="0.000058"/>	ft <input type="text" value="0.30"/> m <input type="text" value="0.09"/>
	Est Water Depth	in <input type="text" value="0.0"/> m <input type="text" value="0.0"/>	% of Stream Morphology
	Surface Velocity	ft/s <input type="text" value="0.0"/> m/s <input type="text" value="0.0"/>	<input checked="" type="checkbox"/> Riffle % <input type="text" value="60"/> <input checked="" type="checkbox"/> Run % <input type="text" value="35"/> <input checked="" type="checkbox"/> Pool % <input type="text" value="5"/> <input type="checkbox"/> Glide Pool <input type="checkbox"/> Step Pool Series
	Channelized	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Dam Present	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

LARGE WOODY DEBRIS	LWD	<input type="text" value="0.1"/> m ² <input type="text" value="1"/> ft ²
	Density of LWD	m ² /km ² <input type="text" value="0.0000000929"/> ft ² /mile ² <input type="text" value="0.0000000359"/>

AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present	Portion of the reach with aquatic vegetation present:
	<input type="checkbox"/> Rooted Emergent <input type="checkbox"/> Rooted Submergent <input type="checkbox"/> Rooted Floating <input checked="" type="checkbox"/> None <input type="checkbox"/> Free Floating <input type="checkbox"/> Attached Algae <input type="checkbox"/> Floating Algae	<input type="text" value="0"/>

WATER QUALITY	<input checked="" type="checkbox"/> No Water Present Temperature <input type="text" value="0"/> °C <input type="text" value="0"/> °F <input type="checkbox"/> No Flow Present Conductivity <input type="text" value="0"/> μs/cm Total Dissolved Solids <input type="text" value="0"/> mg/l pH <input type="text" value="0"/>	Water Odors
	Turbidity <input type="checkbox"/> Clear <input type="checkbox"/> Slightly Turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other	<input type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic Do: <input type="text"/> mg/L Water Surface Oils <input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globs <input type="checkbox"/> Flecks <input type="checkbox"/> Other

SEDIMENT/ SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other	Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper Fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relic Shells <input type="checkbox"/> Other
	Looking at stones which are not deeply embedded, are undersides black in color?	
	Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

INORGANIC SUBSTRATE COMPONENTS			ORGANIC SUBSTRATE COMPONENTS		
Substrate Type	Diameter	% Composite in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock		0	Dietritus	Sticks, wood, coarse plant material	15
Boulder	>10"	0			
Cobble	2.5 - 10"	0	Muck-Mud	Black, very fine organic matter	0
Gravel	0.1 - 2.5"	0			
Sand	gritty	10	Marl	Grey, shell fragments	0
Silt	goeoy	90			
Clay	slick	0			

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADIENT STREAMS																					
	Optimal				SubOptimal				Marginal				Poor									
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).				30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of new fall, but not yet prepared for colonization (may rate at high end of scale).				10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.				10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.									
Score	4	<input type="checkbox"/> 20	<input type="checkbox"/> 19	<input type="checkbox"/> 18	<input type="checkbox"/> 17	<input type="checkbox"/> 16	<input type="checkbox"/> 15	<input type="checkbox"/> 14	<input type="checkbox"/> 13	<input type="checkbox"/> 12	<input type="checkbox"/> 11	<input type="checkbox"/> 10	<input type="checkbox"/> 9	<input type="checkbox"/> 8	<input type="checkbox"/> 7	<input type="checkbox"/> 6	<input type="checkbox"/> 5	<input checked="" type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.				Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.				All mud or clay or sand bottom: little or no root mat: no submerged vegetation.				Hardpan clay or bedrock: no root mat or vegetation.									
Score	6	<input type="checkbox"/> 20	<input type="checkbox"/> 19	<input type="checkbox"/> 18	<input type="checkbox"/> 17	<input type="checkbox"/> 16	<input type="checkbox"/> 15	<input type="checkbox"/> 14	<input type="checkbox"/> 13	<input type="checkbox"/> 12	<input type="checkbox"/> 11	<input type="checkbox"/> 10	<input type="checkbox"/> 9	<input type="checkbox"/> 8	<input type="checkbox"/> 7	<input checked="" type="checkbox"/> 6	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
3. Pool Variability	Even mix of large shallow, large-deep, small shallow, small-deep pools present.				Majority of pools large-deep; very few shallow				Shallow pools much more prevalent than deep pools.				Majority of pools small-shallow or pools absent.									
Score	2	<input type="checkbox"/> 20	<input type="checkbox"/> 19	<input type="checkbox"/> 18	<input type="checkbox"/> 17	<input type="checkbox"/> 16	<input type="checkbox"/> 15	<input type="checkbox"/> 14	<input type="checkbox"/> 13	<input type="checkbox"/> 12	<input type="checkbox"/> 11	<input type="checkbox"/> 10	<input type="checkbox"/> 9	<input type="checkbox"/> 8	<input type="checkbox"/> 7	<input type="checkbox"/> 6	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input checked="" type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.				Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.				Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.				Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.									
Score	14	<input type="checkbox"/> 20	<input type="checkbox"/> 19	<input type="checkbox"/> 18	<input type="checkbox"/> 17	<input type="checkbox"/> 16	<input type="checkbox"/> 15	<input checked="" type="checkbox"/> 14	<input type="checkbox"/> 13	<input type="checkbox"/> 12	<input type="checkbox"/> 11	<input type="checkbox"/> 10	<input type="checkbox"/> 9	<input type="checkbox"/> 8	<input type="checkbox"/> 7	<input type="checkbox"/> 6	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0

5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and many pools as standing pools.	
Score	1	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 0			
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.	
Score	15	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input checked="" type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.	
Score	5	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.	
Note: determine left or right side by facing downstream.					
Score (LB)	8	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	8	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.	
Note: determine left or right side by facing downstream.					
Score (LB)	8	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	8	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.	
Note: determine left or right side by facing downstream.					
Score (LB)	3	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	6	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Total Score	88				

Project ID: Henderson County Solar	Stream Class: Ephemeral Exhibit 14 Attachment 14.1
Stream ID: 1MS1C	Location: HENDERSON KY Page 57 of 237
Lat: 37.80191 Long: -87.62975	River Basin: Ohio

Investigators: Ryan Winka

Signature: _____ Date: 04-May-20 Reason for Survey: _____
 Time: 12:00 PM 404 functional Assessment: _____

WEATHER CONDITIONS	Current	Past 24 Hour	Heavy rain in last 7 days
	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input type="checkbox"/> Cloud Cover % <input type="text" value="0"/> <input checked="" type="checkbox"/> Clear/Sunny	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input checked="" type="checkbox"/> Showers (Intermittent) <input type="checkbox"/> Cloud Cover % <input type="text" value="0"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes Air Temp F <input type="text" value="72"/> Air Temp C <input type="text" value="22"/> Other <input type="text"/>

STREAM CHARACTERIZATION	Stream Subsystem	Stream Type
	<input type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input checked="" type="checkbox"/> Ephemeral	<input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater
	Stream Origin	Catchment Area
	<input type="checkbox"/> Upland Runoff <input checked="" type="checkbox"/> Mixture of Origins <input type="checkbox"/> Spring-fed/Ground Water <input type="checkbox"/> Wetland <input type="checkbox"/> Other <input type="text"/>	Mile ² <input type="text" value="0.01"/> Km ² <input type="text" value="0.03"/>

WATERSHED FEATURES	Surrounding Land Use & Percentage	Local Watershed NPS Pollution
	<input checked="" type="checkbox"/> Forest <input type="text" value="50"/> <input type="checkbox"/> Commercial <input type="text" value="0"/> <input type="checkbox"/> Field/Pasture <input type="text" value="0"/> <input type="checkbox"/> Other <input type="text" value="0"/> <input checked="" type="checkbox"/> Agriculture <input type="text" value="40"/> <input type="checkbox"/> Residential <input type="text" value="0"/>	<input type="checkbox"/> No evidence <input type="checkbox"/> Some potential sources <input checked="" type="checkbox"/> Obvious sources
		Local Watershed Erosion
		<input type="checkbox"/> None <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy

RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present	Dominant Species
	<input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbs <input type="checkbox"/> None	<input type="text" value="Soft mast."/>

INSTREAM FEATURES	Est Reach Length	ft <input type="text" value="100"/> m <input type="text" value="30"/>	Canopy Cover
	Est Stream Width	ft <input type="text" value="3.7"/> m <input type="text" value="1.1"/>	<input type="checkbox"/> Open <input checked="" type="checkbox"/> Partly Open <input type="checkbox"/> Shaded <input type="checkbox"/> Partly Shaded
	Sampling Reach Area	ft ² <input type="text" value="370.0"/> m ² <input type="text" value="34.4"/>	High Water Mark
	Sampling Area	mile ² <input type="text" value="0.000014"/> km ² <input type="text" value="0.000034"/>	ft <input type="text" value="0.50"/> m <input type="text" value="0.15"/>
	Est Water Depth	in <input type="text" value="0.5"/> m <input type="text" value="0.0"/>	% of Stream Morphology
	Surface Velocity	ft/s <input type="text" value="0.0"/> m/s <input type="text" value="0.0"/>	<input checked="" type="checkbox"/> Riffle % <input type="text" value="60"/> <input checked="" type="checkbox"/> Run % <input type="text" value="20"/> <input checked="" type="checkbox"/> Pool % <input type="text" value="20"/> <input type="checkbox"/> Glide Pool <input type="checkbox"/> Step Pool Series
	Channelized	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Dam Present	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

LARGE WOODY DEBRIS	LWD	<input type="text" value="1.9"/> m ² <input type="text" value="20"/> ft ²
	Density of LWD	m ² /km ² <input type="text" value="0.0000018581"/> ft ² /mile ² <input type="text" value="0.0000007174"/>

AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present	Portion of the reach with aquatic vegetation present:
	<input type="checkbox"/> Rooted Emergent <input type="checkbox"/> Rooted Submergent <input type="checkbox"/> Rooted Floating <input checked="" type="checkbox"/> None <input type="checkbox"/> Free Floating <input type="checkbox"/> Attached Algae <input type="checkbox"/> Floating Algae	<input type="text" value="0"/>

WATER QUALITY	No Water Present	Temperature	<input type="text" value="0"/> °C <input type="text" value="0"/> °F	Water Odors
	<input checked="" type="checkbox"/> No Flow Present	Conductivity	µs/cm <input type="text" value="0"/>	<input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic
	Total Dissolved Solids	<input type="text" value="0"/> mg/l	Do:	<input type="text"/>
	pH	<input type="text" value="0"/>	Water Surface Oils	<input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globbs <input type="checkbox"/> Flecks <input type="checkbox"/> Other
	Turbidity	<input checked="" type="checkbox"/> Clear <input type="checkbox"/> Slightly Turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other		

SEDIMENT/ SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other	Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper Fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relic Shells <input type="checkbox"/> Other
	Looking at stones which are not deeply embedded, are undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	

INORGANIC SUBSTRATE COMPONENTS			ORGANIC SUBSTRATE COMPONENTS		
Substrate Type	Diameter	% Composite in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock		0	Dietritus	Sticks, wood, coarse plant material	50
Boulder	>10"	0			
Cobble	2.5 - 10"	0	Muck-Mud	Black, very fine organic matter	0
Gravel	0.1 - 2.5"	0			
Sand	gritty	5	Marl	Grey, shell fragments	0
Silt	goeoy	95			
Clay	slick	0			

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADIENT STREAMS																					
	Optimal				SubOptimal				Marginal				Poor									
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).				30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of new fall, but not yet prepared for colonization (may rate at high end of scale).				10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.				10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.									
Score	6	<input type="checkbox"/> 20	<input type="checkbox"/> 19	<input type="checkbox"/> 18	<input type="checkbox"/> 17	<input type="checkbox"/> 16	<input type="checkbox"/> 15	<input type="checkbox"/> 14	<input type="checkbox"/> 13	<input type="checkbox"/> 12	<input type="checkbox"/> 11	<input type="checkbox"/> 10	<input type="checkbox"/> 9	<input type="checkbox"/> 8	<input type="checkbox"/> 7	<input checked="" type="checkbox"/> 6	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.				Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.				All mud or clay or sand bottom: little or no root mat: no submerged vegetation.				Hardpan clay or bedrock: no root mat or vegetation.									
Score	7	<input type="checkbox"/> 20	<input type="checkbox"/> 19	<input type="checkbox"/> 18	<input type="checkbox"/> 17	<input type="checkbox"/> 16	<input type="checkbox"/> 15	<input type="checkbox"/> 14	<input type="checkbox"/> 13	<input type="checkbox"/> 12	<input type="checkbox"/> 11	<input type="checkbox"/> 10	<input type="checkbox"/> 9	<input type="checkbox"/> 8	<input checked="" type="checkbox"/> 7	<input type="checkbox"/> 6	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
3. Pool Variability	Even mix of large shallow, large-deep, small shallow, small-deep pools present.				Majority of pools large-deep; very few shallow				Shallow pools much more prevalent than deep pools.				Majority of pools small-shallow or pools absent.									
Score	6	<input type="checkbox"/> 20	<input type="checkbox"/> 19	<input type="checkbox"/> 18	<input type="checkbox"/> 17	<input type="checkbox"/> 16	<input type="checkbox"/> 15	<input type="checkbox"/> 14	<input type="checkbox"/> 13	<input type="checkbox"/> 12	<input type="checkbox"/> 11	<input type="checkbox"/> 10	<input type="checkbox"/> 9	<input type="checkbox"/> 8	<input type="checkbox"/> 7	<input checked="" type="checkbox"/> 6	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.				Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.				Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.				Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.									
Score	12	<input type="checkbox"/> 20	<input type="checkbox"/> 19	<input type="checkbox"/> 18	<input type="checkbox"/> 17	<input type="checkbox"/> 16	<input type="checkbox"/> 15	<input type="checkbox"/> 14	<input type="checkbox"/> 13	<input checked="" type="checkbox"/> 12	<input type="checkbox"/> 11	<input type="checkbox"/> 10	<input type="checkbox"/> 9	<input type="checkbox"/> 8	<input type="checkbox"/> 7	<input type="checkbox"/> 6	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0

5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and many pools as standing pools.	
Score	1	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 0			
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.	
Score	15	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input checked="" type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.	
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.	
Note: determine left or right side by facing downstream.					
Score (LB)	3	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	3	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.	
Note: determine left or right side by facing downstream.					
Score (LB)	2	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	2	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.	
Note: determine left or right side by facing downstream.					
Score (LB)	9	<input type="checkbox"/> 10 <input checked="" type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	9	<input type="checkbox"/> 10 <input checked="" type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Total Score	81				

Project ID: Henderson County Solar	Stream Class: Ephemeral Exhibit 14 Attachment 14.1
Stream ID: 1MS1C-1	Location: HENDERSON KY Page 60 of 237
Lat: 37.80158 Long: -87.62979	River Basin: Ohio

Investigators: Ryan Winka

Signature: _____ Date: 04-May-20 Reason for Survey: _____
 Time: 12:15 PM 404 functional Assessment: _____

WEATHER CONDITIONS	Current	Past 24 Hour	Heavy rain in last 7 days
	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input type="checkbox"/> Cloud Cover % <input type="text" value="0"/> <input checked="" type="checkbox"/> Clear/Sunny	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input checked="" type="checkbox"/> Showers (Intermittent) <input type="checkbox"/> Cloud Cover % <input type="text" value="0"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes Air Temp F <input type="text" value="72"/> Air Temp C <input type="text" value="22"/> Other <input type="text"/>

STREAM CHARACTERIZATION	Stream Subsystem	Stream Type
	<input type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input checked="" type="checkbox"/> Ephemeral	<input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater
	Stream Origin	Mile ² <input type="text" value="0.01"/>
	<input type="checkbox"/> Upland Runoff <input checked="" type="checkbox"/> Mixture of Origins <input type="checkbox"/> Spring-fed/Ground Water <input type="checkbox"/> Wetland <input type="checkbox"/> Other <input type="text"/>	Km ² <input type="text" value="0.03"/>

WATERSHED FEATURES	Surrounding Land Use & Percentage	Local Watershed NPS Pollution
	<input checked="" type="checkbox"/> Forest <input type="text" value="30"/> <input type="checkbox"/> Commercial <input type="text" value="0"/> <input type="checkbox"/> Field/Pasture <input type="text" value="0"/> <input type="checkbox"/> Other <input type="text" value="0"/> <input checked="" type="checkbox"/> Agriculture <input type="text" value="70"/> <input type="checkbox"/> Residential <input type="text" value="0"/>	<input type="checkbox"/> No evidence <input type="checkbox"/> Some potential sources <input checked="" type="checkbox"/> Obvious sources
		Local Watershed Erosion
		<input type="checkbox"/> None <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy

RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present	Dominant Species
	<input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbs <input type="checkbox"/> None	Soft mast.

INSTREAM FEATURES	Est Reach Length	ft <input type="text" value="100"/> m <input type="text" value="30"/>	Canopy Cover
	Est Stream Width	ft <input type="text" value="2.8"/> m <input type="text" value="0.9"/>	<input type="checkbox"/> Open <input checked="" type="checkbox"/> Partly Open <input type="checkbox"/> Shaded <input type="checkbox"/> Partly Shaded
	Sampling Reach Area	ft ² <input type="text" value="280.0"/> m ² <input type="text" value="26.0"/>	High Water Mark
	Sampling Area	mile ² <input type="text" value="0.000010"/> km ² <input type="text" value="0.000026"/>	ft <input type="text" value="0.40"/> m <input type="text" value="0.12"/>
	Est Water Depth	in <input type="text" value="0.5"/> m <input type="text" value="0.0"/>	% of Stream Morphology
	Surface Velocity	ft/s <input type="text" value="0.0"/> m/s <input type="text" value="0.0"/>	<input checked="" type="checkbox"/> Riffle % <input type="text" value="40"/> <input checked="" type="checkbox"/> Run % <input type="text" value="50"/> <input checked="" type="checkbox"/> Pool % <input type="text" value="10"/> <input type="checkbox"/> Glide Pool <input type="checkbox"/> Step Pool Series
	Channelized	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Dam Present	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

LARGE WOODY DEBRIS	LWD	<input type="text" value="0.5"/> m ² <input type="text" value="5"/> ft ²
	Density of LWD	m ² /km ² <input type="text" value="0.0000004645"/> ft ² /mile ² <input type="text" value="0.0000001794"/>

AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present	Portion of the reach with aquatic vegetation present:
	<input type="checkbox"/> Rooted Emergent <input type="checkbox"/> Rooted Submergent <input type="checkbox"/> Rooted Floating <input checked="" type="checkbox"/> None <input type="checkbox"/> Free Floating <input type="checkbox"/> Attached Algae <input type="checkbox"/> Floating Algae	<input type="text" value="0"/>

WATER QUALITY	No Water Present	Temperature	<input type="text" value="0"/> °C <input type="text" value="0"/> °F	Water Odors
	<input checked="" type="checkbox"/> No Flow Present	Conductivity	µs/cm <input type="text" value="0"/>	<input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic
	Total Dissolved Solids	<input type="text" value="0"/> mg/l	Do:	<input type="text"/>
	pH	<input type="text" value="0"/>	Water Surface Oils	<input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globbs <input type="checkbox"/> Flecks <input type="checkbox"/> Other
	Turbidity	<input checked="" type="checkbox"/> Clear <input type="checkbox"/> Slightly Turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other		

SEDIMENT/ SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other	Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper Fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relic Shells <input type="checkbox"/> Other
	Looking at stones which are not deeply embedded, are undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	

INORGANIC SUBSTRATE COMPONENTS			ORGANIC SUBSTRATE COMPONENTS		
Substrate Type	Diameter	% Composite in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock		0	Dietritus	Sticks, wood, coarse plant material	5
Boulder	>10"	0			
Cobble	2.5 - 10"	0	Muck-Mud	Black, very fine organic matter	0
Gravel	0.1 - 2.5"	2			
Sand	gritty	8	Marl	Grey, shell fragments	0
Silt	goeoy	90			
Clay	slick	0			

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADIENT STREAMS				
	Optimal	SubOptimal	Marginal	Poor	
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.	
Score	7	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input checked="" type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom: little or no root mat: no submerged vegetation.	Hardpan clay or bedrock: no root mat or vegetation.	
Score	7	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input checked="" type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
3. Pool Variability	Even mix of large shallow, large-deep, small shallow, small-deep pools present.	Majority of pools large-deep; very few shallow	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.	
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.	
Score	14	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input checked="" type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			

5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and most areas as standing pools.	
Score	1	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 0			
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.	
Score	14	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input checked="" type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.	
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.	
Note: determine left or right side by facing downstream.					
Score (LB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.	
Note: determine left or right side by facing downstream.					
Score (LB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.	
Note: determine left or right side by facing downstream.					
Score (LB)	6	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	8	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Total Score	85				

Project ID: Henderson County Solar		Stream Class: Ephemeral Exhibit 14 Attachment 14.1	
Stream ID: 1MS1D		Location: HENDERSON KY Page 63 of 237	
Lat: 37.80190	Long: -87.62732	River Basin Ohio	
Investigators: Ryan Winka			
Signature:		Date: 04-May-20	Reason for Survey:
		Time: 2:21 PM	404 functional Assessment:
WEATHER CONDITIONS	Current	Past 24 Hour	Heavy rain in last 7 days
	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input checked="" type="checkbox"/> Cloud Cover % <input type="text" value="30"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input checked="" type="checkbox"/> Showers (Intermittent) <input type="checkbox"/> Cloud Cover % <input type="text" value="0"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes Air Temp F <input type="text" value="75"/> Air Temp C <input type="text" value="24"/> Other <input type="text"/>
STREAM CHARACTERIZATION	Stream Subsystem		Stream Type
	<input type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input checked="" type="checkbox"/> Ephemeral		<input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater
Stream Origin		Catchment Area	
<input type="checkbox"/> Upland Runoff <input checked="" type="checkbox"/> Mixture of Origins <input type="checkbox"/> Spring-fed/Ground Water <input type="checkbox"/> Wetland <input type="checkbox"/> Other <input type="text"/>		Mile ²	<input type="text" value="0.01"/>
		Km ²	<input type="text" value="0.03"/>
WATERSHED FEATURES	Surrounding Land Use & Percentage		Local Watershed NPS Pollution
	<input checked="" type="checkbox"/> Forest <input type="text" value="30"/> <input type="checkbox"/> Field/Pasture <input type="text" value="0"/> <input checked="" type="checkbox"/> Agriculture <input type="text" value="70"/> <input type="checkbox"/> Residential <input type="text" value="0"/>	<input type="checkbox"/> Commercial <input type="text" value="0"/> <input type="checkbox"/> Other <input type="text" value="0"/>	<input type="checkbox"/> No evidence <input checked="" type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious sources
		Local Watershed Erosion	
		<input type="checkbox"/> None <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy	
RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present		Dominant Species
	<input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbs <input type="checkbox"/> None		<input type="text"/>
INSTREAM FEATURES	Est Reach Length		Canopy Cover
	ft <input type="text" value="100"/>	m <input type="text" value="30"/>	<input type="checkbox"/> Open <input type="checkbox"/> Partly Open <input checked="" type="checkbox"/> Shaded <input type="checkbox"/> Partly Shaded
Est Stream Width		High Water Mark	
ft <input type="text" value="3.2"/>	m <input type="text" value="1.0"/>	ft <input type="text" value="0.35"/>	m <input type="text" value="0.11"/>
Sampling Reach Area		% of Stream Morphology	
ft ² <input type="text" value="320.0"/>	m ² <input type="text" value="29.7"/>	<input checked="" type="checkbox"/> Riffle % <input type="text" value="60"/> <input checked="" type="checkbox"/> Pool % <input type="text" value="10"/> <input type="checkbox"/> Step Pool Series	
Sampling Area		<input checked="" type="checkbox"/> Run % <input type="text" value="30"/> <input type="checkbox"/> Glide Pool	
mile ² <input type="text" value="0.000012"/>	km ² <input type="text" value="0.000030"/>		
Est Water Depth			
in <input type="text" value="0.5"/>	m <input type="text" value="0.0"/>		
Surface Velocity			
ft/s <input type="text" value="0.0"/>	m/s <input type="text" value="0.0"/>		
Channelized			
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
Dam Present			
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
LARGE WOODY DEBRIS	LWD	<input type="text" value="1.4"/> m ²	<input type="text" value="15"/> ft ²
	Density of LWD	<input type="text" value="0.0000013935"/> m ² /km ² <input type="text" value="0.0000005381"/> ft ² /mile ²	
AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present		Portion of the reach with aquatic vegetation present:
	<input type="checkbox"/> Rooted Emergent <input type="checkbox"/> Rooted Submergent <input type="checkbox"/> Rooted Floating <input type="checkbox"/> Free Floating <input type="checkbox"/> Attached Algae <input type="checkbox"/> Floating Algae	<input checked="" type="checkbox"/> None <input type="text" value="0"/>	
WATER QUALITY	<input type="checkbox"/> No Water Present Temperature <input type="text" value="0"/> °C <input type="text" value="0"/> °F <input checked="" type="checkbox"/> No Flow Present		Water Odors
	Conductivity <input type="text" value="0"/> μs/cm Total Dissolved Solids <input type="text" value="0"/> mg/l pH <input type="text" value="0"/>	<input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic Do: <input type="text"/> mg/L	
Turbidity		Water Surface Oils	
<input checked="" type="checkbox"/> Clear <input type="checkbox"/> Slightly Turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other		<input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globbs <input type="checkbox"/> Flecks <input type="checkbox"/> Other	

SEDIMENT/ SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other	Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper Fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relic Shells <input type="checkbox"/> Other
	Looking at stones which are not deeply embedded, are undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	

INORGANIC SUBSTRATE COMPONENTS			ORGANIC SUBSTRATE COMPONENTS		
Substrate Type	Diameter	% Composite in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock		0	Dietritus	Sticks, wood, coarse plant material	10
Boulder	>10"	0			
Cobble	2.5 - 10"	0	Muck-Mud	Black, very fine organic matter	0
Gravel	0.1 - 2.5"	0			
Sand	gritty	5	Marl	Grey, shell fragments	0
Silt	goeoy	95			
Clay	slick	0			

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADIENT STREAMS				
	Optimal	SubOptimal	Marginal	Poor	
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.	
Score	5	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom: little or no root mat: no submerged vegetation.	Hardpan clay or bedrock: no root mat or vegetation.	
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
3. Pool Variability	Even mix of large shallow, large-deep, small shallow, small-deep pools present.	Majority of pools large-deep; very few shallow	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.	
Score	5	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.	
Score	11	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input checked="" type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			

5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and many pools as standing pools.	
Score	2	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.	
Score	15	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input checked="" type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.	
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.	
Note: determine left or right side by facing downstream.					
Score (LB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.	
Note: determine left or right side by facing downstream.					
Score (LB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.	
Note: determine left or right side by facing downstream.					
Score (LB)	8	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	6	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Total Score	80				

Project ID: Henderson County Solar	Stream Class: Ephemeral Exhibit 14 Attachment 14.1
Stream ID: 1MS1E	Location: HENDERSON KY Page 66 of 237
Lat: 37.80192 Long: -87.62695	River Basin: Ohio

Investigators: Ryan Winka

Signature: _____ Date: 04-May-20 Reason for Survey: _____
 Time: 2:48 PM 404 functional Assessment: _____

WEATHER CONDITIONS	Current	Past 24 Hour	Heavy rain in last 7 days
	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input checked="" type="checkbox"/> Cloud Cover % <input type="text" value="30"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input checked="" type="checkbox"/> Showers (Intermittent) <input type="checkbox"/> Cloud Cover % <input type="text" value="0"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes Air Temp F <input type="text" value="75"/> Air Temp C <input type="text" value="24"/> Other <input type="text"/>

STREAM CHARACTERIZATION	Stream Subsystem	Stream Type
	<input type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input checked="" type="checkbox"/> Ephemeral	<input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater
	Stream Origin	Catchment Area
	<input type="checkbox"/> Upland Runoff <input checked="" type="checkbox"/> Mixture of Origins <input type="checkbox"/> Spring-fed/Ground Water <input type="checkbox"/> Wetland <input type="checkbox"/> Other <input type="text"/>	Mile ² <input type="text" value="0.02"/> Km ² <input type="text" value="0.05"/>

WATERSHED FEATURES	Surrounding Land Use & Percentage	Local Watershed NPS Pollution
	<input checked="" type="checkbox"/> Forest <input type="text" value="40"/> <input type="checkbox"/> Commercial <input type="text" value="0"/> <input type="checkbox"/> Field/Pasture <input type="text" value="0"/> <input type="checkbox"/> Other <input type="text" value="0"/> <input checked="" type="checkbox"/> Agriculture <input type="text" value="60"/> <input type="checkbox"/> Residential <input type="text" value="0"/>	<input type="checkbox"/> No evidence <input checked="" type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious sources
		Local Watershed Erosion
		<input type="checkbox"/> None <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy

RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present	Dominant Species
	<input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbs <input type="checkbox"/> None	<input type="text" value="Mixed mast."/>

INSTREAM FEATURES	Est Reach Length	ft <input type="text" value="100"/> m <input type="text" value="30"/>	Canopy Cover
	Est Stream Width	ft <input type="text" value="5.2"/> m <input type="text" value="1.6"/>	<input type="checkbox"/> Open <input type="checkbox"/> Partly Open <input checked="" type="checkbox"/> Shaded <input type="checkbox"/> Partly Shaded
	Sampling Reach Area	ft ² <input type="text" value="520.0"/> m ² <input type="text" value="48.3"/>	High Water Mark
	Sampling Area	mile ² <input type="text" value="0.000019"/> km ² <input type="text" value="0.000048"/>	ft <input type="text" value="0.40"/> m <input type="text" value="0.12"/>
	Est Water Depth	in <input type="text" value="1.0"/> m <input type="text" value="0.0"/>	% of Stream Morphology
	Surface Velocity	ft/s <input type="text" value="0.0"/> m/s <input type="text" value="0.0"/>	<input checked="" type="checkbox"/> Riffle % <input type="text" value="60"/> <input checked="" type="checkbox"/> Run % <input type="text" value="20"/> <input checked="" type="checkbox"/> Pool % <input type="text" value="20"/> <input type="checkbox"/> Glide Pool <input type="checkbox"/> Step Pool Series
	Channelized	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Dam Present	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

LARGE WOODY DEBRIS	LWD	<input type="text" value="0.9"/> m ² <input type="text" value="10"/> ft ²
	Density of LWD	m ² /km ² <input type="text" value="0.0000009290"/> ft ² /mile ² <input type="text" value="0.0000003587"/>

AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present	Portion of the reach with aquatic vegetation present:
	<input type="checkbox"/> Rooted Emergent <input type="checkbox"/> Rooted Submergent <input type="checkbox"/> Rooted Floating <input checked="" type="checkbox"/> None <input type="checkbox"/> Free Floating <input type="checkbox"/> Attached Algae <input type="checkbox"/> Floating Algae	<input type="text" value="0"/>

WATER QUALITY	No Water Present	Temperature	<input type="text" value="0"/> °C <input type="text" value="0"/> °F	Water Odors
	<input checked="" type="checkbox"/> No Flow Present	Conductivity	µs/cm <input type="text" value="0"/>	<input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic
	Total Dissolved Solids	<input type="text" value="0"/> mg/l	Do:	<input type="text"/>
	pH	<input type="text" value="0"/>	Water Surface Oils	<input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globbs <input type="checkbox"/> Flecks <input type="checkbox"/> Other
	Turbidity	<input checked="" type="checkbox"/> Clear <input type="checkbox"/> Slightly Turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other		

SEDIMENT/ SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other	Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper Fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relic Shells <input type="checkbox"/> Other
	Looking at stones which are not deeply embedded, are undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	

INORGANIC SUBSTRATE COMPONENTS			ORGANIC SUBSTRATE COMPONENTS		
Substrate Type	Diameter	% Composite in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock		0	Dietritus	Sticks, wood, coarse plant material	5
Boulder	>10"	0			
Cobble	2.5 - 10"	0	Muck-Mud	Black, very fine organic matter	0
Gravel	0.1 - 2.5"	0			
Sand	gritty	0	Marl	Grey, shell fragments	0
Silt	goeoy	100			
Clay	slick	0			

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADIENT STREAMS				
	Optimal	SubOptimal	Marginal	Poor	
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.	
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom: little or no root mat: no submerged vegetation.	Hardpan clay or bedrock: no root mat or vegetation.	
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
3. Pool Variability	Even mix of large shallow, large-deep, small shallow, small-deep pools present.	Majority of pools large-deep; very few shallow	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.	
Score	5	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.	
Score	11	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input checked="" type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			

5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and many pools as standing pools.
Score	2	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
Score	14	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input checked="" type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Note: determine left or right side by facing downstream.				
Score (LB)	3	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	3	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
Note: determine left or right side by facing downstream.				
Score (LB)	2	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	2	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
Note: determine left or right side by facing downstream.				
Score (LB)	8	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	8	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Total Score	76			

Project ID: Henderson County Solar	Stream Class: Ephemeral Exhibit 14 Attachment 14.1
Stream ID: 1MS1F	Location: HENDERSON KY Page 69 of 237
Lat: 37.80213 Long: -87.62621	River Basin: Ohio

Investigators: Ryan Winka

Signature: _____ Date: 04-May-20 Reason for Survey: _____
 Time: 7:44 AM 404 functional Assessment: _____

WEATHER CONDITIONS	Current	Past 24 Hour	Heavy rain in last 7 days
	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input checked="" type="checkbox"/> Cloud Cover % <input type="text" value="50"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input checked="" type="checkbox"/> Showers (Intermittent) <input type="checkbox"/> Cloud Cover % <input type="text" value="0"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes Air Temp F <input type="text" value="75"/> Air Temp C <input type="text" value="24"/> Other <input type="text"/>

STREAM CHARACTERIZATION	Stream Subsystem	Stream Type
	<input type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input checked="" type="checkbox"/> Ephemeral	<input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater
	Stream Origin	Mile ² <input type="text" value="0.01"/>
	<input type="checkbox"/> Upland Runoff <input checked="" type="checkbox"/> Mixture of Origins <input type="checkbox"/> Spring-fed/Ground Water <input type="checkbox"/> Wetland <input type="checkbox"/> Other <input type="text"/>	Km ² <input type="text" value="0.03"/>

WATERSHED FEATURES	Surrounding Land Use & Percentage	Local Watershed NPS Pollution
	<input checked="" type="checkbox"/> Forest <input type="text" value="60"/> <input type="checkbox"/> Commercial <input type="text" value="0"/> <input type="checkbox"/> Field/Pasture <input type="text" value="0"/> <input type="checkbox"/> Other <input type="text" value="0"/> <input checked="" type="checkbox"/> Agriculture <input type="text" value="40"/> <input type="checkbox"/> Residential <input type="text" value="0"/>	<input type="checkbox"/> No evidence <input checked="" type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious sources
		Local Watershed Erosion
		<input type="checkbox"/> None <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy

RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present	Dominant Species
	<input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbs <input type="checkbox"/> None	<input type="text" value="Mixed mast"/>

INSTREAM FEATURES	Est Reach Length	ft <input type="text" value="100"/> m <input type="text" value="30"/>	Canopy Cover
	Est Stream Width	ft <input type="text" value="2.1"/> m <input type="text" value="0.6"/>	<input type="checkbox"/> Open <input checked="" type="checkbox"/> Partly Open <input type="checkbox"/> Shaded <input type="checkbox"/> Partly Shaded
	Sampling Reach Area	ft ² <input type="text" value="210.0"/> m ² <input type="text" value="19.5"/>	High Water Mark
	Sampling Area	mile ² <input type="text" value="0.000008"/> km ² <input type="text" value="0.000020"/>	ft <input type="text" value="0.40"/> m <input type="text" value="0.12"/>
	Est Water Depth	in <input type="text" value="0.0"/> m <input type="text" value="0.0"/>	% of Stream Morphology
	Surface Velocity	ft/s <input type="text" value="0.0"/> m/s <input type="text" value="0.0"/>	<input checked="" type="checkbox"/> Riffle % <input type="text" value="60"/> <input checked="" type="checkbox"/> Run % <input type="text" value="30"/> <input checked="" type="checkbox"/> Pool % <input type="text" value="10"/> <input type="checkbox"/> Glide Pool <input type="checkbox"/> Step Pool Series
	Channelized	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Dam Present	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

LARGE WOODY DEBRIS	LWD	<input type="text" value="0.0"/> m ² <input type="text" value="0"/> ft ²
	Density of LWD	m ² /km ² <input type="text" value="0.0000000000"/> ft ² /mile ² <input type="text" value="0.0000000000"/>

AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present	Portion of the reach with aquatic vegetation present:
	<input checked="" type="checkbox"/> Rooted Emergent <input type="checkbox"/> Rooted Submergent <input type="checkbox"/> Rooted Floating <input type="checkbox"/> None <input type="checkbox"/> Free Floating <input type="checkbox"/> Attached Algae <input type="checkbox"/> Floating Algae	<input type="text" value="5"/>

WATER QUALITY	<input checked="" type="checkbox"/> No Water Present Temperature <input type="text" value="0"/> °C <input type="text" value="0"/> °F <input type="checkbox"/> No Flow Present Conductivity <input type="text" value="0"/> μs/cm Total Dissolved Solids <input type="text" value="0"/> mg/l pH <input type="text" value="0"/>	Water Odors
	<input type="checkbox"/> Clear <input type="checkbox"/> Slightly Turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other	<input type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic Do: <input type="text"/> mg/L Water Surface Oils <input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globs <input type="checkbox"/> Flecks <input type="checkbox"/> Other

SEDIMENT/ SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other	Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper Fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relic Shells <input type="checkbox"/> Other
	Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	
	Looking at stones which are not deeply embedded, are undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

INORGANIC SUBSTRATE COMPONENTS			ORGANIC SUBSTRATE COMPONENTS		
Substrate Type	Diameter	% Composite in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock		0	Dietritus	Sticks, wood, coarse plant material	5
Boulder	>10"	0			
Cobble	2.5 - 10"	0	Muck-Mud	Black, very fine organic matter	0
Gravel	0.1 - 2.5"	0			
Sand	gritty	0	Marl	Grey, shell fragments	0
Silt	goeoy	100			
Clay	slick	0			

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADIENT STREAMS																					
	Optimal				SubOptimal				Marginal				Poor									
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).				30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of new fall, but not yet prepared for colonization (may rate at high end of scale).				10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.				10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.									
Score	6	<input type="checkbox"/> 20	<input type="checkbox"/> 19	<input type="checkbox"/> 18	<input type="checkbox"/> 17	<input type="checkbox"/> 16	<input type="checkbox"/> 15	<input type="checkbox"/> 14	<input type="checkbox"/> 13	<input type="checkbox"/> 12	<input type="checkbox"/> 11	<input type="checkbox"/> 10	<input type="checkbox"/> 9	<input type="checkbox"/> 8	<input type="checkbox"/> 7	<input checked="" type="checkbox"/> 6	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.				Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.				All mud or clay or sand bottom: little or no root mat: no submerged vegetation.				Hardpan clay or bedrock: no root mat or vegetation.									
Score	6	<input type="checkbox"/> 20	<input type="checkbox"/> 19	<input type="checkbox"/> 18	<input type="checkbox"/> 17	<input type="checkbox"/> 16	<input type="checkbox"/> 15	<input type="checkbox"/> 14	<input type="checkbox"/> 13	<input type="checkbox"/> 12	<input type="checkbox"/> 11	<input type="checkbox"/> 10	<input type="checkbox"/> 9	<input type="checkbox"/> 8	<input type="checkbox"/> 7	<input checked="" type="checkbox"/> 6	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
3. Pool Variability	Even mix of large shallow, large-deep, small shallow, small-deep pools present.				Majority of pools large-deep; very few shallow				Shallow pools much more prevalent than deep pools.				Majority of pools small-shallow or pools absent.									
Score	4	<input type="checkbox"/> 20	<input type="checkbox"/> 19	<input type="checkbox"/> 18	<input type="checkbox"/> 17	<input type="checkbox"/> 16	<input type="checkbox"/> 15	<input type="checkbox"/> 14	<input type="checkbox"/> 13	<input type="checkbox"/> 12	<input type="checkbox"/> 11	<input type="checkbox"/> 10	<input type="checkbox"/> 9	<input type="checkbox"/> 8	<input type="checkbox"/> 7	<input type="checkbox"/> 6	<input type="checkbox"/> 5	<input checked="" type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.				Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.				Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.				Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.									
Score	15	<input type="checkbox"/> 20	<input type="checkbox"/> 19	<input type="checkbox"/> 18	<input type="checkbox"/> 17	<input type="checkbox"/> 16	<input checked="" type="checkbox"/> 15	<input type="checkbox"/> 14	<input type="checkbox"/> 13	<input type="checkbox"/> 12	<input type="checkbox"/> 11	<input type="checkbox"/> 10	<input type="checkbox"/> 9	<input type="checkbox"/> 8	<input type="checkbox"/> 7	<input type="checkbox"/> 6	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0

5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and most reaches as standing pools.	
Score	1	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 0			
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.	
Score	15	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input checked="" type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.	
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.	
Note: determine left or right side by facing downstream.					
Score (LB)	7	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input checked="" type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	7	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input checked="" type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.	
Note: determine left or right side by facing downstream.					
Score (LB)	7	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input checked="" type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	7	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input checked="" type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.	
Note: determine left or right side by facing downstream.					
Score (LB)	8	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	8	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Total Score	97				

Project ID: Henderson County Solar	Stream Class: Intermittent Exhibit 14 Attachment 14.1
Stream ID: 1MS1G	Location: HENDERSON KY Page 72 of 237
Lat: 37.80106 Long: -87.62496	River Basin: Ohio

Investigators: Ryan Winka

Signature: _____ Date: 04-May-20 Reason for Survey: _____
 Time: 11:07 AM 404 functional Assessment: _____

WEATHER CONDITIONS	Current	Past 24 Hour	Heavy rain in last 7 days
	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input checked="" type="checkbox"/> Cloud Cover % <input type="text" value="90"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input checked="" type="checkbox"/> Showers (Intermittent) <input type="checkbox"/> Cloud Cover % <input type="text" value="0"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes Air Temp F <input type="text" value="75"/> Air Temp C <input type="text" value="24"/> Other <input type="text"/>

STREAM CHARACTERIZATION	Stream Subsystem	Stream Type
	<input type="checkbox"/> Perennial <input checked="" type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral	<input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater
	Stream Origin	Mile ² <input type="text" value="0.07"/>
	<input type="checkbox"/> Upland Runoff <input checked="" type="checkbox"/> Mixture of Origins <input type="checkbox"/> Spring-fed/Ground Water <input type="checkbox"/> Wetland <input type="checkbox"/> Other <input type="text"/>	Km ² <input type="text" value="0.18"/>

WATERSHED FEATURES	Surrounding Land Use & Percentage	Local Watershed NPS Pollution
	<input checked="" type="checkbox"/> Forest <input type="text" value="50"/> <input type="checkbox"/> Commercial <input type="text" value="0"/> <input type="checkbox"/> Field/Pasture <input type="text" value="0"/> <input type="checkbox"/> Other <input type="text" value="0"/> <input checked="" type="checkbox"/> Agriculture <input type="text" value="50"/> <input type="checkbox"/> Residential <input type="text" value="0"/>	<input type="checkbox"/> No evidence <input checked="" type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious sources
		Local Watershed Erosion
		<input type="checkbox"/> None <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy

RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present	Dominant Species
	<input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbs <input type="checkbox"/> None	<input type="text" value="Mixed mast."/>

INSTREAM FEATURES	Est Reach Length	ft <input type="text" value="100"/> m <input type="text" value="30"/>	Canopy Cover
	Est Stream Width	ft <input type="text" value="9.0"/> m <input type="text" value="2.7"/>	<input type="checkbox"/> Open <input checked="" type="checkbox"/> Partly Open <input type="checkbox"/> Shaded <input type="checkbox"/> Partly Shaded
	Sampling Reach Area	ft ² <input type="text" value="900.0"/> m ² <input type="text" value="83.6"/>	High Water Mark
	Sampling Area	mile ² <input type="text" value="0.000033"/> km ² <input type="text" value="0.000084"/>	ft <input type="text" value="0.75"/> m <input type="text" value="0.23"/>
	Est Water Depth	in <input type="text" value="1.0"/> m <input type="text" value="0.0"/>	% of Stream Morphology
	Surface Velocity	ft/s <input type="text" value="0.3"/> m/s <input type="text" value="0.1"/>	<input checked="" type="checkbox"/> Riffle % <input type="text" value="40"/> <input checked="" type="checkbox"/> Run % <input type="text" value="30"/> <input checked="" type="checkbox"/> Pool % <input type="text" value="30"/> <input type="checkbox"/> Glide Pool <input type="checkbox"/> Step Pool Series
	Channelized	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Dam Present	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

LARGE WOODY DEBRIS	LWD	<input type="text" value="0.9"/> m ² <input type="text" value="10"/> ft ²
	Density of LWD	m ² /km ² <input type="text" value="0.0000009290"/> ft ² /mile ² <input type="text" value="0.0000003587"/>

AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present	Portion of the reach with aquatic vegetation present:
	<input type="checkbox"/> Rooted Emergent <input type="checkbox"/> Rooted Submergent <input type="checkbox"/> Rooted Floating <input checked="" type="checkbox"/> None <input type="checkbox"/> Free Floating <input type="checkbox"/> Attached Algae <input type="checkbox"/> Floating Algae	<input type="text" value="0"/>

WATER QUALITY	No Water Present	Temperature	<input type="text" value="16"/> °C <input type="text" value="61"/> °F	Water Odors
	No Flow Present	Conductivity	µs/cm <input type="text" value="702"/>	<input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic
	Total Dissolved Solids	mg/l <input type="text" value="351"/>	pH	<input type="text" value="7.64"/>
			Do:	<input type="text" value="8.48"/> mg/L
	Turbidity	Water Surface Oils		
	<input type="checkbox"/> Clear <input checked="" type="checkbox"/> Slightly Turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other	<input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globbs <input type="checkbox"/> Flecks <input type="checkbox"/> Other		

SEDIMENT/ SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other	Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper Fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relic Shells <input type="checkbox"/> Other
	Looking at stones which are not deeply embedded, are undersides black in color?	
	Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

INORGANIC SUBSTRATE COMPONENTS			ORGANIC SUBSTRATE COMPONENTS		
Substrate Type	Diameter	% Composite in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock		0	Dietritus	Sticks, wood, coarse plant material	10
Boulder	>10"	0			
Cobble	2.5 - 10"	0	Muck-Mud	Black, very fine organic matter	0
Gravel	0.1 - 2.5"	2			
Sand	gritty	3	Marl	Grey, shell fragments	0
Silt	goeoy	95			
Clay	slick	0			

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADIENT STREAMS																					
	Optimal				SubOptimal				Marginal				Poor									
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).				30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of new fall, but not yet prepared for colonization (may rate at high end of scale).				10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.				10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.									
Score	7	<input type="checkbox"/> 20	<input type="checkbox"/> 19	<input type="checkbox"/> 18	<input type="checkbox"/> 17	<input type="checkbox"/> 16	<input type="checkbox"/> 15	<input type="checkbox"/> 14	<input type="checkbox"/> 13	<input type="checkbox"/> 12	<input type="checkbox"/> 11	<input type="checkbox"/> 10	<input type="checkbox"/> 9	<input type="checkbox"/> 8	<input checked="" type="checkbox"/> 7	<input type="checkbox"/> 6	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.				Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.				All mud or clay or sand bottom: little or no root mat: no submerged vegetation.				Hardpan clay or bedrock: no root mat or vegetation.									
Score	7	<input type="checkbox"/> 20	<input type="checkbox"/> 19	<input type="checkbox"/> 18	<input type="checkbox"/> 17	<input type="checkbox"/> 16	<input type="checkbox"/> 15	<input type="checkbox"/> 14	<input type="checkbox"/> 13	<input type="checkbox"/> 12	<input type="checkbox"/> 11	<input type="checkbox"/> 10	<input type="checkbox"/> 9	<input type="checkbox"/> 8	<input checked="" type="checkbox"/> 7	<input type="checkbox"/> 6	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
3. Pool Variability	Even mix of large shallow, large-deep, small shallow, small-deep pools present.				Majority of pools large-deep; very few shallow				Shallow pools much more prevalent than deep pools.				Majority of pools small-shallow or pools absent.									
Score	7	<input type="checkbox"/> 20	<input type="checkbox"/> 19	<input type="checkbox"/> 18	<input type="checkbox"/> 17	<input type="checkbox"/> 16	<input type="checkbox"/> 15	<input type="checkbox"/> 14	<input type="checkbox"/> 13	<input type="checkbox"/> 12	<input type="checkbox"/> 11	<input type="checkbox"/> 10	<input type="checkbox"/> 9	<input type="checkbox"/> 8	<input checked="" type="checkbox"/> 7	<input type="checkbox"/> 6	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.				Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.				Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.				Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.									
Score	15	<input type="checkbox"/> 20	<input type="checkbox"/> 19	<input type="checkbox"/> 18	<input type="checkbox"/> 17	<input type="checkbox"/> 16	<input checked="" type="checkbox"/> 15	<input type="checkbox"/> 14	<input type="checkbox"/> 13	<input type="checkbox"/> 12	<input type="checkbox"/> 11	<input type="checkbox"/> 10	<input type="checkbox"/> 9	<input type="checkbox"/> 8	<input type="checkbox"/> 7	<input type="checkbox"/> 6	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0

5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and most areas as standing pools.	
Score	8	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.	
Score	15	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input checked="" type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.	
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.	
Note: determine left or right side by facing downstream.					
Score (LB)	5	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	5	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.	
Note: determine left or right side by facing downstream.					
Score (LB)	5	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	5	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.	
Note: determine left or right side by facing downstream.					
Score (LB)	8	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	8	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Total Score	101				

Project ID: Henderson County Solar	Stream Class: Ephemeral Exhibit 14 Attachment 14.1
Stream ID: 1MS1G1	Location: HENDERSON KY Page 75 of 237
Lat: 37.80000 Long: -87.62523	River Basin: Ohio

Investigators: Ryan Winka

Signature: _____ Date: 04-May-20 Reason for Survey: _____
Time: 4:05 PM 404 functional Assessment: _____

WEATHER CONDITIONS	Current	Past 24 Hour	Heavy rain in last 7 days
	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input checked="" type="checkbox"/> Cloud Cover % <input type="text" value="100"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input checked="" type="checkbox"/> Showers (Intermittent) <input type="checkbox"/> Cloud Cover % <input type="text" value="0"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes Air Temp F <input type="text" value="72"/> Air Temp C <input type="text" value="22"/> Other <input type="text"/>

STREAM CHARACTERIZATION	Stream Subsystem	Stream Type
	<input type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input checked="" type="checkbox"/> Ephemeral Stream Origin <input type="checkbox"/> Upland Runoff <input checked="" type="checkbox"/> Mixture of Origins <input type="text"/> <input type="checkbox"/> Spring-fed/Ground Water <input type="checkbox"/> Wetland <input type="checkbox"/> Other <input type="text"/>	<input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater Catchment Area Mile ² <input type="text" value="0.01"/> Km ² <input type="text" value="0.03"/>

WATERSHED FEATURES	Surrounding Land Use & Percentage	Local Watershed NPS Pollution
	<input checked="" type="checkbox"/> Forest <input type="text" value="20"/> <input type="checkbox"/> Commercial <input type="text" value="0"/> <input type="checkbox"/> Field/Pasture <input type="text" value="0"/> <input type="checkbox"/> Other <input type="text" value="0"/> <input checked="" type="checkbox"/> Agriculture <input type="text" value="80"/> <input type="checkbox"/> Residential <input type="text" value="0"/>	<input type="checkbox"/> No evidence <input checked="" type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious sources Local Watershed Erosion <input type="checkbox"/> None <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy

RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present	Dominant Species
	<input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbs <input type="checkbox"/> None	<input type="text" value="Mixed mast."/>

INSTREAM FEATURES	Est Reach Length	ft <input type="text" value="100"/> m <input type="text" value="30"/>	Canopy Cover
	Est Stream Width	ft <input type="text" value="4.2"/> m <input type="text" value="1.3"/>	<input type="checkbox"/> Open <input type="checkbox"/> Partly Open <input checked="" type="checkbox"/> Shaded <input type="checkbox"/> Partly Shaded
	Sampling Reach Area	ft ² <input type="text" value="420.0"/> m ² <input type="text" value="39.0"/>	High Water Mark
	Sampling Area	mile ² <input type="text" value="0.000015"/> km ² <input type="text" value="0.000039"/>	ft <input type="text" value="0.30"/> m <input type="text" value="0.09"/>
	Est Water Depth	in <input type="text" value="0.5"/> m <input type="text" value="0.0"/>	% of Stream Morphology
	Surface Velocity	ft/s <input type="text" value="0.1"/> m/s <input type="text" value="0.0"/>	<input checked="" type="checkbox"/> Riffle % <input type="text" value="40"/> <input checked="" type="checkbox"/> Run % <input type="text" value="50"/> <input checked="" type="checkbox"/> Pool % <input type="text" value="10"/> <input type="checkbox"/> Glide Pool <input type="checkbox"/> Step Pool Series
	Channelized	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Dam Present	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

LARGE WOODY DEBRIS	LWD	<input type="text" value="0.9"/> m ² <input type="text" value="10"/> ft ²
	Density of LWD	m ² /km ² <input type="text" value="0.0000009290"/> ft ² /mile ² <input type="text" value="0.0000003587"/>

AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present	Portion of the reach with aquatic vegetation present:
	<input type="checkbox"/> Rooted Emergent <input type="checkbox"/> Rooted Submergent <input type="checkbox"/> Rooted Floating <input checked="" type="checkbox"/> None <input type="checkbox"/> Free Floating <input type="checkbox"/> Attached Algae <input type="checkbox"/> Floating Algae	<input type="text" value="0"/>

WATER QUALITY	No Water Present	Temperature	<input type="text" value="14"/> °C <input type="text" value="57"/> °F	Water Odors
	No Flow Present	Conductivity	µs/cm <input type="text" value="728"/>	<input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic
	Total Dissolved Solids	<input type="text" value="364"/> mg/l	pH	Do:
		<input type="text" value="7.26"/>		<input type="text" value="8.22"/> mg/L
	Turbidity	Water Surface Oils		
	<input checked="" type="checkbox"/> Clear <input type="checkbox"/> Slightly Turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other	<input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globbs <input type="checkbox"/> Flecks <input type="checkbox"/> Other		

SEDIMENT/ SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other	Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper Fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relic Shells <input type="checkbox"/> Other
	Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	
	Looking at stones which are not deeply embedded, are undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

INORGANIC SUBSTRATE COMPONENTS			ORGANIC SUBSTRATE COMPONENTS		
Substrate Type	Diameter	% Composite in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock		0	Dietritus	Sticks, wood, coarse plant material	5
Boulder	>10"	0			
Cobble	2.5 - 10"	0	Muck-Mud	Black, very fine organic matter	0
Gravel	0.1 - 2.5"	0			
Sand	gritty	5	Marl	Grey, shell fragments	0
Silt	goeoy	95			
Clay	slick	0			

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADIENT STREAMS				
	Optimal	SubOptimal	Marginal	Poor	
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.	
Score	5	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom: little or no root mat: no submerged vegetation.	Hardpan clay or bedrock: no root mat or vegetation.	
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
3. Pool Variability	Even mix of large shallow, large-deep, small shallow, small-deep pools present.	Majority of pools large-deep; very few shallow	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.	
Score	3	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.	
Score	14	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input checked="" type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			

5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and most areas as standing pools.
Score	4	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
Score	14	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input checked="" type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
Score	5	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Note: determine left or right side by facing downstream.				
Score (LB)	5	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	5	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
Note: determine left or right side by facing downstream.				
Score (LB)	5	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	5	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
Note: determine left or right side by facing downstream.				
Score (LB)	5	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	5	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Total Score	81			

Project ID: Henderson County Solar	Stream Class: Intermittent Exhibit 14 Attachment 14.1
Stream ID: 2AS1F	Location: HENDERSON KY Page 78 of 237
Lat: 37.78741 Long: -87.64021	River Basin: Ohio

Investigators: Ryan Harris

Signature: _____ Date: 07-May-20 Reason for Survey: _____
Time: 9:18 AM 404 functional Assessment: _____

WEATHER CONDITIONS	Current	Past 24 Hour	Heavy rain in last 7 days
	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input type="checkbox"/> Cloud Cover % <input type="text" value="0"/> <input checked="" type="checkbox"/> Clear/Sunny	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input checked="" type="checkbox"/> Cloud Cover % <input type="text" value="50"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes Air Temp F <input type="text" value="65"/> Air Temp C <input type="text" value="18"/> Other <input type="text"/>

STREAM CHARACTERIZATION	Stream Subsystem	Stream Type
	<input type="checkbox"/> Perennial <input checked="" type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral Stream Origin <input type="checkbox"/> Upland Runoff <input checked="" type="checkbox"/> Mixture of Origins <input type="text"/> <input type="checkbox"/> Spring-fed/Ground Water <input type="checkbox"/> Wetland <input type="checkbox"/> Other <input type="text"/>	<input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater Catchment Area Mile ² <input type="text" value="0.61"/> Km ² <input type="text" value="1.58"/>

WATERSHED FEATURES	Surrounding Land Use & Percentage	Local Watershed NPS Pollution
	<input checked="" type="checkbox"/> Forest <input type="text" value="10"/> <input type="checkbox"/> Commercial <input type="text" value="0"/> <input type="checkbox"/> Field/Pasture <input type="text" value="0"/> <input type="checkbox"/> Other <input type="text" value="0"/> <input checked="" type="checkbox"/> Agriculture <input type="text" value="90"/> <input type="text"/> <input type="checkbox"/> Residential <input type="text" value="0"/>	<input type="checkbox"/> No evidence <input checked="" type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious sources Local Watershed Erosion <input type="checkbox"/> None <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy

RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present	Dominant Species
	<input type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Herbs <input type="checkbox"/> None	Annual Grasses

INSTREAM FEATURES	Est Reach Length	ft <input type="text" value="100"/> m <input type="text" value="30"/>	Canopy Cover
	Est Stream Width	ft <input type="text" value="9.4"/> m <input type="text" value="2.9"/>	<input checked="" type="checkbox"/> Open <input type="checkbox"/> Partly Open <input type="checkbox"/> Shaded <input type="checkbox"/> Partly Shaded
	Sampling Reach Area	ft ² <input type="text" value="940.0"/> m ² <input type="text" value="87.3"/>	High Water Mark
	Sampling Area	mile ² <input type="text" value="0.000034"/> km ² <input type="text" value="0.000087"/>	ft <input type="text" value="3.00"/> m <input type="text" value="0.91"/>
	Est Water Depth	in <input type="text" value="3.0"/> m <input type="text" value="0.1"/>	% of Stream Morphology
	Surface Velocity	ft/s <input type="text" value="0.5"/> m/s <input type="text" value="0.2"/>	<input checked="" type="checkbox"/> Riffle % <input type="text" value="20"/> <input checked="" type="checkbox"/> Run % <input type="text" value="60"/> <input checked="" type="checkbox"/> Pool % <input type="text" value="20"/> <input type="checkbox"/> Glide Pool <input type="checkbox"/> Step Pool Series
	Channelized	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
	Dam Present	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

LARGE WOODY DEBRIS	LWD	<input type="text" value="0.0"/> m ² <input type="text" value="0"/> ft ²
	Density of LWD	m ² /km ² <input type="text" value="0.0000000000"/> ft ² /mile ² <input type="text" value="0.0000000000"/>

AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present	Portion of the reach with aquatic vegetation present:
	<input checked="" type="checkbox"/> Rooted Emergent <input type="checkbox"/> Rooted Submergent <input type="checkbox"/> Rooted Floating <input type="checkbox"/> None <input type="checkbox"/> Free Floating <input checked="" type="checkbox"/> Attached Algae <input type="checkbox"/> Floating Algae	<input type="text" value="10"/>

WATER QUALITY	No Water Present	Temperature	<input type="text" value="20"/> °C <input type="text" value="68"/> °F	Water Odors
	No Flow Present	Conductivity	µs/cm <input type="text" value="629"/>	<input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic
	Total Dissolved Solids	<input type="text" value="315"/> mg/l	pH	Do:
		<input type="text" value="7.8"/>		<input type="text" value="9.68"/> mg/L
	Turbidity	Water Surface Oils		
	<input checked="" type="checkbox"/> Clear <input type="checkbox"/> Slightly Turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other	<input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globbs <input type="checkbox"/> Flecks <input type="checkbox"/> Other		

SEDIMENT/ SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other	Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper Fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relic Shells <input type="checkbox"/> Other
	Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	
	Looking at stones which are not deeply embedded, are undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

INORGANIC SUBSTRATE COMPONENTS			ORGANIC SUBSTRATE COMPONENTS		
Substrate Type	Diameter	% Composite in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock		0	Dietritus	Sticks, wood, coarse plant material	1
Boulder	>10"	0			
Cobble	2.5 - 10"	0	Muck-Mud	Black, very fine organic matter	0
Gravel	0.1 - 2.5"	10			
Sand	gritty	5	Marl	Grey, shell fragments	0
Silt	goeoy	5			
Clay	slick	80			

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADIENT STREAMS			
	Optimal	SubOptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom: little or no root mat: no submerged vegetation.	Hardpan clay or bedrock: no root mat or vegetation.
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
3. Pool Variability	Even mix of large shallow, large-deep, small shallow, small-deep pools present.	Majority of pools large-deep; very few shallow	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
Score	14	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input checked="" type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		

5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and many pools as standing pools.
Score	14	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input checked="" type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
Score	3	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Note: determine left or right side by facing downstream.				
Score (LB)	2	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	5	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
Note: determine left or right side by facing downstream.				
Score (LB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	5	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
Note: determine left or right side by facing downstream.				
Score (LB)	1	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	1	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 0		
Total Score	73			

Project ID: Henderson County Solar	Stream Class: Ephemeral Exhibit 14 Attachment 14.1
Stream ID: 2AS1F1	Location: HENDERSON KY Page 81 of 237
Lat: 37.78872 Long: -87.63843	River Basin: Ohio

Investigators: Keith Michalski

Signature: _____ Date: 07-May-20 Reason for Survey: _____
 Time: 9:52 AM 404 functional Assessment: _____

WEATHER CONDITIONS	Current	Past 24 Hour	Heavy rain in last 7 days
	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input type="checkbox"/> Cloud Cover % <input type="text" value="0"/> <input checked="" type="checkbox"/> Clear/Sunny	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input checked="" type="checkbox"/> Cloud Cover % <input type="text" value="50"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes Air Temp F <input type="text" value="65"/> Air Temp C <input type="text" value="18"/> Other <input type="text"/>

STREAM CHARACTERIZATION	Stream Subsystem	Stream Type
	<input type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input checked="" type="checkbox"/> Ephemeral	<input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater
	Stream Origin	Catchment Area
	<input type="checkbox"/> Upland Runoff <input checked="" type="checkbox"/> Mixture of Origins <input type="checkbox"/> Spring-fed/Ground Water <input type="checkbox"/> Wetland <input type="checkbox"/> Other <input type="text"/>	Mile ² <input type="text" value="0.01"/> Km ² <input type="text" value="0.03"/>

WATERSHED FEATURES	Surrounding Land Use & Percentage	Local Watershed NPS Pollution
	<input checked="" type="checkbox"/> Forest <input type="text" value="10"/> <input type="checkbox"/> Commercial <input type="text" value="0"/> <input type="checkbox"/> Field/Pasture <input type="text" value="0"/> <input type="checkbox"/> Other <input type="text" value="0"/> <input checked="" type="checkbox"/> Agriculture <input type="text" value="90"/> <input type="checkbox"/> Residential <input type="text" value="0"/>	<input type="checkbox"/> No evidence <input checked="" type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious sources
		Local Watershed Erosion
		<input type="checkbox"/> None <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy

RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present	Dominant Species
	<input type="checkbox"/> Trees <input checked="" type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbs <input type="checkbox"/> None	<input type="text" value="Soft Mast and Vines (L. japonica)"/>

INSTREAM FEATURES	Est Reach Length	ft <input type="text" value="35"/> m <input type="text" value="11"/>	Canopy Cover
	Est Stream Width	ft <input type="text" value="2.7"/> m <input type="text" value="0.8"/>	<input type="checkbox"/> Open <input type="checkbox"/> Partly Open <input type="checkbox"/> Shaded <input checked="" type="checkbox"/> Partly Shaded
	Sampling Reach Area	ft ² <input type="text" value="94.5"/> m ² <input type="text" value="8.8"/>	High Water Mark
	Sampling Area	mile ² <input type="text" value="0.000003"/> km ² <input type="text" value="0.000009"/>	ft <input type="text" value="0.40"/> m <input type="text" value="0.12"/>
	Est Water Depth	in <input type="text" value="0.5"/> m <input type="text" value="0.0"/>	% of Stream Morphology
	Surface Velocity	ft/s <input type="text" value="0.0"/> m/s <input type="text" value="0.0"/>	<input checked="" type="checkbox"/> Riffle % <input type="text" value="20"/> <input checked="" type="checkbox"/> Run % <input type="text" value="70"/> <input checked="" type="checkbox"/> Pool % <input type="text" value="10"/> <input type="checkbox"/> Glide Pool <input type="checkbox"/> Step Pool Series
	Channelized	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
	Dam Present	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

LARGE WOODY DEBRIS	LWD	<input type="text" value="0.0"/> m ² <input type="text" value="0"/> ft ²
	Density of LWD	m ² /km ² <input type="text" value="0.0000000000"/> ft ² /mile ² <input type="text" value="0.0000000000"/>

AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present	Portion of the reach with aquatic vegetation present:
	<input type="checkbox"/> Rooted Emergent <input type="checkbox"/> Rooted Submergent <input type="checkbox"/> Rooted Floating <input checked="" type="checkbox"/> None <input type="checkbox"/> Free Floating <input type="checkbox"/> Attached Algae <input type="checkbox"/> Floating Algae	<input type="text" value="0"/>

WATER QUALITY	No Water Present	Temperature	<input type="text" value="0"/> °C <input type="text" value="0"/> °F	Water Odors
	<input checked="" type="checkbox"/> No Flow Present	Conductivity	µs/cm <input type="text" value="0"/>	<input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic
	Total Dissolved Solids	<input type="text" value="0"/> mg/l	Do:	<input type="text"/>
	pH	<input type="text" value="0"/>	Water Surface Oils	<input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globbs <input type="checkbox"/> Flecks <input type="checkbox"/> Other
	Turbidity	<input checked="" type="checkbox"/> Clear <input type="checkbox"/> Slightly Turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other		

SEDIMENT/ SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other	Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper Fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relic Shells <input type="checkbox"/> Other
	Looking at stones which are not deeply embedded, are undersides black in color?	
	Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

INORGANIC SUBSTRATE COMPONENTS			ORGANIC SUBSTRATE COMPONENTS		
Substrate Type	Diameter	% Composite in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock		0	Dietritus	Sticks, wood, coarse plant material	10
Boulder	>10"	0			
Cobble	2.5 - 10"	0	Muck-Mud	Black, very fine organic matter	0
Gravel	0.1 - 2.5"	0			
Sand	gritty	0	Marl	Grey, shell fragments	0
Silt	goeoy	80			
Clay	slick	20			

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADIENT STREAMS			
	Optimal	SubOptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.
Score	3	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16	<input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom: little or no root mat: no submerged vegetation.	Hardpan clay or bedrock: no root mat or vegetation.
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16	<input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0
3. Pool Variability	Even mix of large shallow, large-deep, small shallow, small-deep pools present.	Majority of pools large-deep; very few shallow	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
Score	3	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16	<input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
Score	10	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16	<input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11	<input checked="" type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0

5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and many pools as standing pools.
Score	4	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
Score	8	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
Score	3	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Note: determine left or right side by facing downstream.				
Score (LB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
Note: determine left or right side by facing downstream.				
Score (LB)	5	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	5	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
Note: determine left or right side by facing downstream.				
Score (LB)	1	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	5	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Total Score	61			

Project ID: Henderson County Solar		Stream Class: Intermittent Exhibit 14 Attachment 14.1	
Stream ID: 2AS1F-1		Location: HENDERSON KY Page 84 of 237	
Lat: 37.78918	Long: -87.64422	River Basin Ohio	
Investigators: Ryan Harris			
Signature:		Date: 07-May-20	Reason for Survey:
		Time: 10:55 AM	404 functional Assessment:
WEATHER CONDITIONS	Current	Past 24 Hour	Heavy rain in last 7 days
	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input type="checkbox"/> Cloud Cover % <input type="text" value="0"/> <input checked="" type="checkbox"/> Clear/Sunny	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input checked="" type="checkbox"/> Cloud Cover % <input type="text" value="50"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes Air Temp F <input type="text" value="65"/> Air Temp C <input type="text" value="18"/> Other <input type="text"/>
STREAM CHARACTERIZATION	Stream Subsystem		Stream Type
	<input type="checkbox"/> Perennial <input checked="" type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral		<input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater
Stream Origin		Catchment Area	
<input type="checkbox"/> Upland Runoff <input checked="" type="checkbox"/> Mixture of Origins <input type="checkbox"/> Spring-fed/Ground Water <input type="checkbox"/> Wetland <input type="checkbox"/> Other <input type="text"/>		Mile ² <input type="text" value="0.23"/>	Km ² <input type="text" value="0.60"/>
WATERSHED FEATURES	Surrounding Land Use & Percentage		Local Watershed NPS Pollution
	<input type="checkbox"/> Forest <input type="text" value="0"/> <input type="checkbox"/> Field/Pasture <input type="text" value="0"/> <input checked="" type="checkbox"/> Agriculture <input type="text" value="100"/> <input type="checkbox"/> Residential <input type="text" value="0"/>	<input type="checkbox"/> Commercial <input type="text" value="0"/> <input type="checkbox"/> Other <input type="text" value="0"/>	<input type="checkbox"/> No evidence <input type="checkbox"/> Some potential sources <input checked="" type="checkbox"/> Obvious sources
RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present		Dominant Species
	<input type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Herbs <input type="checkbox"/> None		<input type="text" value="Annual Grasses"/>
INSTREAM FEATURES	Est Reach Length		Canopy Cover
	ft <input type="text" value="100"/>	m <input type="text" value="30"/>	<input checked="" type="checkbox"/> Open <input type="checkbox"/> Partly Open <input type="checkbox"/> Shaded <input type="checkbox"/> Partly Shaded
Est Stream Width		High Water Mark	
ft <input type="text" value="10.0"/>	m <input type="text" value="3.0"/>	ft <input type="text" value="2.00"/>	m <input type="text" value="0.61"/>
Sampling Reach Area		% of Stream Morphology	
ft ² <input type="text" value="1000.0"/>	m ² <input type="text" value="92.9"/>	<input checked="" type="checkbox"/> Riffle % <input type="text" value="20"/> <input checked="" type="checkbox"/> Pool % <input type="text" value="10"/> <input type="checkbox"/> Step Pool Series	
Sampling Area		Run % <input type="text" value="70"/>	
mile ² <input type="text" value="0.000037"/>	km ² <input type="text" value="0.000093"/>	<input type="checkbox"/> Glide Pool	
Est Water Depth		Channelized <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
in <input type="text" value="3.0"/>	m <input type="text" value="0.1"/>	Dam Present <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Surface Velocity			
ft/s <input type="text" value="0.5"/>	m/s <input type="text" value="0.2"/>		
LARGE WOODY DEBRIS	LWD		
	<input type="text" value="0.0"/> m ²	<input type="text" value="0"/> ft ²	
Density of LWD			
m ² /km ² <input type="text" value="0.0000000000"/>		ft ² /mile ² <input type="text" value="0.0000000000"/>	
AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present		Portion of the reach with aquatic vegetation present:
	<input checked="" type="checkbox"/> Rooted Emergent <input type="checkbox"/> Rooted Submergent <input type="checkbox"/> Rooted Floating <input type="checkbox"/> Free Floating <input checked="" type="checkbox"/> Attached Algae <input type="checkbox"/> Floating Algae		<input type="text" value="5"/>
WATER QUALITY	Temperature		Water Odors
	<input type="text" value="24"/> °C	<input type="text" value="76"/> °F	<input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic
Conductivity		Do:	
µs/cm <input type="text" value="559"/>		<input type="text" value="11.67"/> mg/L	
Total Dissolved Solids		Water Surface Oils	
mg/l <input type="text" value="280"/>		<input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globs <input type="checkbox"/> Flecks <input type="checkbox"/> Other	
pH			
<input type="text" value="7.85"/>			
Turbidity			
<input checked="" type="checkbox"/> Clear <input type="checkbox"/> Slightly Turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other			

SEDIMENT/ SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other	Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper Fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relic Shells <input type="checkbox"/> Other
	Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	
	Looking at stones which are not deeply embedded, are undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

INORGANIC SUBSTRATE COMPONENTS			ORGANIC SUBSTRATE COMPONENTS		
Substrate Type	Diameter	% Composite in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock		0	Dietritus	Sticks, wood, coarse plant material	1
Boulder	>10"	0			
Cobble	2.5 - 10"	0	Muck-Mud	Black, very fine organic matter	0
Gravel	0.1 - 2.5"	30			
Sand	gritty	20	Marl	Grey, shell fragments	0
Silt	goeoy	35			
Clay	slick	15			

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADIENT STREAMS				
	Optimal	SubOptimal	Marginal	Poor	
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.	
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom: little or no root mat: no submerged vegetation.	Hardpan clay or bedrock: no root mat or vegetation.	
Score	5	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
3. Pool Variability	Even mix of large shallow, large-deep, small shallow, small-deep pools present.	Majority of pools large-deep; very few shallow	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.	
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.	
Score	13	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input checked="" type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			

5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and most areas as standing pools.	
Score	13	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input checked="" type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.	
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.	
Score	3	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.	
Note: determine left or right side by facing downstream.					
Score (LB)	2	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	1	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 0			
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.	
Note: determine left or right side by facing downstream.					
Score (LB)	2	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	1	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.	
Note: determine left or right side by facing downstream.					
Score (LB)	2	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	1	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 0			
Total Score	61				

Investigators: Ryan Harris

Signature: _____ Date: 07-May-20 Reason for Survey: _____
 Time: 10:03 AM 404 functional Assessment: _____

WEATHER CONDITIONS	Current <input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input type="checkbox"/> Cloud Cover % <input type="text" value="0"/> <input checked="" type="checkbox"/> Clear/Sunny	Past 24 Hour <input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input checked="" type="checkbox"/> Cloud Cover % <input type="text" value="50"/> <input type="checkbox"/> Clear/Sunny	Heavy rain in last 7 days <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes Air Temp F <input type="text" value="65"/> Air Temp C <input type="text" value="18"/> Other <input type="text"/>
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STREAM CHARACTERIZATION	Stream Subsystem <input type="checkbox"/> Perennial <input checked="" type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral Stream Origin <input type="checkbox"/> Upland Runoff <input checked="" type="checkbox"/> Mixture of Origins <input type="text"/> <input type="checkbox"/> Spring-fed/Ground Water <input type="checkbox"/> Wetland <input type="checkbox"/> Other <input type="text"/>	Stream Type <input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater Catchment Area Mile ² <input type="text" value="0.23"/> Km ² <input type="text" value="0.60"/>
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WATERSHED FEATURES	Surrounding Land Use & Percentage <input checked="" type="checkbox"/> Forest <input type="text" value="10"/> <input type="checkbox"/> Commercial <input type="text" value="0"/> <input type="checkbox"/> Field/Pasture <input type="text" value="0"/> <input type="checkbox"/> Other <input type="text" value="0"/> <input checked="" type="checkbox"/> Agriculture <input type="text" value="90"/> <input type="checkbox"/> Residential <input type="text" value="0"/>	Local Watershed NPS Pollution <input type="checkbox"/> No evidence <input checked="" type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious sources Local Watershed Erosion <input type="checkbox"/> None <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy
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RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present <input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbs <input type="checkbox"/> None	Dominant Species <input type="text" value="Soft Mast, L. japonica"/>
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INSTREAM FEATURES	Est Reach Length ft <input type="text" value="17"/> m <input type="text" value="5"/> Est Stream Width ft <input type="text" value="8.5"/> m <input type="text" value="2.6"/> Sampling Reach Area ft ² <input type="text" value="144.5"/> m ² <input type="text" value="13.4"/> Sampling Area mile ² <input type="text" value="0.000005"/> km ² <input type="text" value="0.000013"/> Est Water Depth in <input type="text" value="2.0"/> m <input type="text" value="0.1"/> Surface Velocity ft/s <input type="text" value="0.6"/> m/s <input type="text" value="0.2"/> Channelized <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Dam Present <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Canopy Cover <input type="checkbox"/> Open <input type="checkbox"/> Partly Open <input type="checkbox"/> Shaded <input checked="" type="checkbox"/> Partly Shaded High Water Mark ft <input type="text" value="1.80"/> High Water Mark m <input type="text" value="0.55"/> % of Stream Morphology <input checked="" type="checkbox"/> Riffle % <input type="text" value="20"/> <input checked="" type="checkbox"/> Run % <input type="text" value="40"/> <input checked="" type="checkbox"/> Pool % <input type="text" value="40"/> <input type="checkbox"/> Glide Pool <input type="checkbox"/> Step Pool Series
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LARGE WOODY DEBRIS	LWD <input type="text" value="0.2"/> m ² <input type="text" value="2"/> ft ² Density of LWD <input type="text" value="0.0000001858"/> m ² /km ² <input type="text" value="0.0000000717"/> ft ² /mile ²
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AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present <input checked="" type="checkbox"/> Rooted Emergent <input type="checkbox"/> Rooted Submergent <input type="checkbox"/> Rooted Floating <input type="checkbox"/> None <input type="checkbox"/> Free Floating <input checked="" type="checkbox"/> Attached Algae <input type="checkbox"/> Floating Algae	Portion of the reach with aquatic vegetation present: <input type="text" value="30"/>
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WATER QUALITY	<input type="checkbox"/> No Water Present Temperature <input type="text" value="18"/> °C <input type="text" value="65"/> °F <input type="checkbox"/> No Flow Present Conductivity <input type="text" value="665"/> μs/cm Total Dissolved Solids <input type="text" value="333"/> mg/l pH <input type="text" value="7.81"/> Water Odors <input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic Do: <input type="text" value="9.26"/> mg/L Turbidity <input checked="" type="checkbox"/> Clear <input type="checkbox"/> Slightly Turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other Water Surface Oils <input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globbs <input type="checkbox"/> Flecks <input type="checkbox"/> Other
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SEDIMENT/ SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other	Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper Fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relic Shells <input type="checkbox"/> Other
	Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	
	Looking at stones which are not deeply embedded, are undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

INORGANIC SUBSTRATE COMPONENTS			ORGANIC SUBSTRATE COMPONENTS		
Substrate Type	Diameter	% Composite in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock		0	Dietritus	Sticks, wood, coarse plant material	6
Boulder	>10"	0			
Cobble	2.5 - 10"	0	Muck-Mud	Black, very fine organic matter	0
Gravel	0.1 - 2.5"	0			
Sand	gritty	10	Marl	Grey, shell fragments	0
Silt	goeoy	20			
Clay	slick	70			

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADIENT STREAMS			
	Optimal	SubOptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.
Score	8	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom: little or no root mat: no submerged vegetation.	Hardpan clay or bedrock: no root mat or vegetation.
Score	8	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
3. Pool Variability	Even mix of large shallow, large-deep, small shallow, small-deep pools present.	Majority of pools large-deep; very few shallow	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
Score	13	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input checked="" type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		

5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and most areas as standing pools.
Score	13	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input checked="" type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
Score	3	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Note: determine left or right side by facing downstream.				
Score (LB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	3	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
Note: determine left or right side by facing downstream.				
Score (LB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	3	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
Note: determine left or right side by facing downstream.				
Score (LB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	2	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Total Score	77			

Project ID: Henderson County Solar	Stream Class: Intermittent Exhibit 14 Attachment 14.1
Stream ID: 2AS1L3A	Location: HENDERSON KY Page 90 of 237
Lat: 37.77994 Long: -87.62812	River Basin: Ohio

Investigators: Scott Mitchell

Signature: _____ Date: 11-May-20 Reason for Survey: _____
 Time: 3:36 PM 404 functional Assessment: _____

WEATHER CONDITIONS	Current	Past 24 Hour	Heavy rain in last 7 days
	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input checked="" type="checkbox"/> Cloud Cover % <input type="text" value="50"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input type="checkbox"/> Cloud Cover % <input type="text" value="0"/> <input checked="" type="checkbox"/> Clear/Sunny	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes Air Temp F <input type="text" value="55"/> Air Temp C <input type="text" value="13"/> Other <input type="text"/>

STREAM CHARACTERIZATION	Stream Subsystem	Stream Type
	<input type="checkbox"/> Perennial <input checked="" type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral	<input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater
	Stream Origin	Mile ² <input type="text" value="0.07"/>
	<input checked="" type="checkbox"/> Upland Runoff <input type="checkbox"/> Mixture of Origins <input type="checkbox"/> Spring-fed/Ground Water <input type="checkbox"/> Wetland <input type="checkbox"/> Other <input type="text"/>	Km ² <input type="text" value="0.18"/>

WATERSHED FEATURES	Surrounding Land Use & Percentage	Local Watershed NPS Pollution
	<input type="checkbox"/> Forest <input type="text" value="0"/> <input type="checkbox"/> Commercial <input type="text" value="0"/> <input type="checkbox"/> Field/Pasture <input type="text" value="0"/> <input type="checkbox"/> Other <input type="text" value="0"/> <input checked="" type="checkbox"/> Agriculture <input type="text" value="100"/> <input type="checkbox"/> Residential <input type="text" value="0"/>	<input type="checkbox"/> No evidence <input type="checkbox"/> Some potential sources <input checked="" type="checkbox"/> Obvious sources
		Local Watershed Erosion
		<input type="checkbox"/> None <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy

RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present	Dominant Species
	<input type="checkbox"/> Trees <input checked="" type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbs <input type="checkbox"/> None	<input type="text" value="Soft Mast"/>

INSTREAM FEATURES	Est Reach Length	ft <input type="text" value="100"/> m <input type="text" value="30"/>	Canopy Cover
	Est Stream Width	ft <input type="text" value="3.5"/> m <input type="text" value="1.1"/>	<input checked="" type="checkbox"/> Open <input type="checkbox"/> Partly Open <input type="checkbox"/> Shaded <input type="checkbox"/> Partly Shaded
	Sampling Reach Area	ft ² <input type="text" value="350.0"/> m ² <input type="text" value="32.5"/>	High Water Mark
	Sampling Area	mile ² <input type="text" value="0.000013"/> km ² <input type="text" value="0.000032"/>	ft <input type="text" value="0.80"/> m <input type="text" value="0.24"/>
	Est Water Depth	in <input type="text" value="0.5"/> m <input type="text" value="0.0"/>	% of Stream Morphology
	Surface Velocity	ft/s <input type="text" value="0.1"/> m/s <input type="text" value="0.0"/>	<input checked="" type="checkbox"/> Riffle % <input type="text" value="40"/> <input checked="" type="checkbox"/> Run % <input type="text" value="55"/> <input checked="" type="checkbox"/> Pool % <input type="text" value="5"/> <input type="checkbox"/> Glide Pool <input type="checkbox"/> Step Pool Series
	Channelized	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
	Dam Present	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

LARGE WOODY DEBRIS	LWD	<input type="text" value="0.0"/> m ² <input type="text" value="0"/> ft ²
	Density of LWD	m ² /km ² <input type="text" value="0.0000000000"/> ft ² /mile ² <input type="text" value="0.0000000000"/>

AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present	Portion of the reach with aquatic vegetation present:
	<input type="checkbox"/> Rooted Emergent <input type="checkbox"/> Rooted Submergent <input type="checkbox"/> Rooted Floating <input type="checkbox"/> None <input type="checkbox"/> Free Floating <input checked="" type="checkbox"/> Attached Algae <input type="checkbox"/> Floating Algae	<input type="text" value="3"/>

WATER QUALITY	No Water Present	Temperature	<input type="text" value="12"/> °C <input type="text" value="54"/> °F	Water Odors
	No Flow Present	Conductivity	µs/cm <input type="text" value="596"/>	<input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic
	Total Dissolved Solids	<input type="text" value="298"/> mg/l	Do:	<input type="text" value="9.01"/> mg/L
	pH	<input type="text" value="7.23"/>	Water Surface Oils	<input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globbs <input type="checkbox"/> Flecks <input type="checkbox"/> Other
	Turbidity	<input checked="" type="checkbox"/> Clear <input type="checkbox"/> Slightly Turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other		

SEDIMENT/ SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other	Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper Fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relic Shells <input type="checkbox"/> Other
	Looking at stones which are not deeply embedded, are undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	

INORGANIC SUBSTRATE COMPONENTS			ORGANIC SUBSTRATE COMPONENTS		
Substrate Type	Diameter	% Composite in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock		0	Dietritus	Sticks, wood, coarse plant material	2
Boulder	>10"	0			
Cobble	2.5 - 10"	0	Muck-Mud	Black, very fine organic matter	0
Gravel	0.1 - 2.5"	5			
Sand	gritty	5	Marl	Grey, shell fragments	0
Silt	goeoy	5			
Clay	slick	85			

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADIENT STREAMS			
	Optimal	SubOptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.
Score	5	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom: little or no root mat: no submerged vegetation.	Hardpan clay or bedrock: no root mat or vegetation.
Score	5	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
3. Pool Variability	Even mix of large shallow, large-deep, small shallow, small-deep pools present.	Majority of pools large-deep; very few shallow	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
Score	3	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
Score	16	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input checked="" type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		

5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and most areas as standing pools.	
Score	8	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.	
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.	
Score	3	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.	
Note: determine left or right side by facing downstream.					
Score (LB)	6	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	6	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.	
Note: determine left or right side by facing downstream.					
Score (LB)	6	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	6	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.	
Note: determine left or right side by facing downstream.					
Score (LB)	2	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	2	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Total Score	74				

Project ID: Henderson County Solar	Stream Class: Perennial	Exhibit 14 Attachment 14.1
Stream ID: 2MS1	Location: HENDERSON KY	Page 93 of 237
Lat: 037.78741	Long: -87.62783	River Basin: Ohio

Investigators: Keith Michalski

Signature: _____ Date: 05-May-20 Reason for Survey: _____
 Time: 2:01 PM 404 functional Assessment: _____

WEATHER CONDITIONS	Current	Past 24 Hour	Heavy rain in last 7 days
	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input checked="" type="checkbox"/> Cloud Cover % <input type="text" value="100"/> <input type="checkbox"/> Clear/Sunny	<input checked="" type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input type="checkbox"/> Cloud Cover % <input type="text" value="0"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes Air Temp F <input type="text" value="60"/> Air Temp C <input type="text" value="16"/> Other <input type="text"/>

STREAM CHARACTERIZATION	Stream Subsystem	Stream Type
	<input checked="" type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral Stream Origin <input type="checkbox"/> Upland Runoff <input checked="" type="checkbox"/> Mixture of Origins <input type="text" value=""/> <input type="checkbox"/> Spring-fed/Ground Water <input type="checkbox"/> Wetland <input type="checkbox"/> Other <input type="text"/>	<input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater Catchment Area Mile ² <input type="text" value="10.00"/> Km ² <input type="text" value="25.90"/>

WATERSHED FEATURES	Surrounding Land Use & Percentage	Local Watershed NPS Pollution
	<input checked="" type="checkbox"/> Forest <input type="text" value="30"/> <input type="checkbox"/> Commercial <input type="text" value="0"/> <input type="checkbox"/> Field/Pasture <input type="text" value="0"/> <input type="checkbox"/> Other <input type="text" value="0"/> <input checked="" type="checkbox"/> Agriculture <input type="text" value="70"/> <input type="text" value=""/> <input type="checkbox"/> Residential <input type="text" value="0"/>	<input type="checkbox"/> No evidence <input checked="" type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious sources Local Watershed Erosion <input checked="" type="checkbox"/> None <input type="checkbox"/> Moderate <input type="checkbox"/> Heavy

RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present	Dominant Species
	<input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbs <input type="checkbox"/> None	<input type="text" value="Mixed Mast"/>

INSTREAM FEATURES	Est Reach Length	ft <input type="text" value="100"/> m <input type="text" value="30"/>	Canopy Cover
	Est Stream Width	ft <input type="text" value="28.0"/> m <input type="text" value="8.5"/>	<input type="checkbox"/> Open <input checked="" type="checkbox"/> Partly Open <input type="checkbox"/> Shaded <input type="checkbox"/> Partly Shaded
	Sampling Reach Area	ft ² <input type="text" value="2800.0"/> m ² <input type="text" value="260.1"/>	High Water Mark
	Sampling Area	mile ² <input type="text" value="0.000103"/> km ² <input type="text" value="0.000260"/>	ft <input type="text" value="4.60"/> m <input type="text" value="1.40"/>
	Est Water Depth	in <input type="text" value="3.0"/> m <input type="text" value="0.1"/>	% of Stream Morphology
	Surface Velocity	ft/s <input type="text" value="0.7"/> m/s <input type="text" value="0.2"/>	<input checked="" type="checkbox"/> Riffle % <input type="text" value="20"/> <input checked="" type="checkbox"/> Run % <input type="text" value="50"/> <input checked="" type="checkbox"/> Pool % <input type="text" value="30"/> <input type="checkbox"/> Glide Pool <input type="checkbox"/> Step Pool Series
	Channelized	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Dam Present	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

LARGE WOODY DEBRIS	LWD	<input type="text" value="0.9"/> m ² <input type="text" value="10"/> ft ²
	Density of LWD	m ² /km ² <input type="text" value="0.0000009290"/> ft ² /mile ² <input type="text" value="0.0000003587"/>

AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present	Portion of the reach with aquatic vegetation present:
	<input type="checkbox"/> Rooted Emergent <input type="checkbox"/> Rooted Submergent <input type="checkbox"/> Rooted Floating <input checked="" type="checkbox"/> None <input type="checkbox"/> Free Floating <input type="checkbox"/> Attached Algae <input type="checkbox"/> Floating Algae	<input type="text" value="0"/>

WATER QUALITY	No Water Present	Temperature	<input type="text" value="16"/> °C <input type="text" value="60"/> °F	Water Odors
	No Flow Present	Conductivity	µs/cm <input type="text" value="524"/>	<input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic
	Total Dissolved Solids	<input type="text" value="262"/> mg/l	pH	Do: <input type="text" value="9.64"/> mg/L
		<input type="text" value="7.9"/>	Turbidity	Water Surface Oils
			<input type="checkbox"/> Clear <input type="checkbox"/> Slightly Turbid <input checked="" type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other	<input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globbs <input type="checkbox"/> Flecks <input type="checkbox"/> Other

SEDIMENT/ SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other	Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper Fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relic Shells <input type="checkbox"/> Other
	Looking at stones which are not deeply embedded, are undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	

INORGANIC SUBSTRATE COMPONENTS			ORGANIC SUBSTRATE COMPONENTS		
Substrate Type	Diameter	% Composite in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock		0	Dietritus	Sticks, wood, coarse plant material	5
Boulder	>10"	0			
Cobble	2.5 - 10"	0	Muck-Mud	Black, very fine organic matter	0
Gravel	0.1 - 2.5"	10			
Sand	gritty	10	Marl	Grey, shell fragments	0
Silt	goeoy	30			
Clay	slick	50			

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADIENT STREAMS				
	Optimal	SubOptimal	Marginal	Poor	
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.	
Score	8	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom: little or no root mat: no submerged vegetation.	Hardpan clay or bedrock: no root mat or vegetation.	
Score	8	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
3. Pool Variability	Even mix of large shallow, large-deep, small shallow, small-deep pools present.	Majority of pools large-deep; very few shallow	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.	
Score	12	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input checked="" type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.	
Score	11	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input checked="" type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			

5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and most areas as standing pools.	
Score	18	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input checked="" type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.	
Score	13	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input checked="" type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.	
Score	9	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input checked="" type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.	
Note: determine left or right side by facing downstream.					
Score (LB)	2	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	2	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.	
Note: determine left or right side by facing downstream.					
Score (LB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.	
Note: determine left or right side by facing downstream.					
Score (LB)	5	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	9	<input type="checkbox"/> 10 <input checked="" type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Total Score	105				

Project ID: Henderson County Solar	Stream Class: Perennial Exhibit 14 Attachment 14.1
Stream ID: 2MS1-1	Location; HENDERSON KY Page 96 of 237
Lat: 37.78477 Long: -87.63895	River Basin Ohio

Investigators: Ryan Winka

Signature: _____ Date: 06-May-20 Reason for Survey: _____
 Time: 1:31 PM 404 functional Assessment: _____

WEATHER CONDITIONS	Current	Past 24 Hour	Heavy rain in last 7 days
	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input type="checkbox"/> Cloud Cover % <input type="text" value="0"/> <input checked="" type="checkbox"/> Clear/Sunny	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input checked="" type="checkbox"/> Cloud Cover % <input type="text" value="100"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes Air Temp F <input type="text" value="65"/> Air Temp C <input type="text" value="18"/> Other <input type="text"/>

STREAM CHARACTERIZATION	Stream Subsystem	Stream Type
	<input checked="" type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral	<input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater
	Stream Origin	Mile ² <input type="text" value="8.40"/>
	<input type="checkbox"/> Upland Runoff <input checked="" type="checkbox"/> Mixture of Origins <input type="checkbox"/> Spring-fed/Ground Water <input type="checkbox"/> Wetland <input type="checkbox"/> Other <input type="text"/>	Km ² <input type="text" value="21.76"/>

WATERSHED FEATURES	Surrounding Land Use & Percentage	Local Watershed NPS Pollution
	<input checked="" type="checkbox"/> Forest <input type="text" value="50"/> <input type="checkbox"/> Commercial <input type="text" value="0"/> <input type="checkbox"/> Field/Pasture <input type="text" value="0"/> <input type="checkbox"/> Other <input type="text" value="0"/> <input checked="" type="checkbox"/> Agriculture <input type="text" value="50"/> <input type="checkbox"/> Residential <input type="text" value="0"/>	<input type="checkbox"/> No evidence <input checked="" type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious sources
		Local Watershed Erosion
		<input type="checkbox"/> None <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy

RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present	Dominant Species
	<input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbs <input type="checkbox"/> None	<input type="text" value="Mixed Mast"/>

INSTREAM FEATURES	Est Reach Length	ft <input type="text" value="100"/> m <input type="text" value="30"/>	Canopy Cover
	Est Stream Width	ft <input type="text" value="30.0"/> m <input type="text" value="9.1"/>	<input type="checkbox"/> Open <input checked="" type="checkbox"/> Partly Open <input type="checkbox"/> Shaded <input type="checkbox"/> Partly Shaded
	Sampling Reach Area	ft ² <input type="text" value="3000.0"/> m ² <input type="text" value="278.7"/>	High Water Mark
	Sampling Area	mile ² <input type="text" value="0.000110"/> km ² <input type="text" value="0.000279"/>	ft <input type="text" value="4.00"/> m <input type="text" value="1.22"/>
	Est Water Depth	in <input type="text" value="36.0"/> m <input type="text" value="0.9"/>	% of Stream Morphology
	Surface Velocity	ft/s <input type="text" value="0.1"/> m/s <input type="text" value="0.0"/>	<input checked="" type="checkbox"/> Riffle % <input type="text" value="30"/> <input checked="" type="checkbox"/> Run % <input type="text" value="40"/> <input checked="" type="checkbox"/> Pool % <input type="text" value="30"/> <input type="checkbox"/> Glide Pool <input type="checkbox"/> Step Pool Series
	Channelized	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Dam Present	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

LARGE WOODY DEBRIS	LWD	<input type="text" value="0.9"/> m ² <input type="text" value="10"/> ft ²
	Density of LWD	m ² /km ² <input type="text" value="0.0000009290"/> ft ² /mile ² <input type="text" value="0.0000003587"/>

AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present	Portion of the reach with aquatic vegetation present:
	<input type="checkbox"/> Rooted Emergent <input type="checkbox"/> Rooted Submergent <input type="checkbox"/> Rooted Floating <input checked="" type="checkbox"/> None <input type="checkbox"/> Free Floating <input type="checkbox"/> Attached Algae <input type="checkbox"/> Floating Algae	<input type="text" value="0"/>

WATER QUALITY	No Water Present	Temperature	<input type="text" value="16"/> °C <input type="text" value="61"/> °F	Water Odors
	No Flow Present	Conductivity	<input type="text" value="547"/> μs/cm	<input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic
	Total Dissolved Solids	<input type="text" value="274"/> mg/l	pH	Do:
		<input type="text" value="7.63"/>		<input type="text" value="10.8"/> mg/L
	Turbidity	<input type="checkbox"/> Clear <input type="checkbox"/> Slightly Turbid <input checked="" type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other	Water Surface Oils	<input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globs <input type="checkbox"/> Flecks <input type="checkbox"/> Other

SEDIMENT/ SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other	Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper Fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relic Shells <input type="checkbox"/> Other
	Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	
	Looking at stones which are not deeply embedded, are undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

INORGANIC SUBSTRATE COMPONENTS			ORGANIC SUBSTRATE COMPONENTS		
Substrate Type	Diameter	% Composite in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock		0	Dietritus	Sticks, wood, coarse plant material	5
Boulder	>10"	0			
Cobble	2.5 - 10"	0	Muck-Mud	Black, very fine organic matter	0
Gravel	0.1 - 2.5"	10			
Sand	gritty	10	Marl	Grey, shell fragments	0
Silt	goeoy	40			
Clay	slick	40			

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADIENT STREAMS																					
	Optimal				SubOptimal				Marginal				Poor									
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).				30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of new fall, but not yet prepared for colonization (may rate at high end of scale).				10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.				10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.									
Score	9	<input type="checkbox"/> 20	<input type="checkbox"/> 19	<input type="checkbox"/> 18	<input type="checkbox"/> 17	<input type="checkbox"/> 16	<input type="checkbox"/> 15	<input type="checkbox"/> 14	<input type="checkbox"/> 13	<input type="checkbox"/> 12	<input type="checkbox"/> 11	<input type="checkbox"/> 10	<input checked="" type="checkbox"/> 9	<input type="checkbox"/> 8	<input type="checkbox"/> 7	<input type="checkbox"/> 6	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.				Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.				All mud or clay or sand bottom: little or no root mat: no submerged vegetation.				Hardpan clay or bedrock: no root mat or vegetation.									
Score	9	<input type="checkbox"/> 20	<input type="checkbox"/> 19	<input type="checkbox"/> 18	<input type="checkbox"/> 17	<input type="checkbox"/> 16	<input type="checkbox"/> 15	<input type="checkbox"/> 14	<input type="checkbox"/> 13	<input type="checkbox"/> 12	<input type="checkbox"/> 11	<input type="checkbox"/> 10	<input checked="" type="checkbox"/> 9	<input type="checkbox"/> 8	<input type="checkbox"/> 7	<input type="checkbox"/> 6	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
3. Pool Variability	Even mix of large shallow, large-deep, small shallow, small-deep pools present.				Majority of pools large-deep; very few shallow				Shallow pools much more prevalent than deep pools.				Majority of pools small-shallow or pools absent.									
Score	10	<input type="checkbox"/> 20	<input type="checkbox"/> 19	<input type="checkbox"/> 18	<input type="checkbox"/> 17	<input type="checkbox"/> 16	<input type="checkbox"/> 15	<input type="checkbox"/> 14	<input type="checkbox"/> 13	<input type="checkbox"/> 12	<input type="checkbox"/> 11	<input checked="" type="checkbox"/> 10	<input type="checkbox"/> 9	<input type="checkbox"/> 8	<input type="checkbox"/> 7	<input type="checkbox"/> 6	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.				Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.				Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.				Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.									
Score	14	<input type="checkbox"/> 20	<input type="checkbox"/> 19	<input type="checkbox"/> 18	<input type="checkbox"/> 17	<input type="checkbox"/> 16	<input type="checkbox"/> 15	<input checked="" type="checkbox"/> 14	<input type="checkbox"/> 13	<input type="checkbox"/> 12	<input type="checkbox"/> 11	<input type="checkbox"/> 10	<input type="checkbox"/> 9	<input type="checkbox"/> 8	<input type="checkbox"/> 7	<input type="checkbox"/> 6	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0

5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and most areas as standing pools.
Score	15	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16	<input checked="" type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
Score	13	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16	<input type="checkbox"/> 15 <input type="checkbox"/> 14 <input checked="" type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
Score	7	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16	<input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input checked="" type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Note: determine left or right side by facing downstream.				
Score (LB)	2	<input type="checkbox"/> 10 <input type="checkbox"/> 9	<input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6	<input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0
Score (RB)	2	<input type="checkbox"/> 10 <input type="checkbox"/> 9	<input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6	<input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
Note: determine left or right side by facing downstream.				
Score (LB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9	<input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6	<input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0
Score (RB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9	<input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6	<input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
Note: determine left or right side by facing downstream.				
Score (LB)	6	<input type="checkbox"/> 10 <input type="checkbox"/> 9	<input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6	<input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0
Score (RB)	9	<input type="checkbox"/> 10 <input checked="" type="checkbox"/> 9	<input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6	<input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0
Total Score	104			

Project ID: Henderson County Solar	Stream Class: Ephemeral Exhibit 14 Attachment 14.1
Stream ID: 2MS1A	Location: HENDERSON KY Page 99 of 237
Lat: 37.78752 Long: -87.62620	River Basin: Ohio

Investigators: Keith Michalski

Signature: _____ Date: 06-May-20 Reason for Survey: _____
Time: 1:17 PM 404 functional Assessment: _____

WEATHER CONDITIONS	Current	Past 24 Hour	Heavy rain in last 7 days
	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input type="checkbox"/> Cloud Cover % <input type="text" value="0"/> <input checked="" type="checkbox"/> Clear/Sunny	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input checked="" type="checkbox"/> Cloud Cover % <input type="text" value="100"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes Air Temp F <input type="text" value="60"/> Air Temp C <input type="text" value="16"/> Other <input type="text"/>

STREAM CHARACTERIZATION	Stream Subsystem	Stream Type
	<input type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input checked="" type="checkbox"/> Ephemeral	<input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater
	Stream Origin	Mile ² <input type="text" value="0.01"/>
	<input type="checkbox"/> Upland Runoff <input checked="" type="checkbox"/> Mixture of Origins <input type="checkbox"/> Spring-fed/Ground Water <input type="checkbox"/> Wetland <input type="checkbox"/> Other <input type="text"/>	Km ² <input type="text" value="0.03"/>

WATERSHED FEATURES	Surrounding Land Use & Percentage	Local Watershed NPS Pollution
	<input checked="" type="checkbox"/> Forest <input type="text" value="20"/> <input type="checkbox"/> Commercial <input type="text" value="0"/> <input type="checkbox"/> Field/Pasture <input type="text" value="0"/> <input type="checkbox"/> Other <input type="text" value="0"/> <input checked="" type="checkbox"/> Agriculture <input type="text" value="80"/> <input type="checkbox"/> Residential <input type="text" value="0"/>	<input type="checkbox"/> No evidence <input checked="" type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious sources
		Local Watershed Erosion
		<input type="checkbox"/> None <input type="checkbox"/> Moderate <input checked="" type="checkbox"/> Heavy

RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present	Dominant Species
	<input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbs <input type="checkbox"/> None	<input type="text" value="Soft Mast"/>

INSTREAM FEATURES	Est Reach Length	ft <input type="text" value="51"/> m <input type="text" value="16"/>	Canopy Cover
	Est Stream Width	ft <input type="text" value="2.8"/> m <input type="text" value="0.9"/>	<input type="checkbox"/> Open <input type="checkbox"/> Partly Open <input checked="" type="checkbox"/> Shaded <input type="checkbox"/> Partly Shaded
	Sampling Reach Area	ft ² <input type="text" value="142.8"/> m ² <input type="text" value="13.3"/>	High Water Mark
	Sampling Area	mile ² <input type="text" value="0.000005"/> km ² <input type="text" value="0.000013"/>	ft <input type="text" value="0.40"/> m <input type="text" value="0.12"/>
	Est Water Depth	in <input type="text" value="0.0"/> m <input type="text" value="0.0"/>	% of Stream Morphology
	Surface Velocity	ft/s <input type="text" value="0.0"/> m/s <input type="text" value="0.0"/>	<input type="checkbox"/> Riffle % <input type="text" value="0"/> <input type="checkbox"/> Run % <input type="text" value="0"/> <input type="checkbox"/> Pool % <input type="text" value="0"/> <input type="checkbox"/> Glide Pool <input checked="" type="checkbox"/> Step Pool Series
	Channelized	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Dam Present	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

LARGE WOODY DEBRIS	LWD	<input type="text" value="0.0"/> m ² <input type="text" value="0"/> ft ²
	Density of LWD	m ² /km ² <input type="text" value="0.0000000000"/> ft ² /mile ² <input type="text" value="0.0000000000"/>

AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present	Portion of the reach with aquatic vegetation present: <input type="text" value="0"/>
	<input type="checkbox"/> Rooted Emergent <input type="checkbox"/> Rooted Submergent <input type="checkbox"/> Rooted Floating <input checked="" type="checkbox"/> None <input type="checkbox"/> Free Floating <input type="checkbox"/> Attached Algae <input type="checkbox"/> Floating Algae	

WATER QUALITY	<input checked="" type="checkbox"/> No Water Present	Temperature	<input type="text" value="0"/> °C <input type="text" value="0"/> °F	Water Odors
	<input type="checkbox"/> No Flow Present	Conductivity	µs/cm <input type="text" value="0"/>	<input type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic
	Total Dissolved Solids	<input type="text" value="0"/> mg/l	Do:	<input type="text"/>
	pH	<input type="text" value="0"/>	Water Surface Oils	<input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globbs <input type="checkbox"/> Flecks <input type="checkbox"/> Other
	Turbidity	<input type="checkbox"/> Clear <input type="checkbox"/> Slightly Turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other		

SEDIMENT/ SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other	Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper Fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relic Shells <input type="checkbox"/> Other
	Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	
	Looking at stones which are not deeply embedded, are undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

INORGANIC SUBSTRATE COMPONENTS			ORGANIC SUBSTRATE COMPONENTS		
Substrate Type	Diameter	% Composite in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock		0	Dietritus	Sticks, wood, coarse plant material	3
Boulder	>10"	0			
Cobble	2.5 - 10"	0	Muck-Mud	Black, very fine organic matter	0
Gravel	0.1 - 2.5"	0			
Sand	gritty	0	Marl	Grey, shell fragments	0
Silt	goeoy	100			
Clay	slick	0			

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADIENT STREAMS				
	Optimal	SubOptimal	Marginal	Poor	
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.	
Score	2	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom: little or no root mat: no submerged vegetation.	Hardpan clay or bedrock: no root mat or vegetation.	
Score	5	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
3. Pool Variability	Even mix of large shallow, large-deep, small shallow, small-deep pools present.	Majority of pools large-deep; very few shallow	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.	
Score	2	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.	
Score	11	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input checked="" type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			

5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.	
Score	1	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 0			
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.	
Score	11	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input checked="" type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.	
Score	5	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.	
Note: determine left or right side by facing downstream.					
Score (LB)	2	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	2	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.	
Note: determine left or right side by facing downstream.					
Score (LB)	2	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	2	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.	
Note: determine left or right side by facing downstream.					
Score (LB)	5	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	5	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Total Score	55				

Project ID: Henderson County Solar	Stream Class: Ephemeral Exhibit 14 Attachment 14.1
Stream ID: 2MS1B	Location: HENDERSON KY Page 102 of 237
Lat: 37.78720 Long: -87.62802	River Basin: Ohio

Investigators: Keith Michalski

Signature: _____ Date: 06-May-20 Reason for Survey: _____
 Time: 1:42 PM 404 functional Assessment: _____

WEATHER CONDITIONS	Current	Past 24 Hour	Heavy rain in last 7 days
	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input type="checkbox"/> Cloud Cover % <input type="text" value="0"/> <input checked="" type="checkbox"/> Clear/Sunny	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input checked="" type="checkbox"/> Cloud Cover % <input type="text" value="100"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes Air Temp F <input type="text" value="60"/> Air Temp C <input type="text" value="16"/> Other <input type="text"/>

STREAM CHARACTERIZATION	Stream Subsystem	Stream Type
	<input type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input checked="" type="checkbox"/> Ephemeral	<input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater
	Stream Origin	Mile ² <input type="text" value="0.01"/>
	<input type="checkbox"/> Upland Runoff <input checked="" type="checkbox"/> Mixture of Origins <input type="checkbox"/> Spring-fed/Ground Water <input type="checkbox"/> Wetland <input type="checkbox"/> Other <input type="text"/>	Km ² <input type="text" value="0.03"/>

WATERSHED FEATURES	Surrounding Land Use & Percentage	Local Watershed NPS Pollution
	<input checked="" type="checkbox"/> Forest <input type="text" value="20"/> <input type="checkbox"/> Commercial <input type="text" value="0"/> <input type="checkbox"/> Field/Pasture <input type="text" value="0"/> <input type="checkbox"/> Other <input type="text" value="0"/> <input checked="" type="checkbox"/> Agriculture <input type="text" value="80"/> <input type="checkbox"/> Residential <input type="text" value="0"/>	<input type="checkbox"/> No evidence <input checked="" type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious sources
		Local Watershed Erosion
		<input type="checkbox"/> None <input type="checkbox"/> Moderate <input checked="" type="checkbox"/> Heavy

RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present	Dominant Species
	<input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbs <input type="checkbox"/> None	<input type="text" value="Mixed Mast"/>

INSTREAM FEATURES	Est Reach Length	ft <input type="text" value="47"/> m <input type="text" value="14"/>	Canopy Cover
	Est Stream Width	ft <input type="text" value="2.6"/> m <input type="text" value="0.8"/>	<input type="checkbox"/> Open <input checked="" type="checkbox"/> Partly Open <input type="checkbox"/> Shaded <input type="checkbox"/> Partly Shaded
	Sampling Reach Area	ft ² <input type="text" value="122.2"/> m ² <input type="text" value="11.4"/>	High Water Mark
	Sampling Area	mile ² <input type="text" value="0.000004"/> km ² <input type="text" value="0.000011"/>	ft <input type="text" value="0.40"/> m <input type="text" value="0.12"/>
	Est Water Depth	in <input type="text" value="0.0"/> m <input type="text" value="0.0"/>	% of Stream Morphology
	Surface Velocity	ft/s <input type="text" value="0.0"/> m/s <input type="text" value="0.0"/>	<input checked="" type="checkbox"/> Riffle % <input type="text" value="20"/> <input checked="" type="checkbox"/> Run % <input type="text" value="80"/> <input type="checkbox"/> Pool % <input type="text" value="0"/> <input type="checkbox"/> Glide Pool <input type="checkbox"/> Step Pool Series
	Channelized	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Dam Present	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

LARGE WOODY DEBRIS	LWD	<input type="text" value="0.0"/> m ² <input type="text" value="0"/> ft ²
	Density of LWD	m ² /km ² <input type="text" value="0.0000000000"/> ft ² /mile ² <input type="text" value="0.0000000000"/>

AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present	Portion of the reach with aquatic vegetation present: <input type="text" value="0"/>
	<input type="checkbox"/> Rooted Emergent <input type="checkbox"/> Rooted Submergent <input type="checkbox"/> Rooted Floating <input checked="" type="checkbox"/> None <input type="checkbox"/> Free Floating <input type="checkbox"/> Attached Algae <input type="checkbox"/> Floating Algae	

WATER QUALITY	<input checked="" type="checkbox"/> No Water Present Temperature <input type="text" value="0"/> °C <input type="text" value="0"/> °F <input type="checkbox"/> No Flow Present Conductivity <input type="text" value="0"/> μs/cm Total Dissolved Solids <input type="text" value="0"/> mg/l pH <input type="text" value="0"/>	Water Odors
	<input type="checkbox"/> Clear <input type="checkbox"/> Slightly Turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other	<input type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic Do: <input type="text"/> mg/L Water Surface Oils <input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globs <input type="checkbox"/> Flecks <input type="checkbox"/> Other

SEDIMENT/ SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other	Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper Fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relic Shells <input type="checkbox"/> Other
	Looking at stones which are not deeply embedded, are undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	

INORGANIC SUBSTRATE COMPONENTS			ORGANIC SUBSTRATE COMPONENTS		
Substrate Type	Diameter	% Composite in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock		0	Dietritus	Sticks, wood, coarse plant material	5
Boulder	>10"	0			
Cobble	2.5 - 10"	0	Muck-Mud	Black, very fine organic matter	0
Gravel	0.1 - 2.5"	0			
Sand	gritty	0	Marl	Grey, shell fragments	0
Silt	goeoy	100			
Clay	slick	0			

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADIENT STREAMS				
	Optimal	SubOptimal	Marginal	Poor	
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.	
Score	2	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom: little or no root mat: no submerged vegetation.	Hardpan clay or bedrock: no root mat or vegetation.	
Score	5	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
3. Pool Variability	Even mix of large shallow, large-deep, small shallow, small-deep pools present.	Majority of pools large-deep; very few shallow	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.	
Score	1	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 0			
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.	
Score	12	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input checked="" type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			

5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.	
Score	1	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 0			
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.	
Score	11	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input checked="" type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.	
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.	
Note: determine left or right side by facing downstream.					
Score (LB)	3	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	3	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.	
Note: determine left or right side by facing downstream.					
Score (LB)	3	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	3	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.	
Note: determine left or right side by facing downstream.					
Score (LB)	5	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	5	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Total Score	60				

Project ID: Henderson County Solar	Stream Class: Ephemeral Exhibit 14 Attachment 14.1
Stream ID: 2MS1C	Location: HENDERSON KY Page 105 of 237
Lat: 37.78675 Long: -87.62907	River Basin: Ohio

Investigators: Keith Michalski

Signature: _____ Date: 06-May-20 Reason for Survey: _____
 Time: 2:11 PM 404 functional Assessment: _____

WEATHER CONDITIONS	Current	Past 24 Hour	Heavy rain in last 7 days
	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input checked="" type="checkbox"/> Cloud Cover % <input type="text" value="20"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input checked="" type="checkbox"/> Cloud Cover % <input type="text" value="100"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes Air Temp F <input type="text" value="60"/> Air Temp C <input type="text" value="16"/> Other <input type="text"/>

STREAM CHARACTERIZATION	Stream Subsystem	Stream Type
	<input type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input checked="" type="checkbox"/> Ephemeral	<input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater
	Stream Origin	Mile ² <input type="text" value="0.01"/>
	<input type="checkbox"/> Upland Runoff <input checked="" type="checkbox"/> Mixture of Origins <input type="checkbox"/> Spring-fed/Ground Water <input type="checkbox"/> Wetland <input type="checkbox"/> Other <input type="text"/>	Km ² <input type="text" value="0.03"/>

WATERSHED FEATURES	Surrounding Land Use & Percentage	Local Watershed NPS Pollution
	<input checked="" type="checkbox"/> Forest <input type="text" value="10"/> <input type="checkbox"/> Commercial <input type="text" value="0"/> <input type="checkbox"/> Field/Pasture <input type="text" value="0"/> <input type="checkbox"/> Other <input type="text" value="0"/> <input checked="" type="checkbox"/> Agriculture <input type="text" value="90"/> <input type="checkbox"/> Residential <input type="text" value="0"/>	<input type="checkbox"/> No evidence <input checked="" type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious sources
		Local Watershed Erosion
		<input type="checkbox"/> None <input type="checkbox"/> Moderate <input checked="" type="checkbox"/> Heavy

RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present	Dominant Species
	<input type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Herbs <input type="checkbox"/> None	Annual grasses

INSTREAM FEATURES	Est Reach Length	ft <input type="text" value="41"/> m <input type="text" value="12"/>	Canopy Cover
	Est Stream Width	ft <input type="text" value="2.4"/> m <input type="text" value="0.7"/>	<input checked="" type="checkbox"/> Open <input type="checkbox"/> Partly Open <input type="checkbox"/> Shaded <input type="checkbox"/> Partly Shaded
	Sampling Reach Area	ft ² <input type="text" value="98.4"/> m ² <input type="text" value="9.1"/>	High Water Mark
	Sampling Area	mile ² <input type="text" value="0.000004"/> km ² <input type="text" value="0.000009"/>	ft <input type="text" value="0.30"/> m <input type="text" value="0.09"/>
	Est Water Depth	in <input type="text" value="0.0"/> m <input type="text" value="0.0"/>	% of Stream Morphology
	Surface Velocity	ft/s <input type="text" value="0.0"/> m/s <input type="text" value="0.0"/>	<input checked="" type="checkbox"/> Riffle % <input type="text" value="20"/> <input checked="" type="checkbox"/> Run % <input type="text" value="75"/> <input checked="" type="checkbox"/> Pool % <input type="text" value="5"/> <input type="checkbox"/> Glide Pool <input type="checkbox"/> Step Pool Series
	Channelized	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Dam Present	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

LARGE WOODY DEBRIS	LWD	<input type="text" value="0.0"/> m ² <input type="text" value="0"/> ft ²
	Density of LWD	m ² /km ² <input type="text" value="0.0000000000"/> ft ² /mile ² <input type="text" value="0.0000000000"/>

AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present	Portion of the reach with aquatic vegetation present: <input type="text" value="0"/>
	<input type="checkbox"/> Rooted Emergent <input type="checkbox"/> Rooted Submergent <input type="checkbox"/> Rooted Floating <input checked="" type="checkbox"/> None <input type="checkbox"/> Free Floating <input type="checkbox"/> Attached Algae <input type="checkbox"/> Floating Algae	

WATER QUALITY	<input checked="" type="checkbox"/> No Water Present Temperature <input type="text" value="0"/> °C <input type="text" value="0"/> °F <input type="checkbox"/> No Flow Present Conductivity <input type="text" value="0"/> μs/cm Total Dissolved Solids <input type="text" value="0"/> mg/l pH <input type="text" value="0"/>	Water Odors
	<input type="checkbox"/> Clear <input type="checkbox"/> Slightly Turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other	<input type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic Do: <input type="text"/> mg/L Water Surface Oils <input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globbs <input type="checkbox"/> Flecks <input type="checkbox"/> Other

SEDIMENT/ SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other	Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper Fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relic Shells <input type="checkbox"/> Other
	Looking at stones which are not deeply embedded, are undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	

INORGANIC SUBSTRATE COMPONENTS			ORGANIC SUBSTRATE COMPONENTS		
Substrate Type	Diameter	% Composite in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock		0	Dietritus	Sticks, wood, coarse plant material	2
Boulder	>10"	0			
Cobble	2.5 - 10"	0	Muck-Mud	Black, very fine organic matter	0
Gravel	0.1 - 2.5"	0			
Sand	gritty	0	Marl	Grey, shell fragments	0
Silt	goeoy	100			
Clay	slick	0			

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADIENT STREAMS				
	Optimal	SubOptimal	Marginal	Poor	
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.	
Score	2	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom: little or no root mat: no submerged vegetation.	Hardpan clay or bedrock: no root mat or vegetation.	
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
3. Pool Variability	Even mix of large shallow, large-deep, small shallow, small-deep pools present.	Majority of pools large-deep; very few shallow	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.	
Score	3	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.	
Score	11	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input checked="" type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			

5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.	
Score	1	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 0			
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.	
Score	9	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input checked="" type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.	
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.	
Note: determine left or right side by facing downstream.					
Score (LB)	3	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	3	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.	
Note: determine left or right side by facing downstream.					
Score (LB)	2	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	2	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.	
Note: determine left or right side by facing downstream.					
Score (LB)	2	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	2	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Total Score	52				

Investigators: Ryan Winka

Signature: _____ Date: 07-May-20 Reason for Survey: _____
 Time: 10:15 AM 404 functional Assessment: _____

WEATHER CONDITIONS	Current	Past 24 Hour	Heavy rain in last 7 days
	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input type="checkbox"/> Cloud Cover % <input type="text" value="0"/> <input checked="" type="checkbox"/> Clear/Sunny	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input checked="" type="checkbox"/> Cloud Cover % <input type="text" value="50"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes Air Temp F <input type="text" value="65"/> Air Temp C <input type="text" value="18"/> Other <input type="text"/>

STREAM CHARACTERIZATION	Stream Subsystem	Stream Type
	<input type="checkbox"/> Perennial <input checked="" type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral Stream Origin <input type="checkbox"/> Upland Runoff <input checked="" type="checkbox"/> Mixture of Origins <input type="text"/> <input type="checkbox"/> Spring-fed/Ground Water <input type="checkbox"/> Wetland <input type="checkbox"/> Other <input type="text"/>	<input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater Catchment Area Mile ² <input type="text" value="0.02"/> Km ² <input type="text" value="0.05"/>

WATERSHED FEATURES	Surrounding Land Use & Percentage	Local Watershed NPS Pollution
	<input checked="" type="checkbox"/> Forest <input type="text" value="10"/> <input type="checkbox"/> Commercial <input type="text" value="0"/> <input type="checkbox"/> Field/Pasture <input type="text" value="0"/> <input type="checkbox"/> Other <input type="text" value="0"/> <input checked="" type="checkbox"/> Agriculture <input type="text" value="90"/> <input type="checkbox"/> Residential <input type="text" value="0"/>	<input type="checkbox"/> No evidence <input checked="" type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious sources Local Watershed Erosion <input type="checkbox"/> None <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy

RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present	Dominant Species
	<input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbs <input type="checkbox"/> None	<input type="text" value="Soft Mast"/>

INSTREAM FEATURES	Est Reach Length	ft <input type="text" value="100"/> m <input type="text" value="30"/>	Canopy Cover
	Est Stream Width	ft <input type="text" value="2.6"/> m <input type="text" value="0.8"/>	<input type="checkbox"/> Open <input checked="" type="checkbox"/> Partly Open <input type="checkbox"/> Shaded <input type="checkbox"/> Partly Shaded
	Sampling Reach Area	ft ² <input type="text" value="260.0"/> m ² <input type="text" value="24.2"/>	High Water Mark
	Sampling Area	mile ² <input type="text" value="0.000010"/> km ² <input type="text" value="0.000024"/>	ft <input type="text" value="0.25"/> m <input type="text" value="0.08"/>
	Est Water Depth	in <input type="text" value="0.5"/> m <input type="text" value="0.0"/>	% of Stream Morphology
	Surface Velocity	ft/s <input type="text" value="0.3"/> m/s <input type="text" value="0.1"/>	<input checked="" type="checkbox"/> Riffle % <input type="text" value="35"/> <input checked="" type="checkbox"/> Run % <input type="text" value="55"/> <input checked="" type="checkbox"/> Pool % <input type="text" value="10"/> <input type="checkbox"/> Glide Pool <input type="checkbox"/> Step Pool Series
	Channelized	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
	Dam Present	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

LARGE WOODY DEBRIS	LWD	<input type="text" value="0.0"/> m ² <input type="text" value="0"/> ft ²
	Density of LWD	m ² /km ² <input type="text" value="0.0000000000"/> ft ² /mile ² <input type="text" value="0.0000000000"/>

AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present	Portion of the reach with aquatic vegetation present:
	<input checked="" type="checkbox"/> Rooted Emergent <input type="checkbox"/> Rooted Submergent <input type="checkbox"/> Rooted Floating <input type="checkbox"/> None <input type="checkbox"/> Free Floating <input type="checkbox"/> Attached Algae <input type="checkbox"/> Floating Algae	<input type="text" value="1"/>

WATER QUALITY	No Water Present	Temperature	<input type="text" value="17"/> °C <input type="text" value="63"/> °F	Water Odors
	No Flow Present	Conductivity	µs/cm <input type="text" value="615"/>	<input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic
	Total Dissolved Solids	<input type="text" value="308"/> mg/l	pH	Do:
		<input type="text" value="7.93"/>		<input type="text" value="1.52"/> mg/L
	Turbidity	Water Surface Oils		
	<input checked="" type="checkbox"/> Clear <input type="checkbox"/> Slightly Turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other	<input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globbs <input type="checkbox"/> Flecks <input type="checkbox"/> Other		

SEDIMENT/ SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other	Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper Fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relic Shells <input type="checkbox"/> Other
	Looking at stones which are not deeply embedded, are undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	

INORGANIC SUBSTRATE COMPONENTS			ORGANIC SUBSTRATE COMPONENTS		
Substrate Type	Diameter	% Composite in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock		0	Dietritus	Sticks, wood, coarse plant material	5
Boulder	>10"	0			
Cobble	2.5 - 10"	0	Muck-Mud	Black, very fine organic matter	0
Gravel	0.1 - 2.5"	2			
Sand	gritty	18	Marl	Grey, shell fragments	0
Silt	goeoy	40			
Clay	slick	40			

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADIENT STREAMS																					
	Optimal				SubOptimal				Marginal				Poor									
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).				30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of new fall, but not yet prepared for colonization (may rate at high end of scale).				10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.				10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.									
Score	7	<input type="checkbox"/> 20	<input type="checkbox"/> 19	<input type="checkbox"/> 18	<input type="checkbox"/> 17	<input type="checkbox"/> 16	<input type="checkbox"/> 15	<input type="checkbox"/> 14	<input type="checkbox"/> 13	<input type="checkbox"/> 12	<input type="checkbox"/> 11	<input type="checkbox"/> 10	<input type="checkbox"/> 9	<input type="checkbox"/> 8	<input checked="" type="checkbox"/> 7	<input type="checkbox"/> 6	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.				Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.				All mud or clay or sand bottom: little or no root mat: no submerged vegetation.				Hardpan clay or bedrock: no root mat or vegetation.									
Score	6	<input type="checkbox"/> 20	<input type="checkbox"/> 19	<input type="checkbox"/> 18	<input type="checkbox"/> 17	<input type="checkbox"/> 16	<input type="checkbox"/> 15	<input type="checkbox"/> 14	<input type="checkbox"/> 13	<input type="checkbox"/> 12	<input type="checkbox"/> 11	<input type="checkbox"/> 10	<input type="checkbox"/> 9	<input type="checkbox"/> 8	<input type="checkbox"/> 7	<input checked="" type="checkbox"/> 6	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
3. Pool Variability	Even mix of large shallow, large-deep, small shallow, small-deep pools present.				Majority of pools large-deep; very few shallow				Shallow pools much more prevalent than deep pools.				Majority of pools small-shallow or pools absent.									
Score	4	<input type="checkbox"/> 20	<input type="checkbox"/> 19	<input type="checkbox"/> 18	<input type="checkbox"/> 17	<input type="checkbox"/> 16	<input type="checkbox"/> 15	<input type="checkbox"/> 14	<input type="checkbox"/> 13	<input type="checkbox"/> 12	<input type="checkbox"/> 11	<input type="checkbox"/> 10	<input type="checkbox"/> 9	<input type="checkbox"/> 8	<input type="checkbox"/> 7	<input type="checkbox"/> 6	<input type="checkbox"/> 5	<input checked="" type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.				Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.				Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.				Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.									
Score	14	<input type="checkbox"/> 20	<input type="checkbox"/> 19	<input type="checkbox"/> 18	<input type="checkbox"/> 17	<input type="checkbox"/> 16	<input type="checkbox"/> 15	<input checked="" type="checkbox"/> 14	<input type="checkbox"/> 13	<input type="checkbox"/> 12	<input type="checkbox"/> 11	<input type="checkbox"/> 10	<input type="checkbox"/> 9	<input type="checkbox"/> 8	<input type="checkbox"/> 7	<input type="checkbox"/> 6	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0

5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly less than standing pools.
Score	10	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input checked="" type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
Score	12	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input checked="" type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
Score	5	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Note: determine left or right side by facing downstream.				
Score (LB)	7	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input checked="" type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	7	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input checked="" type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
Note: determine left or right side by facing downstream.				
Score (LB)	7	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input checked="" type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	7	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input checked="" type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
Note: determine left or right side by facing downstream.				
Score (LB)	1	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	3	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Total Score	90			

Project ID: Henderson County Solar	Stream Class: Ephemeral Exhibit 14 Attachment 14.1
Stream ID: 2MS11	Location: HENDERSON KY Page 111 of 237
Lat: 37.78665 Long: -87.62786	River Basin: Ohio

Investigators: Ryan Winka

Signature: _____ Date: 07-May-20 Reason for Survey: _____
 Time: 3:21 PM 404 functional Assessment: _____

WEATHER CONDITIONS	Current	Past 24 Hour	Heavy rain in last 7 days
	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input checked="" type="checkbox"/> Cloud Cover % <input type="text" value="60"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input checked="" type="checkbox"/> Cloud Cover % <input type="text" value="50"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes Air Temp F <input type="text" value="70"/> Air Temp C <input type="text" value="21"/> Other <input type="text"/>

STREAM CHARACTERIZATION	Stream Subsystem	Stream Type
	<input type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input checked="" type="checkbox"/> Ephemeral	<input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater
	Stream Origin	Mile ² <input type="text" value="0.02"/>
	<input type="checkbox"/> Upland Runoff <input checked="" type="checkbox"/> Mixture of Origins <input type="checkbox"/> Spring-fed/Ground Water <input type="checkbox"/> Wetland <input type="checkbox"/> Other <input type="text"/>	Km ² <input type="text" value="0.05"/>

WATERSHED FEATURES	Surrounding Land Use & Percentage	Local Watershed NPS Pollution
	<input checked="" type="checkbox"/> Forest <input type="text" value="95"/> <input type="checkbox"/> Commercial <input type="text" value="0"/> <input type="checkbox"/> Field/Pasture <input type="text" value="0"/> <input type="checkbox"/> Other <input type="text" value="0"/> <input checked="" type="checkbox"/> Agriculture <input type="text" value="5"/> <input type="checkbox"/> Residential <input type="text" value="0"/>	<input type="checkbox"/> No evidence <input checked="" type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious sources
		Local Watershed Erosion
		<input type="checkbox"/> None <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy

RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present	Dominant Species
	<input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbs <input type="checkbox"/> None	<input type="text" value="Soft Mast"/>

INSTREAM FEATURES	Est Reach Length	ft <input type="text" value="100"/> m <input type="text" value="30"/>	Canopy Cover
	Est Stream Width	ft <input type="text" value="3.9"/> m <input type="text" value="1.2"/>	<input type="checkbox"/> Open <input type="checkbox"/> Partly Open <input checked="" type="checkbox"/> Shaded <input type="checkbox"/> Partly Shaded
	Sampling Reach Area	ft ² <input type="text" value="390.0"/> m ² <input type="text" value="36.2"/>	High Water Mark
	Sampling Area	mile ² <input type="text" value="0.000014"/> km ² <input type="text" value="0.000036"/>	ft <input type="text" value="0.20"/> m <input type="text" value="0.06"/>
	Est Water Depth	in <input type="text" value="0.3"/> m <input type="text" value="0.0"/>	% of Stream Morphology
	Surface Velocity	ft/s <input type="text" value="0.0"/> m/s <input type="text" value="0.0"/>	<input checked="" type="checkbox"/> Riffle % <input type="text" value="25"/> <input checked="" type="checkbox"/> Run % <input type="text" value="55"/> <input checked="" type="checkbox"/> Pool % <input type="text" value="20"/> <input type="checkbox"/> Glide Pool <input type="checkbox"/> Step Pool Series
	Channelized	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Dam Present	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

LARGE WOODY DEBRIS	LWD	<input type="text" value="1.9"/> m ² <input type="text" value="20"/> ft ²
	Density of LWD	m ² /km ² <input type="text" value="0.0000018581"/> ft ² /mile ² <input type="text" value="0.0000007174"/>

AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present	Portion of the reach with aquatic vegetation present:
	<input checked="" type="checkbox"/> Rooted Emergent <input type="checkbox"/> Rooted Submergent <input type="checkbox"/> Rooted Floating <input type="checkbox"/> None <input type="checkbox"/> Free Floating <input type="checkbox"/> Attached Algae <input type="checkbox"/> Floating Algae	<input type="text" value="5"/>

WATER QUALITY	No Water Present	Temperature	<input type="text" value="0"/> °C <input type="text" value="0"/> °F	Water Odors
	<input checked="" type="checkbox"/> No Flow Present	Conductivity	µs/cm <input type="text" value="0"/>	<input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic
	Total Dissolved Solids	<input type="text" value="0"/> mg/l	Do:	<input type="text"/>
	pH	<input type="text" value="0"/>	Water Surface Oils	<input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globbs <input type="checkbox"/> Flecks <input type="checkbox"/> Other
	Turbidity	<input checked="" type="checkbox"/> Clear <input type="checkbox"/> Slightly Turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other		

SEDIMENT/ SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other	Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper Fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relic Shells <input type="checkbox"/> Other
	Looking at stones which are not deeply embedded, are undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	

INORGANIC SUBSTRATE COMPONENTS			ORGANIC SUBSTRATE COMPONENTS		
Substrate Type	Diameter	% Composite in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock		0	Dietritus	Sticks, wood, coarse plant material	50
Boulder	>10"	0			
Cobble	2.5 - 10"	0	Muck-Mud	Black, very fine organic matter	0
Gravel	0.1 - 2.5"	0			
Sand	gritty	0	Marl	Grey, shell fragments	0
Silt	goeoy	100			
Clay	slick	0			

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADIENT STREAMS				
	Optimal	SubOptimal	Marginal	Poor	
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.	
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom: little or no root mat: no submerged vegetation.	Hardpan clay or bedrock: no root mat or vegetation.	
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
3. Pool Variability	Even mix of large shallow, large-deep, small shallow, small-deep pools present.	Majority of pools large-deep; very few shallow	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.	
Score	5	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.	
Score	12	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input checked="" type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			

5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly pools as standing pools.	
Score	5	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.	
Score	13	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input checked="" type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.	
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.	
Note: determine left or right side by facing downstream.					
Score (LB)	8	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	8	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.	
Note: determine left or right side by facing downstream.					
Score (LB)	8	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	8	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.	
Note: determine left or right side by facing downstream.					
Score (LB)	5	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	5	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Total Score	95				

Project ID: Henderson County Solar		Stream Class: Intermittent Exhibit 14 Attachment 14.1	
Stream ID: 2MS1L		Location: HENDERSON KY Page 114 of 237	
Lat: 37.78248 Long: -87.63264		River Basin Ohio	
Investigators: Keith Michalski			
Signature:		Date: 11-May-20	Reason for Survey:
		Time: 3:00 PM	404 functional Assessment:
WEATHER CONDITIONS	Current	Past 24 Hour	Heavy rain in last 7 days
	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input checked="" type="checkbox"/> Cloud Cover % <input type="text" value="50"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input type="checkbox"/> Cloud Cover % <input type="text" value="0"/> <input checked="" type="checkbox"/> Clear/Sunny	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes Air Temp F <input type="text" value="50"/> Air Temp C <input type="text" value="10"/> Other <input type="text"/>
STREAM CHARACTERIZATION	Stream Subsystem		Stream Type
	<input type="checkbox"/> Perennial <input checked="" type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral		<input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater
Stream Origin		Catchment Area	
<input type="checkbox"/> Upland Runoff <input checked="" type="checkbox"/> Mixture of Origins <input type="checkbox"/> Spring-fed/Ground Water <input type="checkbox"/> Wetland <input type="checkbox"/> Other <input type="text"/>		Mile ² <input type="text" value="1.36"/>	Km ² <input type="text" value="3.52"/>
WATERSHED FEATURES	Surrounding Land Use & Percentage		Local Watershed NPS Pollution
	<input checked="" type="checkbox"/> Forest <input type="text" value="10"/> <input type="checkbox"/> Field/Pasture <input type="text" value="0"/> <input checked="" type="checkbox"/> Agriculture <input type="text" value="80"/> <input checked="" type="checkbox"/> Residential <input type="text" value="10"/>	<input type="checkbox"/> Commercial <input type="text" value="0"/> <input type="checkbox"/> Other <input type="text" value="0"/>	<input type="checkbox"/> No evidence <input checked="" type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious sources
RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present		Dominant Species
	<input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbs <input type="checkbox"/> None		<input type="text" value="Mixed Mast"/>
INSTREAM FEATURES	Est Reach Length ft <input type="text" value="100"/> m <input type="text" value="30"/>		Canopy Cover
	Est Stream Width ft <input type="text" value="16.8"/> m <input type="text" value="5.1"/>		<input type="checkbox"/> Open <input checked="" type="checkbox"/> Partly Open <input type="checkbox"/> Shaded <input type="checkbox"/> Partly Shaded
Sampling Reach Area ft ² <input type="text" value="1680.0"/> m ² <input type="text" value="156.1"/>		High Water Mark ft <input type="text" value="3.80"/>	
Sampling Area mile ² <input type="text" value="0.000062"/> km ² <input type="text" value="0.000156"/>		High Water Mark m <input type="text" value="1.16"/>	
Est Water Depth in <input type="text" value="3.0"/> m <input type="text" value="0.1"/>		% of Stream Morphology	
Surface Velocity ft/s <input type="text" value="0.5"/> m/s <input type="text" value="0.2"/>		<input checked="" type="checkbox"/> Riffle % <input type="text" value="25"/> <input checked="" type="checkbox"/> Run % <input type="text" value="40"/> <input checked="" type="checkbox"/> Pool % <input type="text" value="35"/> <input type="checkbox"/> Glide Pool <input type="checkbox"/> Step Pool Series	
Channelized <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
Dam Present <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
LARGE WOODY DEBRIS	LWD <input type="text" value="0.5"/> m ² <input type="text" value="5"/> ft ²		
	Density of LWD <input type="text" value="0.0000004645"/> m ² /km ² <input type="text" value="0.0000001794"/> ft ² /mile ²		
AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present		Portion of the reach with aquatic vegetation present: <input type="text" value="5"/>
	<input type="checkbox"/> Rooted Emergent <input checked="" type="checkbox"/> Rooted Submergent <input type="checkbox"/> Rooted Floating <input type="checkbox"/> None <input type="checkbox"/> Free Floating <input checked="" type="checkbox"/> Attached Algae <input type="checkbox"/> Floating Algae		
WATER QUALITY	<input type="checkbox"/> No Water Present Temperature <input type="text" value="19"/> °C <input type="text" value="67"/> °F		Water Odors
	<input type="checkbox"/> No Flow Present Conductivity <input type="text" value="537"/> μs/cm Total Dissolved Solids <input type="text" value="268"/> mg/l pH <input type="text" value="7.81"/>		<input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic Do: <input type="text" value="9.02"/> mg/L
Turbidity <input type="checkbox"/> Clear <input checked="" type="checkbox"/> Slightly Turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other		Water Surface Oils <input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globs <input type="checkbox"/> Flecks <input type="checkbox"/> Other	

SEDIMENT/ SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other	Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper Fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relic Shells <input type="checkbox"/> Other
	Looking at stones which are not deeply embedded, are undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	

INORGANIC SUBSTRATE COMPONENTS			ORGANIC SUBSTRATE COMPONENTS		
Substrate Type	Diameter	% Composite in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock		0	Dietritus	Sticks, wood, coarse plant material	3
Boulder	>10"	0			
Cobble	2.5 - 10"	0	Muck-Mud	Black, very fine organic matter	0
Gravel	0.1 - 2.5"	10			
Sand	gritty	25	Marl	Grey, shell fragments	0
Silt	goeoy	30			
Clay	slick	35			

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADIENT STREAMS				
	Optimal	SubOptimal	Marginal	Poor	
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.	
Score	8	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom: little or no root mat: no submerged vegetation.	Hardpan clay or bedrock: no root mat or vegetation.	
Score	7	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input checked="" type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
3. Pool Variability	Even mix of large shallow, large-deep, small shallow, small-deep pools present.	Majority of pools large-deep; very few shallow	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.	
Score	8	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.	
Score	12	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input checked="" type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			

5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and most reaches as standing pools.
Score	15	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16	<input checked="" type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
Score	14	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16	<input type="checkbox"/> 15 <input checked="" type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16	<input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Note: determine left or right side by facing downstream.				
Score (LB)	3	<input type="checkbox"/> 10 <input type="checkbox"/> 9	<input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6	<input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0
Score (RB)	3	<input type="checkbox"/> 10 <input type="checkbox"/> 9	<input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6	<input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
Note: determine left or right side by facing downstream.				
Score (LB)	3	<input type="checkbox"/> 10 <input type="checkbox"/> 9	<input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6	<input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0
Score (RB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9	<input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6	<input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
Note: determine left or right side by facing downstream.				
Score (LB)	3	<input type="checkbox"/> 10 <input type="checkbox"/> 9	<input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6	<input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0
Score (RB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9	<input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6	<input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0
Total Score	90			

Project ID: Henderson County Solar		Stream Class: Intermittent Exhibit 14 Attachment 14.1	
Stream ID: 2MS1L-1		Location: HENDERSON KY Page 117 of 237	
Lat: 37.77949	Long: -87.63468	River Basin Ohio	
Investigators: Ryan Harris			
Signature:		Date: 12-May-20	Reason for Survey:
		Time: 3:12 PM	404 functional Assessment:
WEATHER CONDITIONS	Current	Past 24 Hour	Heavy rain in last 7 days
	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input checked="" type="checkbox"/> Cloud Cover % <input type="text" value="100"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input checked="" type="checkbox"/> Cloud Cover % <input type="text" value="50"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes Air Temp F <input type="text" value="60"/> Air Temp C <input type="text" value="16"/> Other <input type="text"/>
STREAM CHARACTERIZATION	Stream Subsystem		Stream Type
	<input type="checkbox"/> Perennial <input checked="" type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral		<input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater
Stream Origin		Catchment Area	
<input type="checkbox"/> Upland Runoff <input checked="" type="checkbox"/> Mixture of Origins <input type="checkbox"/> Spring-fed/Ground Water <input type="checkbox"/> Wetland <input type="checkbox"/> Other <input type="text"/>		Mile ² <input type="text" value="0.84"/>	Km ² <input type="text" value="2.18"/>
WATERSHED FEATURES	Surrounding Land Use & Percentage		Local Watershed NPS Pollution
	<input checked="" type="checkbox"/> Forest <input type="text" value="10"/> <input type="checkbox"/> Field/Pasture <input type="text" value="0"/> <input checked="" type="checkbox"/> Agriculture <input type="text" value="90"/> <input type="checkbox"/> Residential <input type="text" value="0"/>	<input type="checkbox"/> Commercial <input type="text" value="0"/> <input type="checkbox"/> Other <input type="text" value="0"/>	<input type="checkbox"/> No evidence <input checked="" type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious sources
RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present		Dominant Species
	<input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbs <input type="checkbox"/> None		<input type="text" value="Soft mast."/>
INSTREAM FEATURES	Est Reach Length		Canopy Cover
	ft <input type="text" value="100"/>	m <input type="text" value="30"/>	<input type="checkbox"/> Open <input type="checkbox"/> Partly Open <input checked="" type="checkbox"/> Shaded <input type="checkbox"/> Partly Shaded
Est Stream Width		High Water Mark	
ft <input type="text" value="14.3"/>	m <input type="text" value="4.4"/>	ft <input type="text" value="3.10"/>	m <input type="text" value="0.94"/>
Sampling Reach Area		% of Stream Morphology	
ft ² <input type="text" value="1430.0"/>	m ² <input type="text" value="132.9"/>	<input checked="" type="checkbox"/> Riffle % <input type="text" value="30"/> <input checked="" type="checkbox"/> Pool % <input type="text" value="30"/> <input type="checkbox"/> Step Pool Series	
Sampling Area		Run % <input type="text" value="40"/>	
mile ² <input type="text" value="0.000052"/>	km ² <input type="text" value="0.000133"/>	<input type="checkbox"/> Glide Pool	
Est Water Depth		Channelized <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
in <input type="text" value="4.0"/>	m <input type="text" value="0.1"/>	Dam Present <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Surface Velocity			
ft/s <input type="text" value="0.2"/>	m/s <input type="text" value="0.1"/>		
LARGE WOODY DEBRIS	LWD		
	<input type="text" value="1.4"/> m ²	<input type="text" value="15"/> ft ²	
Density of LWD			
m ² /km ² <input type="text" value="0.0000013935"/>		ft ² /mile ² <input type="text" value="0.0000005381"/>	
AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present		Portion of the reach with aquatic vegetation present:
	<input type="checkbox"/> Rooted Emergent <input type="checkbox"/> Rooted Submergent <input type="checkbox"/> Rooted Floating <input type="checkbox"/> Free Floating <input checked="" type="checkbox"/> Attached Algae <input type="checkbox"/> Floating Algae		<input type="text" value="10"/>
WATER QUALITY	Temperature		Water Odors
	<input type="text" value="12"/> °C	<input type="text" value="54"/> °F	<input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic
Conductivity		Do:	
µs/cm <input type="text" value="487"/>		<input type="text" value="9.85"/> mg/L	
Total Dissolved Solids		Water Surface Oils	
mg/l <input type="text" value="242"/>		<input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globbs <input type="checkbox"/> Flecks <input type="checkbox"/> Other	
pH			
<input type="text" value="7.75"/>			
Turbidity			
<input type="checkbox"/> Clear <input checked="" type="checkbox"/> Slightly Turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other			

SEDIMENT/ SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other	Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper Fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relic Shells <input type="checkbox"/> Other
	Looking at stones which are not deeply embedded, are undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	

INORGANIC SUBSTRATE COMPONENTS			ORGANIC SUBSTRATE COMPONENTS		
Substrate Type	Diameter	% Composite in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock		0	Dietritus	Sticks, wood, coarse plant material	4
Boulder	>10"	0			
Cobble	2.5 - 10"	0	Muck-Mud	Black, very fine organic matter	0
Gravel	0.1 - 2.5"	60			
Sand	gritty	15	Marl	Grey, shell fragments	0
Silt	goeoy	15			
Clay	slick	10			

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADIENT STREAMS			
	Optimal	SubOptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.
Score	9	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input checked="" type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom: little or no root mat: no submerged vegetation.	Hardpan clay or bedrock: no root mat or vegetation.
Score	9	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input checked="" type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
3. Pool Variability	Even mix of large shallow, large-deep, small shallow, small-deep pools present.	Majority of pools large-deep; very few shallow	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
Score	10	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input checked="" type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
Score	9	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input checked="" type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		

5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly in pools as standing pools.
Score	12	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input checked="" type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
Score	11	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input checked="" type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Note: determine left or right side by facing downstream.				
Score (LB)	3	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	3	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
Note: determine left or right side by facing downstream.				
Score (LB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	3	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
Note: determine left or right side by facing downstream.				
Score (LB)	2	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	5	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Total Score	86			

Investigators: Keith Michalski

Signature: _____ Date: 11-May-20 Reason for Survey: _____
 Time: 2:28 PM 404 functional Assessment: _____

WEATHER CONDITIONS	Current <input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input checked="" type="checkbox"/> Cloud Cover % <input type="text" value="75"/> <input type="checkbox"/> Clear/Sunny	Past 24 Hour <input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input type="checkbox"/> Cloud Cover % <input type="text" value="0"/> <input checked="" type="checkbox"/> Clear/Sunny	Heavy rain in last 7 days <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes Air Temp F <input type="text" value="50"/> Air Temp C <input type="text" value="10"/> Other <input type="text"/>
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STREAM CHARACTERIZATION	Stream Subsystem <input type="checkbox"/> Perennial <input checked="" type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral Stream Origin <input type="checkbox"/> Upland Runoff <input checked="" type="checkbox"/> Mixture of Origins <input type="text"/> <input type="checkbox"/> Spring-fed/Ground Water <input type="checkbox"/> Wetland <input type="checkbox"/> Other <input type="text"/>	Stream Type <input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater Catchment Area Mile ² <input type="text" value="0.04"/> Km ² <input type="text" value="0.10"/>
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WATERSHED FEATURES	Surrounding Land Use & Percentage <input checked="" type="checkbox"/> Forest <input type="text" value="10"/> <input type="checkbox"/> Commercial <input type="text" value="0"/> <input type="checkbox"/> Field/Pasture <input type="text" value="0"/> <input type="checkbox"/> Other <input type="text" value="0"/> <input checked="" type="checkbox"/> Agriculture <input type="text" value="90"/> <input type="checkbox"/> Residential <input type="text" value="0"/>	Local Watershed NPS Pollution <input type="checkbox"/> No evidence <input type="checkbox"/> Some potential sources <input checked="" type="checkbox"/> Obvious sources Local Watershed Erosion <input type="checkbox"/> None <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy
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RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present <input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbs <input type="checkbox"/> None	Dominant Species <input type="text" value="Mixed Mast"/>
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INSTREAM FEATURES	Est Reach Length ft <input type="text" value="48"/> m <input type="text" value="15"/> Est Stream Width ft <input type="text" value="3.1"/> m <input type="text" value="0.9"/> Sampling Reach Area ft ² <input type="text" value="148.8"/> m ² <input type="text" value="13.8"/> Sampling Area mile ² <input type="text" value="0.000005"/> km ² <input type="text" value="0.000014"/> Est Water Depth in <input type="text" value="1.0"/> m <input type="text" value="0.0"/> Surface Velocity ft/s <input type="text" value="0.7"/> m/s <input type="text" value="0.2"/> Channelized <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Dam Present <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Canopy Cover <input type="checkbox"/> Open <input checked="" type="checkbox"/> Partly Open <input type="checkbox"/> Shaded <input type="checkbox"/> Partly Shaded High Water Mark ft <input type="text" value="0.60"/> High Water Mark m <input type="text" value="0.18"/> % of Stream Morphology <input checked="" type="checkbox"/> Riffle % <input type="text" value="40"/> <input checked="" type="checkbox"/> Run % <input type="text" value="55"/> <input checked="" type="checkbox"/> Pool % <input type="text" value="5"/> <input type="checkbox"/> Glide Pool <input type="checkbox"/> Step Pool Series
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LARGE WOODY DEBRIS	LWD <input type="text" value="0.2"/> m ² <input type="text" value="2"/> ft ² Density of LWD <input type="text" value="0.0000001858"/> m ² /km ² <input type="text" value="0.0000000717"/> ft ² /mile ²
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AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present <input type="checkbox"/> Rooted Emergent <input type="checkbox"/> Rooted Submergent <input type="checkbox"/> Rooted Floating <input checked="" type="checkbox"/> None <input type="checkbox"/> Free Floating <input type="checkbox"/> Attached Algae <input type="checkbox"/> Floating Algae	Portion of the reach with aquatic vegetation present: <input type="text" value="0"/>
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WATER QUALITY	<input type="checkbox"/> No Water Present Temperature <input type="text" value="18"/> °C <input type="text" value="65"/> °F <input type="checkbox"/> No Flow Present Conductivity <input type="text" value="474"/> µs/cm Total Dissolved Solids <input type="text" value="237"/> mg/l pH <input type="text" value="7.18"/> Turbidity <input checked="" type="checkbox"/> Clear <input type="checkbox"/> Slightly Turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other	Water Odors <input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic Do: <input type="text" value="7.72"/> mg/L Water Surface Oils <input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globbs <input type="checkbox"/> Flecks <input type="checkbox"/> Other
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SEDIMENT/ SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other	Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper Fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relic Shells <input type="checkbox"/> Other
	Looking at stones which are not deeply embedded, are undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	

INORGANIC SUBSTRATE COMPONENTS			ORGANIC SUBSTRATE COMPONENTS		
Substrate Type	Diameter	% Composite in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock		0	Dietritus	Sticks, wood, coarse plant material	2
Boulder	>10"	0			
Cobble	2.5 - 10"	0	Muck-Mud	Black, very fine organic matter	0
Gravel	0.1 - 2.5"	0			
Sand	gritty	10	Marl	Grey, shell fragments	0
Silt	goeoy	70			
Clay	slick	20			

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADIENT STREAMS				
	Optimal	SubOptimal	Marginal	Poor	
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.	
Score	3	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom: little or no root mat: no submerged vegetation.	Hardpan clay or bedrock: no root mat or vegetation.	
Score	5	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
3. Pool Variability	Even mix of large shallow, large-deep, small shallow, small-deep pools present.	Majority of pools large-deep; very few shallow	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.	
Score	2	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.	
Score	14	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input checked="" type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			

5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly pools as standing pools.
Score	12	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input checked="" type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
Score	5	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
Score	3	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Note: determine left or right side by facing downstream.				
Score (LB)	2	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	2	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
Note: determine left or right side by facing downstream.				
Score (LB)	3	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	2	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
Note: determine left or right side by facing downstream.				
Score (LB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	2	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Total Score	59			

Project ID: Henderson County Solar	Stream Class: Intermittent Exhibit 14 Attachment 14.1
Stream ID: 2MS1L-2	Location: HENDERSON KY Page 123 of 237
Lat: 37.77345 Long: -87.63566	River Basin: Ohio

Investigators: Ryan Harris

Signature: _____ Date: 12-May-20 Reason for Survey: _____
 Time: 4:26 PM 404 functional Assessment: _____

WEATHER CONDITIONS	Current	Past 24 Hour	Heavy rain in last 7 days
	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input checked="" type="checkbox"/> Cloud Cover % <input type="text" value="100"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input checked="" type="checkbox"/> Cloud Cover % <input type="text" value="50"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes Air Temp F <input type="text" value="58"/> Air Temp C <input type="text" value="14"/> Other <input type="text"/>

STREAM CHARACTERIZATION	Stream Subsystem	Stream Type
	<input type="checkbox"/> Perennial <input checked="" type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral Stream Origin <input type="checkbox"/> Upland Runoff <input checked="" type="checkbox"/> Mixture of Origins <input type="text"/> <input type="checkbox"/> Spring-fed/Ground Water <input type="checkbox"/> Wetland <input type="checkbox"/> Other <input type="text"/>	<input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater Catchment Area Mile ² <input type="text" value="0.75"/> Km ² <input type="text" value="1.94"/>

WATERSHED FEATURES	Surrounding Land Use & Percentage	Local Watershed NPS Pollution
	<input checked="" type="checkbox"/> Forest <input type="text" value="10"/> <input type="checkbox"/> Commercial <input type="text" value="0"/> <input type="checkbox"/> Field/Pasture <input type="text" value="0"/> <input type="checkbox"/> Other <input type="text" value="0"/> <input checked="" type="checkbox"/> Agriculture <input type="text" value="90"/> <input type="checkbox"/> Residential <input type="text" value="0"/>	<input type="checkbox"/> No evidence <input checked="" type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious sources Local Watershed Erosion <input type="checkbox"/> None <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy

RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present	Dominant Species
	<input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbs <input type="checkbox"/> None	<input type="text" value="Mixed mast."/>

INSTREAM FEATURES	Est Reach Length	ft <input type="text" value="100"/> m <input type="text" value="30"/>	Canopy Cover
	Est Stream Width	ft <input type="text" value="13.3"/> m <input type="text" value="4.1"/>	<input type="checkbox"/> Open <input type="checkbox"/> Partly Open <input type="checkbox"/> Shaded <input checked="" type="checkbox"/> Partly Shaded
	Sampling Reach Area	ft ² <input type="text" value="1330.0"/> m ² <input type="text" value="123.6"/>	High Water Mark
	Sampling Area	mile ² <input type="text" value="0.000049"/> km ² <input type="text" value="0.000124"/>	ft <input type="text" value="2.00"/> m <input type="text" value="0.61"/>
	Est Water Depth	in <input type="text" value="3.0"/> m <input type="text" value="0.1"/>	% of Stream Morphology
	Surface Velocity	ft/s <input type="text" value="0.2"/> m/s <input type="text" value="0.1"/>	<input checked="" type="checkbox"/> Riffle % <input type="text" value="30"/> <input checked="" type="checkbox"/> Run % <input type="text" value="60"/> <input checked="" type="checkbox"/> Pool % <input type="text" value="10"/> <input type="checkbox"/> Glide Pool <input type="checkbox"/> Step Pool Series
	Channelized	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
	Dam Present	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

LARGE WOODY DEBRIS	LWD	<input type="text" value="0.5"/> m ² <input type="text" value="5"/> ft ²
	Density of LWD	m ² /km ² <input type="text" value="0.0000004645"/> ft ² /mile ² <input type="text" value="0.0000001794"/>

AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present	Portion of the reach with aquatic vegetation present:
	<input type="checkbox"/> Rooted Emergent <input type="checkbox"/> Rooted Submergent <input type="checkbox"/> Rooted Floating <input checked="" type="checkbox"/> None <input type="checkbox"/> Free Floating <input type="checkbox"/> Attached Algae <input type="checkbox"/> Floating Algae	<input type="text" value="0"/>

WATER QUALITY	No Water Present	Temperature	<input type="text" value="14"/> °C <input type="text" value="58"/> °F	Water Odors
	No Flow Present	Conductivity	µs/cm <input type="text" value="463"/>	<input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic
	Total Dissolved Solids	<input type="text" value="231"/> mg/l	pH	Do:
		<input type="text" value="7.9"/>		<input type="text" value="9.88"/> mg/L
	Turbidity	Water Surface Oils		
	<input checked="" type="checkbox"/> Clear <input type="checkbox"/> Slightly Turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other	<input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globbs <input type="checkbox"/> Flecks <input type="checkbox"/> Other		

SEDIMENT/ SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other	Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper Fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relic Shells <input type="checkbox"/> Other
	Looking at stones which are not deeply embedded, are undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	

INORGANIC SUBSTRATE COMPONENTS			ORGANIC SUBSTRATE COMPONENTS		
Substrate Type	Diameter	% Composite in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock		0	Dietritus	Sticks, wood, coarse plant material	5
Boulder	>10"	0			
Cobble	2.5 - 10"	0	Muck-Mud	Black, very fine organic matter	0
Gravel	0.1 - 2.5"	30			
Sand	gritty	40	Marl	Grey, shell fragments	0
Silt	goeoy	15			
Clay	slick	15			

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADIENT STREAMS				
	Optimal	SubOptimal	Marginal	Poor	
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.	
Score	8	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom: little or no root mat: no submerged vegetation.	Hardpan clay or bedrock: no root mat or vegetation.	
Score	10	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input checked="" type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
3. Pool Variability	Even mix of large shallow, large-deep, small shallow, small-deep pools present.	Majority of pools large-deep; very few shallow	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.	
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.	
Score	10	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input checked="" type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			

5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly pools as standing pools.
Score	9	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input checked="" type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
Score	8	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Note: determine left or right side by facing downstream.				
Score (LB)	2	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	3	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
Note: determine left or right side by facing downstream.				
Score (LB)	5	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	5	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
Note: determine left or right side by facing downstream.				
Score (LB)	3	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Total Score	79			

Project ID: Henderson County Solar		Stream Class: Intermittent Exhibit 14 Attachment 14.1	
Stream ID: 2MS1L3		Location: HENDERSON KY Page 126 of 237	
Lat: 37.78131 Long: -87.63165		River Basin Ohio	
Investigators: Ryan Harris			
Signature:		Date: 11-May-20	Reason for Survey:
		Time: 3:26 PM	404 functional Assessment:
WEATHER CONDITIONS	Current	Past 24 Hour	Heavy rain in last 7 days
	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input checked="" type="checkbox"/> Cloud Cover % <input type="text" value="40"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input type="checkbox"/> Cloud Cover % <input type="text" value="0"/> <input checked="" type="checkbox"/> Clear/Sunny	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes Air Temp F <input type="text" value="55"/> Air Temp C <input type="text" value="13"/> Other <input type="text"/>
STREAM CHARACTERIZATION	Stream Subsystem		Stream Type
	<input type="checkbox"/> Perennial <input checked="" type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral		<input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater
Stream Origin		Catchment Area	
<input type="checkbox"/> Upland Runoff <input checked="" type="checkbox"/> Mixture of Origins <input type="checkbox"/> Spring-fed/Ground Water <input type="checkbox"/> Wetland <input type="checkbox"/> Other <input type="text"/>		Mile ² <input type="text" value="0.36"/>	Km ² <input type="text" value="0.93"/>
WATERSHED FEATURES	Surrounding Land Use & Percentage		Local Watershed NPS Pollution
	<input checked="" type="checkbox"/> Forest <input type="text" value="20"/> <input type="checkbox"/> Field/Pasture <input type="text" value="0"/> <input checked="" type="checkbox"/> Agriculture <input type="text" value="80"/> <input type="checkbox"/> Residential <input type="text" value="0"/>	<input type="checkbox"/> Commercial <input type="text" value="0"/> <input type="checkbox"/> Other <input type="text" value="0"/>	<input type="checkbox"/> No evidence <input checked="" type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious sources
RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present		Dominant Species
	<input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbs <input type="checkbox"/> None		<input type="text" value="Mixed Mast"/>
INSTREAM FEATURES	Est Reach Length ft <input type="text" value="100"/> m <input type="text" value="30"/>		Canopy Cover
	Est Stream Width ft <input type="text" value="11.9"/> m <input type="text" value="3.6"/>		<input type="checkbox"/> Open <input checked="" type="checkbox"/> Partly Open <input type="checkbox"/> Shaded <input type="checkbox"/> Partly Shaded
Sampling Reach Area ft ² <input type="text" value="1190.0"/> m ² <input type="text" value="110.6"/>		High Water Mark ft <input type="text" value="2.80"/>	
Sampling Area mile ² <input type="text" value="0.000044"/> km ² <input type="text" value="0.000111"/>		High Water Mark m <input type="text" value="0.85"/>	
Est Water Depth in <input type="text" value="3.0"/> m <input type="text" value="0.1"/>		% of Stream Morphology	
Surface Velocity ft/s <input type="text" value="0.5"/> m/s <input type="text" value="0.2"/>		<input checked="" type="checkbox"/> Riffle % <input type="text" value="30"/> <input checked="" type="checkbox"/> Run % <input type="text" value="40"/> <input checked="" type="checkbox"/> Pool % <input type="text" value="30"/> <input type="checkbox"/> Glide Pool <input type="checkbox"/> Step Pool Series	
Channelized <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
Dam Present <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
LARGE WOODY DEBRIS	LWD <input type="text" value="0.9"/> m ² <input type="text" value="10"/> ft ²		
	Density of LWD <input type="text" value="0.0000009290"/> m ² /km ² <input type="text" value="0.0000003587"/> ft ² /mile ²		
AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present		Portion of the reach with aquatic vegetation present: <input type="text" value="10"/>
	<input type="checkbox"/> Rooted Emergent <input type="checkbox"/> Rooted Submergent <input type="checkbox"/> Rooted Floating <input type="checkbox"/> None <input type="checkbox"/> Free Floating <input checked="" type="checkbox"/> Attached Algae <input type="checkbox"/> Floating Algae		
WATER QUALITY	<input type="checkbox"/> No Water Present Temperature <input type="text" value="12"/> °C <input type="text" value="53"/> °F <input type="checkbox"/> No Flow Present Conductivity <input type="text" value="586"/> µs/cm Total Dissolved Solids <input type="text" value="293"/> mg/l pH <input type="text" value="7.73"/>		Water Odors <input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic Do: <input type="text" value="9.93"/> mg/L
	Turbidity <input type="checkbox"/> Clear <input checked="" type="checkbox"/> Slightly Turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other		Water Surface Oils <input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globs <input type="checkbox"/> Flecks <input type="checkbox"/> Other

SEDIMENT/ SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other	Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper Fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relic Shells <input type="checkbox"/> Other
	Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	
	Looking at stones which are not deeply embedded, are undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

INORGANIC SUBSTRATE COMPONENTS			ORGANIC SUBSTRATE COMPONENTS		
Substrate Type	Diameter	% Composite in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock		0	Dietritus	Sticks, wood, coarse plant material	5
Boulder	>10"	0			
Cobble	2.5 - 10"	0	Muck-Mud	Black, very fine organic matter	0
Gravel	0.1 - 2.5"	30			
Sand	gritty	30	Marl	Grey, shell fragments	0
Silt	goeoy	20			
Clay	slick	20			

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADIENT STREAMS			
	Optimal	SubOptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.
Score	10	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11	<input checked="" type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom: little or no root mat: no submerged vegetation.	Hardpan clay or bedrock: no root mat or vegetation.
Score	8	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0
3. Pool Variability	Even mix of large shallow, large-deep, small shallow, small-deep pools present.	Majority of pools large-deep; very few shallow	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
Score	8	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
Score	11	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input checked="" type="checkbox"/> 11	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input checked="" type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0

5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly pools as standing pools.
Score	12	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input checked="" type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
Score	8	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
Score	5	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Note: determine left or right side by facing downstream.				
Score (LB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	3	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
Note: determine left or right side by facing downstream.				
Score (LB)	6	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	5	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
Note: determine left or right side by facing downstream.				
Score (LB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Total Score	88			

Project ID: Henderson County Solar	Stream Class: Ephemeral Exhibit 14 Attachment 14.1
Stream ID: 2MS1L3C	Location: HENDERSON KY Page 129 of 237
Lat: 37.77743 Long: -87.62680	River Basin: Ohio

Investigators: Ryan Harris

Signature: _____ Date: 12-May-20 Reason for Survey: _____
 Time: 9:20 AM 404 functional Assessment: _____

WEATHER CONDITIONS	Current	Past 24 Hour	Heavy rain in last 7 days
	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input checked="" type="checkbox"/> Cloud Cover % <input type="text" value="100"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input checked="" type="checkbox"/> Cloud Cover % <input type="text" value="50"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes Air Temp F <input type="text" value="53"/> Air Temp C <input type="text" value="12"/> Other <input type="text"/>

STREAM CHARACTERIZATION	Stream Subsystem	Stream Type
	<input type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input checked="" type="checkbox"/> Ephemeral Stream Origin <input type="checkbox"/> Upland Runoff <input checked="" type="checkbox"/> Mixture of Origins <input type="text"/> <input type="checkbox"/> Spring-fed/Ground Water <input type="checkbox"/> Wetland <input type="checkbox"/> Other <input type="text"/>	<input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater Catchment Area Mile ² <input type="text" value="0.05"/> Km ² <input type="text" value="0.13"/>

WATERSHED FEATURES	Surrounding Land Use & Percentage	Local Watershed NPS Pollution
	<input checked="" type="checkbox"/> Forest <input type="text" value="5"/> <input type="checkbox"/> Commercial <input type="text" value="0"/> <input type="checkbox"/> Field/Pasture <input type="text" value="0"/> <input type="checkbox"/> Other <input type="text" value="0"/> <input checked="" type="checkbox"/> Agriculture <input type="text" value="95"/> <input type="checkbox"/> Residential <input type="text" value="0"/>	<input type="checkbox"/> No evidence <input type="checkbox"/> Some potential sources <input checked="" type="checkbox"/> Obvious sources Local Watershed Erosion <input type="checkbox"/> None <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy

RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present	Dominant Species
	<input type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Herbs <input type="checkbox"/> None	<input type="text" value="Annual grasses"/>

INSTREAM FEATURES	Est Reach Length	ft <input type="text" value="100"/> m <input type="text" value="30"/>	Canopy Cover
	Est Stream Width	ft <input type="text" value="5.1"/> m <input type="text" value="1.6"/>	<input type="checkbox"/> Open <input type="checkbox"/> Partly Open <input type="checkbox"/> Shaded <input checked="" type="checkbox"/> Partly Shaded
	Sampling Reach Area	ft ² <input type="text" value="510.0"/> m ² <input type="text" value="47.4"/>	High Water Mark
	Sampling Area	mile ² <input type="text" value="0.000019"/> km ² <input type="text" value="0.000047"/>	ft <input type="text" value="1.60"/> m <input type="text" value="0.49"/>
	Est Water Depth	in <input type="text" value="0.0"/> m <input type="text" value="0.0"/>	% of Stream Morphology
	Surface Velocity	ft/s <input type="text" value="0.0"/> m/s <input type="text" value="0.0"/>	<input checked="" type="checkbox"/> Riffle % <input type="text" value="20"/> <input checked="" type="checkbox"/> Run % <input type="text" value="60"/> <input checked="" type="checkbox"/> Pool % <input type="text" value="20"/> <input type="checkbox"/> Glide Pool <input type="checkbox"/> Step Pool Series
	Channelized	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
	Dam Present	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

LARGE WOODY DEBRIS	LWD	<input type="text" value="0.2"/> m ² <input type="text" value="2"/> ft ²
	Density of LWD	m ² /km ² <input type="text" value="0.0000001858"/> ft ² /mile ² <input type="text" value="0.0000000717"/>

AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present	Portion of the reach with aquatic vegetation present:
	<input type="checkbox"/> Rooted Emergent <input type="checkbox"/> Rooted Submergent <input type="checkbox"/> Rooted Floating <input checked="" type="checkbox"/> None <input type="checkbox"/> Free Floating <input type="checkbox"/> Attached Algae <input type="checkbox"/> Floating Algae	<input type="text" value="0"/>

WATER QUALITY	<input checked="" type="checkbox"/> No Water Present Temperature <input type="text" value="0"/> °C <input type="text" value="0"/> °F <input type="checkbox"/> No Flow Present Conductivity <input type="text" value="0"/> μs/cm Total Dissolved Solids <input type="text" value="0"/> mg/l pH <input type="text" value="0"/>	Water Odors <input type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic Do: <input type="text"/> mg/L
	Turbidity <input type="checkbox"/> Clear <input type="checkbox"/> Slightly Turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other	Water Surface Oils <input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globs <input type="checkbox"/> Flecks <input type="checkbox"/> Other

SEDIMENT/ SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other	Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper Fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relic Shells <input type="checkbox"/> Other
	Looking at stones which are not deeply embedded, are undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

INORGANIC SUBSTRATE COMPONENTS			ORGANIC SUBSTRATE COMPONENTS		
Substrate Type	Diameter	% Composite in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock		0	Dietritus	Sticks, wood, coarse plant material	3
Boulder	>10"	0			
Cobble	2.5 - 10"	0	Muck-Mud	Black, very fine organic matter	0
Gravel	0.1 - 2.5"	10			
Sand	gritty	5	Marl	Grey, shell fragments	0
Silt	goeoy	35			
Clay	slick	50			

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADIENT STREAMS				
	Optimal	SubOptimal	Marginal	Poor	
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.	
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16	<input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6	<input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom: little or no root mat: no submerged vegetation.	Hardpan clay or bedrock: no root mat or vegetation.	
Score	5	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16	<input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6	<input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0
3. Pool Variability	Even mix of large shallow, large-deep, small shallow, small-deep pools present.	Majority of pools large-deep; very few shallow	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.	
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16	<input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6	<input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.	
Score	12	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16	<input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input checked="" type="checkbox"/> 12 <input type="checkbox"/> 11	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6	<input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0

5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
Score	3	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
Score	7	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input checked="" type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
Score	5	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Note: determine left or right side by facing downstream.				
Score (LB)	2	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	3	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
Note: determine left or right side by facing downstream.				
Score (LB)	2	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	2	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
Note: determine left or right side by facing downstream.				
Score (LB)	1	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	1	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 0		
Total Score	55			

Project ID: Henderson County Solar	Stream Class: Ephemeral Exhibit 14 Attachment 14.1
Stream ID: 2MS1L4	Location: HENDERSON KY Page 132 of 237
Lat: 37.77897 Long: -87.63469	River Basin: Ohio

Investigators: Ryan Harris

Signature: _____ Date: 12-May-20 Reason for Survey: _____
 Time: 2:33 PM 404 functional Assessment: _____

WEATHER CONDITIONS	Current	Past 24 Hour	Heavy rain in last 7 days
	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input checked="" type="checkbox"/> Cloud Cover % <input type="text" value="100"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input checked="" type="checkbox"/> Cloud Cover % <input type="text" value="50"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes Air Temp F <input type="text" value="60"/> Air Temp C <input type="text" value="16"/> Other <input type="text"/>

STREAM CHARACTERIZATION	Stream Subsystem	Stream Type
	<input type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input checked="" type="checkbox"/> Ephemeral	<input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater
	Stream Origin	Mile ² <input type="text" value="0.05"/>
	<input type="checkbox"/> Upland Runoff <input checked="" type="checkbox"/> Mixture of Origins <input type="checkbox"/> Spring-fed/Ground Water <input type="checkbox"/> Wetland <input type="checkbox"/> Other <input type="text"/>	Km ² <input type="text" value="0.13"/>

WATERSHED FEATURES	Surrounding Land Use & Percentage	Local Watershed NPS Pollution
	<input checked="" type="checkbox"/> Forest <input type="text" value="10"/> <input type="checkbox"/> Commercial <input type="text" value="0"/> <input type="checkbox"/> Field/Pasture <input type="text" value="0"/> <input type="checkbox"/> Other <input type="text" value="0"/> <input checked="" type="checkbox"/> Agriculture <input type="text" value="90"/> <input type="checkbox"/> Residential <input type="text" value="0"/>	<input type="checkbox"/> No evidence <input checked="" type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious sources
		Local Watershed Erosion
		<input type="checkbox"/> None <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy

RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present	Dominant Species
	<input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbs <input type="checkbox"/> None	<input type="text" value="Soft mast"/>

INSTREAM FEATURES	Est Reach Length	ft <input type="text" value="100"/> m <input type="text" value="30"/>	Canopy Cover
	Est Stream Width	ft <input type="text" value="3.7"/> m <input type="text" value="1.1"/>	<input type="checkbox"/> Open <input type="checkbox"/> Partly Open <input type="checkbox"/> Shaded <input checked="" type="checkbox"/> Partly Shaded
	Sampling Reach Area	ft ² <input type="text" value="370.0"/> m ² <input type="text" value="34.4"/>	High Water Mark
	Sampling Area	mile ² <input type="text" value="0.000014"/> km ² <input type="text" value="0.000034"/>	ft <input type="text" value="0.60"/>
	Est Water Depth	in <input type="text" value="2.0"/> m <input type="text" value="0.1"/>	m <input type="text" value="0.18"/>
	Surface Velocity	ft/s <input type="text" value="0.5"/> m/s <input type="text" value="0.2"/>	% of Stream Morphology
	Channelized	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> Riffle % <input type="text" value="30"/> <input checked="" type="checkbox"/> Run % <input type="text" value="60"/> <input checked="" type="checkbox"/> Pool % <input type="text" value="10"/> <input type="checkbox"/> Glide Pool <input type="checkbox"/> Step Pool Series
	Dam Present	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

LARGE WOODY DEBRIS	LWD	<input type="text" value="0.5"/> m ² <input type="text" value="5"/> ft ²
	Density of LWD	m ² /km ² <input type="text" value="0.0000004645"/> ft ² /mile ² <input type="text" value="0.0000001794"/>

AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present	Portion of the reach with aquatic vegetation present:
	<input type="checkbox"/> Rooted Emergent <input type="checkbox"/> Rooted Submergent <input type="checkbox"/> Rooted Floating <input checked="" type="checkbox"/> None <input type="checkbox"/> Free Floating <input type="checkbox"/> Attached Algae <input type="checkbox"/> Floating Algae	<input type="text" value="0"/>

WATER QUALITY	No Water Present	Temperature	<input type="text" value="18"/> °C <input type="text" value="65"/> °F	Water Odors
	No Flow Present	Conductivity	µs/cm <input type="text" value="551"/>	<input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic
	Total Dissolved Solids	<input type="text" value="267"/> mg/l	Do:	<input type="text" value="6.86"/> mg/L
	pH	<input type="text" value="6.92"/>	Water Surface Oils	<input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globbs <input type="checkbox"/> Flecks <input type="checkbox"/> Other
	Turbidity	<input checked="" type="checkbox"/> Clear <input type="checkbox"/> Slightly Turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other		

SEDIMENT/ SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other	Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper Fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relic Shells <input type="checkbox"/> Other
	Looking at stones which are not deeply embedded, are undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	

INORGANIC SUBSTRATE COMPONENTS			ORGANIC SUBSTRATE COMPONENTS		
Substrate Type	Diameter	% Composite in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock		0	Dietritus	Sticks, wood, coarse plant material	10
Boulder	>10"	0			
Cobble	2.5 - 10"	0	Muck-Mud	Black, very fine organic matter	0
Gravel	0.1 - 2.5"	0			
Sand	gritty	5	Marl	Grey, shell fragments	0
Silt	goeoy	70			
Clay	slick	25			

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADIENT STREAMS				
	Optimal	SubOptimal	Marginal	Poor	
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.	
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom: little or no root mat: no submerged vegetation.	Hardpan clay or bedrock: no root mat or vegetation.	
Score	5	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
3. Pool Variability	Even mix of large shallow, large-deep, small shallow, small-deep pools present.	Majority of pools large-deep; very few shallow	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.	
Score	3	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.	
Score	7	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input checked="" type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			

5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
Score	10	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input checked="" type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
Score	5	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Note: determine left or right side by facing downstream.				
Score (LB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	3	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
Note: determine left or right side by facing downstream.				
Score (LB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	3	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
Note: determine left or right side by facing downstream.				
Score (LB)	2	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Score (RB)	2	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0		
Total Score	60			

Project ID: Henderson County Solar		Stream Class: Ephemeral Exhibit 14 Attachment 14.1	
Stream ID: 2MS1L5		Location: HENDERSON KY Page 135 of 237	
Lat: 37.77918	Long: -87.63500	River Basin: Ohio	
Investigators: Ryan Winka			
Signature:		Date: 12-May-20	Reason for Survey:
		Time: 2:25 PM	404 functional Assessment:
WEATHER CONDITIONS	Current	Past 24 Hour	Heavy rain in last 7 days
	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input checked="" type="checkbox"/> Cloud Cover % <input type="text" value="100"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input checked="" type="checkbox"/> Cloud Cover % <input type="text" value="50"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes Air Temp F <input type="text" value="60"/> Air Temp C <input type="text" value="16"/> Other <input type="text"/>
STREAM CHARACTERIZATION	Stream Subsystem		Stream Type
	<input type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input checked="" type="checkbox"/> Ephemeral		<input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater
Stream Origin		Catchment Area	
<input type="checkbox"/> Upland Runoff <input checked="" type="checkbox"/> Mixture of Origins <input type="checkbox"/> Spring-fed/Ground Water <input type="checkbox"/> Wetland <input type="checkbox"/> Other <input type="text"/>		Mile ² <input type="text" value="0.04"/>	Km ² <input type="text" value="0.10"/>
WATERSHED FEATURES	Surrounding Land Use & Percentage		Local Watershed NPS Pollution
	<input checked="" type="checkbox"/> Forest <input type="text" value="10"/> <input type="checkbox"/> Field/Pasture <input type="text" value="0"/> <input checked="" type="checkbox"/> Agriculture <input type="text" value="90"/> <input type="checkbox"/> Residential <input type="text" value="0"/>	<input type="checkbox"/> Commercial <input type="text" value="0"/> <input type="checkbox"/> Other <input type="text" value="0"/>	<input type="checkbox"/> No evidence <input checked="" type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious sources
RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present		Dominant Species
	<input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbs <input type="checkbox"/> None		<input type="text" value="Mixed mast."/>
INSTREAM FEATURES	Est Reach Length ft <input type="text" value="100"/> m <input type="text" value="30"/>		Canopy Cover
	Est Stream Width ft <input type="text" value="3.2"/> m <input type="text" value="1.0"/>		<input type="checkbox"/> Open <input checked="" type="checkbox"/> Partly Open <input type="checkbox"/> Shaded <input type="checkbox"/> Partly Shaded
Sampling Reach Area ft ² <input type="text" value="320.0"/> m ² <input type="text" value="29.7"/>		High Water Mark ft <input type="text" value="0.40"/>	
Sampling Area mile ² <input type="text" value="0.000012"/> km ² <input type="text" value="0.000030"/>		High Water Mark m <input type="text" value="0.12"/>	
Est Water Depth in <input type="text" value="0.0"/> m <input type="text" value="0.0"/>		% of Stream Morphology	
Surface Velocity ft/s <input type="text" value="0.0"/> m/s <input type="text" value="0.0"/>		<input checked="" type="checkbox"/> Riffle % <input type="text" value="40"/> <input checked="" type="checkbox"/> Run % <input type="text" value="55"/> <input checked="" type="checkbox"/> Pool % <input type="text" value="5"/> <input type="checkbox"/> Glide Pool <input type="checkbox"/> Step Pool Series	
Channelized <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
Dam Present <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
LARGE WOODY DEBRIS	LWD <input type="text" value="0.2"/> m ² <input type="text" value="2"/> ft ²		
	Density of LWD <input type="text" value="0.0000001858"/> m ² /km ² <input type="text" value="0.0000000717"/> ft ² /mile ²		
AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present		Portion of the reach with aquatic vegetation present: <input type="text" value="2"/>
	<input checked="" type="checkbox"/> Rooted Emergent <input type="checkbox"/> Rooted Submergent <input type="checkbox"/> Rooted Floating <input type="checkbox"/> None <input type="checkbox"/> Free Floating <input type="checkbox"/> Attached Algae <input type="checkbox"/> Floating Algae		
WATER QUALITY	<input checked="" type="checkbox"/> No Water Present Temperature <input type="text" value="0"/> °C <input type="text" value="0"/> °F <input type="checkbox"/> No Flow Present Conductivity <input type="text" value="0"/> μs/cm Total Dissolved Solids <input type="text" value="0"/> mg/l pH <input type="text" value="0"/>		Water Odors
	<input type="checkbox"/> Clear <input type="checkbox"/> Slightly Turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other		<input type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic Do: <input type="text"/> mg/L Water Surface Oils <input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globbs <input type="checkbox"/> Flecks <input type="checkbox"/> Other

SEDIMENT/ SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other	Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper Fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relic Shells <input type="checkbox"/> Other
	Looking at stones which are not deeply embedded, are undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	

INORGANIC SUBSTRATE COMPONENTS			ORGANIC SUBSTRATE COMPONENTS		
Substrate Type	Diameter	% Composite in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock		0	Dietritus	Sticks, wood, coarse plant material	15
Boulder	>10"	0			
Cobble	2.5 - 10"	0	Muck-Mud	Black, very fine organic matter	0
Gravel	0.1 - 2.5"	0			
Sand	gritty	0	Marl	Grey, shell fragments	0
Silt	goeoy	80			
Clay	slick	20			

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADIENT STREAMS				
	Optimal	SubOptimal	Marginal	Poor	
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.	
Score	5	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom: little or no root mat: no submerged vegetation.	Hardpan clay or bedrock: no root mat or vegetation.	
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
3. Pool Variability	Even mix of large shallow, large-deep, small shallow, small-deep pools present.	Majority of pools large-deep; very few shallow	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.	
Score	2	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.	
Score	15	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input checked="" type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			

5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.	
Score	1	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 0			
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.	
Score	14	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input checked="" type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.	
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.	
Note: determine left or right side by facing downstream.					
Score (LB)	6	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	6	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.	
Note: determine left or right side by facing downstream.					
Score (LB)	7	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input checked="" type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	7	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input checked="" type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.	
Note: determine left or right side by facing downstream.					
Score (LB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	4	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Total Score	83				

Project ID: Henderson County Solar	Stream Class: Ephemeral Exhibit 14 Attachment 14.1
Stream ID: 2MS106	Location: HENDERSON KY Page 138 of 237
Lat: 37.79163 Long: -87.62754	River Basin: Ohio

Investigators: Ryan Harris

Signature: _____ Date: 26-Oct-20 Reason for Survey: _____
Time: 2:46 PM 404 functional Assessment: _____

WEATHER CONDITIONS	Current	Past 24 Hour	Heavy rain in last 7 days
	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input type="checkbox"/> Showers (Intermittent) <input checked="" type="checkbox"/> Cloud Cover % <input type="text" value="100"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> Storm (Heavy Rain) <input type="checkbox"/> Rain Steady <input checked="" type="checkbox"/> Showers (Intermittent) <input type="checkbox"/> Cloud Cover % <input type="text" value="0"/> <input type="checkbox"/> Clear/Sunny	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes Air Temp F <input type="text" value="60"/> Air Temp C <input type="text" value="16"/> Other <input type="text"/>

STREAM CHARACTERIZATION	Stream Subsystem	Stream Type
	<input type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input checked="" type="checkbox"/> Ephemeral Stream Origin <input type="checkbox"/> Upland Runoff <input checked="" type="checkbox"/> Mixture of Origins <input type="text"/> <input type="checkbox"/> Spring-fed/Ground Water <input type="checkbox"/> Wetland <input type="checkbox"/> Other <input type="text"/>	<input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater Catchment Area Mile ² <input type="text" value="0.01"/> Km ² <input type="text" value="0.03"/>

WATERSHED FEATURES	Surrounding Land Use & Percentage	Local Watershed NPS Pollution
	<input checked="" type="checkbox"/> Forest <input type="text" value="10"/> <input type="checkbox"/> Commercial <input type="text" value="0"/> <input checked="" type="checkbox"/> Field/Pasture <input type="text" value="45"/> <input type="checkbox"/> Other <input type="text" value="0"/> <input checked="" type="checkbox"/> Agriculture <input type="text" value="45"/> <input type="text"/> <input type="checkbox"/> Residential <input type="text" value="0"/>	<input type="checkbox"/> No evidence <input checked="" type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious sources Local Watershed Erosion <input type="checkbox"/> None <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy

RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present	Dominant Species
	<input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbs <input type="checkbox"/> None	<input type="text" value="Soft Mast"/>

INSTREAM FEATURES	Est Reach Length	ft <input type="text" value="22"/> m <input type="text" value="7"/>	Canopy Cover
	Est Stream Width	ft <input type="text" value="5.3"/> m <input type="text" value="1.6"/>	<input type="checkbox"/> Open <input type="checkbox"/> Partly Open <input type="checkbox"/> Shaded <input checked="" type="checkbox"/> Partly Shaded
	Sampling Reach Area	ft ² <input type="text" value="116.6"/> m ² <input type="text" value="10.8"/>	High Water Mark
	Sampling Area	mile ² <input type="text" value="0.000004"/> km ² <input type="text" value="0.000011"/>	ft <input type="text" value="0.50"/> m <input type="text" value="0.15"/>
	Est Water Depth	in <input type="text" value="0.5"/> m <input type="text" value="0.0"/>	% of Stream Morphology
	Surface Velocity	ft/s <input type="text" value="0.0"/> m/s <input type="text" value="0.0"/>	<input checked="" type="checkbox"/> Riffle % <input type="text" value="20"/> <input checked="" type="checkbox"/> Run % <input type="text" value="70"/> <input checked="" type="checkbox"/> Pool % <input type="text" value="10"/> <input type="checkbox"/> Glide Pool <input type="checkbox"/> Step Pool Series
	Channelized	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Dam Present	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

LARGE WOODY DEBRIS	LWD	<input type="text" value="0.0"/> m ² <input type="text" value="0"/> ft ²
	Density of LWD	m ² /km ² <input type="text" value="0.0000000000"/> ft ² /mile ² <input type="text" value="0.0000000000"/>

AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present	Portion of the reach with aquatic vegetation present:
	<input type="checkbox"/> Rooted Emergent <input type="checkbox"/> Rooted Submergent <input type="checkbox"/> Rooted Floating <input checked="" type="checkbox"/> None <input type="checkbox"/> Free Floating <input type="checkbox"/> Attached Algae <input type="checkbox"/> Floating Algae	<input type="text" value="0"/>

WATER QUALITY	No Water Present	Temperature	<input type="text" value="0"/> °C <input type="text" value="0"/> °F	Water Odors
	<input checked="" type="checkbox"/> No Flow Present	Conductivity	µs/cm <input type="text" value="0"/>	<input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic
	Total Dissolved Solids	<input type="text" value="0"/> mg/l	Do:	<input type="text"/>
	pH	<input type="text" value="0"/>	Water Surface Oils	<input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globbs <input type="checkbox"/> Flecks <input type="checkbox"/> Other
	Turbidity	<input type="checkbox"/> Clear <input checked="" type="checkbox"/> Slightly Turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other		

SEDIMENT/ SUBSTRATE	Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other	Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper Fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relic Shells <input type="checkbox"/> Other
	Looking at stones which are not deeply embedded, are undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	

INORGANIC SUBSTRATE COMPONENTS			ORGANIC SUBSTRATE COMPONENTS		
Substrate Type	Diameter	% Composite in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock		0	Dietritus	Sticks, wood, coarse plant material	15
Boulder	>10"	0			
Cobble	2.5 - 10"	0	Muck-Mud	Black, very fine organic matter	0
Gravel	0.1 - 2.5"	30			
Sand	gritty	10	Marl	Grey, shell fragments	0
Silt	goeoy	20			
Clay	slick	40			

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADIENT STREAMS				
	Optimal	SubOptimal	Marginal	Poor	
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.	
Score	8	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom: little or no root mat: no submerged vegetation.	Hardpan clay or bedrock: no root mat or vegetation.	
Score	10	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input checked="" type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
3. Pool Variability	Even mix of large shallow, large-deep, small shallow, small-deep pools present.	Majority of pools large-deep; very few shallow	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.	
Score	5	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.	
Score	13	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input checked="" type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			

5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly in pools as standing pools.	
Score	4	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.	
Score	6	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.	
Score	2	<input type="checkbox"/> 20 <input type="checkbox"/> 19 <input type="checkbox"/> 18 <input type="checkbox"/> 17 <input type="checkbox"/> 16 <input type="checkbox"/> 15 <input type="checkbox"/> 14 <input type="checkbox"/> 13 <input type="checkbox"/> 12 <input type="checkbox"/> 11 <input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.	
Note: determine left or right side by facing downstream.					
Score (LB)	5	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	5	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.	
Note: determine left or right side by facing downstream.					
Score (LB)	6	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	5	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.	
Note: determine left or right side by facing downstream.					
Score (LB)	6	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Score (RB)	5	<input type="checkbox"/> 10 <input type="checkbox"/> 9 <input type="checkbox"/> 8 <input type="checkbox"/> 7 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0			
Total Score	80				

WETLAND DETERMINATION DATA FORM Eastern Mountains and Piedmont

Project/Site: Henderson County Solar City/County: Henderson/Henderson Date: 04-May-20
 Applicant/Owner: Henderson County Solar LLC State: KY Sampling Point: 1MW1
 Investigators: Scott Mitchell Sec, Twp, Rng: S NA
 Landform: Flat Local Relief: Concave Slope %: 1
 Subregion: LRR Lat: 38.80247 N Lon: -87.63102 W Datum: Decimal Degrees
 Soil Map Unit Name: _____ NWI Classification: PFO Area Ft²: 6,261
 Are climatic/hydrologic conditions on this site typical for this time of year? Yes Remarks (If No): _____
 Are Vegetation , Soil , or Hydrology Significantly Disturbed? Are "Normal Circumstances" present: Yes
 Are Vegetation , Soil , or Hydrology Naturally Problematic? Remarks: _____

SUMMARY OF FINDINGS -- Attach site map showing sampling locations, transects, important features, etc.

Hydrophytic Vegetation Present? <u>Yes</u>	Is the Sampled Area within a Wetland? <u>Yes</u>
Hydric Soil Present? <u>Yes</u>	
Wetland Hydrology Present? <u>Yes</u>	
Remarks: Floodplain wetland along Canoe Creek.	

VEGETATION: Scientific Names

<u>Tree Stratum</u>	Plot Size: <u>Unit</u>	Absolute % Cover:	Dominant Species?	Indicator Status	Dominance Test Worksheet: Number of Dominant Species that are OBL, FACW or FAC: <u>4</u> A Total Number of Dominant Species across all Strata: <u>5</u> B Percent of Dominant Species that are OBL, FACW or FAC: <u>80.0</u> A/B
1. Acer negundo		10.0	No	FAC	
2. Populus deltoides		25.0	Yes	FAC	
3. Acer saccharum		20.0	Yes	FACU	
4. Celtis laevigata		10.0	No	FACW	
65.0 = Total Cover					Prevalence Index Worksheet: Total % Cover of: Multiply by: OBL <u>0</u> x1= <u>0</u> FACW <u>0</u> x2= <u>0</u> FAC <u>0</u> x3= <u>0</u> FACU <u>0</u> x4= <u>0</u> UPL <u>0</u> x5= <u>0</u> TOTALS (A) <u>0</u> (B) <u>0</u> Prevalence Index = B/A = _____
<u>Sapling/Shrub Stratum</u>	Plot Size: <u>Unit</u>				
1. Celtis laevigata		5.0	Yes	FACW	
2. Platanus occidentalis		5.0	Yes	FACW	
10.0 = Total Cover					
<u>Herb Stratum</u>	Plot Size: <u>Unit</u>				
1. Laportea canadensis		40.0	Yes	FAC	
2. Cinna latifolia		5.0	No	FACW	
3. Symphyotrichum lateriflorum		10.0	No	FACW	
55.0 = Total Cover					
<u>Woody Vine Stratum</u>	Plot Size: <u>Unit</u>				
1.					
2.					
= Total Cover					
Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤ 3.0 ¹ <input type="checkbox"/> Morphologic Adaptations ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.					
Hydrophytic Vegetation Present? <u>Yes</u>					
Remarks:					

SOIL

Sampling Point: 1MW1

Profile Description: (Describe to depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features					Texture	Remarks
	Color (Moist)	%	Color (Moist)	%	Type ¹	Loc ²			
0-7	10YR 4/2	90	7.5YR 5/6	10	C	M	Loamy		
7-12	10YR 4/1	90	7.5YR 5/6	10	C	M	Loamy		

¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ² Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils³:
<input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Stratified Layers (A5) <input type="checkbox"/> 2 cm Muck (A10) (LRR N) <input type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N)	<input type="checkbox"/> Sandy Gleyed Matrix (S4) <input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Stripped Matrix (S6) <input type="checkbox"/> Dark Surface (S7) <input type="checkbox"/> Loamy Gleyed Matrix (F2) <input checked="" type="checkbox"/> Depleted Matrix (F3) <input type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Depleted Dark Surface (F7) <input type="checkbox"/> Redox Depressions (F8) <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N)	<input type="checkbox"/> Red Parent Material (TF2) <input type="checkbox"/> Very Shallow Dark Surface (TF12) <input type="checkbox"/> Other (Explain in Remarks) ³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: <u>0</u> Depth (inches): <u>0</u>	Hydric Soil Present? <u>Yes</u>
---	--

Remarks:

Hydrology

Wetland Hydrology Indicators:		Secondary Indicators
Primary Indicators (minimum of one is required; check all that apply)		(minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> High Water Table (A2) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input checked="" type="checkbox"/> Sediment Deposits (B2) <input checked="" type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible From Aerial Imagery (B7)	<input type="checkbox"/> Water Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres on Live Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Other (Explain in Remarks)	<input checked="" type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:		Wetland Hydrology Present?
Surface Water Present? <u>No</u>	Depth (inches) <u>0.0</u>	
Water Table Present? <u>No</u>	Depth (inches) <u>0.0</u>	
Saturation Present? (including capillary fringe) <u>Yes</u>	Depth (inches) <u>0.0</u>	<u>Yes</u>

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

Sampling Point: 1MW1



WETLAND DETERMINATION DATA FORM Eastern Mountains and Piedmont

Project/Site: Henderson County Solar City/County: Henderson/Henderson Date: 04-May-20
 Applicant/Owner: Henderson County Solar LLC State: KY Sampling Point: 1MW1U
 Investigators: Scott Mitchell Sec, Twp, Rng: S NA
 Landform: Hillslope Local Relief: Convex Slope %: 30
 Subregion: LRR Lat: 38.80247 N Lon: -87.63102 W Datum: Decimal Degrees
 Soil Map Unit Name: _____ NWI Classification: _____ Area Ft²: _____
 Are climatic/hydrologic conditions on this site typical for this time of year? Yes
 Are Vegetation , Soil , or Hydrology Significantly Disturbed? Are "Normal Circumstances" present: Yes
 Are Vegetation , Soil , or Hydrology Naturally Problematic? Remarks: _____

SUMMARY OF FINDINGS -- Attach site map showing sampling locations, transects, important features, etc.

Hydrophytic Vegetation Present? <u>No</u>	Is the Sampled Area within a Wetland? <u>No</u>
Hydric Soil Present? <u>No</u>	
Wetland Hydrology Present? <u>No</u>	
Remarks:	

VEGETATION: Scientific Names

<u>Tree Stratum</u>	Plot Size: <u>Unit</u>	Absolute % Cover:	Dominant Species?	Indicator Status	Dominance Test Worksheet: Number of Dominant Species that are OBL, FACW or FAC: <u>4</u> A Total Number of Dominant Species across all Strata: <u>9</u> B Percent of Dominant Species that are OBL, FACW or FAC: <u>44.4</u> A/B
1. <i>Carya ovalis</i>		20.0	Yes	FACU	
2. <i>Populus deltoides</i>		15.0	Yes	FAC	
3. <i>Platanus occidentalis</i>		15.0	Yes	FACW	
4. <i>Celtis occidentalis</i>		10.0	No	FACU	
5.					
60.0 = Total Cover					
<u>Sapling/Shrub Stratum</u>	Plot Size: <u>Unit</u>				Prevalence Index Worksheet: Total % Cover of: Multiply by: OBL <u>0</u> x1= <u>0</u> FACW <u>15</u> x2= <u>30</u> FAC <u>45</u> x3= <u>135</u> FACU <u>60</u> x4= <u>240</u> UPL <u>0</u> x5= <u>0</u> TOTALS (A) <u>120</u> (B) <u>405</u> Prevalence Index = B/A = <u>3.4</u>
1. <i>Acer negundo</i>		10.0	Yes	FAC	
2. <i>Celtis occidentalis</i>		10.0	Yes	FACU	
3.					
4.					
5.					
20.0 = Total Cover					
<u>Herb Stratum</u>	Plot Size: <u>Unit</u>				Hydrophytic Vegetation Indicators: <input type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤ 3.0 ¹ <input type="checkbox"/> Morphologic Adaptations ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.
1. <i>Laportea canadensis</i>		20.0	Yes	FAC	
2. <i>Parthenocissus quinquefolia</i>		10.0	No	FACU	
3. <i>Poa</i> sp.		20.0	Yes	NI	
4. <i>Euonymus fortunei</i>		5.0	No	NI	
5. <i>Galium aparine</i>		5.0	No	FACU	
6.					
7.					
8.					
9.					
10.					
60.0 = Total Cover					
<u>Woody Vine Stratum</u>	Plot Size: <u>Unit</u>				Hydrophytic Vegetation Present? <u>No</u>
1. <i>Parthenocissus quinquefolia</i>		5.0	Yes	FACU	
2. <i>Euonymus fortunei</i>		5.0	Yes	NI	
10.0 = Total Cover					
Remarks:					



WETLAND DETERMINATION DATA FORM Eastern Mountains and Piedmont

Project/Site: Henderson County Solar City/County: Henderson/Henderson Date: 04-May-20
 Applicant/Owner: Henderson County Solar LLC State: KY Sampling Point: 1MW2
 Investigators: Ryan Winka Sec, Twp, Rng: S NA
 Landform: Flat Local Relief: Concave Slope %: 0.5
 Subregion: LRR Lat: 37.80309 N Lon: -87.63149 W Datum: Decimal Degrees
 Soil Map Unit Name: _____ NWI Classification: PFO Area Ft²: 6,207
 Are climatic/hydrologic conditions on this site typical for this time of year? Yes Remarks (If No): _____
 Are Vegetation , Soil , or Hydrology Significantly Disturbed? Are "Normal Circumstances" present: Yes
 Are Vegetation , Soil , or Hydrology Naturally Problematic? Remarks: _____

SUMMARY OF FINDINGS -- Attach site map showing sampling locations, transects, important features, etc.

Hydrophytic Vegetation Present? <u>Yes</u> Hydric Soil Present? <u>Yes</u> Wetland Hydrology Present? <u>Yes</u>	Is the Sampled Area within a Wetland? <u>Yes</u>
Remarks: _____	

VEGETATION: Scientific Names

<u>Tree Stratum</u> Plot Size: <u>Unit</u>	Absolute % Cover:	Dominant Species?	Indicator Status	Dominance Test Worksheet:
1. Acer rubrum	50.0	Yes	FAC	Number of Dominant Species that are OBL, FACW or FAC: <u>7</u> A Total Number of Dominant Species across all Strata: <u>7</u> B Percent of Dominant Species that are OBL, FACW or FAC: <u>100.0</u> A/B
2. Ulmus americana	40.0	Yes	FACW	
3.				
4.				
5.				
90.0 = Total Cover				Prevalence Index Worksheet: Total % Cover of: Multiply by: OBL <u>0</u> x1= <u>0</u> FACW <u>0</u> x2= <u>0</u> FAC <u>0</u> x3= <u>0</u> FACU <u>0</u> x4= <u>0</u> UPL <u>0</u> x5= <u>0</u> TOTALS (A) <u>0</u> (B) <u>0</u> Prevalence Index = B/A = _____
<u>Sapling/Shrub Stratum</u> Plot Size: <u>Unit</u>	Absolute % Cover:	Dominant Species?	Indicator Status	
1. Acer negundo	15.0	Yes	FAC	
2. Celtis laevigata	10.0	Yes	FACW	
3.				
4.				
5.				
25.0 = Total Cover				
<u>Herb Stratum</u> Plot Size: <u>Unit</u>	Absolute % Cover:	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤ 3.0 ¹ <input type="checkbox"/> Morphologic Adaptations ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.
1. Smilax rotundifolia	7.0	Yes	FAC	
2. Laportea canadensis	7.0	Yes	FAC	
3. Polygonum hydropiperoides	5.0	Yes	OBL	
4. Carex sp.	1.0	No	NI	
5.				
6.				
7.				
8.				
9.				
10.				
20.0 = Total Cover				
<u>Woody Vine Stratum</u> Plot Size: <u>Unit</u>	Absolute % Cover:	Dominant Species?	Indicator Status	Hydrophytic Vegetation Present? <u>Yes</u>
1.				
2.				
= Total Cover				
Remarks: _____				

SOIL

Sampling Point: **1MW2**

Profile Description: (Describe to depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features					Texture	Remarks
	Color (Moist)	%	Color (Moist)	%	Type ¹	Loc ²			
0-6	10YR 5/2	95	7.5YR 5/8	5	C	M	Loamy		
6-12	10YR 5/2	100					Loamy		

¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ² Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils³:
<input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Stratified Layers (A5) <input type="checkbox"/> 2 cm Muck (A10) (LRR N) <input type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N)	<input type="checkbox"/> Sandy Gleyed Matrix (S4) <input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Stripped Matrix (S6) <input type="checkbox"/> Dark Surface (S7) <input type="checkbox"/> Loamy Gleyed Matrix (F2) <input checked="" type="checkbox"/> Depleted Matrix (F3) <input type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Depleted Dark Surface (F7) <input type="checkbox"/> Redox Depressions (F8) <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N)	<input type="checkbox"/> Red Parent Material (TF2) <input type="checkbox"/> Very Shallow Dark Surface (TF12) <input type="checkbox"/> Other (Explain in Remarks) ³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: <u>0</u> Depth (inches): <u>0</u>	Hydric Soil Present? <u>Yes</u>
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Remarks:

Hydrology

Wetland Hydrology Indicators:		Secondary Indicators
Primary Indicators (minimum of one is required; check all that apply)		(minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> High Water Table (A2) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input checked="" type="checkbox"/> Sediment Deposits (B2) <input checked="" type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible From Aerial Imagery (B7)	<input checked="" type="checkbox"/> Water Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres on Live Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:		
Surface Water Present? <u>No</u>	Depth (inches) <u>0.0</u>	Wetland Hydrology Present? <u>Yes</u>
Water Table Present? <u>No</u>	Depth (inches) <u>0.0</u>	
Saturation Present? (including capillary fringe) <u>Yes</u>	Depth (inches) <u>0.0</u>	

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

Sampling Point: 1MW2



WETLAND DETERMINATION DATA FORM Eastern Mountains and Piedmont

Project/Site: Henderson County Solar City/County: Henderson/Henderson Date: 04-May-20
 Applicant/Owner: Henderson County Solar LLC State: KY Sampling Point: 1MW2U
 Investigators: Ryan Winka Sec, Twp, Rng: S NA
 Landform: Hillslope Local Relief: Convex Slope %: 15
 Subregion: LRR Lat: 37.80309 N Lon: -87.63149 W Datum: Decimal Degrees
 Soil Map Unit Name: _____ NWI Classification: _____ Area Ft²: _____
 Are climatic/hydrologic conditions on this site typical for this time of year? Yes
 Are Vegetation , Soil , or Hydrology Significantly Disturbed? Are "Normal Circumstances" present: Yes
 Are Vegetation , Soil , or Hydrology Naturally Problematic? Remarks: _____

SUMMARY OF FINDINGS -- Attach site map showing sampling locations, transects, important features, etc.

Hydrophytic Vegetation Present? <u>No</u>	Is the Sampled Area within a Wetland? <u>No</u>
Hydric Soil Present? <u>No</u>	
Wetland Hydrology Present? <u>No</u>	
Remarks:	

VEGETATION: Scientific Names

<u>Tree Stratum</u>	Plot Size: <u>Unit</u>	Absolute % Cover:	Dominant Species?	Indicator Status	Dominance Test Worksheet: Number of Dominant Species that are OBL, FACW or FAC: <u>1</u> A Total Number of Dominant Species across all Strata: <u>8</u> B Percent of Dominant Species that are OBL, FACW or FAC: <u>12.5</u> A/B
1. Celtis occidentalis		65.0	Yes	FACU	
2. Carya ovalis		20.0	Yes	FACU	
3.					
4.					
85.0 = Total Cover					Prevalence Index Worksheet: Total % Cover of: Multiply by: OBL <u>0</u> x1= <u>0</u> FACW <u>0</u> x2= <u>0</u> FAC <u>20</u> x3= <u>60</u> FACU <u>175</u> x4= <u>700</u> UPL <u>0</u> x5= <u>0</u> TOTALS (A) <u>195</u> (B) <u>760</u> Prevalence Index = B/A = <u>3.9</u>
<u>Sapling/Shrub Stratum</u>	Plot Size: <u>Unit</u>				
1. Celtis occidentalis		10.0	Yes	FACU	
2. Carya ovalis		10.0	Yes	FACU	
3. Acer negundo		5.0	No	FAC	
4.					
5.					
25.0 = Total Cover					
<u>Herb Stratum</u>	Plot Size: <u>Unit</u>				Hydrophytic Vegetation Indicators: <input type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤ 3.0 ¹ <input type="checkbox"/> Morphologic Adaptations ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.
1. Symphoricarpos orbiculatus		25.0	Yes	FACU	
2. Laportea canadensis		15.0	Yes	FAC	
3. Parthenocissus quinquefolia		10.0	No	FACU	
4. Poa pratensis		10.0	No	FACU	
5. Galium aparine		5.0	No	FACU	
6. Erigeron annuus		5.0	No	FACU	
7. Carex sp.		2.0	No	NI	
8.					
9.					
10.					
72.0 = Total Cover					
<u>Woody Vine Stratum</u>	Plot Size: <u>Unit</u>				Hydrophytic Vegetation Present? <u>No</u>
1. Parthenocissus quinquefolia		15.0	Yes	FACU	
2. Euonymus fortunei		15.0	Yes	NI	
30.0 = Total Cover					
Remarks:					

SOIL

Profile Description: (Describe to depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features					Texture	Remarks
	Color (Moist)	%	Color (Moist)	%	Type ¹	Loc ²			
0-16	10YR 4/3	100						Loamy	

¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ² Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils³:
<input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Stratified Layers (A5) <input type="checkbox"/> 2 cm Muck (A10) (LRR N) <input type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N)	<input type="checkbox"/> Sandy Gleyed Matrix (S4) <input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Stripped Matrix (S6) <input type="checkbox"/> Dark Surface (S7) <input type="checkbox"/> Loamy Gleyed Matrix (F2) <input type="checkbox"/> Depleted Matrix (F3) <input type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Depleted Dark Surface (F7) <input type="checkbox"/> Redox Depressions (F8) <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N)	<input type="checkbox"/> Red Parent Material (TF2) <input type="checkbox"/> Very Shallow Dark Surface (TF12) <input type="checkbox"/> 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? <u>No</u>
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Remarks:

Hydrology

Wetland Hydrology Indicators:	Secondary Indicators
<u>Primary Indicators (minimum of one is required; check all that apply)</u>	<u>(minimum of two required)</u>
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible From Aerial Imagery (B7)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Water Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres on Live Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Other (Explain in Remarks)	

Field Observations:	
Surface Water Present? <u>No</u>	Depth (inches) <u>0.0</u>
Water Table Present? <u>No</u>	Depth (inches) <u>0.0</u>
Saturation Present? (including capillary fringe) <u>No</u>	Depth (inches) <u>0.0</u>
Wetland Hydrology Present? <u>No</u>	

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

Sampling Point: 1MW2U



WETLAND DETERMINATION DATA FORM Eastern Mountains and Piedmont

Project/Site: Henderson County Solar City/County: Henderson/Henderson Date: 04-May-20
 Applicant/Owner: Henderson County Solar LLC State: KY Sampling Point: 1MW3
 Investigators: Ryan Harris Sec, Twp, Rng: S NA
 Landform: Flat Local Relief: Concave Slope %: 1
 Subregion: LRR Lat: 37.80167 N Lon: -87.62983 W Datum: Decimal Degrees
 Soil Map Unit Name: _____ NWI Classification: PFO Area Ft²: 2,871
 Are climatic/hydrologic conditions on this site typical for this time of year? Yes Remarks (If No): _____
 Are Vegetation , Soil , or Hydrology Significantly Disturbed? Are "Normal Circumstances" present: Yes
 Are Vegetation , Soil , or Hydrology Naturally Problematic? Remarks: _____

SUMMARY OF FINDINGS -- Attach site map showing sampling locations, transects, important features, etc.

Hydrophytic Vegetation Present? <u>Yes</u>	Is the Sampled Area within a Wetland? <u>Yes</u>
Hydric Soil Present? <u>Yes</u>	
Wetland Hydrology Present? <u>Yes</u>	
Remarks:	

VEGETATION: Scientific Names

<u>Tree Stratum</u>	Plot Size: <u>Unit</u>	Absolute % Cover:	Dominant Species?	Indicator Status	Dominance Test Worksheet: Number of Dominant Species that are OBL, FACW or FAC: <u>5</u> A Total Number of Dominant Species across all Strata: <u>5</u> B Percent of Dominant Species that are OBL, FACW or FAC: <u>100.0</u> A/B
1. Platanus occidentalis		40.0	Yes	FACW	
2. Populus deltoides		25.0	Yes	FAC	
3. Salix nigra		5.0	No	OBL	
4.					
5.					
70.0 = Total Cover					Prevalence Index Worksheet: Total % Cover of: Multiply by: OBL <u>0</u> x1= <u>0</u> FACW <u>0</u> x2= <u>0</u> FAC <u>0</u> x3= <u>0</u> FACU <u>0</u> x4= <u>0</u> UPL <u>0</u> x5= <u>0</u> TOTALS (A) <u>0</u> (B) <u>0</u> Prevalence Index = B/A = _____
<u>Sapling/Shrub Stratum</u>	Plot Size: <u>Unit</u>				
1. Acer negundo		15.0	Yes	FAC	
2. Ulmus rubra		5.0	No	FAC	
3. Populus deltoides		5.0	No	FAC	
4. Platanus occidentalis		5.0	No	FACW	
5.					
30.0 = Total Cover					
<u>Herb Stratum</u>	Plot Size: <u>Unit</u>				
1. Symphyotrichum lateriflorum		25.0	Yes	FACW	
2. Cinna latifolia		10.0	Yes	FACW	
3. Ranunculus hispidus		5.0	No	FAC	
4. Geum canadense		5.0	No	FACU	
5. Impatiens capensis		5.0	No	FACW	
6. Packera glabella		5.0	No	OBL	
7.					
8.					
9.					
10.					
55.0 = Total Cover					Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤ 3.0 ¹ <input type="checkbox"/> Morphologic Adaptations ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.
<u>Woody Vine Stratum</u>	Plot Size: <u>Unit</u>				
1.					
2.					
= Total Cover					
Hydrophytic Vegetation Present? <u>Yes</u>					
Remarks:					

SOIL

Sampling Point: 1MW3

Profile Description: (Describe to depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features					Texture	Remarks
	Color (Moist)	%	Color (Moist)	%	Type ¹	Loc ²			
0-12	10YR 5/2	80	7.5YR 5/6	20	C	M	Loamy		

¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ² Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils³:
<input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Stratified Layers (A5) <input type="checkbox"/> 2 cm Muck (A10) (LRR N) <input type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N)	<input type="checkbox"/> Sandy Gleyed Matrix (S4) <input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Stripped Matrix (S6) <input type="checkbox"/> Dark Surface (S7) <input type="checkbox"/> Loamy Gleyed Matrix (F2) <input checked="" type="checkbox"/> Depleted Matrix (F3) <input type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Depleted Dark Surface (F7) <input type="checkbox"/> Redox Depressions (F8) <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N)	<input type="checkbox"/> Red Parent Material (TF2) <input type="checkbox"/> Very Shallow Dark Surface (TF12) <input type="checkbox"/> Other (Explain in Remarks) ³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: <u>0</u> Depth (inches): <u>0</u>	Hydric Soil Present? <u>Yes</u>
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Remarks:

Hydrology

Wetland Hydrology Indicators:		Secondary Indicators
Primary Indicators (minimum of one is required; check all that apply)		(minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input checked="" type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible From Aerial Imagery (B7)	<input type="checkbox"/> Water Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres on Live Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:		
Surface Water Present? <u>No</u>	Depth (inches) <u>0.0</u>	Wetland Hydrology Present? <u>Yes</u>
Water Table Present? <u>No</u>	Depth (inches) <u>0.0</u>	
Saturation Present? (including capillary fringe) <u>No</u>	Depth (inches) <u>0.0</u>	

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

Sampling Point: 1MW3



WETLAND DETERMINATION DATA FORM Eastern Mountains and Piedmont

Project/Site: Henderson County Solar City/County: Henderson/Henderson Date: 04-May-20
 Applicant/Owner: Henderson County Solar LLC State: KY Sampling Point: 1MW3U
 Investigators: Ryan Harris Sec, Twp, Rng: S NA
 Landform: Hillslope Local Relief: Convex Slope %: 15
 Subregion: LRR Lat: 37.80167 N Lon: -87.62983 W Datum: Decimal Degrees
 Soil Map Unit Name: _____ NWI Classification: _____ Area Ft²: _____
 Are climatic/hydrologic conditions on this site typical for this time of year? Yes
 Are Vegetation , Soil , or Hydrology Significantly Disturbed? Are "Normal Circumstances" present: Yes
 Are Vegetation , Soil , or Hydrology Naturally Problematic? Remarks: _____

SUMMARY OF FINDINGS -- Attach site map showing sampling locations, transects, important features, etc.

Hydrophytic Vegetation Present? <u>Yes</u> Hydric Soil Present? <u>No</u> Wetland Hydrology Present? <u>No</u>	Is the Sampled Area within a Wetland? <u>No</u>
Remarks: _____	

VEGETATION: Scientific Names

<u>Tree Stratum</u> Plot Size: <u>Unit</u>	Absolute % Cover:	Dominant Species?	Indicator Status	Dominance Test Worksheet:
1. Gleditsia triacanthos	60.0	Yes	FAC	Number of Dominant Species that are OBL, FACW or FAC: <u>6</u> A Total Number of Dominant Species across all Strata: <u>9</u> B Percent of Dominant Species that are OBL, FACW or FAC: <u>66.7</u> A/B
2. Platanus occidentalis	10.0	No	FACW	
3.				
4.				
5.				
70.0 = Total Cover				Prevalence Index Worksheet: Total % Cover of: _____ Multiply by: OBL _____ 0 x1= _____ 0 FACW _____ 0 x2= _____ 0 FAC _____ 0 x3= _____ 0 FACU _____ 0 x4= _____ 0 UPL _____ 0 x5= _____ 0 TOTALS (A) _____ 0 (B) _____ 0 Prevalence Index = B/A = _____
<u>Sapling/Shrub Stratum</u> Plot Size: <u>Unit</u>				
1. Acer negundo	5.0	Yes	FAC	
2. Platanus occidentalis	5.0	Yes	FACW	
3. Gleditsia triacanthos	10.0	Yes	FAC	
4. Fraxinus americana	3.0	No	FACU	
5.				
23.0 = Total Cover				
<u>Herb Stratum</u> Plot Size: <u>Unit</u>				Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤ 3.0 ¹ <input type="checkbox"/> Morphologic Adaptations ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.
1. Galium aparine	15.0	Yes	FACU	
2. Cinna latifolia	15.0	Yes	FACW	
3. Euonymus fortunei	10.0	No	NI	
4. Symphoricarpos orbiculatus	5.0	No	FACU	
5. Lamium purpureum	5.0	No	NI	
6. Toxicodendron radicans	3.0	No	FAC	
7. Rosa multiflora	3.0	No	FACU	
8. Chaerophyllum tainturieri	25.0	Yes	FAC	
9.				
10.				
81.0 = Total Cover				
<u>Woody Vine Stratum</u> Plot Size: <u>Unit</u>				Hydrophytic Vegetation Present? <u>Yes</u>
1. Rosa multiflora	5.0	Yes	FACU	
2. Euonymus fortunei	5.0	Yes	NI	
10.0 = Total Cover				
Remarks: _____				

Sampling Point: 1MW3U

SOIL

Profile Description: (Describe to depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features					Texture	Remarks
	Color (Moist)	%	Color (Moist)	%	Type ¹	Loc ²			
0-16	10YR 5/3	100						Loamy	

¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ² Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils³:
<input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Stratified Layers (A5) <input type="checkbox"/> 2 cm Muck (A10) (LRR N) <input type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N)	<input type="checkbox"/> Sandy Gleyed Matrix (S4) <input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Stripped Matrix (S6) <input type="checkbox"/> Dark Surface (S7) <input type="checkbox"/> Loamy Gleyed Matrix (F2) <input type="checkbox"/> Depleted Matrix (F3) <input type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Depleted Dark Surface (F7) <input type="checkbox"/> Redox Depressions (F8) <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N)	<input type="checkbox"/> Red Parent Material (TF2) <input type="checkbox"/> Very Shallow Dark Surface (TF12) <input type="checkbox"/> 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? <u>No</u>
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Remarks:

Hydrology

Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply) <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible From Aerial Imagery (B7) <input type="checkbox"/> Water Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres on Live Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:	
Surface Water Present? <u>No</u>	Depth (inches) <u>0.0</u>
Water Table Present? <u>No</u>	Depth (inches) <u>0.0</u>
Saturation Present? (including capillary fringe) <u>No</u>	Depth (inches) <u>0.0</u>
Wetland Hydrology Present? <u>No</u>	

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:



WETLAND DETERMINATION DATA FORM Eastern Mountains and Piedmont

Project/Site: Henderson County Solar City/County: Henderson/Henderson Date: 04-May-20
 Applicant/Owner: Henderson County Solar LLC State: KY Sampling Point: 1MW4
 Investigators: Scott Mitchell Sec, Twp, Rng: S NA
 Landform: Flat Local Relief: Concave Slope %: 1.5
 Subregion: LRR Lat: 37.80200 N Lon: -87.62681 W Datum: Decimal Degrees
 Soil Map Unit Name: _____ NWI Classification: PFO Area Ft²: 1,915
 Are climatic/hydrologic conditions on this site typical for this time of year? Yes Remarks (If No): _____
 Are Vegetation , Soil , or Hydrology Significantly Disturbed? Are "Normal Circumstances" present: Yes
 Are Vegetation , Soil , or Hydrology Naturally Problematic? Remarks: _____

SUMMARY OF FINDINGS -- Attach site map showing sampling locations, transects, important features, etc.

Hydrophytic Vegetation Present? <u>Yes</u>	Is the Sampled Area within a Wetland? <u>Yes</u>
Hydric Soil Present? <u>Yes</u>	
Wetland Hydrology Present? <u>Yes</u>	
Remarks: Wetland is old stream channel.	

VEGETATION: Scientific Names

<u>Tree Stratum</u>	Plot Size: <u>Unit</u>	Absolute % Cover:	Dominant Species?	Indicator Status	Dominance Test Worksheet: Number of Dominant Species that are OBL, FACW or FAC: <u>4</u> A Total Number of Dominant Species across all Strata: <u>5</u> B Percent of Dominant Species that are OBL, FACW or FAC: <u>80.0</u> A/B
1. Celtis laevigata		30.0	Yes	FACW	
2. Acer saccharum		20.0	Yes	FACU	
3.					
4.					
50.0 = Total Cover					Prevalence Index Worksheet: Total % Cover of: Multiply by: OBL <u>0</u> x1= <u>0</u> FACW <u>0</u> x2= <u>0</u> FAC <u>0</u> x3= <u>0</u> FACU <u>0</u> x4= <u>0</u> UPL <u>0</u> x5= <u>0</u> TOTALS (A) <u>0</u> (B) <u>0</u> Prevalence Index = B/A = _____
<u>Sapling/Shrub Stratum</u>	Plot Size: <u>Unit</u>				
1. Ulmus rubra		10.0	Yes	FAC	
2. Celtis laevigata		5.0	No	FACW	
3. Carya laciniosa		2.0	No	FAC	
4. Fraxinus pennsylvanica		10.0	Yes	FACW	
5.					
27.0 = Total Cover					
<u>Herb Stratum</u>	Plot Size: <u>Unit</u>				
1. Laportea canadensis		5.0	No	FAC	
2. Carex grayi		3.0	No	FACW	
3. Symphyotrichum lateriflorum		20.0	Yes	FACW	
4. Arundinaria gigantea		2.0	No	FACW	
5. Smilax spp.		2.0	No	NI	
6. Euonymus fortunei		2.0	No	NI	
7. Galium aparine		2.0	No	FACU	
8. Symphoricarpos occidentalis		2.0	No	UPL	
9.					
10.					
38.0 = Total Cover					
<u>Woody Vine Stratum</u>	Plot Size: <u>Unit</u>				
1. Euonymus fortunei		2.0	No	NI	
2. Parthenocissus quinquefolia		2.0	No	FACU	
4.0 = Total Cover					
Remarks:					

Hydrophytic Vegetation Indicators:
 Dominance Test is >50%
 Prevalence Index is ≤ 3.0¹
 Morphologic Adaptations¹
 Problematic Hydrophytic Vegetation¹ (Explain)
¹Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes

SOIL

Sampling Point: 1MW4

Profile Description: (Describe to depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features					Texture	Remarks
	Color (Moist)	%	Color (Moist)	%	Type ¹	Loc ²			
0-8	10YR 5/2	95	7.5YR 5/6	5	C	M	Loamy		
8-12	10YR 5/2	90	7.5YR 5/6	10	C	M	Loamy		

¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ² Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils³:
<input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Stratified Layers (A5) <input type="checkbox"/> 2 cm Muck (A10) (LRR N) <input type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N)	<input type="checkbox"/> Sandy Gleyed Matrix (S4) <input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Stripped Matrix (S6) <input type="checkbox"/> Dark Surface (S7) <input type="checkbox"/> Loamy Gleyed Matrix (F2) <input checked="" type="checkbox"/> Depleted Matrix (F3) <input type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Depleted Dark Surface (F7) <input type="checkbox"/> Redox Depressions (F8) <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N)	<input type="checkbox"/> Red Parent Material (TF2) <input type="checkbox"/> Very Shallow Dark Surface (TF12) <input type="checkbox"/> Other (Explain in Remarks) ³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: <u>0</u> Depth (inches): <u>0</u>	Hydric Soil Present? <u>Yes</u>
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Remarks:

Hydrology

Wetland Hydrology Indicators:		Secondary Indicators
Primary Indicators (minimum of one is required; check all that apply)		(minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> High Water Table (A2) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input checked="" type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible From Aerial Imagery (B7)	<input checked="" type="checkbox"/> Water Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres on Live Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input checked="" type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:		
Surface Water Present? <u>No</u>	Depth (inches) <u>0.0</u>	Wetland Hydrology Present? <u>Yes</u>
Water Table Present? <u>No</u>	Depth (inches) <u>0.0</u>	
Saturation Present? (including capillary fringe) <u>Yes</u>	Depth (inches) <u>0.0</u>	

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

Sampling Point: 1MW4



WETLAND DETERMINATION DATA FORM Eastern Mountains and Piedmont

Project/Site: Henderson County Solar City/County: Henderson/Henderson Date: 04-May-20
 Applicant/Owner: Henderson County Solar LLC State: KY Sampling Point: 1MW4U
 Investigators: Scott Mitchell Sec, Twp, Rng: S NA
 Landform: Flat Local Relief: Convex Slope %: 2
 Subregion: LRR Lat: 37.80200 N Lon: -87.62681 W Datum: Decimal Degrees
 Soil Map Unit Name: _____ NWI Classification: _____ Area Ft²: _____
 Are climatic/hydrologic conditions on this site typical for this time of year? Yes
 Are Vegetation , Soil , or Hydrology Significantly Disturbed? Are "Normal Circumstances" present: Yes
 Are Vegetation , Soil , or Hydrology Naturally Problematic? Remarks: _____

SUMMARY OF FINDINGS -- Attach site map showing sampling locations, transects, important features, etc.

Hydrophytic Vegetation Present? <u>No</u>	Is the Sampled Area within a Wetland? <u>No</u>
Hydric Soil Present? <u>No</u>	
Wetland Hydrology Present? <u>No</u>	
Remarks:	

VEGETATION: Scientific Names

<u>Tree Stratum</u>	Plot Size: <u>Unit</u>	Absolute % Cover:	Dominant Species?	Indicator Status	Dominance Test Worksheet: Number of Dominant Species that are OBL, FACW or FAC: <u>0</u> A Total Number of Dominant Species across all Strata: <u>7</u> B Percent of Dominant Species that are OBL, FACW or FAC: <u>0.0</u> A/B
1. Acer saccharum		70.0	Yes	FACU	
2. Juglans nigra		15.0	No	FACU	
3.					
4.					
5.					
85.0 = Total Cover					
<u>Sapling/Shrub Stratum</u>	Plot Size: <u>Unit</u>	Absolute % Cover:	Dominant Species?	Indicator Status	Prevalence Index Worksheet: Total % Cover of: Multiply by: OBL <u>0</u> x1= <u>0</u> FACW <u>2</u> x2= <u>4</u> FAC <u>0</u> x3= <u>0</u> FACU <u>145</u> x4= <u>580</u> UPL <u>0</u> x5= <u>0</u> TOTALS (A) <u>147</u> (B) <u>584</u> Prevalence Index = B/A = <u>4.0</u>
1. Acer saccharum		20.0	Yes	FACU	
2.					
3.					
4.					
5.					
20.0 = Total Cover					
<u>Herb Stratum</u>	Plot Size: <u>Unit</u>	Absolute % Cover:	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators: <input type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤ 3.0 ¹ <input type="checkbox"/> Morphologic Adaptations ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.
1. Poa pratensis		15.0	Yes	FACU	
2. Galium aparine		15.0	Yes	FACU	
3. Euonymus fortunei		10.0	Yes	NI	
4. Parthenocissus quinquefolia		5.0	No	FACU	
5. Arisaema dracontium		2.0	No	FACW	
6.					
7.					
8.					
9.					
10.					
47.0 = Total Cover					
<u>Woody Vine Stratum</u>	Plot Size: <u>Unit</u>	Absolute % Cover:	Dominant Species?	Indicator Status	Hydrophytic Vegetation Present? <u>No</u>
1. Euonymus fortunei		15.0	Yes	NI	
2. Parthenocissus quinquefolia		5.0	Yes	FACU	
20.0 = Total Cover					
Remarks:					

Sampling Point: 1MW4U

SOIL

Profile Description: (Describe to depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features					Texture	Remarks
	Color (Moist)	%	Color (Moist)	%	Type ¹	Loc ²			
0-2	10YR 4/2	100						Loamy	
2-16	10YR 5/3	100						Loamy	

¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ² Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils³:
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Dark Surface (S7)	
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N)	<input type="checkbox"/> Redox Depressions (F8)	
	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N)	

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? <u>No</u>
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Remarks:

Hydrology

Wetland Hydrology Indicators:	Secondary Indicators
<u>Primary Indicators (minimum of one is required; check all that apply)</u>	<u>(minimum of two required)</u>
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible From Aerial Imagery (B7)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Water Stained Leaves (B9)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Microtopographic Relief (D4)
<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	
<input type="checkbox"/> Oxidized Rhizospheres on Live Roots (C3)	
<input type="checkbox"/> Presence of Reduced Iron (C4)	
<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	
<input type="checkbox"/> Thin Muck Surface (C7)	
<input type="checkbox"/> Other (Explain in Remarks)	

Field Observations:	
Surface Water Present? <u>No</u>	Depth (inches) <u>0.0</u>
Water Table Present? <u>No</u>	Depth (inches) <u>0.0</u>
Saturation Present? (including capillary fringe) <u>No</u>	Depth (inches) <u>0.0</u>
Wetland Hydrology Present? <u>No</u>	

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

Sampling Point: 1MW4U



WETLAND DETERMINATION DATA FORM Eastern Mountains and Piedmont

Project/Site: Henderson County Solar City/County: Henderson/Henderson Date: 04-May-20
 Applicant/Owner: Henderson County Solar LLC State: KY Sampling Point: 1MW5
 Investigators: Ryan Harris Sec, Twp, Rng: S NA
 Landform: Flat Local Relief: Concave Slope %: 2
 Subregion: LRR Lat: 37.80187 N Lon: -87.62629 W Datum: Decimal Degrees
 Soil Map Unit Name: _____ NWI Classification: PFO Area Ft²: 3,516
 Are climatic/hydrologic conditions on this site typical for this time of year? Yes Remarks (If No): _____
 Are Vegetation , Soil , or Hydrology Significantly Disturbed? Are "Normal Circumstances" present: Yes
 Are Vegetation , Soil , or Hydrology Naturally Problematic? Remarks: _____

SUMMARY OF FINDINGS -- Attach site map showing sampling locations, transects, important features, etc.

Hydrophytic Vegetation Present? <u>Yes</u> Hydric Soil Present? <u>Yes</u> Wetland Hydrology Present? <u>Yes</u>	Is the Sampled Area within a Wetland? <u>Yes</u>
Remarks: _____	

VEGETATION: Scientific Names

<u>Tree Stratum</u> Plot Size: <u>Unit</u>	Absolute % Cover:	Dominant Species?	Indicator Status	Dominance Test Worksheet:		
1. Acer saccharum	30.0	Yes	FACU	Number of Dominant Species that are OBL, FACW or FAC: <u>4</u> A Total Number of Dominant Species across all Strata: <u>8</u> B Percent of Dominant Species that are OBL, FACW or FAC: <u>50.0</u> A/B		
2. Fraxinus pennsylvanica	20.0	Yes	FACW			
3. Acer saccharinum	15.0	No	FACW			
4. Liquidambar styraciflua	20.0	Yes	FAC			
5. Quercus pagoda	5.0	No	FACW			
90.0 = Total Cover				Prevalence Index Worksheet: Total % Cover of: Multiply by: OBL <u>0</u> x1= <u>0</u> FACW <u>58</u> x2= <u>116</u> FAC <u>35</u> x3= <u>105</u> FACU <u>53</u> x4= <u>212</u> UPL <u>0</u> x5= <u>0</u> TOTALS (A) <u>146</u> (B) <u>433</u> Prevalence Index = B/A = <u>3.0</u>		
<u>Sapling/Shrub Stratum</u> Plot Size: <u>Unit</u>	1. Acer saccharum	10.0	Yes			FACU
2. Ulmus rubra	10.0	Yes	FAC			
3.						
4.						
5.						
20.0 = Total Cover						
<u>Herb Stratum</u> Plot Size: <u>Unit</u>	1. Poa pratensis	10.0	Yes	FACU	Hydrophytic Vegetation Indicators: <input type="checkbox"/> Dominance Test is >50% <input checked="" type="checkbox"/> Prevalence Index is ≤ 3.0 ¹ <input type="checkbox"/> Morphologic Adaptations ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.	
2. Carex grayi	10.0	Yes	FACW			
3. Impatiens capensis	3.0	No	FACW			
4. Persicaria virginiana	5.0	No	FAC			
5. Galium aparine	3.0	No	FACU			
6. Euonymus fortunei	10.0	Yes	NI			
7. Cinna latifolia	5.0	No	FACW			
8.						
9.						
10.						
46.0 = Total Cover						
<u>Woody Vine Stratum</u> Plot Size: <u>Unit</u>	1.				Hydrophytic Vegetation Present? <u>Yes</u>	
2.						
= Total Cover						
Remarks: _____						

SOIL

Sampling Point: 1MW5

Profile Description: (Describe to depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features					Texture	Remarks
	Color (Moist)	%	Color (Moist)	%	Type ¹	Loc ²			
0-5	10YR 4/2	98	7.5YR 5/6	2	C	M	Loamy		
5-12	10YR 4/1	90	7.5YR 5/6	10	C	M	Loamy		

¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ² Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils³:
<input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Stratified Layers (A5) <input type="checkbox"/> 2 cm Muck (A10) (LRR N) <input type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N)	<input type="checkbox"/> Sandy Gleyed Matrix (S4) <input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Stripped Matrix (S6) <input type="checkbox"/> Dark Surface (S7) <input type="checkbox"/> Loamy Gleyed Matrix (F2) <input checked="" type="checkbox"/> Depleted Matrix (F3) <input type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Depleted Dark Surface (F7) <input type="checkbox"/> Redox Depressions (F8) <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N)	<input type="checkbox"/> Red Parent Material (TF2) <input type="checkbox"/> Very Shallow Dark Surface (TF12) <input type="checkbox"/> Other (Explain in Remarks) ³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: <u>0</u> Depth (inches): <u>0</u>	Hydric Soil Present? <u>Yes</u>
---	--

Remarks:

Hydrology

Wetland Hydrology Indicators:		Secondary Indicators
Primary Indicators (minimum of one is required; check all that apply)		(minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> High Water Table (A2) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input checked="" type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible From Aerial Imagery (B7)	<input checked="" type="checkbox"/> Water Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres on Live Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:		
Surface Water Present? <u>No</u>	Depth (inches) <u>0.0</u>	Wetland Hydrology Present? <u>Yes</u>
Water Table Present? <u>No</u>	Depth (inches) <u>0.0</u>	
Saturation Present? (including capillary fringe) <u>Yes</u>	Depth (inches) <u>0.0</u>	

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

Sampling Point: 1MW5



WETLAND DETERMINATION DATA FORM Eastern Mountains and Piedmont

Project/Site: Henderson County Solar City/County: Henderson/Henderson Date: 04-May-20
 Applicant/Owner: Henderson County Solar LLC State: KY Sampling Point: 1MW5U
 Investigators: Ryan Harris Sec, Twp, Rng: S NA
 Landform: Hillslope Local Relief: Convex Slope %: 4
 Subregion: LRR Lat: 37.80187 N Lon: -87.62629 W Datum: Decimal Degrees
 Soil Map Unit Name: _____ NWI Classification: _____ Area Ft²: _____
 Are climatic/hydrologic conditions on this site typical for this time of year? Yes
 Are Vegetation , Soil , or Hydrology Significantly Disturbed? Are "Normal Circumstances" present: Yes
 Are Vegetation , Soil , or Hydrology Naturally Problematic? Remarks: _____

SUMMARY OF FINDINGS -- Attach site map showing sampling locations, transects, important features, etc.

Hydrophytic Vegetation Present? <u>No</u>	Is the Sampled Area within a Wetland? <u>No</u>
Hydric Soil Present? <u>No</u>	
Wetland Hydrology Present? <u>No</u>	
Remarks:	

VEGETATION: Scientific Names

<u>Tree Stratum</u>	Plot Size: <u>Unit</u>	Absolute % Cover:	Dominant Species?	Indicator Status	Dominance Test Worksheet: Number of Dominant Species that are OBL, FACW or FAC: <u>4</u> A Total Number of Dominant Species across all Strata: <u>8</u> B Percent of Dominant Species that are OBL, FACW or FAC: <u>50.0</u> A/B
1. Gleditsia triacanthos		40.0	Yes	FAC	
2. Acer saccharum		10.0	No	FACU	
3. Sassafras albidum		10.0	No	FACU	
4.					
5.					
60.0 = Total Cover					Prevalence Index Worksheet: Total % Cover of: Multiply by: OBL <u>0</u> x1= <u>0</u> FACW <u>20</u> x2= <u>40</u> FAC <u>75</u> x3= <u>225</u> FACU <u>80</u> x4= <u>320</u> UPL <u>0</u> x5= <u>0</u> TOTALS (A) <u>175</u> (B) <u>585</u> Prevalence Index = B/A = <u>3.3</u>
Sapling/Shrub Stratum Plot Size: <u>Unit</u>					
1. Gleditsia triacanthos		10.0	Yes	FAC	
2. Elaeagnus angustifolia		10.0	Yes	FACU	
3. Acer saccharum		5.0	No	FACU	
4. Fraxinus americana		5.0	No	FACU	
5. Sassafras albidum		5.0	No	FACU	
35.0 = Total Cover					
Herb Stratum Plot Size: <u>Unit</u>					
1. Cinna latifolia		20.0	Yes	FACW	
2. Galium aparine		10.0	No	FACU	
3. Chaerophyllum tainturieri		20.0	Yes	FAC	
4. Erigeron annuus		10.0	No	FACU	
5. Euonymus fortunei		10.0	Yes	NI	
6. Parthenocissus quinquefolia		5.0	No	FACU	
7. Allium vineale		5.0	No	FACU	
8. Lamium purpureum		3.0	No	NI	
9. Carex sp.		5.0	No	NI	
10. Lonicera japonica		5.0	No	FAC	
93.0 = Total Cover					
Woody Vine Stratum Plot Size: <u>Unit</u>					
1. Parthenocissus quinquefolia		5.0	Yes	FACU	
2. Euonymus fortunei		3.0	Yes	NI	
8.0 = Total Cover					
Hydrophytic Vegetation Indicators: <input type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤ 3.0 ¹ <input type="checkbox"/> Morphologic Adaptations ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.					
Hydrophytic Vegetation Present? <u>No</u>					
Remarks:					

Sampling Point: 1MW5U



WETLAND DETERMINATION DATA FORM Eastern Mountains and Piedmont

Project/Site: Henderson County Solar City/County: Henderson/Henderson Date: 04-May-20
 Applicant/Owner: Henderson County Solar LLC State: KY Sampling Point: 1MW6
 Investigators: Scott Mitchell Sec, Twp, Rng: S NA
 Landform: Flat Local Relief: Concave Slope %: 1
 Subregion: LRR Lat: 37.80175 N Lon: -87.62544 W Datum: Decimal Degrees
 Soil Map Unit Name: _____ NWI Classification: PFO Area Ft²: 11,379
 Are climatic/hydrologic conditions on this site typical for this time of year? Yes Remarks (If No): _____
 Are Vegetation , Soil , or Hydrology Significantly Disturbed? Are "Normal Circumstances" present: Yes
 Are Vegetation , Soil , or Hydrology Naturally Problematic? Remarks: _____

SUMMARY OF FINDINGS -- Attach site map showing sampling locations, transects, important features, etc.

Hydrophytic Vegetation Present? <u>Yes</u> Hydric Soil Present? <u>Yes</u> Wetland Hydrology Present? <u>Yes</u>	Is the Sampled Area within a Wetland? <u>Yes</u>
Remarks: _____	

VEGETATION: Scientific Names

<u>Tree Stratum</u>	Plot Size:	Absolute % Cover:	Dominant Species?	Indicator Status	Dominance Test Worksheet:
1.					Number of Dominant Species that are OBL, FACW or FAC: <u>4</u> A Total Number of Dominant Species across all Strata: <u>6</u> B Percent of Dominant Species that are OBL, FACW or FAC: <u>66.7</u> A/B
2.					
3.					
4.					
5.					
_____ = Total Cover					
<u>Sapling/Shrub Stratum</u>	Plot Size:				Prevalence Index Worksheet:
1.					Total % Cover of: _____ Multiply by: _____ OBL _____ x1= _____ FACW _____ x2= _____ FAC _____ x3= _____ FACU _____ x4= _____ UPL _____ x5= _____ TOTALS (A) _____ (B) _____
2.					Prevalence Index = B/A = _____ Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤ 3.0 ¹ <input type="checkbox"/> Morphologic Adaptations ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
_____ = Total Cover					
<u>Woody Vine Stratum</u>	Plot Size:				Hydrophytic Vegetation Present? <u>Yes</u>
1.					
2.					
_____ = Total Cover					
Remarks: _____					

SOIL

Sampling Point: **1MW6**

Profile Description: (Describe to depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features					Texture	Remarks
	Color (Moist)	%	Color (Moist)	%	Type ¹	Loc ²			
0-12	10YR 5/2	90	7.5YR 4/6	10	C	M	Loamy		

¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ² Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils³:
<input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Stratified Layers (A5) <input type="checkbox"/> 2 cm Muck (A10) (LRR N) <input type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N)	<input type="checkbox"/> Sandy Gleyed Matrix (S4) <input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Stripped Matrix (S6) <input type="checkbox"/> Dark Surface (S7) <input type="checkbox"/> Loamy Gleyed Matrix (F2) <input checked="" type="checkbox"/> Depleted Matrix (F3) <input type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Depleted Dark Surface (F7) <input type="checkbox"/> Redox Depressions (F8) <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N)	<input type="checkbox"/> Red Parent Material (TF2) <input type="checkbox"/> Very Shallow Dark Surface (TF12) <input type="checkbox"/> Other (Explain in Remarks) ³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: <u>0</u> Depth (inches): <u>0</u>	Hydric Soil Present? <u>Yes</u>
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Remarks:

Hydrology

Wetland Hydrology Indicators:		Secondary Indicators
Primary Indicators (minimum of one is required; check all that apply)		(minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible From Aerial Imagery (B7)	<input type="checkbox"/> Water Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres on Live Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:		
Surface Water Present? <u>No</u>	Depth (inches) <u>0.0</u>	Wetland Hydrology Present? <u>Yes</u>
Water Table Present? <u>No</u>	Depth (inches) <u>0.0</u>	
Saturation Present? (including capillary fringe) <u>No</u>	Depth (inches) <u>0.0</u>	

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

Sampling Point: 1MW6



WETLAND DETERMINATION DATA FORM Eastern Mountains and Piedmont

Project/Site: Henderson County Solar City/County: Henderson/Henderson Date: 04-May-20
 Applicant/Owner: Henderson County Solar LLC State: KY Sampling Point: 1MW6U
 Investigators: Scott Mitchell Sec, Twp, Rng: S NA
 Landform: Flat Local Relief: Flat Slope %: 2
 Subregion: LRR Lat: 37.80175 N Lon: -87.62544 W Datum: Decimal Degrees
 Soil Map Unit Name: _____ NWI Classification: _____ Area Ft²: _____
 Are climatic/hydrologic conditions on this site typical for this time of year? Yes
 Are Vegetation , Soil , or Hydrology Significantly Disturbed? Are "Normal Circumstances" present: Yes
 Are Vegetation , Soil , or Hydrology Naturally Problematic? Remarks: _____

SUMMARY OF FINDINGS -- Attach site map showing sampling locations, transects, important features, etc.

Hydrophytic Vegetation Present? <u>No</u>	Is the Sampled Area within a Wetland? <u>No</u>
Hydric Soil Present? <u>No</u>	
Wetland Hydrology Present? <u>No</u>	
Remarks: Upland is crop field.	

VEGETATION: Scientific Names

<u>Tree Stratum</u>	Plot Size: <u>Unit</u>	Absolute % Cover:	Dominant Species?	Indicator Status	Dominance Test Worksheet: Number of Dominant Species that are OBL, FACW or FAC: <u>1</u> A Total Number of Dominant Species across all Strata: <u>2</u> B Percent of Dominant Species that are OBL, FACW or FAC: <u>50.0</u> A/B
1.					
2.					
3.					
4.					
5.					
_____ = Total Cover					Prevalence Index Worksheet: Total % Cover of: Multiply by: OBL <u>0</u> x1= <u>0</u> FACW <u>0</u> x2= <u>0</u> FAC <u>15</u> x3= <u>45</u> FACU <u>8</u> x4= <u>32</u> UPL <u>0</u> x5= <u>0</u> TOTALS (A) <u>23</u> (B) <u>77</u> Prevalence Index = B/A = <u>3.3</u>
<u>Sapling/Shrub Stratum</u>	Plot Size: <u>Unit</u>				
1.					
2.					
3.					
4.					
5.					
_____ = Total Cover					
<u>Herb Stratum</u>	Plot Size: <u>Unit</u>				Hydrophytic Vegetation Indicators: <input type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤ 3.0 ¹ <input type="checkbox"/> Morphologic Adaptations ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.
1. Ranunculus hispidus		15.0	Yes	FAC	
2. Allium vineale		5.0	Yes	FACU	
3. Erigeron annuus		3.0	No	FACU	
4.					
5.					
6.					
7.					
8.					
9.					
10.					
23.0 = Total Cover					
<u>Woody Vine Stratum</u>	Plot Size: <u>Unit</u>				
1.					
2.					
_____ = Total Cover					
Remarks:					



WETLAND DETERMINATION DATA FORM Eastern Mountains and Piedmont

Project/Site: Henderson County Solar City/County: Henderson/Henderson Date: 05-May-20
 Applicant/Owner: Henderson County Solar LLC State: KY Sampling Point: 2MW1
 Investigators: Ryan Winka Sec, Twp, Rng: S NA
 Landform: Basin Local Relief: Flat Slope %: 0.5
 Subregion: LRR Lat: 37.00000 N Lon: 87.62570 W Datum: Decimal Degrees
 Soil Map Unit Name: _____ NWI Classification: PUBG Area Ft²: 4,990
 Are climatic/hydrologic conditions on this site typical for this time of year? Yes Remarks (If No): _____
 Are Vegetation , Soil , or Hydrology Significantly Disturbed? Are "Normal Circumstances" present: Yes
 Are Vegetation , Soil , or Hydrology Naturally Problematic? Remarks: _____

SUMMARY OF FINDINGS -- Attach site map showing sampling locations, transects, important features, etc.

Hydrophytic Vegetation Present? <u>Yes</u> Hydric Soil Present? <u>Yes</u> Wetland Hydrology Present? <u>Yes</u>	Is the Sampled Area within a Wetland? <u>Yes</u>
Remarks: _____	

VEGETATION: Scientific Names

<u>Tree Stratum</u>	Plot Size: <u>Unit</u>	Absolute % Cover:	Dominant Species?	Indicator Status	Dominance Test Worksheet:
1. Acer rubrum		30.0	Yes	FAC	Number of Dominant Species that are OBL, FACW or FAC: <u>4</u> A Total Number of Dominant Species across all Strata: <u>6</u> B Percent of Dominant Species that are OBL, FACW or FAC: <u>66.7</u> A/B
2. Platanus occidentalis		20.0	Yes	FACW	
3.					
4.					
5.					
50.0 = Total Cover					Prevalence Index Worksheet: Total % Cover of: Multiply by: OBL <u>0</u> x1= <u>0</u> FACW <u>0</u> x2= <u>0</u> FAC <u>0</u> x3= <u>0</u> FACU <u>0</u> x4= <u>0</u> UPL <u>0</u> x5= <u>0</u> TOTALS (A) <u>0</u> (B) <u>0</u> Prevalence Index = B/A = _____
Sapling/Shrub Stratum	Plot Size: <u>Unit</u>				
1.					
2.					
3.					
4.					
5.					
= Total Cover					
Herb Stratum	Plot Size: <u>Unit</u>				
1. Smilax spp.		2.0	Yes	NI	
2. Parthenocissus quinquefolia		2.0	Yes	FACU	
3. Laportea canadensis		2.0	Yes	FAC	
4. Carex blanda		2.0	Yes	FAC	
5.					
6.					
7.					
8.					
9.					
10.					
8.0 = Total Cover					
Woody Vine Stratum	Plot Size: <u>Unit</u>				
1.					
2.					
= Total Cover					
Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤ 3.0 ¹ <input type="checkbox"/> Morphologic Adaptations ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)					
¹ Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.					
Hydrophytic Vegetation Present? <u>Yes</u>					
Remarks: _____					

SOIL

Sampling Point: 2MW1

Profile Description: (Describe to depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features					Texture	Remarks
	Color (Moist)	%	Color (Moist)	%	Type ¹	Loc ²			
0-12	10YR5/2	90	7.5YR4/6	10	C	M	Loamy		

¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ² Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils³:
<input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Stratified Layers (A5) <input type="checkbox"/> 2 cm Muck (A10) (LRR N) <input type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N)	<input type="checkbox"/> Sandy Gleyed Matrix (S4) <input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Stripped Matrix (S6) <input type="checkbox"/> Dark Surface (S7) <input type="checkbox"/> Loamy Gleyed Matrix (F2) <input checked="" type="checkbox"/> Depleted Matrix (F3) <input type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Depleted Dark Surface (F7) <input type="checkbox"/> Redox Depressions (F8) <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N)	<input type="checkbox"/> Red Parent Material (TF2) <input type="checkbox"/> Very Shallow Dark Surface (TF12) <input type="checkbox"/> Other (Explain in Remarks) ³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: <u>0</u> Depth (inches): <u>0</u>	Hydric Soil Present? <u>Yes</u>
---	--

Remarks:

Hydrology

Wetland Hydrology Indicators:		Secondary Indicators
Primary Indicators (minimum of one is required; check all that apply)		(minimum of two required)
<input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> High Water Table (A2) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input checked="" type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible From Aerial Imagery (B7)	<input checked="" type="checkbox"/> Water Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres on Live Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input checked="" type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:		
Surface Water Present? <u>Yes</u>	Depth (inches) <u>0.3</u>	Wetland Hydrology Present? <u>Yes</u>
Water Table Present? <u>No</u>	Depth (inches) <u>0.0</u>	
Saturation Present? (including capillary fringe) <u>Yes</u>	Depth (inches) <u>0.0</u>	

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

Sampling Point: 2MW1



WETLAND DETERMINATION DATA FORM Eastern Mountains and Piedmont

Project/Site: Henderson County Solar City/County: Henderson/Henderson Date: 05-May-20
 Applicant/Owner: Henderson County Solar LLC State: KY Sampling Point: 2MW1U
 Investigators: Ryan Winka Sec, Twp, Rng: S NA
 Landform: Hillslope Local Relief: Convex Slope %: 3
 Subregion: LRR Lat: 37.00000 N Lon: 87.62570 W Datum: Decimal Degrees
 Soil Map Unit Name: _____ NWI Classification: _____ Area Ft²: _____
 Are climatic/hydrologic conditions on this site typical for this time of year? Yes
 Are Vegetation , Soil , or Hydrology Significantly Disturbed? Are "Normal Circumstances" present: Yes
 Are Vegetation , Soil , or Hydrology Naturally Problematic? Remarks: _____

SUMMARY OF FINDINGS -- Attach site map showing sampling locations, transects, important features, etc.

Hydrophytic Vegetation Present? <u>No</u>	Is the Sampled Area within a Wetland? <u>No</u>
Hydric Soil Present? <u>No</u>	
Wetland Hydrology Present? <u>No</u>	
Remarks:	

VEGETATION: Scientific Names

<u>Tree Stratum</u> Plot Size: <u>Unit</u>	Absolute % Cover:	Dominant Species?	Indicator Status	Dominance Test Worksheet:	
1. <i>Celtis occidentalis</i>	55.0	Yes	FACU	Number of Dominant Species that are OBL, FACW or FAC: <u>2</u> A	
2. <i>Quercus macrocarpa</i>	15.0	No	FAC	Total Number of Dominant Species across all Strata: <u>4</u> B	
3. <i>Quercus bicolor</i>	10.0	No	FACW	Percent of Dominant Species that are OBL, FACW or FAC: <u>50.0</u> A/B	
4.					
5.					
80.0 = Total Cover					
<u>Sapling/Shrub Stratum</u> Plot Size: <u>Unit</u>	Absolute % Cover:	Dominant Species?	Indicator Status	Prevalence Index Worksheet:	
1. <i>Acer negundo</i>	5.0	Yes	FAC	Total % Cover of: <u>5.0</u> Multiply by:	
2.				OBL <u>0</u>	x1= <u>0</u>
3.				FACW <u>15</u>	x2= <u>30</u>
4.				FAC <u>75</u>	x3= <u>225</u>
5.				FACU <u>85</u>	x4= <u>340</u>
5.0 = Total Cover				UPL <u>0</u>	x5= <u>0</u>
				TOTALS	
				(A) <u>175</u>	(B) <u>595</u>
				Prevalence Index = B/A = <u>3.4</u>	
<u>Herb Stratum</u> Plot Size: <u>Unit</u>	Absolute % Cover:	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators:	
1. <i>Laportea canadensis</i>	50.0	Yes	FAC	<input type="checkbox"/> Dominance Test is >50%	
2. <i>Poa pratensis</i>	10.0	No	FACU	<input type="checkbox"/> Prevalence Index is ≤ 3.0 ¹	
3. <i>Galium aparine</i>	5.0	No	FACU	<input type="checkbox"/> Morphologic Adaptations ¹	
4. <i>Elymus riparius</i>	5.0	No	FACW	<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)	
5. <i>Smilax rotundifolia</i>	5.0	No	FAC		
6. <i>Euonymus fortunei</i>	3.0	No	NI		
7.					
8.					
9.					
10.					
78.0 = Total Cover					
<u>Woody Vine Stratum</u> Plot Size: <u>Unit</u>	Absolute % Cover:	Dominant Species?	Indicator Status	Hydrophytic Vegetation Present? <u>No</u>	
1. <i>Parthenocissus quinquefolia</i>	15.0	Yes	FACU		
2.					
15.0 = Total Cover					
Remarks:					

SOIL

Profile Description: (Describe to depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features					Texture	Remarks
	Color (Moist)	%	Color (Moist)	%	Type ¹	Loc ²			
0-4	10YR4/3	100						Loamy	
4-16	10YR4/4	100						Loamy	

¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ² Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils³:	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Red Parent Material (TF2)	³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Dark Surface (S7)		
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)		
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Depleted Matrix (F3)		
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Redox Dark Surface (F6)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N)	<input type="checkbox"/> Redox Depressions (F8)		
	<input type="checkbox"/> Iron-Manganese Masses (F12)(LRR N)		

Restrictive Layer (if observed): Type: Depth (inches):	Hydric Soil Present? <u>No</u>
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Remarks:

Hydrology

Wetland Hydrology Indicators:		Secondary Indicators
Primary Indicators (minimum of one is required; check all that apply)		(minimum of two required)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Live Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible From Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
		<input type="checkbox"/> Shallow Aquitard (D3)
		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:		
Surface Water Present? <u>No</u>	Depth (inches) <u>0.0</u>	Wetland Hydrology Present? <u>No</u>
Water Table Present? <u>No</u>	Depth (inches) <u>0.0</u>	
Saturation Present? (including capillary fringe) <u>No</u>	Depth (inches) <u>0.0</u>	

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

Sampling Point: 2MW1U



WETLAND DETERMINATION DATA FORM Eastern Mountains and Piedmont

Project/Site: Henderson County Solar City/County: Henderson/Henderson Date: 06-May-20
 Applicant/Owner: Henderson County Solar LLC State: KY Sampling Point: 2MW10
 Investigators: Scott Mitchell Sec, Twp, Rng: S NA
 Landform: Flat Local Relief: Flat Slope %: 0.5
 Subregion: LRR Lat: 37.78871 N Lon: -87.63366 W Datum: Decimal Degrees
 Soil Map Unit Name: _____ NWI Classification: PSS Area Ft²: 1,092
 Are climatic/hydrologic conditions on this site typical for this time of year? Yes Remarks (If No): _____
 Are Vegetation , Soil , or Hydrology Significantly Disturbed? Are "Normal Circumstances" present: Yes
 Are Vegetation , Soil , or Hydrology Naturally Problematic? Remarks: _____

SUMMARY OF FINDINGS -- Attach site map showing sampling locations, transects, important features, etc.

Hydrophytic Vegetation Present? <u>Yes</u> Hydric Soil Present? <u>Yes</u> Wetland Hydrology Present? <u>Yes</u>	Is the Sampled Area within a Wetland? <u>Yes</u>
Remarks: _____	

VEGETATION: Scientific Names

<u>Tree Stratum</u>	Plot Size: <u>Unit</u>	Absolute % Cover:	Dominant Species?	Indicator Status	Dominance Test Worksheet:
1.					Number of Dominant Species that are OBL, FACW or FAC: <u>6</u> A Total Number of Dominant Species across all Strata: <u>6</u> B Percent of Dominant Species that are OBL, FACW or FAC: <u>100.0</u> A/B
2.					
3.					
4.					
5.					
_____ = Total Cover					
<u>Sapling/Shrub Stratum</u>	Plot Size: <u>Unit</u>				Prevalence Index Worksheet: Total % Cover of: _____ Multiply by: OBL _____ x1= _____ 0 FACW _____ x2= _____ 0 FAC _____ x3= _____ 0 FACU _____ x4= _____ 0 UPL _____ x5= _____ 0 TOTALS (A) _____ 0 (B) _____ 0 Prevalence Index = B/A = _____
1.					
2.					
3.					
4.					
5.					
_____ = Total Cover					
<u>Herb Stratum</u>	Plot Size: <u>Unit</u>				Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤ 3.0 ¹ <input type="checkbox"/> Morphologic Adaptations ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
_____ = Total Cover					
<u>Woody Vine Stratum</u>	Plot Size: <u>Unit</u>				Hydrophytic Vegetation Present? <u>Yes</u>
1.					
2.					
_____ = Total Cover					
Remarks: _____					

SOIL

Profile Description: (Describe to depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features					Texture	Remarks
	Color (Moist)	%	Color (Moist)	%	Type ¹	Loc ²			
0-7	10YR4/1	90	7.5YR4/6	10	C	M	Loamy		
7-12	10YR4/1	80	7.5YR5/6	20	C	M	Loamy		

¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ² Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils³:
<input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Stratified Layers (A5) <input type="checkbox"/> 2 cm Muck (A10) (LRR N) <input type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N)	<input type="checkbox"/> Sandy Gleyed Matrix (S4) <input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Stripped Matrix (S6) <input type="checkbox"/> Dark Surface (S7) <input type="checkbox"/> Loamy Gleyed Matrix (F2) <input checked="" type="checkbox"/> Depleted Matrix (F3) <input type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Depleted Dark Surface (F7) <input type="checkbox"/> Redox Depressions (F8) <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N)	<input type="checkbox"/> Red Parent Material (TF2) <input type="checkbox"/> Very Shallow Dark Surface (TF12) <input type="checkbox"/> Other (Explain in Remarks) ³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: <u>0</u> Depth (inches): <u>0</u>	Hydric Soil Present? <u>Yes</u>
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Remarks:

Hydrology

Wetland Hydrology Indicators:		Secondary Indicators
Primary Indicators (minimum of one is required; check all that apply)		(minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible From Aerial Imagery (B7)	<input type="checkbox"/> Water Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres on Live Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:		
Surface Water Present? <u>No</u>	Depth (inches) <u>0.0</u>	Wetland Hydrology Present? <u>Yes</u>
Water Table Present? <u>No</u>	Depth (inches) <u>0.0</u>	
Saturation Present? (including capillary fringe) <u>No</u>	Depth (inches) <u>0.0</u>	

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

Sampling Point: 2MW10



WETLAND DETERMINATION DATA FORM Eastern Mountains and Piedmont

Project/Site: Henderson County Solar City/County: Henderson/Henderson Date: 06-May-20
 Applicant/Owner: Henderson County Solar LLC State: KY Sampling Point: 2MW10U
 Investigators: Scott Mitchell Sec, Twp, Rng: S NA
 Landform: Flat Local Relief: Flat Slope %: 1
 Subregion: LRR Lat: 37.78871 N Lon: -87.63366 W Datum: Decimal Degrees
 Soil Map Unit Name: _____ NWI Classification: _____ Area Ft²: _____
 Are climatic/hydrologic conditions on this site typical for this time of year? Yes
 Are Vegetation , Soil , or Hydrology Significantly Disturbed? Are "Normal Circumstances" present: Yes
 Are Vegetation , Soil , or Hydrology Naturally Problematic? Remarks: _____

SUMMARY OF FINDINGS -- Attach site map showing sampling locations, transects, important features, etc.

Hydrophytic Vegetation Present? <u>Yes</u>	Is the Sampled Area within a Wetland? <u>No</u>
Hydric Soil Present? <u>No</u>	
Wetland Hydrology Present? <u>No</u>	
Remarks: Upland is crop field.	

VEGETATION: Scientific Names

<u>Tree Stratum</u>	Plot Size: <u>Unit</u>	Absolute % Cover:	Dominant Species?	Indicator Status	Dominance Test Worksheet: Number of Dominant Species that are OBL, FACW or FAC: <u>1</u> A Total Number of Dominant Species across all Strata: <u>1</u> B Percent of Dominant Species that are OBL, FACW or FAC: <u>100.0</u> A/B
1.					
2.					
3.					
4.					
5.					
_____ = Total Cover					Prevalence Index Worksheet: Total % Cover of: _____ Multiply by: OBL _____ x1= _____ 0 FACW _____ x2= _____ 0 FAC _____ x3= _____ 0 FACU _____ x4= _____ 0 UPL _____ x5= _____ 0 TOTALS (A) _____ 0 (B) _____ 0 Prevalence Index = B/A = _____
<u>Sapling/Shrub Stratum</u>	Plot Size: <u>Unit</u>				
1.					
2.					
3.					
4.					
5.					
_____ = Total Cover					
<u>Herb Stratum</u>	Plot Size: <u>Unit</u>				Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤ 3.0 ¹ <input type="checkbox"/> Morphologic Adaptations ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.
1. Ranunculus sardous		60.0	Yes	FAC	
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
60.0 = Total Cover					
<u>Woody Vine Stratum</u>	Plot Size: <u>Unit</u>				Hydrophytic Vegetation Present? <u>Yes</u>
1.					
2.					
_____ = Total Cover					
Remarks:					

SOIL

Profile Description: (Describe to depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features					Texture	Remarks
	Color (Moist)	%	Color (Moist)	%	Type ¹	Loc ²			
0-10	10YR4/1	95	7.5YR4/6	5	C	M	Loamy		
10-16	10YR4/1	90	7.5YR5/6	10	C	M	Loamy		

¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ² Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils³:
<input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Stratified Layers (A5) <input type="checkbox"/> 2 cm Muck (A10) (LRR N) <input type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N)	<input type="checkbox"/> Sandy Gleyed Matrix (S4) <input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Stripped Matrix (S6) <input type="checkbox"/> Dark Surface (S7) <input type="checkbox"/> Loamy Gleyed Matrix (F2) <input type="checkbox"/> Depleted Matrix (F3) <input type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Depleted Dark Surface (F7) <input type="checkbox"/> Redox Depressions (F8) <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N)	<input type="checkbox"/> Red Parent Material (TF2) <input type="checkbox"/> Very Shallow Dark Surface (TF12) <input type="checkbox"/> 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? <u>No</u>
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Remarks:

Hydrology

Wetland Hydrology Indicators:		Secondary Indicators
Primary Indicators (minimum of one is required; check all that apply)		(minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible From Aerial Imagery (B7)	<input type="checkbox"/> Water Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres on Live Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:		
Surface Water Present? <u>No</u>	Depth (inches) <u>0.0</u>	Wetland Hydrology Present? <u>No</u>
Water Table Present? <u>No</u>	Depth (inches) <u>0.0</u>	
Saturation Present? (including capillary fringe) <u>No</u>	Depth (inches) <u>0.0</u>	

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:



WETLAND DETERMINATION DATA FORM Eastern Mountains and Piedmont

Project/Site: Henderson County Solar City/County: Henderson/Henderson Date: 07-May-20
 Applicant/Owner: Henderson County Solar LLC State: KY Sampling Point: 2MW13
 Investigators: Ryan Winka Sec, Twp, Rng: S NA
 Landform: Depression Local Relief: Concave Slope %: 1.5
 Subregion: LRR Lat: 37.78765 N Lon: -87.64251 W Datum: Decimal Degrees
 Soil Map Unit Name: _____ NWI Classification: PEM Area Ft²: 2,787
 Are climatic/hydrologic conditions on this site typical for this time of year? Yes Remarks (If No): _____
 Are Vegetation , Soil , or Hydrology Significantly Disturbed? Are "Normal Circumstances" present: Yes
 Are Vegetation , Soil , or Hydrology Naturally Problematic? Remarks: _____

SUMMARY OF FINDINGS -- Attach site map showing sampling locations, transects, important features, etc.

Hydrophytic Vegetation Present? <u>Yes</u>	Is the Sampled Area within a Wetland? <u>Yes</u>
Hydric Soil Present? <u>Yes</u>	
Wetland Hydrology Present? <u>Yes</u>	
Remarks: Linear wetland 5 ft wide	

VEGETATION: Scientific Names

<u>Tree Stratum</u>	Plot Size:	Absolute % Cover:	Dominant Species?	Indicator Status	Dominance Test Worksheet: Number of Dominant Species that are OBL, FACW or FAC: <u>3</u> A Total Number of Dominant Species across all Strata: <u>4</u> B Percent of Dominant Species that are OBL, FACW or FAC: <u>75.0</u> A/B
1.					
2.					
3.					
4.					
5.					
_____ = Total Cover					Prevalence Index Worksheet: Total % Cover of: _____ Multiply by: OBL _____ x1= _____ 0 FACW _____ x2= _____ 0 FAC _____ x3= _____ 0 FACU _____ x4= _____ 0 UPL _____ x5= _____ 0 TOTALS (A) _____ 0 (B) _____ 0 Prevalence Index = B/A = _____
<u>Sapling/Shrub Stratum</u>	Plot Size:				
1.					
2.					
3.					
4.					
5.					
_____ = Total Cover					
<u>Herb Stratum</u>	Plot Size:				Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤ 3.0 ¹ <input type="checkbox"/> Morphologic Adaptations ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
_____ = Total Cover					
<u>Woody Vine Stratum</u>	Plot Size:				Hydrophytic Vegetation Present? <u>Yes</u>
1.					
2.					
_____ = Total Cover					
Remarks:					

Sampling Point: 2MW13



WETLAND DETERMINATION DATA FORM Eastern Mountains and Piedmont

Project/Site: Henderson County Solar City/County: Henderson/Henderson Date: 07-May-20
 Applicant/Owner: Henderson County Solar LLC State: KY Sampling Point: 2MW13U
 Investigators: Ryan Winka Sec, Twp, Rng: S NA
 Landform: Hillslope Local Relief: Convex Slope %: 2
 Subregion: LRR Lat: 37.78765 N Lon: -87.64251 W Datum: Decimal Degrees
 Soil Map Unit Name: _____ NWI Classification: _____ Area Ft²: _____
 Are climatic/hydrologic conditions on this site typical for this time of year? Yes
 Are Vegetation , Soil , or Hydrology Significantly Disturbed? Are "Normal Circumstances" present: Yes
 Are Vegetation , Soil , or Hydrology Naturally Problematic? Remarks: _____

SUMMARY OF FINDINGS -- Attach site map showing sampling locations, transects, important features, etc.

Hydrophytic Vegetation Present? <u>Yes</u> Hydric Soil Present? <u>No</u> Wetland Hydrology Present? <u>No</u>	Is the Sampled Area within a Wetland? <u>No</u>
Remarks: _____	

VEGETATION: Scientific Names

<u>Tree Stratum</u>	Plot Size: <u>Unit</u>	Absolute % Cover:	Dominant Species?	Indicator Status	
1.					
2.					
3.					
4.					
5.					
_____ = Total Cover					
<u>Sapling/Shrub Stratum</u>	Plot Size: <u>Unit</u>				
1.					
2.					
3.					
4.					
5.					
_____ = Total Cover					
<u>Herb Stratum</u>	Plot Size: <u>Unit</u>				
1. Lamium amplexicaule		10.0	Yes	NI	
2. Packera glabella		2.0	No	OBL	
3. Poa annua		3.0	No	FACU	
4.					
5.					
6.					
7.					
8.					
9.					
10.					
15.0 = Total Cover					
<u>Woody Vine Stratum</u>	Plot Size: <u>Unit</u>				
1.					
2.					
_____ = Total Cover					
Remarks: _____					

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 2 x1= 2
 FACW 0 x2= 0
 FAC 0 x3= 0
 FACU 3 x4= 12
 UPL 0 x5= 0
 TOTALS
 (A) 5 (B) 14
 Prevalence Index = B/A = 2.8

Hydrophytic Vegetation Indicators:
 Dominance Test is >50%
 Prevalence Index is ≤ 3.0¹
 Morphologic Adaptations¹
 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes

SOIL

Profile Description: (Describe to depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features					Texture	Remarks
	Color (Moist)	%	Color (Moist)	%	Type ¹	Loc ²			
0-8	10YR4/4	100						Loamy	
8-16	10YR4/3	100						Loamy	

¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ² Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils³:
<input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Stratified Layers (A5) <input type="checkbox"/> 2 cm Muck (A10) (LRR N) <input type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N)	<input type="checkbox"/> Sandy Gleyed Matrix (S4) <input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Stripped Matrix (S6) <input type="checkbox"/> Dark Surface (S7) <input type="checkbox"/> Loamy Gleyed Matrix (F2) <input type="checkbox"/> Depleted Matrix (F3) <input type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Depleted Dark Surface (F7) <input type="checkbox"/> Redox Depressions (F8) <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N)	<input type="checkbox"/> Red Parent Material (TF2) <input type="checkbox"/> Very Shallow Dark Surface (TF12) <input type="checkbox"/> 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? <u>No</u>
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Remarks:

Hydrology

Wetland Hydrology Indicators:		Secondary Indicators
Primary Indicators (minimum of one is required; check all that apply)		(minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible From Aerial Imagery (B7)	<input type="checkbox"/> Water Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres on Live Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:		
Surface Water Present? <u>No</u>	Depth (inches) <u>0.0</u>	Wetland Hydrology Present? <u>No</u>
Water Table Present? <u>No</u>	Depth (inches) <u>0.0</u>	
Saturation Present? (including capillary fringe) <u>No</u>	Depth (inches) <u>0.0</u>	

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:



WETLAND DETERMINATION DATA FORM Eastern Mountains and Piedmont

Project/Site: Henderson County Solar City/County: Henderson/Henderson Date: 07-May-20
 Applicant/Owner: Henderson County Solar LLC State: KY Sampling Point: 2MW14
 Investigators: Keith Michalski, Ryan Harris Sec, Twp, Rng: S NA
 Landform: Flat Local Relief: Concave Slope %: 1
 Subregion: LRR Lat: 37.79076 N Lon: -87.64378 W Datum: Decimal Degrees
 Soil Map Unit Name: _____ NWI Classification: PFO Area Ft²: 7,569
 Are climatic/hydrologic conditions on this site typical for this time of year? Yes Remarks (If No): _____
 Are Vegetation , Soil , or Hydrology Significantly Disturbed? Are "Normal Circumstances" present: Yes
 Are Vegetation , Soil , or Hydrology Naturally Problematic? Remarks: _____

SUMMARY OF FINDINGS -- Attach site map showing sampling locations, transects, important features, etc.

Hydrophytic Vegetation Present? <u>Yes</u>	Is the Sampled Area within a Wetland? <u>Yes</u>
Hydric Soil Present? <u>Yes</u>	
Wetland Hydrology Present? <u>Yes</u>	
Remarks: Wetland is hillside seep.	

VEGETATION: Scientific Names

<u>Tree Stratum</u>	Plot Size: <u>Unit</u>	Absolute % Cover:	Dominant Species?	Indicator Status	Dominance Test Worksheet: Number of Dominant Species that are OBL, FACW or FAC: <u>6</u> A Total Number of Dominant Species across all Strata: <u>6</u> B Percent of Dominant Species that are OBL, FACW or FAC: <u>100.0</u> A/B
1. Celtis laevigata		20.0	Yes	FACW	
2. Quercus imbricaria		15.0	Yes	FAC	
3. Gleditsia triacanthos		10.0	No	FAC	
4. Carya illinoensis		10.0	No	FACU	
5.					
55.0 = Total Cover					Prevalence Index Worksheet: Total % Cover of: Multiply by: OBL <u>0</u> x1= <u>0</u> FACW <u>0</u> x2= <u>0</u> FAC <u>0</u> x3= <u>0</u> FACU <u>0</u> x4= <u>0</u> UPL <u>0</u> x5= <u>0</u> TOTALS (A) <u>0</u> (B) <u>0</u> Prevalence Index = B/A = _____
<u>Sapling/Shrub Stratum</u>	Plot Size: <u>Unit</u>				
1. Salix nigra		20.0	Yes	OBL	
2. Populus deltoides		5.0	No	FAC	
3. Celtis laevigata		2.0	No	FACW	
4. Asimina triloba		2.0	No	FAC	
5.					
29.0 = Total Cover					
<u>Herb Stratum</u>	Plot Size: <u>Unit</u>				Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤ 3.0 ¹ <input type="checkbox"/> Morphologic Adaptations ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.
1. Solidago rugosa		20.0	Yes	FAC	
2. Panicum virgatum		15.0	Yes	FAC	
3. Carex blanda		10.0	Yes	FAC	
4. Dactylis glomerata		8.0	No	FACU	
5. Elymus riparius		8.0	No	FACW	
6. Juncus tenuis		5.0	No	FAC	
7. Carex vulpinoidea		5.0	No	OBL	
8. Erigeron annuus		5.0	No	FACU	
9. Rubus argutus		6.0	No	FACU	
10. Symphoricarpos orbiculatus		4.0	No	FACU	
86.0 = Total Cover					
<u>Woody Vine Stratum</u>	Plot Size: <u>Unit</u>				Hydrophytic Vegetation Present? <u>Yes</u>
1.					
2.					
= Total Cover					
Remarks:					

Sampling Point: 2MW14

SOIL

Profile Description: (Describe to depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features					Texture	Remarks
	Color (Moist)	%	Color (Moist)	%	Type ¹	Loc ²			
0-12	10YR4/2	90	7.5YR4/6	10	C	M	Loamy		

¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ² Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils³:
<input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Stratified Layers (A5) <input type="checkbox"/> 2 cm Muck (A10) (LRR N) <input type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N)	<input type="checkbox"/> Sandy Gleyed Matrix (S4) <input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Stripped Matrix (S6) <input type="checkbox"/> Dark Surface (S7) <input type="checkbox"/> Loamy Gleyed Matrix (F2) <input checked="" type="checkbox"/> Depleted Matrix (F3) <input type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Depleted Dark Surface (F7) <input type="checkbox"/> Redox Depressions (F8) <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N)	<input type="checkbox"/> Red Parent Material (TF2) <input type="checkbox"/> Very Shallow Dark Surface (TF12) <input type="checkbox"/> Other (Explain in Remarks) ³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: <u>0</u> Depth (inches): <u>0</u>	Hydric Soil Present? <u>Yes</u>
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Remarks:

Hydrology

Wetland Hydrology Indicators:		Secondary Indicators
Primary Indicators (minimum of one is required; check all that apply)		(minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> High Water Table (A2) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible From Aerial Imagery (B7)	<input checked="" type="checkbox"/> Water Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres on Live Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:		
Surface Water Present? <u>No</u>	Depth (inches) <u>0.0</u>	Wetland Hydrology Present? <u>Yes</u>
Water Table Present? <u>No</u>	Depth (inches) <u>0.0</u>	
Saturation Present? (including capillary fringe) <u>Yes</u>	Depth (inches) <u>0.0</u>	

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:



WETLAND DETERMINATION DATA FORM Eastern Mountains and Piedmont

Project/Site: Henderson County Solar City/County: Henderson/Henderson Date: 07-May-20
 Applicant/Owner: Henderson County Solar LLC State: KY Sampling Point: 2MW14U
 Investigators: Keith Michalski, Ryan Harris Sec, Twp, Rng: S NA
 Landform: Hillslope Local Relief: Convex Slope %: 4
 Subregion: LRR Lat: 37.79076 N Lon: -87.64378 W Datum: Decimal Degrees
 Soil Map Unit Name: _____ NWI Classification: _____ Area Ft²: _____
 Are climatic/hydrologic conditions on this site typical for this time of year? Yes
 Are Vegetation , Soil , or Hydrology Significantly Disturbed? Are "Normal Circumstances" present: Yes
 Are Vegetation , Soil , or Hydrology Naturally Problematic? Remarks: _____

SUMMARY OF FINDINGS -- Attach site map showing sampling locations, transects, important features, etc.

Hydrophytic Vegetation Present? <u>No</u>	Is the Sampled Area within a Wetland? <u>No</u>
Hydric Soil Present? <u>No</u>	
Wetland Hydrology Present? <u>No</u>	
Remarks: Upland is crop field.	

VEGETATION: Scientific Names

<u>Tree Stratum</u>	Plot Size: <u>Unit</u>	Absolute % Cover:	Dominant Species?	Indicator Status	Dominance Test Worksheet: Number of Dominant Species that are OBL, FACW or FAC: <u>0</u> A Total Number of Dominant Species across all Strata: <u>2</u> B Percent of Dominant Species that are OBL, FACW or FAC: <u>0.0</u> A/B
1.					
2.					
3.					
4.					
5.					
_____ = Total Cover					Prevalence Index Worksheet: Total % Cover of: _____ Multiply by: OBL _____ x1= _____ 8 FACW _____ x2= _____ 0 FAC _____ x3= _____ 0 FACU _____ x4= _____ 80 UPL _____ x5= _____ 0 TOTALS (A) <u>28</u> (B) <u>88</u> Prevalence Index = B/A = <u>3.1</u>
<u>Sapling/Shrub Stratum</u>	Plot Size: <u>Unit</u>				
1.					
2.					
3.					
4.					
5.					
_____ = Total Cover					
<u>Herb Stratum</u>	Plot Size: <u>Unit</u>				Hydrophytic Vegetation Indicators: <input type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤ 3.0 ¹ <input type="checkbox"/> Morphologic Adaptations ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.
1. Lamium amplexicaule		20.0	Yes	NI	
2. Capsella bursa-pastoris		10.0	Yes	FACU	
3. Packera glabella		8.0	No	OBL	
4. Poa annua		5.0	No	FACU	
5. Geranium maculatum		5.0	No	FACU	
6.					
7.					
8.					
9.					
10.					
48.0 = Total Cover					
<u>Woody Vine Stratum</u>	Plot Size: <u>Unit</u>				
1.					
2.					
_____ = Total Cover					
Remarks:					

SOIL

Profile Description: (Describe to depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features					Texture	Remarks
	Color (Moist)	%	Color (Moist)	%	Type ¹	Loc ²			
0-4	10YR4/3	100						Loamy	
4-16	10YR5/4	100						Loamy	

¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ² Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils³:
<input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Stratified Layers (A5) <input type="checkbox"/> 2 cm Muck (A10) (LRR N) <input type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N)	<input type="checkbox"/> Sandy Gleyed Matrix (S4) <input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Stripped Matrix (S6) <input type="checkbox"/> Dark Surface (S7) <input type="checkbox"/> Loamy Gleyed Matrix (F2) <input type="checkbox"/> Depleted Matrix (F3) <input type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Depleted Dark Surface (F7) <input type="checkbox"/> Redox Depressions (F8) <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N)	<input type="checkbox"/> Red Parent Material (TF2) <input type="checkbox"/> Very Shallow Dark Surface (TF12) <input type="checkbox"/> 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? <u>No</u>
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Remarks:

Hydrology

Wetland Hydrology Indicators:	Secondary Indicators
<u>Primary Indicators (minimum of one is required; check all that apply)</u>	<u>(minimum of two required)</u>
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible From Aerial Imagery (B7)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Water Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres on Live Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Other (Explain in Remarks)	

Field Observations:	
Surface Water Present? <u>No</u>	Depth (inches) <u>0.0</u>
Water Table Present? <u>No</u>	Depth (inches) <u>0.0</u>
Saturation Present? (including capillary fringe) <u>No</u>	Depth (inches) <u>0.0</u>
Wetland Hydrology Present? <u>No</u>	

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:



WETLAND DETERMINATION DATA FORM Eastern Mountains and Piedmont

Project/Site: Henderson County Solar City/County: Henderson/Henderson Date: 27-Oct-20
 Applicant/Owner: Henderson County Solar LLC State: KY Sampling Point: 2MW30
 Investigators: Keith Michalski Sec, Twp, Rng: S NA
 Landform: Flat Local Relief: Concave Slope %: 0.25
 Subregion: LRR Lat: 37.79211 N Lon: -87.62700 W Datum: Decimal Degrees
 Soil Map Unit Name: _____ NWI Classification: PEM Area Ft²: 961
 Are climatic/hydrologic conditions on this site typical for this time of year? Yes Remarks (If No): _____
 Are Vegetation , Soil , or Hydrology Significantly Disturbed? Are "Normal Circumstances" present: No
 Are Vegetation , Soil , or Hydrology Naturally Problematic? Remarks: Mowed

SUMMARY OF FINDINGS -- Attach site map showing sampling locations, transects, important features, etc.

Hydrophytic Vegetation Present? <u>Yes</u>	Is the Sampled Area within a Wetland? <u>Yes</u>
Hydric Soil Present? <u>Yes</u>	
Wetland Hydrology Present? <u>Yes</u>	
Remarks: <u>Mowed driving range field.</u>	

VEGETATION: Scientific Names

<u>Tree Stratum</u>	Plot Size: <u>Unit</u>	Absolute % Cover:	Dominant Species?	Indicator Status	Dominance Test Worksheet: Number of Dominant Species that are OBL, FACW or FAC: <u>1</u> A Total Number of Dominant Species across all Strata: <u>2</u> B Percent of Dominant Species that are OBL, FACW or FAC: <u>50.0</u> A/B
1.					
2.					
3.					
4.					
5.					
_____ = Total Cover					Prevalence Index Worksheet: Total % Cover of: _____ Multiply by: OBL _____ x1= _____ 10 FACW _____ x2= _____ 10 FAC _____ x3= _____ 45 FACU _____ x4= _____ 30 UPL _____ x5= _____ 0 TOTALS (A) _____ 95 (B) _____ 285 Prevalence Index = B/A = _____ 3.0
<u>Sapling/Shrub Stratum</u>	Plot Size: <u>Unit</u>				
1.					
2.					
3.					
4.					
5.					
_____ = Total Cover					
<u>Herb Stratum</u>	Plot Size: <u>Unit</u>				Hydrophytic Vegetation Indicators: <input type="checkbox"/> Dominance Test is >50% <input checked="" type="checkbox"/> Prevalence Index is ≤ 3.0 ¹ <input type="checkbox"/> Morphologic Adaptations ¹ <input checked="" type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.
1. <i>Setaria parviflora</i>		30.0	Yes	FAC	
2. <i>Festuca arundinacea</i>		20.0	Yes	FACU	
3. <i>Dactylis glomerata</i>		10.0	No	FACU	
4. <i>Juncus tenuis</i>		10.0	No	FAC	
5. <i>Carex frankii</i>		10.0	No	OBL	
6. <i>Cyperus odoratus</i>		5.0	No	FACW	
7. <i>Phalaris arundinacea</i>		5.0	No	FACW	
8. <i>Paspalum laeve</i>		5.0	No	FAC	
9.					
10.					
95.0 = Total Cover					
<u>Woody Vine Stratum</u>	Plot Size: <u>Unit</u>				Hydrophytic Vegetation Present? <u>Yes</u>
1.					
2.					
_____ = Total Cover					
Remarks:					

SOIL

Sampling Point: 2MW30

Profile Description: (Describe to depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features					Texture	Remarks
	Color (Moist)	%	Color (Moist)	%	Type ¹	Loc ²			
0-10	10YR 4/1	80	7.5YR 4/6	20	C	M	Loamy		
10-16	10YR 3/1	100					Clayey		

¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ² Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils³:
<input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Stratified Layers (A5) <input type="checkbox"/> 2 cm Muck (A10) (LRR N) <input type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N)	<input type="checkbox"/> Sandy Gleyed Matrix (S4) <input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Stripped Matrix (S6) <input type="checkbox"/> Dark Surface (S7) <input type="checkbox"/> Loamy Gleyed Matrix (F2) <input checked="" type="checkbox"/> Depleted Matrix (F3) <input type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Depleted Dark Surface (F7) <input type="checkbox"/> Redox Depressions (F8) <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N)	<input type="checkbox"/> Red Parent Material (TF2) <input type="checkbox"/> Very Shallow Dark Surface (TF12) <input type="checkbox"/> Other (Explain in Remarks) ³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: <u>0</u> Depth (inches): <u>0</u>	Hydric Soil Present? <u>Yes</u>
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Remarks:

Hydrology

Wetland Hydrology Indicators:		Secondary Indicators
Primary Indicators (minimum of one is required; check all that apply)		(minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible From Aerial Imagery (B7)	<input type="checkbox"/> Water Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres on Live Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input checked="" type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:		
Surface Water Present? <u>No</u>	Depth (inches) <u>0.0</u>	Wetland Hydrology Present? <u>Yes</u>
Water Table Present? <u>No</u>	Depth (inches) <u>0.0</u>	
Saturation Present? (including capillary fringe) <u>No</u>	Depth (inches) <u>0.0</u>	

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

Sampling Point: 2MW30



WETLAND DETERMINATION DATA FORM Eastern Mountains and Piedmont

Project/Site: Henderson County Solar City/County: Henderson/Henderson Date: 27-Oct-20
 Applicant/Owner: Henderson County Solar LLC State: KY Sampling Point: 2MW30U
 Investigators: Keith Michalski Sec, Twp, Rng: S NA
 Landform: Hillslope Local Relief: Convex Slope %: 1
 Subregion: LRR Lat: 37.79211 N Lon: -87.62700 W Datum: Decimal Degrees
 Soil Map Unit Name: _____ NWI Classification: _____ Area Ft²: _____
 Are climatic/hydrologic conditions on this site typical for this time of year? Yes Remarks (If No): _____
 Are Vegetation , Soil , or Hydrology Significantly Disturbed? Are "Normal Circumstances" present: No
 Are Vegetation , Soil , or Hydrology Naturally Problematic? Remarks: Mowed

SUMMARY OF FINDINGS -- Attach site map showing sampling locations, transects, important features, etc.

Hydrophytic Vegetation Present? <u>No</u>	Is the Sampled Area within a Wetland? <u>No</u>
Hydric Soil Present? <u>No</u>	
Wetland Hydrology Present? <u>No</u>	
Remarks: <u>Mowed driving range field.</u>	

VEGETATION: Scientific Names

<u>Tree Stratum</u>	Plot Size: <u>Unit</u>	Absolute % Cover:	Dominant Species?	Indicator Status	Dominance Test Worksheet: Number of Dominant Species that are OBL, FACW or FAC: <u>0</u> A Total Number of Dominant Species across all Strata: <u>2</u> B Percent of Dominant Species that are OBL, FACW or FAC: <u>0.0</u> A/B
1.					
2.					
3.					
4.					
5.					
_____ = Total Cover					Prevalence Index Worksheet: Total % Cover of: _____ Multiply by: OBL _____ x1= _____ 0 FACW _____ x2= _____ 0 FAC _____ x3= _____ 0 FACU _____ 90 x4= _____ 360 UPL _____ 5 x5= _____ 25 TOTALS (A) _____ 95 (B) _____ 385 Prevalence Index = B/A = _____ 4.1
<u>Sapling/Shrub Stratum</u>	Plot Size: <u>Unit</u>				
1.					
2.					
3.					
4.					
5.					
_____ = Total Cover					
<u>Herb Stratum</u>	Plot Size: <u>Unit</u>				Hydrophytic Vegetation Indicators: <input type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤ 3.0 ¹ <input type="checkbox"/> Morphologic Adaptations ¹ <input checked="" type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.
1. Festuca arundinacea		40.0	Yes	FACU	
2. Dactylis glomerata		30.0	Yes	FACU	
3. Andropogon virginicus		10.0	No	FACU	
4. Plantago lanceolata		5.0	No	UPL	
5. Trifolium repens		10.0	No	FACU	
6.					
7.					
8.					
9.					
10.					
95.0 = Total Cover					
<u>Woody Vine Stratum</u>	Plot Size: <u>Unit</u>				Hydrophytic Vegetation Present? <u>No</u>
1.					
2.					
_____ = Total Cover					
Remarks:					

SOIL

Profile Description: (Describe to depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features					Texture	Remarks
	Color (Moist)	%	Color (Moist)	%	Type ¹	Loc ²			
0-16	10YR 5/4	100						Loamy	

¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ² Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils³:
<input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Stratified Layers (A5) <input type="checkbox"/> 2 cm Muck (A10) (LRR N) <input type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N)	<input type="checkbox"/> Sandy Gleyed Matrix (S4) <input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Stripped Matrix (S6) <input type="checkbox"/> Dark Surface (S7) <input type="checkbox"/> Loamy Gleyed Matrix (F2) <input type="checkbox"/> Depleted Matrix (F3) <input type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Depleted Dark Surface (F7) <input type="checkbox"/> Redox Depressions (F8) <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N)	<input type="checkbox"/> Red Parent Material (TF2) <input type="checkbox"/> Very Shallow Dark Surface (TF12) <input type="checkbox"/> 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? <u>No</u>
---	---------------------------------------

Remarks:

Hydrology

Wetland Hydrology Indicators:	Secondary Indicators
<u>Primary Indicators (minimum of one is required; check all that apply)</u>	<u>(minimum of two required)</u>
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible From Aerial Imagery (B7)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Water Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres on Live Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Other (Explain in Remarks)	

Field Observations:	
Surface Water Present? <u>No</u>	Depth (inches) <u>0.0</u>
Water Table Present? <u>No</u>	Depth (inches) <u>0.0</u>
Saturation Present? (including capillary fringe) <u>No</u>	Depth (inches) <u>0.0</u>
Wetland Hydrology Present? <u>No</u>	

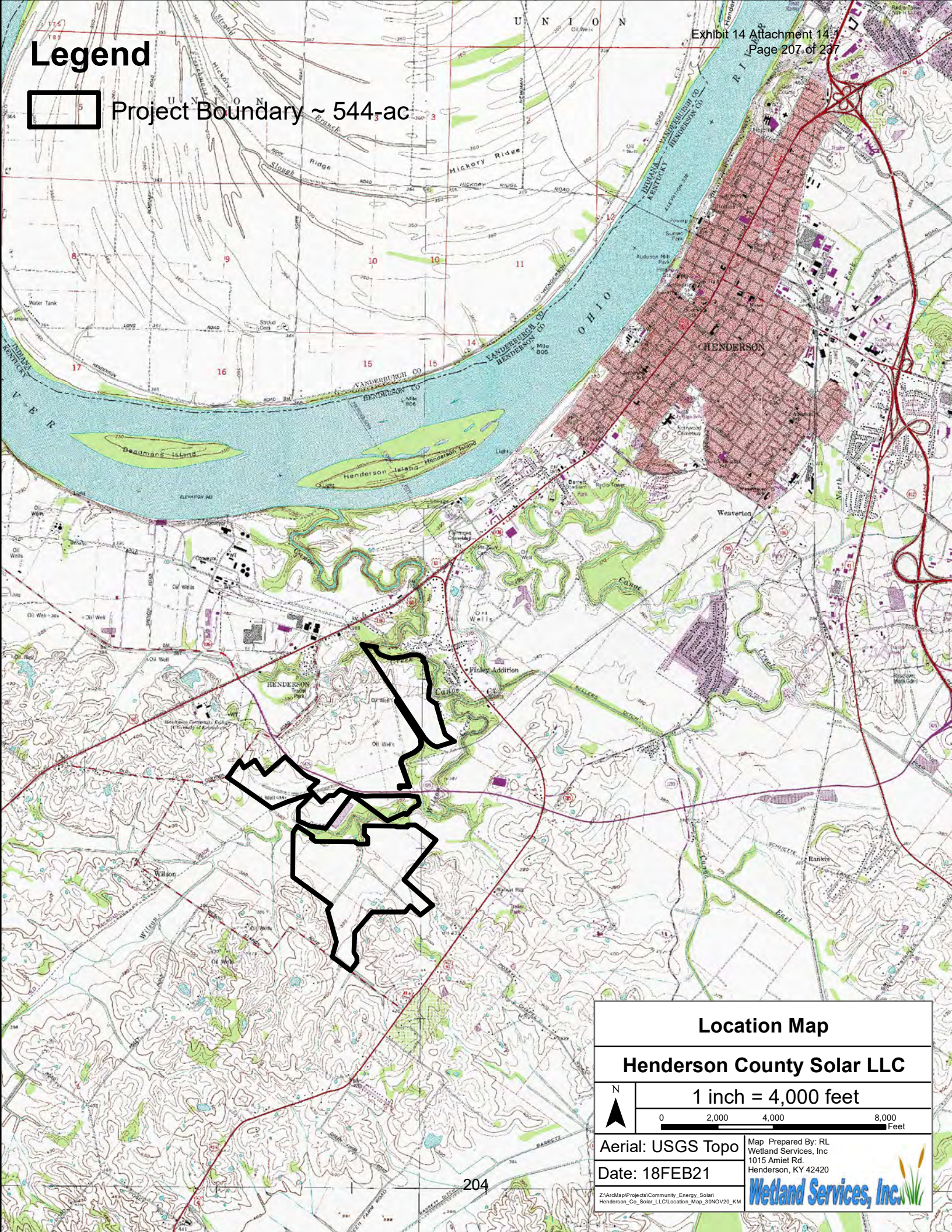
Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspection), if available:

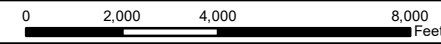


Remarks:

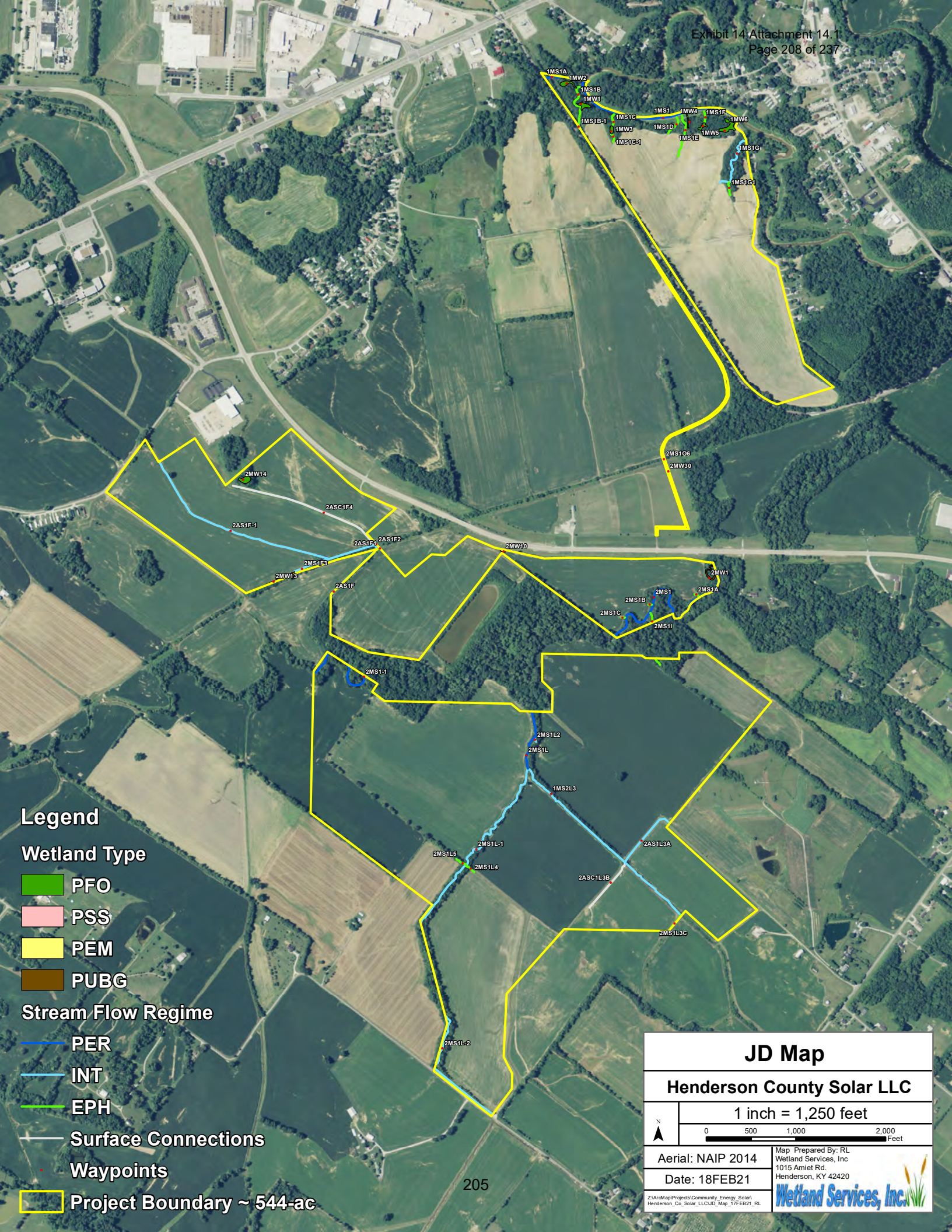


Legend

 Project Boundary ~ 544-ac



Location Map	
Henderson County Solar LLC	
1 inch = 4,000 feet	
	
	Aerial: USGS Topo Date: 18FEB21
Map Prepared By: RL Wetland Services, Inc. 1015 Amiet Rd. Henderson, KY 42420 	



Legend

Wetland Type

- PFO
- PSS
- PEM
- PUBG

Stream Flow Regime

- PER
- INT
- EPH

Surface Connections

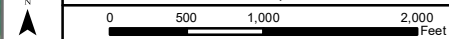
Waypoints

Project Boundary ~ 544-ac

JD Map

Henderson County Solar LLC

1 inch = 1,250 feet



Aerial: NAIP 2014

Date: 18FEB21

Map Prepared By: RL
Wetland Services, Inc
1015 Armet Rd.
Henderson, KY 42420



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205

Legend

Wetland Type

- PFO
- PSS
- PEM
- PUBG

Stream Flow Regime

- PER
- INT
- EPH

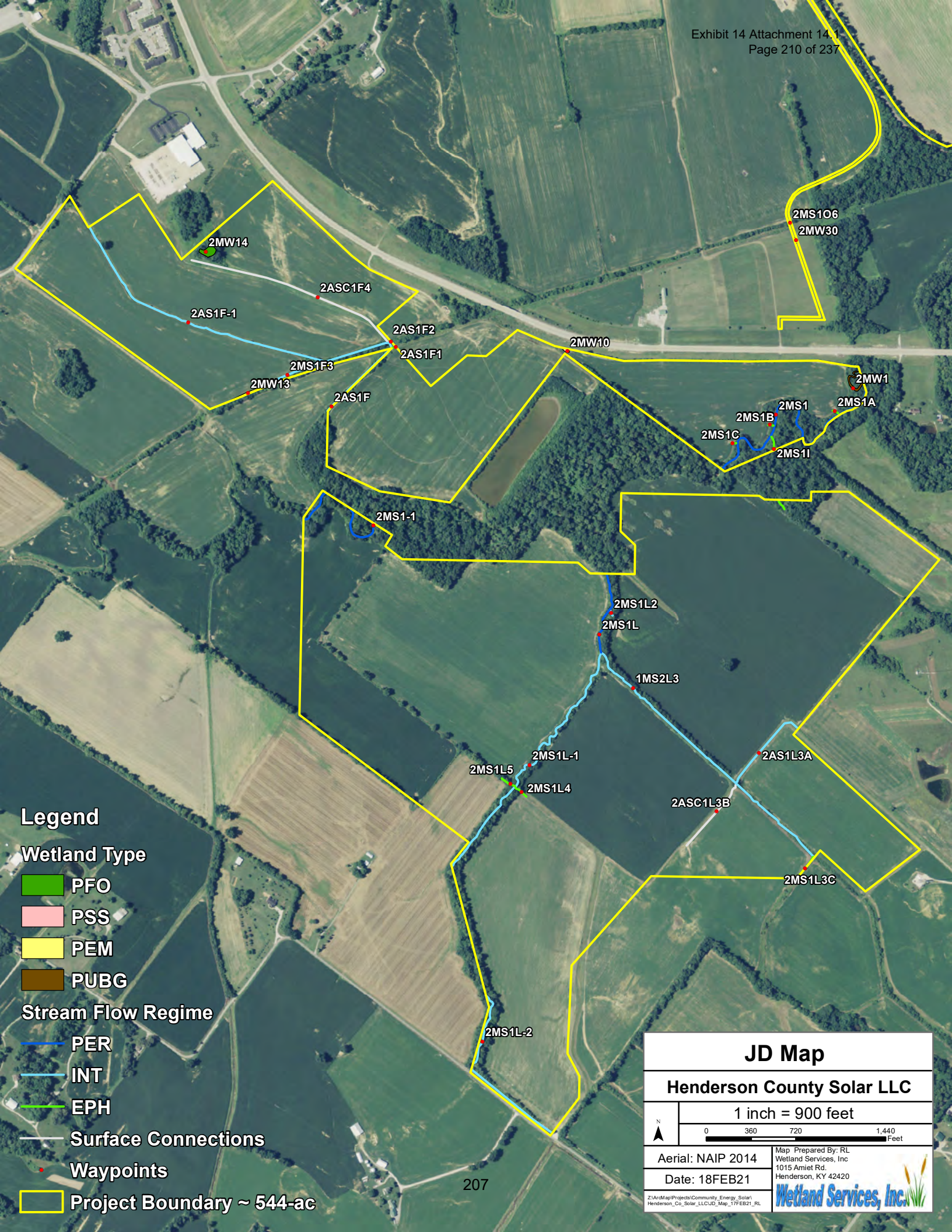
Surface Connections

Waypoints

Project Boundary ~ 544-ac



JD Map	
Henderson County Solar LLC	
1 inch = 500 feet	
Aerial: NAIP 2014	Map Prepared By: RL Wetland Services, Inc 1015 Arriet Rd. Henderson, KY 42420
Date: 18FEB21	
Z:\ArcMap\Projects\Community_Energy_Solar\Henderson_Co_Solar_ILLC\UD_Map_17FEB21_RL	



Legend

Wetland Type

- PFO
- PSS
- PEM
- PUBG

Stream Flow Regime

- PER
- INT
- EPH

Surface Connections

- Waypoints

Project Boundary ~ 544-ac

<h2>JD Map</h2>	
<h3>Henderson County Solar LLC</h3>	
1 inch = 900 feet	
Aerial: NAIP 2014	Map Prepared By: RL Wetland Services, Inc 1015 Arriet Rd. Henderson, KY 42420
Date: 18FEB21	
Z:\ArcMap\Projects\Community_Energy_Solar\Henderson_Co_Solar_LLC\UD_Map_17FEB21_RL	



**U.S. ARMY CORPS OF ENGINEERS
REGULATORY PROGRAM
APPROVED JURISDICTIONAL DETERMINATION FORM (INTERIM)
NAVIGABLE WATERS PROTECTION RULE**

I. ADMINISTRATIVE INFORMATION

Completion Date of Approved Jurisdictional Determination (AJD): [Select](#).
 ORM Number: (e.g. [HQS-2020-00001-MSW](#)).
 Associated JDs: [N/A](#) or [ORM numbers and identifiers \(e.g. HQS-2020-00001-MSW-MITSITE\)](#).
 Review Area Location¹: State/Territory: [KY](#) City: [Henderson](#) County/Parish/Borough: [Henderson](#)
 Center Coordinates of Review Area: Latitude [37.78453](#) Longitude [-87.62989](#)

II. FINDINGS

A. Summary: Check all that apply. At least one box from the following list **MUST** be selected. Complete the corresponding sections/tables and summarize data sources.

- The review area is comprised entirely of dry land (i.e., there are no waters or water features, including wetlands, of any kind in the entire review area). Rationale: [N/A](#) or [describe rationale](#).
- There are “navigable waters of the United States” within Rivers and Harbors Act jurisdiction within the review area (complete table in Section II.B).
- There are “waters of the United States” within Clean Water Act jurisdiction within the review area (complete appropriate tables in Section II.C).
- There are waters or water features excluded from Clean Water Act jurisdiction within the review area (complete table in Section II.D).

B. Rivers and Harbors Act of 1899 Section 10 (§ 10)²

§ 10 Name	§ 10 Size		§ 10 Criteria	Rationale for § 10 Determination
N/A.	N/A.	N/A.	N/A.	N/A.

C. Clean Water Act Section 404

Territorial Seas and Traditional Navigable Waters ((a)(1) waters): ³				
(a)(1) Name	(a)(1) Size		(a)(1) Criteria	Rationale for (a)(1) Determination
N/A.	N/A.	N/A.	N/A.	N/A.

Tributaries ((a)(2) waters):				
(a)(2) Name	(a)(2) Size		(a)(2) Criteria	Rationale for (a)(2) Determination
1MS1	2,000	linear feet	(a)(2) Perennial tributary contributes surface water flow directly or indirectly to an (a)(1) water in a typical year.	Point-in-time data sources. Please see attached.
1MS1A	184	linear feet	(a)(2) Perennial tributary contributes	Point-in-time data sources. Please see attached.

¹ Map(s)/figure(s) are attached to the AJD provided to the requestor.

² If the navigable water is not subject to the ebb and flow of the tide or included on the District’s list of Rivers and Harbors Act Section 10 navigable waters list, do NOT use this document to make the determination. The District must continue to follow the procedure outlined in 33 CFR part 329.14 to make a Rivers and Harbors Act Section 10 navigability determination.

³ A stand-alone TNW determination is completed independently of a request for an AJD. A stand-alone TNW determination is conducted for a specific segment of river or stream or other type of waterbody, such as a lake, where upstream or downstream limits or lake borders are established. A stand-alone TNW determination should be completed following applicable guidance and should NOT be documented on the AJD Form.



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Tributaries ((a)(2) waters):			
(a)(2) Name	(a)(2) Size	(a)(2) Criteria	Rationale for (a)(2) Determination
		surface water flow directly or indirectly to an (a)(1) water in a typical year.	
1MS1G	729	linear feet (a)(2) Intermittent tributary contributes surface water flow directly or indirectly to an (a)(1) water in a typical year.	Point-in-time data sources. Please see attached.
2AS1F	770	linear feet (a)(2) Intermittent tributary contributes surface water flow directly or indirectly to an (a)(1) water in a typical year.	Point-in-time data sources. Please see attached.
2AS1F-1	2,852	linear feet (a)(2) Intermittent tributary contributes surface water flow directly or indirectly to an (a)(1) water in a typical year.	Point-in-time data sources. Please see attached.
2AS1F2	17	linear feet (a)(2) Intermittent tributary contributes surface water flow directly or indirectly to an (a)(1) water in a typical year.	Point-in-time data sources. Please see attached.
2AS1L3A	748	linear feet (a)(2) Intermittent tributary contributes surface water flow directly or indirectly to an (a)(1) water in a typical year.	Point-in-time data sources. Please see attached.
2MS1	1,987	linear feet (a)(2) Perennial tributary contributes	Point-in-time data sources. Please see attached.



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Tributaries ((a)(2) waters):				
(a)(2) Name	(a)(2) Size		(a)(2) Criteria	Rationale for (a)(2) Determination
			surface water flow directly or indirectly to an (a)(1) water in a typical year.	
2MS1-1	780	linear feet	(a)(2) Perennial tributary contributes surface water flow directly or indirectly to an (a)(1) water in a typical year.	Point-in-time data sources. Please see attached.
2MS1F3	412	linear feet	(a)(2) Intermittent tributary contributes surface water flow directly or indirectly to an (a)(1) water in a typical year.	Point-in-time data sources. Please see attached.
2MS1L	687	linear feet	(a)(2) Perennial tributary contributes surface water flow directly or indirectly to an (a)(1) water in a typical year.	Point-in-time data sources. Please see attached.
2MS1L-1	2,313	linear feet	(a)(2) Intermittent tributary contributes surface water flow directly or indirectly to an (a)(1) water in a typical year.	Point-in-time data sources. Please see attached.
2MS1L2	48	linear feet	(a)(2) Intermittent tributary contributes surface water flow directly or indirectly to an (a)(1) water in a typical year.	Point-in-time data sources. Please see attached.
2MS1L-2	1,439	linear feet	(a)(2) Intermittent tributary contributes	Point-in-time data sources. Please see attached.



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Tributaries ((a)(2) waters):				
(a)(2) Name	(a)(2) Size		(a)(2) Criteria	Rationale for (a)(2) Determination
			surface water flow directly or indirectly to an (a)(1) water in a typical year.	
2MS1L3	2,421	linear feet	(a)(2) Intermittent tributary contributes surface water flow directly or indirectly to an (a)(1) water in a typical year.	Point-in-time data sources. Please see attached.

Lakes and ponds, and impoundments of jurisdictional waters ((a)(3) waters):				
(a)(3) Name	(a)(3) Size		(a)(3) Criteria	Rationale for (a)(3) Determination
N/A.	N/A.	N/A.	N/A.	N/A.

Adjacent wetlands ((a)(4) waters):				
(a)(4) Name	(a)(4) Size		(a)(4) Criteria	Rationale for (a)(4) Determination
1MW1	0.14	acre(s)	(a)(4) Wetland inundated by flooding from an (a)(1)-(a)(3) water in a typical year.	Point-in-time data sources. Please see attached.
1MW2	0.14	acre(s)	(a)(4) Wetland inundated by flooding from an (a)(1)-(a)(3) water in a typical year.	Point-in-time data sources. Please see attached.
1MW4	0.04	acre(s)	(a)(4) Wetland abuts an (a)(1)-(a)(3) water.	Point-in-time data sources. Please see attached.
1MW6	0.26	acre(s)	(a)(4) Wetland abuts an (a)(1)-(a)(3) water.	Point-in-time data sources. Please see attached.
2MW1	0.11	acre(s)	(a)(4) Wetland inundated by flooding from an (a)(1)-(a)(3) water in a typical year.	Point-in-time data sources. Please see attached.
2MW13	0.06	acre(s)	(a)(4) Wetland abuts an (a)(1)-(a)(3) water.	Point-in-time data sources. Please see attached.



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D. Excluded Waters or Features

Excluded waters ((b)(1) – (b)(12)): ⁴				
Exclusion Name	Exclusion Size		Exclusion ⁵	Rationale for Exclusion Determination
1MS1B	378	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Point-in-time data sources. Please see attached.
1MS1B-1	197	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Point-in-time data sources. Please see attached.
1MS1C	151	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Point-in-time data sources. Please see attached.
1MS1C-1	105	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Point-in-time data sources. Please see attached.
1MS1D	239	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Point-in-time data sources. Please see attached.
1MS1E	507	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Point-in-time data sources. Please see attached.
1MS1F	131	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Point-in-time data sources. Please see attached.
1MS1G1	153	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Point-in-time data sources. Please see attached.
2AS1F1	35	linear feet	(b)(3) Ephemeral feature, including	Point-in-time data sources. Please see attached.

⁴ Some excluded waters, such as (b)(2) and (b)(4), may not be specifically identified on the AJD form unless a requestor specifically asks a Corps district to do so. Corps districts may, in case-by-case instances, choose to identify some or all of these waters within the review area.

⁵ Because of the broad nature of the (b)(1) exclusion and in an effort to collect data on specific types of waters that would be covered by the (b)(1) exclusion, four sub-categories of (b)(1) exclusions were administratively created for the purposes of the AJD Form. These four sub-categories are not new exclusions, but are simply administrative distinctions and remain (b)(1) exclusions as defined by the NWPR.



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Excluded waters ((b)(1) – (b)(12)): ⁴				
Exclusion Name	Exclusion Size	Exclusion ⁵	Rationale for Exclusion Determination	
		an ephemeral stream, swale, gully, rill, or pool.		
2MS1A	51	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Point-in-time data sources. Please see attached.
2MS1B	47	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Point-in-time data sources. Please see attached.
2MS1C	41	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Point-in-time data sources. Please see attached.
2MS1I	208	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Point-in-time data sources. Please see attached.
2MS1L3C	194	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Point-in-time data sources. Please see attached.
2MS1L4	118	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Point-in-time data sources. Please see attached.
2MS1L5	124	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Point-in-time data sources. Please see attached.
2MS1O6	188	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Point-in-time data sources. Please see attached.
1MW3	0.07	acre(s)	(b)(1) Non-adjacent wetland.	Point-in-time data sources. Please see attached.
1MW5	0.08	acre(s)	(b)(1) Non-adjacent wetland.	Point-in-time data sources. Please see attached.



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Excluded waters ((b)(1) – (b)(12)): ⁴			
Exclusion Name	Exclusion Size	Exclusion ⁵	Rationale for Exclusion Determination
2MW10	0.03 acre(s)	(b)(1) Non-adjacent wetland.	Point-in-time data sources. Please see attached.
2MW14	0.17 acre(s)	(b)(1) Non-adjacent wetland.	Point-in-time data sources. Please see attached.
2MW30	0.09 acre(s)	(b)(1) Non-adjacent wetland.	Point-in-time data sources. Please see attached.
2ASC1F4	1,741 linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Point-in-time data sources. Please see attached.
2ASC1L3B	644 linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Point-in-time data sources. Please see attached.

III. SUPPORTING INFORMATION

A. Select/enter all resources that were used to aid in this determination and attach data/maps to this document and/or references/citations in the administrative record, as appropriate.

Information submitted by, or on behalf of, the applicant/consultant: [JD Report](#), [Data Sheets](#), [Location/Topo & JD Map](#)

This information [Select](#). sufficient for purposes of this AJD.

Rationale: [N/A or describe rationale for insufficiency \(including partial insufficiency\)](#).

Data sheets prepared by the Corps: [Title\(s\) and/or date\(s\)](#).

Photographs: [Aerial and Other: Google Earth \(1993-2019\), ESRI World Imagery. NAIP 2014. Also see photos attached to data sheets.](#)

Corps site visit(s) conducted on: [Date\(s\)](#).

Previous Jurisdictional Determinations (AJDs or PJDs): [ORM Number\(s\) and date\(s\)](#).

Antecedent Precipitation Tool: [provide detailed discussion in Section III.B.](#)

USDA NRCS Soil Survey: [Web Soil Survey, 8MAY20 & 6OCT20](#)

USFWS NWI maps: [NWI, 30MAY19](#)

USGS topographic maps: [Wilson & Henderson, 1:24,000](#)

Other data sources used to aid in this determination:

Data Source (select)	Name and/or date and other relevant information
USGS Sources	N/A.
USDA Sources	N/A.
NOAA Sources	N/A.
USACE Sources	N/A.
State/Local/Tribal Sources	N/A.
Other Sources	N/A.

B. Typical year assessment(s): [See JD Report.](#)



**U.S. ARMY CORPS OF ENGINEERS
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APPROVED JURISDICTIONAL DETERMINATION FORM (INTERIM)
NAVIGABLE WATERS PROTECTION RULE**

C. Additional comments to support AJD: [See JD Report.](#)



DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, LOUISVILLE
CORPS OF ENGINEERS
REGULATORY DIVISION, SOUTH BRANCH
6855 STATE ROAD 66
NEWBURGH, INDIANA 47630

May 18, 2021

Regulatory Division
South Branch
ID No. LRL-2021-221-tmb

Mr. Chris Killenberg
Henderson County Solar LLC
Three Radnor Corporate Center, Suite 300
Radnor, PA 19087

Dear Mr. Killenberg:

This is regarding an approved jurisdictional determination request received in this office on March 2, 2021, regarding approximately 544 acres in Henderson, Henderson County, Kentucky. Specifically located at 37.78456 °N Latitude and -87.62980 °W Longitude. A location map is enclosed.

The U.S. Army Corps of Engineers exercises regulatory authority under Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403) and Section 404 of the Clean Water Act (33 USC 1344) for certain activities in “waters of the United States (U.S.)” These waters include all waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce.

Based on the information provided to this office and a site visit conducted on May 13, 2021, the site contains approximately 5,638 linear feet of perennial streams, 11,867 linear feet of intermittent streams, 0.58 acres of palustrine forested wetlands, 0.06 acres of palustrine emergent wetlands and 0.11 acres if palustrine unconsolidated bottom wetlands considered jurisdictional “waters of the U.S.” Therefore, the aforementioned resources are subject to regulation under Section 404 of the Clean Water Act.

The below listed aquatic resources are excluded from regulation under Section 404 of the Clean Water Act.

1MS1B	378	Linear feet	(b)(3) Ephemeral feature
1MS1B-1	197	Linear feet	(b)(3) Ephemeral feature
1MS1C	151	Linear feet	(b)(3) Ephemeral feature
1MS1C-1	105	Linear feet	(b)(3) Ephemeral feature
1MS1D	239	Linear feet	(b)(3) Ephemeral feature
1MS1E	507	Linear feet	(b)(3) Ephemeral feature
1MS1F	131	Linear feet	(b)(3) Ephemeral feature
1MS1G1	153	Linear feet	(b)(3) Ephemeral feature
2AS1F1	35	Linear feet	(b)(3) Ephemeral feature
2MS1A	51	Linear feet	(b)(3) Ephemeral feature
2MS1B	47	Linear feet	(b)(3) Ephemeral feature

2MS1C	41	Linear feet	(b)(3) Ephemeral feature
2MS1I	208	Linear feet	(b)(3) Ephemeral feature
2MS1L3C	194	Linear feet	(b)(3) Ephemeral feature
2MS1L5	124	Linear feet	(b)(3) Ephemeral feature
2MS1O6	188	Linear feet	(b)(3) Ephemeral feature
1MW3	0.07	Acres	(b)(1) Non-adjacent wetland
1MW5	0.08	Acres	(b)(1) Non-adjacent wetland
2MW10	0.03	Acres	(b)(1) Non-adjacent wetland
2MW14	0.09	Acres	(b)(1) Non-adjacent wetland
2MW30	0.09	Acres	(b)(1) Non-adjacent wetland
2ASC1F4	1,741	Linear feet	(b)(3) Ephemeral feature
2ASC1L3B	644	Linear feet	(b)(3) Ephemeral feature

As such, these resources are not considered to be “waters of the U.S.” and are not regulated under Section 404 of the Clean Water Act. However, this determination does not relieve you of the responsibility to comply with applicable State law. We urge you to contact the Kentucky Division of Water, 300 Sower Boulevard, Frankfort, Kentucky 40601 to determine the applicability of State law to the excluded waters mentioned above.

This letter contains an approved jurisdictional determination (JD) for your site. If you object to this JD, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed you will find a Notification of Appeal Process (NAP) fact sheet and Request for Appeal (RFA) form. If you request to appeal this JD you must submit a completed RFA form to the Lakes and Rivers Division Office at the following address:

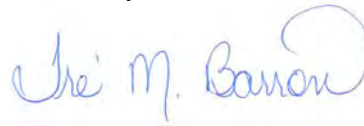
U.S. Army Engineer Division,
ATTN: Regulatory Appeal Review Officer, CELRD-PD-REG
550 Main Street - Room 10-714
Cincinnati, Ohio 45202-3222
(513) 684-2699

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR Part 331.5, and that it has been received by the Division Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received at the above address by July 17, 2021.

This jurisdictional determination is valid for a period of 5 years from the date of this letter unless new information warrants revision of the determination before the expiration date. It is not necessary to submit an RFA form to the Division Office if you do not object to the JD in this letter. Our comments on this project area limited to only those effects, which may fall within our area of jurisdiction, and thus does not obviate the need to obtain other permits from State or Local agencies. Lack of comments on other environmental aspects should not be construed as either concurrence or nonconcurrence with stated environmental impacts.

If you have any questions, contact me directly at 812-853-9713 or tre.m.barron@usace.army.mil. Any correspondence on this matter should refer to our ID Number LRL-2021-221-tmb.

Sincerely,



Tré M. Barron
Environmental Protection Specialist
South Branch

Enclosures

Copy

Kentucky Division of Water
300 Sower Boulevard
Frankfort, Kentucky 40601

Mr. Keith Michalski
Wetland Services
3880 Trigg-Turner Road
Corydon, KY 42406



**U.S. ARMY CORPS OF ENGINEERS
REGULATORY PROGRAM
APPROVED JURISDICTIONAL DETERMINATION FORM (INTERIM)
NAVIGABLE WATERS PROTECTION RULE**

I. ADMINISTRATIVE INFORMATION

Completion Date of Approved Jurisdictional Determination (AJD): 5/17/2021
 ORM Number: LRL-2021-221
 Associated JDs: N/A.
 Review Area Location¹: State/Territory: KY City: Henderson County/Parish/Borough: Henderson
 Center Coordinates of Review Area: Latitude 37.78453 Longitude -87.62989

II. FINDINGS

A. Summary: Check all that apply. At least one box from the following list MUST be selected. Complete the corresponding sections/tables and summarize data sources.

- The review area is comprised entirely of dry land (i.e., there are no waters or water features, including wetlands, of any kind in the entire review area). Rationale: N/A or describe rationale.
- There are “navigable waters of the United States” within Rivers and Harbors Act jurisdiction within the review area (complete table in Section II.B).
- There are “waters of the United States” within Clean Water Act jurisdiction within the review area (complete appropriate tables in Section II.C).
- There are waters or water features excluded from Clean Water Act jurisdiction within the review area (complete table in Section II.D).

B. Rivers and Harbors Act of 1899 Section 10 (§ 10)²

§ 10 Name	§ 10 Size		§ 10 Criteria	Rationale for § 10 Determination
N/A.	N/A.	N/A	N/A.	N/A.

C. Clean Water Act Section 404

Territorial Seas and Traditional Navigable Waters ((a)(1) waters): ³				
(a)(1) Name	(a)(1) Size		(a)(1) Criteria	Rationale for (a)(1) Determination
N/A.	N/A.	N/A.	N/A.	N/A.

Tributaries ((a)(2) waters):				
(a)(2) Name	(a)(2) Size		(a)(2) Criteria	Rationale for (a)(2) Determination
1MS1	2,000	linear feet	(a)(2) Perennial tributary contributes surface water flow directly or indirectly to an (a)(1) water in a typical year.	1MS1 (Canoe Creek) is a stream that has hydrological and physical characteristics of a perennial stream. Flows north west to the Ohio River. Precipitation at time met normal conditions according the Antecedent Precipitation Tool.
1MS1A	184	linear feet	(a)(2) Perennial tributary contributes	1MS1A is a stream that has hydrological and physical characteristics of a perennial stream. Flows east to Canoe Creek.

¹ Map(s)/figure(s) are attached to the AJD provided to the requestor.

² If the navigable water is not subject to the ebb and flow of the tide or included on the District’s list of Rivers and Harbors Act Section 10 navigable waters list, do NOT use this document to make the determination. The District must continue to follow the procedure outlined in 33 CFR part 329.14 to make a Rivers and Harbors Act Section 10 navigability determination.

³ A stand-alone TNW determination is completed independently of a request for an AJD. A stand-alone TNW determination is conducted for a specific segment of river or stream or other type of waterbody, such as a lake, where upstream or downstream limits or lake borders are established. A stand-alone TNW determination should be completed following applicable guidance and should NOT be documented on the AJD Form.



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Tributaries ((a)(2) waters):				
(a)(2) Name	(a)(2) Size		(a)(2) Criteria	Rationale for (a)(2) Determination
			surface water flow directly or indirectly to an (a)(1) water in a typical year.	
1MS1G	729	linear feet	(a)(2) Intermittent tributary contributes surface water flow directly or indirectly to an (a)(1) water in a typical year.	1MS1G is a stream that has hydrological and physical characteristics of an intermittent stream. Flows NE to Canoe Creek.
2AS1F	770	linear feet	(a)(2) Intermittent tributary contributes surface water flow directly or indirectly to an (a)(1) water in a typical year.	2AS1F is a channelized stream that has hydrological and physical characteristics of an intermittent stream. Flows SW to Wilson Creek to Canoe Creek to Ohio River.
2AS1F-1	2,852	linear feet	(a)(2) Intermittent tributary contributes surface water flow directly or indirectly to an (a)(1) water in a typical year.	2AS1F-1 is a channelized stream that has hydrological and physical characteristics of an intermittent stream. Flows SE through tributaries to Wilson Creek.
2AS1F2	17	linear feet	(a)(2) Intermittent tributary contributes surface water flow directly or indirectly to an (a)(1) water in a typical year.	2AS1F2 is a channelized stream that has hydrological and physical characteristics of an intermittent stream. Flows SW through tributaries to Wilson Creek.
2AS1L3A	748	linear feet	(a)(2) Intermittent tributary contributes surface water flow directly or indirectly to an (a)(1) water in a typical year.	2AS1L3A is a channelized stream that has hydrological and physical characteristics of an intermittent stream. Flows SW through tributaries to Wilson Creek.
2MS1	1,987	linear feet	(a)(2) Perennial tributary contributes	2MS1 (Wilson Creek) is a stream that has hydrological and physical characteristics of a



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Tributaries ((a)(2) waters):				
(a)(2) Name	(a)(2) Size		(a)(2) Criteria	Rationale for (a)(2) Determination
			surface water flow directly or indirectly to an (a)(1) water in a typical year.	perennial stream. Flows NE to Canoe Creek to Ohio River.
2MS1-1	780	linear feet	(a)(2) Perennial tributary contributes surface water flow directly or indirectly to an (a)(1) water in a typical year.	2MS1 (Wilson Creek) is a stream that has hydrological and physical characteristics of a perennial stream. Flows NE to Canoe Creek to Ohio River.
2MS1F3	412	linear feet	(a)(2) Intermittent tributary contributes surface water flow directly or indirectly to an (a)(1) water in a typical year.	2MS1F3 is a channelized stream that has hydrological and physical characteristics of an intermittent stream. Flows NE through tributaries to Wilson Creek.
2MS1L	687	linear feet	(a)(2) Perennial tributary contributes surface water flow directly or indirectly to an (a)(1) water in a typical year.	2MS1L is a stream that has hydrological and physical characteristics of a perennial stream. Flows north to Wilson Creek.
2MS1L-1	2,313	linear feet	(a)(2) Intermittent tributary contributes surface water flow directly or indirectly to an (a)(1) water in a typical year.	2MS1L-1 is a stream that has hydrological and physical characteristics of an intermittent stream. Flows north through tributaries to Wilson Creek.
2MS1L2	48	linear feet	(a)(2) Intermittent tributary contributes surface water flow directly or indirectly to an (a)(1) water in a typical year.	2MS1L2 is a stream that has hydrological and physical characteristics of an intermittent stream. Originates from field tile pipe. Flows north through tributaries to Wilson Creek.
2MS1L-2	1,439	linear feet	(a)(2) Intermittent tributary contributes	2MS1L-2 is a channelized stream that has hydrological and physical characteristics of an



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Tributaries ((a)(2) waters):				
(a)(2) Name	(a)(2) Size		(a)(2) Criteria	Rationale for (a)(2) Determination
			surface water flow directly or indirectly to an (a)(1) water in a typical year.	intermittent stream. Flows north through tributaries to Wilson Creek.
2MS1L3	2,421	linear feet	(a)(2) Intermittent tributary contributes surface water flow directly or indirectly to an (a)(1) water in a typical year.	2MS1L3 is a channelized stream that has hydrological and physical characteristics of an intermittent stream. Flows NW through tributaries to Wilson Creek.
2MS1L4	118	linear feet	(a)(2) Intermittent tributary contributes surface water flow directly or indirectly to an (a)(1) water in a typical year.	2MS1L4 is a channelized stream that has hydrological and physical characteristics of an intermittent stream. Flows NW through tributaries to Wilson Creek.

Lakes and ponds, and impoundments of jurisdictional waters ((a)(3) waters):				
(a)(3) Name	(a)(3) Size		(a)(3) Criteria	Rationale for (a)(3) Determination
N/A.	N/A.	N/A.	N/A.	N/A.

Adjacent wetlands ((a)(4) waters):				
(a)(4) Name	(a)(4) Size		(a)(4) Criteria	Rationale for (a)(4) Determination
1MW1	0.14	acre(s)	(a)(4) Wetland inundated by flooding from an (a)(1)-(a)(3) water in a typical year.	1MW1 met wetland criteria and indicators of annual flooding were observed. Adjacent to Canoe Creek to Ohio River. Precipitation at time met normal conditions according the Antecedent Precipitation Tool.
1MW2	0.14	acre(s)	(a)(4) Wetland inundated by flooding from an (a)(1)-(a)(3) water in a typical year.	1MW2 met wetland criteria and indicators of annual flooding were observed. Adjacent to Canoe Creek to Ohio River.
1MW4	0.04	acre(s)	(a)(4) Wetland abuts an (a)(1)-(a)(3) water.	1MW2 met wetland criteria and is not separated from a tributary by an upland. Has direct hydrological surface connection. Abuts Canoe Creek to Ohio River.



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Adjacent wetlands ((a)(4) waters):				
(a)(4) Name	(a)(4) Size		(a)(4) Criteria	Rationale for (a)(4) Determination
1MW6	0.26	acre(s)	(a)(4) Wetland abuts an (a)(1)-(a)(3) water.	1MW6 met wetland criteria and is not separated from a tributary by an upland. Has direct hydrological surface connection. Abuts Canoe Creek to Ohio River.
2MW1	0.11	acre(s)	(a)(4) Wetland inundated by flooding from an (a)(1)-(a)(3) water in a typical year.	2MW1 met wetland criteria and indicators of annual flooding were observed. Adjacent to Wilson Creek to Canoe Creek to Ohio River.
2MW13	0.06	acre(s)	(a)(4) Wetland abuts an (a)(1)-(a)(3) water.	2MW13 met wetland criteria and is not separated from a tributary by an upland. Has direct hydrological surface connection. Abuts tributary to Wilson Creek to Canoe Creek to Ohio River.

D. Excluded Waters or Features

Excluded waters ((b)(1) – (b)(12)): ⁴				
Exclusion Name	Exclusion Size		Exclusion ⁵	Rationale for Exclusion Determination
1MS1B	378	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	1MS1B displayed hydrological and physical characteristics of an ephemeral drainage. Flows north to Canoe Creek to Ohio River. Precipitation at time met normal conditions according the Antecedent Precipitation Tool.
1MS1B-1	197	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	1MS1B displayed hydrological and physical characteristics of an ephemeral drainage. Flows north to Canoe Creek to Ohio River.
1MS1C	151	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	1MS1C displayed hydrological and physical characteristics of an ephemeral drainage. Flows north to Canoe Creek to Ohio River.
1MS1C-1	105	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	1MS1C-1 displayed hydrological and physical characteristics of an ephemeral drainage. Flows north to Canoe Creek to Ohio River.

⁴ Some excluded waters, such as (b)(2) and (b)(4), may not be specifically identified on the AJD form unless a requestor specifically asks a Corps district to do so. Corps districts may, in case-by-case instances, choose to identify some or all of these waters within the review area.

⁵ Because of the broad nature of the (b)(1) exclusion and in an effort to collect data on specific types of waters that would be covered by the (b)(1) exclusion, four sub-categories of (b)(1) exclusions were administratively created for the purposes of the AJD Form. These four sub-categories are not new exclusions, but are simply administrative distinctions and remain (b)(1) exclusions as defined by the NWPR.



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Excluded waters ((b)(1) – (b)(12)): ⁴				
Exclusion Name	Exclusion Size	Exclusion ⁵	Rationale for Exclusion Determination	
1MS1D	239	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	1MS1D displayed hydrological and physical characteristics of an ephemeral drainage. Flows north to Canoe Creek to Ohio River.
1MS1E	507	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	1MS1E displayed hydrological and physical characteristics of an ephemeral drainage. Flows north to Canoe Creek to Ohio River.
1MS1F	131	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	1MS1F displayed hydrological and physical characteristics of an ephemeral drainage. Flows north to Canoe Creek to Ohio River.
1MS1G1	153	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	1MS1G1 displayed hydrological and physical characteristics of an ephemeral drainage. Flows north through tributary to Canoe Creek to Ohio River.
2AS1F1	35	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	1MS1F1 displayed hydrological and physical characteristics of an ephemeral drainage. Flows west through tributary to Wilson Creek to Canoe Creek to Ohio River.
2MS1A	51	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	2MS1A displayed hydrological and physical characteristics of an ephemeral drainage. Flows east to Wilson Creek to Canoe Creek to Ohio River.
2MS1B	47	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	2MS1B displayed hydrological and physical characteristics of an ephemeral drainage. Flows east to Wilson Creek to Canoe Creek to Ohio River.
2MS1C	41	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	2MS1B displayed hydrological and physical characteristics of an ephemeral drainage. Flows east to Wilson Creek to Canoe Creek to Ohio River.
2MS1I	208	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	2MS1I displayed hydrological and physical characteristics of an ephemeral drainage. Flows west to Wilson Creek to Canoe Creek to Ohio River.
2MS1L3C	194	linear feet	(b)(3) Ephemeral feature, including	2MS1L3C displayed hydrological and physical characteristics of an ephemeral drainage. Flows



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Excluded waters ((b)(1) – (b)(12)): ⁴				
Exclusion Name	Exclusion Size		Exclusion ⁵	Rationale for Exclusion Determination
			an ephemeral stream, swale, gully, rill, or pool.	NE through tributary to Wilson Creek to Canoe Creek to Ohio River.
2MS1L5	124	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	2MS1L4 displayed hydrological and physical characteristics of an ephemeral drainage. Flows SE through tributary to Wilson Creek to Canoe Creek to Ohio River.
2MS1O6	188	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	2MS1O6 displayed hydrological and physical characteristics of an ephemeral drainage. Flows west through tributary to Wilson Creek to Canoe Creek to Ohio River.
1MW3	0.07	acre(s)	(b)(1) Non-adjacent wetland.	1MW3 met wetland criteria but does not physically abut, nor is inundated by an a(1) – a(3) water in a typical year. Drains north through b(3) to Canoe Creek to Ohio River.
1MW5	0.08	acre(s)	(b)(1) Non-adjacent wetland.	1MW5 met wetland criteria but does not physically abut, nor is inundated by an a(1) – a(3) water in a typical year. Drains north through b(3) to Canoe Creek to Ohio River.
2MW10	0.03	acre(s)	(b)(1) Non-adjacent wetland.	2MW10 met wetland criteria but does not physically abut nor is inundated by an a(1) - (3) water in a typical year. Surrounded by upland.
2MW14	0.17	acre(s)	(b)(1) Non-adjacent wetland.	2MW14 met wetland criteria but does physically abut, nor is inundated by an a(1) - a(3) water in a typical year. Surrounded by upland.
2MW30	0.09	acre(s)	(b)(1) Non-adjacent wetland.	2MW30 met wetland criteria but does not physically abut, nor is inundated by an a(1) – a(3) water in a typical year. Drains west through b(3) to tributary to Wilson Creek to Canoe Creek to Ohio River.
2ASC1F4	1,741	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	2ASC1F4 displayed hydrological and physical characteristics of an ephemeral drainage in the position of a hillside diversion. Flows west through tributary to Wilson Creek to Canoe Creek to Ohio River.
2ASC1L3B	644	linear feet	(b)(3) Ephemeral feature, including an ephemeral	2ASC1L3B displayed hydrological and physical characteristics of an ephemeral drainage. Agricultural gully. Flows north through tributary to Wilson Creek to Canoe Creek to Ohio River.



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Excluded waters ((b)(1) – (b)(12)): ⁴			
Exclusion Name	Exclusion Size	Exclusion ⁵	Rationale for Exclusion Determination
		stream, swale, gully, rill, or pool.	

III. SUPPORTING INFORMATION

A. Select/enter all resources that were used to aid in this determination and attach data/maps to this document and/or references/citations in the administrative record, as appropriate.

Information submitted by, or on behalf of, the applicant/consultant: [JD Report](#), [Data Sheets](#), [Location/Topo & JD Map](#)

This information [Select](#). sufficient for purposes of this AJD.

Rationale: [N/A or describe rationale for insufficiency \(including partial insufficiency\)](#).

Data sheets prepared by the Corps: [Title\(s\) and/or date\(s\)](#).

Photographs: [Aerial and Other: Google Earth \(1993-2019\), ESRI World Imagery. NAIP 2014. Also see photos attached to point in time data sheets.](#)

Corps site visit(s) conducted on: [13May2021](#)

Previous Jurisdictional Determinations (AJDs or PJDs): [ORM Number\(s\) and date\(s\)](#).

Antecedent Precipitation Tool: [provide detailed discussion in Section III.B.](#)

USDA NRCS Soil Survey: [Web Soil Survey, 8MAY20 & 6OCT20](#)

USFWS NWI maps: [USFWS NWI \(Wetland Mapper\), 30MAY19](#)

USGS topographic maps: [Wilson & Henderson, 1:24,000](#)

Other data sources used to aid in this determination:

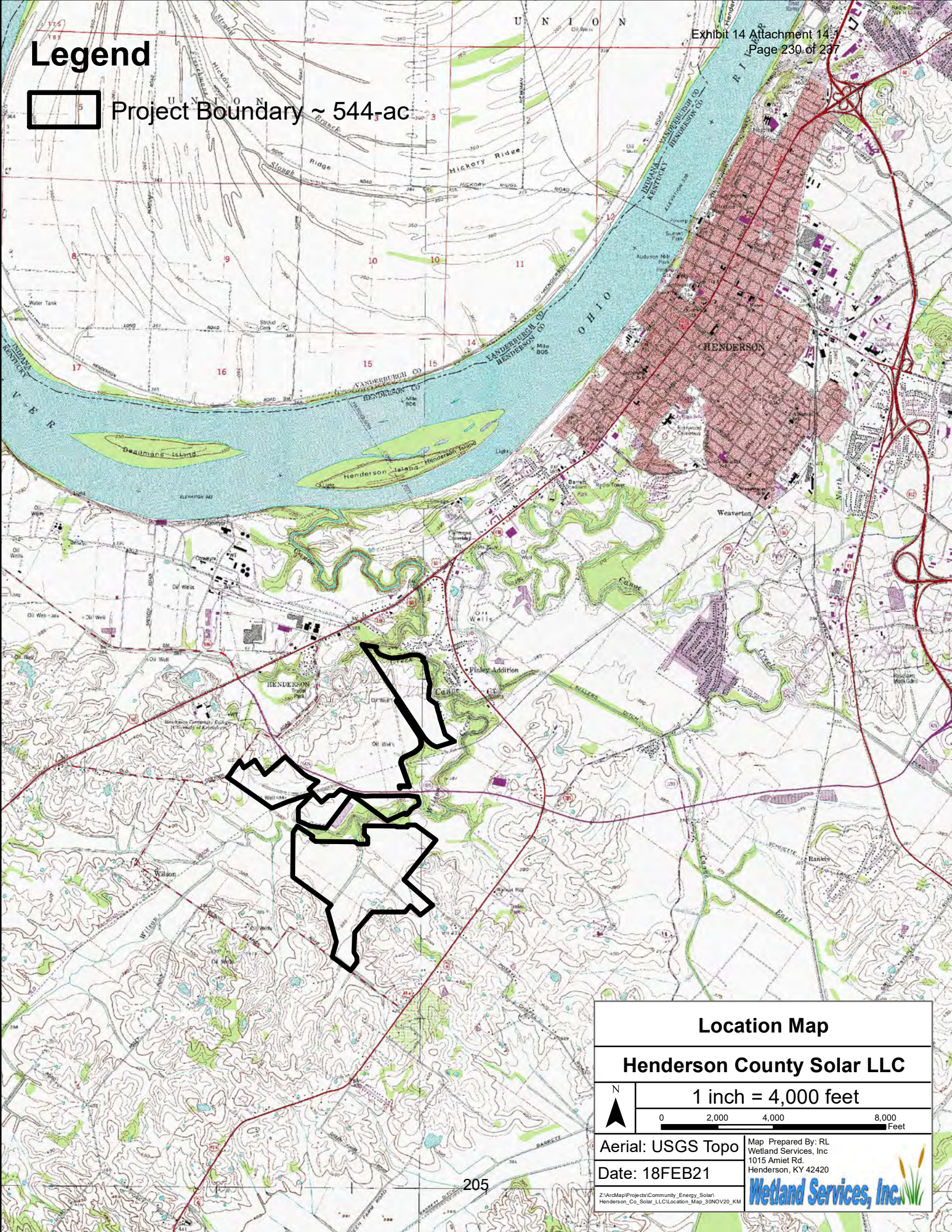
Data Source (select)	Name and/or date and other relevant information
USGS Sources	N/A.
USDA Sources	N/A.
NOAA Sources	N/A.
USACE Sources	N/A.
State/Local/Tribal Sources	N/A.
Other Sources	N/A.

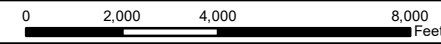


B. Typical year assessment(s): [The Antecedent Precipitation Tool indicates that determinations were made during a time frame of normal conditions. Weather was typical for the season upon determination. See JD Report for a more detailed description of location conditions.](#)

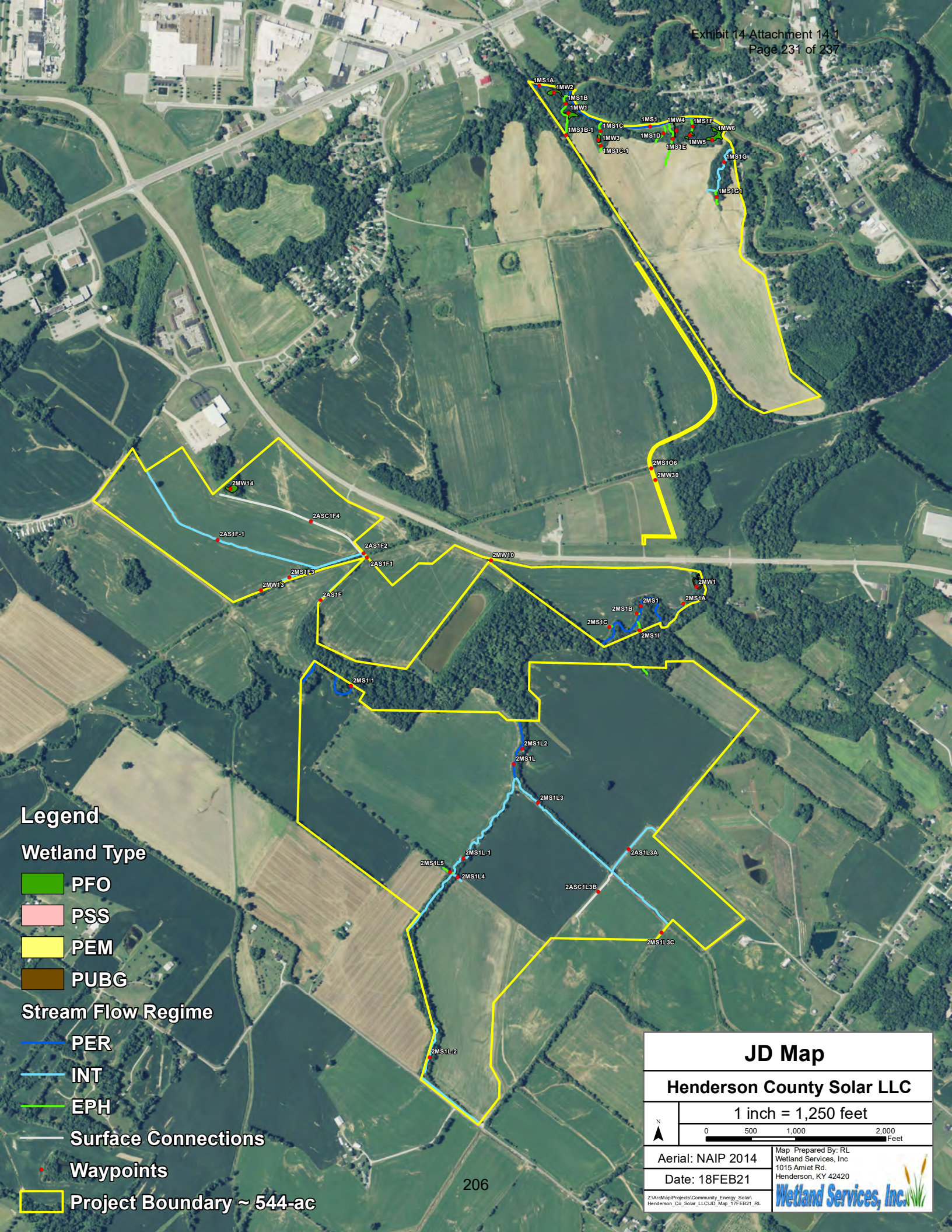
C. Additional comments to support AJD: [See JD report, point in time data collection and adjoining JD maps.](#)

Legend

 Project Boundary ~ 544-ac



Location Map	
Henderson County Solar LLC	
1 inch = 4,000 feet	
	
	Aerial: USGS Topo Date: 18FEB21
Map Prepared By: RL Wetland Services, Inc. 1015 Amiet Rd. Henderson, KY 42420 	



Legend

Wetland Type

- PFO
- PSS
- PEM
- PUBG

Stream Flow Regime

- PER
- INT
- EPH

Surface Connections

- Waypoints

Project Boundary ~ 544-ac

<h2>JD Map</h2>	
<h3>Henderson County Solar LLC</h3>	
1 inch = 1,250 feet	
Aerial: NAIP 2014 Date: 18FEB21	Map Prepared By: RL Wetland Services, Inc 1015 Arriet Rd. Henderson, KY 42420

Legend

Wetland Type

- PFO
- PSS
- PEM
- PUBG

Stream Flow Regime

- PER
- INT
- EPH

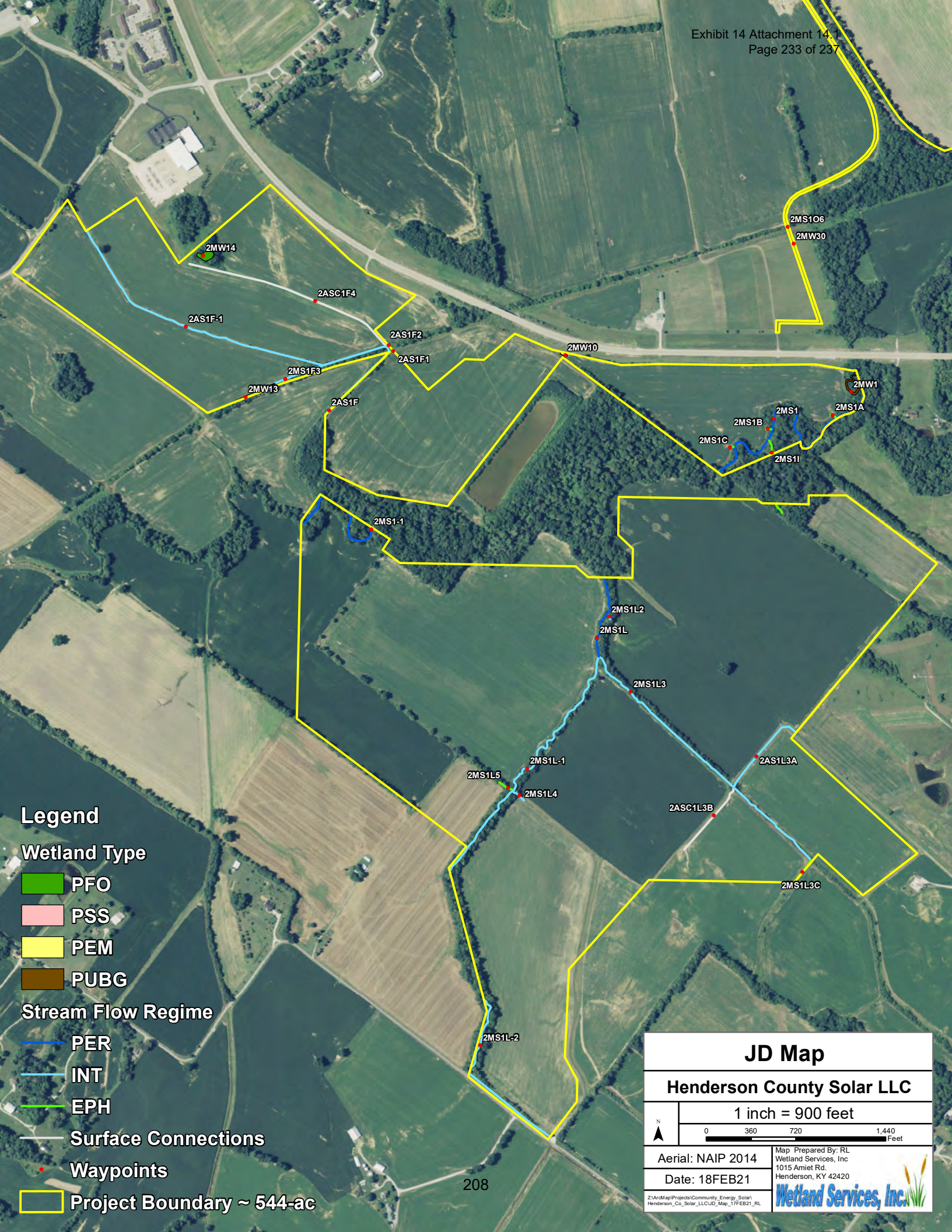
Surface Connections

Waypoints

Project Boundary ~ 544-ac



JD Map	
Henderson County Solar LLC	
1 inch = 500 feet	
Aerial: NAIP 2014	Map Prepared By: RL Wetland Services, Inc 1015 Arriet Rd. Henderson, KY 42420
Date: 18FEB21	
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Legend

Wetland Type

- PFO
- PSS
- PEM
- PUBG

Stream Flow Regime

- PER
- INT
- EPH

Surface Connections

- Waypoints

Project Boundary ~ 544-ac

<h2>JD Map</h2>	
<h3>Henderson County Solar LLC</h3>	
1 inch = 900 feet	
Aerial: NAIP 2014	Map Prepared By: RL Wetland Services, Inc 1015 Arriet Rd. Henderson, KY 42420
Date: 18FEB21	
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Summary Tables

Stream	Latitude	Longitude	Perennial Linear Feet	Intermittent Linear Feet	Excluded Waters ((b)(1) - (b)(12)) Linear Feet	Class of Aquatic Resource
1MS1	37.80201	-87.62741	2,000	0	0	Non-Section 10, non-tidal
1MS1A	37.80330	-87.63178	184	0	0	
1MS1B	37.80176	-87.63108	0	0	378	
1MS1B-1	37.80141	-87.63081	0	0	197	
1MS1C	37.80191	-87.62975	0	0	151	
1MS1C-1	37.80158	-87.62979	0	0	105	
1MS1D	37.80190	-87.62732	0	0	239	
1MS1E	37.80192	-87.62695	0	0	507	
1MS1F	37.80213	-87.62621	0	0	131	
1MS1G	37.80106	-87.62496	0	729	0	
1MS1G1	37.80000	-87.62523	0	0	153	
2AS1F	37.78741	-87.64021	0	770	0	
2AS1F1	37.78876	-87.63840	0	0	35	
2AS1F-1	37.78918	-87.64422	0	2,852	0	
2AS1F2	37.78894	-87.63835	0	17	0	
2AS1L3A	37.77994	-87.62812	0	748	0	
2ASC1F4	37.78978	-87.64062	0	0	1,741	
2ASC1L3B	37.77863	-87.62927	0	0	644	
2MS1	37.78741	-87.62783	1,987	0	0	
2MS1-1	37.78518	-87.63714	780	0	0	
2MS1A	37.78752	-87.62620	0	0	51	
2MS1B	37.78720	-87.62802	0	0	47	
2MS1C	37.78675	-87.62907	0	0	41	
2MS1F3	37.78805	-87.64140	0	412	0	
2MS1I	37.78629	-87.62774	0	0	208	
2MS1L	37.78248	-87.63264	687	0	0	
2MS1L-1	37.77949	-87.63468	0	2,313	0	
2MS1L2	37.78302	-87.63232	0	48	0	
2MS1L-2	37.77345	-87.63566	0	1,439	0	
2MS1L3	37.78131	-87.63165	0	2,421	0	
2MS1L3C	37.77743	-87.62680	0	0	194	
2MS1L4	37.77897	-87.63469	0	118	0	
2MS1L5	37.77918	-87.63500	0	0	124	
2MS1O6	37.79183	-87.62699	0	0	22	
Total			5,638	11,867	4,968	

Wetland	Latitude	Longitude	Cowardin Class	Adjacent Wetland Acres	Excluded Waters (b)(1)-(b)(12)) Acres	Class of Aquatic Resource	
1MW1	38.80247	-87.63102	PFO	0.14	0	Non-Section 10, Non-Tidal	
1MW2	37.80309	-87.63149	PFO	0.14	0		
1MW3	37.80167	-87.62983	PFO	0	0.07		
1MW4	37.80200	-87.62681	PFO	0.04	0		
1MW5	37.80187	-87.62629	PFO	0	0.08		
1MW6	37.80175	-87.62544	PFO	0.26	0		
2MW1	37.00000	87.62570	PUBG	0.11	0		
2MW10	37.78871	-87.63366	PSS	0	0.03		
2MW13	37.78765	-87.64251	PEM	0.06	0		
2MW14	37.79076	-87.64378	PFO	0	0.17		
2MW30	37.79211	-87.62700	PEM	0	0.02		
Total				0.75	0.37		

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: Henderson County Solar LLC	File Number: LRL-2021-221	Date: May 18, 2021
Attached is:		See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
	PROFFERED PERMIT (Standard Permit or Letter of permission)	B
	PERMIT DENIAL	C
X	APPROVED JURISDICTIONAL DETERMINATION	D
	PRELIMINARY JURISDICTIONAL DETERMINATION	E

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

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

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

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

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

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

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

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

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

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

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

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

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

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

U.S. Army Corps of Engineers
Attn: Ms. Tre M. Barron
Newburgh Regulatory Office
6855 State Road 66
Newburgh, IN 47630

812-853-9713

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

U.S. Army Engineer Division,
ATTN: Regulatory Appeal Review Officer, CELRD-PD-REG
550 Main Street - Room 10-714
Cincinnati, Ohio 45202-3222
TEL (513) 684-7261

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

Signature of appellant or agent.

Date:

Telephone number:

EXHIBIT 14
ATTACHMENT 14.2

Phase I Environmental Site Assessment of the proposed Henderson County Solar Site, Henderson Kentucky

Prepared for:
Community Energy Solar, LLC
Henderson County Solar LLC

Project Number: 60632959

June 2020

Quality information

Prepared by



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Revision History

Revision	Revision date	Details	Authorized	Name	Position

Distribution List

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Figure 1 – Site Vicinity Map

Executive Summary

Community Energy Solar, LLC, on behalf of Henderson County Solar LLC, contacted AECOM to perform a Phase I Environmental Site Assessment (ESA) at the site of a proposed solar energy facility to be located between United States Highway (US HWY) 41A, County Route 425 (Henderson Bypass), and US HWY 60 southeast from Henderson, Kentucky. The Phase I ESA was performed in general conformance with the scope and limitations of American Society for Testing and Materials (ASTM) Standard Practice Designation E 1527-13 for ESAs. Exceptions to, or deletions from, this practice are described in this report.

Property A is 625 acres and Property B encompasses approximately 94 acres. Both areas are situated within a predominantly agricultural district with heavy and light industrial zonings.

The subject properties are bordered to the north, east, south, and west by a mixture of light industrial, heavy industrial, agricultural, highway commercial, single family residential, two family residential, and general business district zoning. The historical land use for both subject properties has been, and currently remains, for agricultural purposes.

No recognized environmental conditions (RECs), controlled RECs (CRECs), or historical RECs (HRECs) were identified during this assessment.

1. Introduction

Community Energy Solar, LLC, on behalf of Henderson County Solar LLC (HCS), contracted AECOM to perform a Phase I Environmental Site Assessment (ESA) at the proposed Henderson County Solar sites located at 620 Lovers Lane and 3001 Wilson Station Road in Henderson, Henderson County, Kentucky (subject properties). The Phase I ESA was performed in general conformance with the scope and limitations of American Society for Testing and Materials (ASTM) Standard Practice Designation E 1527-13 for ESAs. Exceptions to, or deletions from, this practice are described in this report.

1.1 Purpose

The Phase I ESA was performed pursuant to AECOM's written proposal. The purpose of the Phase I ESA is to provide HCS with information for use in evaluating recognized environmental conditions (RECs) associated with the subject property.

Per the ASTM standard, potential findings can include RECs, historical RECs (HRECs), controlled RECs (CRECs), and *de minimis* conditions. A REC is defined by the ASTM standard as “the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment.” The term includes hazardous substances or petroleum products even under conditions in compliance with laws. HRECs are past releases of any hazardous substances or petroleum products that have occurred in connection with the property and have been addressed to the satisfaction of the applicable regulatory authority or meet unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls. CRECs are recognized environmental conditions resulting from past releases of hazardous substances or petroleum products that have been addressed to the satisfaction of the applicable regulatory authority, with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls. *de minimis* conditions are those situations that do not present a material risk of harm to public health or the environment and generally would not be subject to enforcement action if brought to the attention of the regulating authority.

This assessment is based on a review of existing conditions, reported pre-existing conditions, and observed operations at the subject property and adjacent properties.

1.2 Scope of Work

The Phase I ESA included a site visit, regulatory research, historical review, and environmental database analysis of the subject property. In conducting the Phase I ESA, AECOM assessed the subject property for visible signs of potential contamination and researched public records for the subject property and adjacent properties (as applicable).

This project was performed in general accordance with ASTM Standard Practice Designation E 1527-13. Conclusions reached in this report are based upon the assessment performed and are subject to limitations set forth in Sections 1.3, 1.4, and 1.5 below.

1.3 Study Limitations

This report describes the results of AECOM's Phase I ESA to identify the presence of contamination-related liabilities materially affecting the subject properties. In the conduct of this assessment, AECOM assessed the presence of such problems within the limits of the established scope of work described in the proposal.

As with any due diligence assessment, there is a certain degree of dependence upon oral information provided by facility or site representatives, which is not readily verifiable through visual observations or supported by any available written documentation. AECOM shall not be held responsible for conditions or consequences arising from relevant facts that were concealed, withheld, or not fully disclosed by facility or site representatives at the time this assessment was performed. In addition, the findings and opinions expressed in this report are subject to certain conditions and assumptions, which are noted in the report. Any party reviewing the findings of the report must carefully review and consider all such conditions and assumptions.

This report, all field data, and notes were gathered and/or prepared by AECOM in accordance with the agreed upon scope of work and generally accepted engineering and scientific practice in effect at the time of AECOM's assessment of the subject property. The statements, findings, and opinions contained in this report are only intended to give approximations of the environmental conditions at the subject properties.

As specified in the ASTM standard (referred to below as "this practice"), it is incumbent on the client and any other parties who review and rely upon this report to understand the following inherent conditions surrounding any Phase I ESA:

- **Uncertainty Not Eliminated:** No ESA can wholly eliminate uncertainty regarding the potential for RECs in connection with a property. Performance of this practice is intended to reduce, but not eliminate, uncertainty regarding the potential for REC in connection with a property, and this practice recognizes reasonable limits of time and costs (Section 4.5.1 of the ASTM standard).
- **Not Exhaustive:** "All appropriate inquiry" does not mean an exhaustive assessment of a clean property. There is a point at which the cost of information obtained outweighs the usefulness of the information and, in fact, may be a material detriment to the orderly completion of transactions. One of the purposes of this practice is to identify a balance between the competing goals of limiting the costs and time demands inherent in performing an ESA and the reduction of uncertainty about unknown conditions resulting from additional information (Section 4.5.2 of the ASTM Standard).
- **Comparison with Subsequent Inquiry:** ESAs must be evaluated based on the reasonableness of judgments made at the time and under the circumstances in which they were made. Subsequent ESAs should not be considered valid standards to judge the appropriateness of any prior assessment based on hindsight, new information, use of developing technology or analytical techniques, or other factors (Section 4.5.4 of the ASTM Standard).

This report was prepared pursuant to an agreement between Community Energy Solar, LLC and AECOM and is for the exclusive use of Community Energy Solar, LLC and Henderson County Solar LLC. No other party is entitled to rely on the conclusions, observations, specifications, or data contained herein without first obtaining AECOM's written consent and provided any such party signs an AECOM-generated Reliance Letter. A third party's signing of the AECOM Reliance Letter and AECOM's written consent are conditions precedent to any additional use or reliance on this report.

The passage of time may result in changes in technology, economic conditions, site variations, or regulatory provisions, which would render the report inaccurate. Reliance on this report after the date of issuance as an accurate representation of current site conditions shall be at the user's sole risk.

1.4 Site-Related Limiting Conditions

The following site-specific limitations were encountered during this assessment:

- During the site visit, AECOM did not have contact with any facility or site representative. AECOM's evaluation of the subject properties therefore solely relies on due diligence and the accuracy of the site visit, regulatory research, historical review, and environmental database analysis of the subject properties. This site-related limiting condition is not expected to impact the results of this assessment.

1.5 Data Gaps/Data Failure

The following data failure/data gaps were encountered during this assessment:

- As specified in the agreed upon scope of work, a title search and environmental lien search were not conducted as part of this ESA. However, based upon historical data collected from other sources, this data gap is not expected to impact the results of this assessment. In addition, the user was not aware of environmental liens or activity use limitations that have been placed on the subject property.
- Per ASTM, past owners, operators, and occupants of the subject property who are likely to have material information regarding the potential for contamination at the subject property shall be contacted to the extent that they can be identified and that the information likely to be obtained is not duplicative of information already obtained from other sources. AECOM was unable to interview past owners and operators at the subject property. However, based upon historical data collected from other sources, this data gap is not expected to impact the results of this assessment.

2. Site Description

2.1 Site Location and Parcel Description

The subject properties, Property A and Property B, are located between United States Highway (US HWY) 41A, County Route 425 (Henderson Bypass), and US HWY 60 southeast from Henderson, Kentucky. Property A, the larger of the two subject properties, is approximately 625 acres and Property B encompasses approximately 94 acres. Both areas are situated within a predominantly agricultural district with heavy and light industrial zonings.

According to the Henderson City-County office, Property A is comprised of seven (7) land parcels listed in **Table 1**. Wilson Station Road, a two-lane asphalt paved road, serves as the southern property border. Property A is bordered to the north-west by Old Corydon Road, a two-lane gravel paved road; north-east by Henderson Bypass, a two-lane asphalt paved road; and south-east by US HWY 41A, a two-lane asphalt paved road. Property A is accessed by easement bridges constructed over the culvert separating the agricultural land and Wilson Station Road. Many of the access points are primarily used for agricultural equipment.

Property B is made up of one parcel of land designated as Henderson County parcel number 46-19.2 (93.98 acres). Property B is an agricultural field with an access road to the Illinois Central Railroad (ICRR) running east to west through the middle of the field. Canoe Creek and single-family residences make up the eastern border of the subject property.

The approximate location of the subject properties is illustrated on **Figure 1**.

Table 1

Property A Comprising County Parcels	
County Parcel Number	Parcel Size (acres)
39-2-66	107.70
39-2-66	40.93
46-20	13.55
46-19.2	29.05
46-39	31.91
46-42	46.33
47-3	389.47

2.2 Site Ownership

The ownership of the parcels which comprise Property A, according to the Henderson City-County Geographic Information System (GIS) Records, is detailed in Table 2.

Table 2

Property A Parcel Ownership		
County Parcel Number	Parcel Size (Acres)	Ownership
39-2-66	107.70	Tommy D Tapp
39-2-66	40.93	
46-20	13.55	
46-19.2	29.05	Beth Ann and Jeff Francis
46-39	31.91	Richard N and Lynn Payne
46-42	46.33	Debra J. Crooks
47-3	389.47	Margarete E Sutton and Charles R McCollom III

According to the Henderson City-County GIS Records, Property B is owned by Beth Ann and Jeff Francis of Henderson, Kentucky.

2.3 Site Visit

Mr. Niels Heidner, Geologist I with AECOM’s Franklin, Tennessee office, visited the subject property on May 13, 2020. During the site visit, Mr. Heidner accessed the subject properties via access points generally used for agricultural equipment. Site related limiting conditions encountered during this assessment are summarized in Section 1.4.

The site visit methodology consisted of walking over accessible areas of the subject properties, including the perimeter and interior of each individual parcel. Each parcel was first traversed around its perimeter then the interior of the parcel was inspected. The following sections summarize the results of the site visit.

2.3.1 Site Description

The subject property contains approximately 753 acres of agricultural land zoned for light industrial, heavy industrial, agricultural, highway commercial, single family residential, two family residential, and general business districts. Individual fields are separated by drainage culverts, intermittent streams, berms, and barbed-wire fences. The runoff from the culverts and intermittent streams form a drainage network that runs into Wilson Creek, a perennial stream. Canoe Creek, another perennial stream which drains much of Property B. The subject properties have historically been utilized for agriculture. During the site visit the acreage comprising the subject properties was cultivated and plowed or sewn. The most heavily forested areas were located around Wilson Creek. Few trees were observed within the agriculturally active fields which made up much of the acreage on subject property A and B. Wild vegetation and mature trees were concentrated along property boundaries and along the floodplain of Wilson and Canoe Creeks. Stand-up drains were seen in the low-lying areas to the southeast. Crop drains were present to prevent water accumulation or flooding.

During the site visit, no visual evidence of potable water wells, monitoring wells, dry wells, clarifiers, septic tanks, or leach fields was observed on the subject parcels. No visual evidence of discolored

soil, water, or unusual vegetative conditions or odors were detected during the site visit. Representative site photographs are provided in **Appendix A**.

2.3.2 Surrounding Properties

The adjacent properties to the north of Property A, located across from Old Corydon Road and County Route 425, are agricultural fields. Kenergy Corporation Headquarters is located at the intersection of Old Corydon Road and County Route 425. The east adjacent properties for Property A, located across County Route 425, are occupied by agricultural land and By-Pass Golf Driving Range. The east adjacent properties, on the interior of the intersection of County Route 425 and US HWY 41A are occupied by single-family residences, agricultural fields, two retention ponds, and a broadcasting tower. To the south-east, located across US HWY 41A, single-family residences and agricultural fields comprise the surrounding parcels of Property A. The adjacent properties on the interior of the intersection of US HWY 41A and Wilson Station Road are occupied by agricultural fields and single-family residences. The adjacent properties to the west of Property A, on both sides of Wilson Station Road and north to Old Corydon Road are occupied by agricultural fields and single-family residences.

The adjacent property to the north of subject Property B is occupied by an electrical substation at 2239 South Green Street. The adjacent properties to the north, across Canoe Creek; and the adjacent properties to the east are occupied by single family or duplex residences. Subject property B is bordered to the south and west by two branches of the ICRR. Past the ICRR, the agricultural fields exist.

AECOM did not observe any gasoline service stations or dry cleaners within one half mile of the subject property. In addition, no day care centers, schools, or hospitals are located adjacent to the subject property. Based on AECOM's site reconnaissance of the surrounding neighborhood, no off-site sources of concern were identified.

2.3.3 Petroleum Products, Hazardous Waste, and Hazardous Materials

No hazardous waste or hazardous materials were observed at the subject property.

2.3.4 Polychlorinated Biphenyls

Polychlorinated biphenyl (PCB)-containing dielectric fluids have been widely used as coolants and lubricants in transformers, capacitors, and other electric equipment due to their insulating and nonflammable properties.

AECOM observed multiple pole-mounted transformers situated across both subject properties. No damage or leaks were observed from the transformers. No PCB-free labeling was observed on the transformer; however, they appeared to be constructed after 1979.

2.3.5 Storage Tanks (Aboveground and Underground)

Aboveground storage tanks (ASTs), and underground storage tanks (UST's), were not identified during the site visit.

2.3.6 Solid Waste

No evidence of inappropriate disposal activities by the current property owners or soil staining was observed during the site visit.

2.3.7 Water

The properties are not connected to public water supplies. One residential water well, identified by the University of Kentucky, Kentucky Geological Survey (KGS) Groundwater Wells Search (GWS) as AKGWA_NUMBER 60001277, may be associated with county parcel number 46-39, owned by Richard and Lynn Payne and located on Property A. According to the KGS GWS the well was drilled to an unknown total depth but contacted bedrock at 33 feet below the ground surface. The water well was not observed during the site walk through and based on a review of maps from the KGS Geologic Map Information Service (GMIS) website; the water well is associated with an adjacent residential home.

2.3.8 Stormwater

Stormwater at the subject properties infiltrates the bare soil into the subsurface. If flooded, the ground surface is expected to flow off-site as sheet flow towards Wilson Creek. Wilson Creek, which drains both Property A and B flows into the Ohio River to the north.

3. Environmental Setting

3.1 Topography

According to the United States Geological Survey historic topographic maps of the subject property area (Wilson 7.5" quadrangle and Henderson 7.5" quadrangle), the elevation of subject property located A is approximately 380 feet above mean sea level (MSL). The elevation of subject property B is approximately 380 feet above MSL. Subject property A has an approximate maximum topographic elevation of 445 ft above MSL at the southeast corner of the subject property near the intersection of Wilson Station Road and US HWY 41A. Subject property A has an approximate minimum topographic elevation of 325 ft above MSL where Wilson Creek crosses County Route 425. Subject property B has an approximate maximum topographic elevation of 405 ft above MSL at the center western edge of the property. Subject property B has an approximate minimum topographic elevation of 345 ft above MSL at Canoe Creek, the northern property boundary.

3.2 Site Soil and Geology

According to the Department of the Interior, United States Geological Survey, Geologic Map of Part of the Wilson Quadrangle, Henderson County, Kentucky (1973), the subject properties are underlain by alluvial sediment which is intermixed Quaternary Alluvium, and Quaternary Loess. The alluvium has a local thickness up to 190 feet. The aeolian loess has a regional occurrence between 0-50 feet in thickness. These two formations are characterized by clay, silt, sand, and gravel.

3.3 Groundwater and Hydrogeology

Site-specific hydrologic information was not identified during this assessment. Based on the surface topography of subject property A, the groundwater flow direction drains from the north and south into Wilson Creek. Wilson Creek trends from west to east across subject property A. Based on the surface topography of subject property B, the groundwater flow direction is to the east-southeast towards Canoe Creek. Canoe Creek, which joins Wilson Creek, drains the subject properties into the Ohio River. The actual depth and flow direction of groundwater beneath the subject properties cannot be determined without site-specific groundwater monitoring well data but is assumed to regionally trend north towards the Ohio River.

4. Site and Area History

Historical information for the subject property and surrounding properties is based on AECOM's review and analysis of the following historical sources provided by Environmental Data Resources, Inc. (EDR):

- Aerial photographs dated 1940, 1950, 1958, 1970, 1973, 1983, 1998, 2008, 2012, and 2016.
- Historic topographic maps dated 1914, 1916, 1952, 1959, 1971, 1980, 1981, 1993, and 2013.
- City directories for the years 1963, 1966, 1992, 1995, 2000, 2005, 2010, 2014, and 2017.

In addition, according to EDR, Sanborn® Fire Insurance Map coverage is not available for the subject property. Refer to **Appendix B** for the historical sources, which include the historical aerial photographs, topographic maps, and city directories.

4.1 Subject Property

Based on a review of aerial photographs and historical topographic maps the subject properties have been used as agricultural land since 1940. According to the 1914 historical topographic map, Wilson Station Road, the ICRR, Madisonville Road which would later become US HWY 41A, and Old Corydon Road were established. Between the historical topographic map for 1916 and the 1950 aerial photograph additional construction occurred on the ICRR. Between 1981 and 1993, County Route 425 was constructed to form the property border for subject property A. Between 1981 and 1993, the historical topographic maps highlight the excavation of the borrow pit on county parcel number 46-20 on subject property A, and the construction of a gravel road which bisects subject property B from east to west. Between the 1983 and 1998, aerial photographs reveal the construction of Kenergy Corporation Headquarters located at the intersection of Old Corydon Road and County Route 425.

City directories for the years 1963, 1966, 1992, 1995, 2000, 2005, 2010, 2014, and 2017 were provided by EDR. Addresses for the subject properties were listed in the city directories for the year 1992 as 5872 Highway 425 for the subject property located at 3001 Wilson Station Road; and 648, 654, 904, 910, 914, 1008, 1018, 1026, and 5806 Lovers Lane for the property located at 620 Lovers Lane. None of the addresses were formerly owned by non-private individuals.

4.2 Adjacent Properties

Based on a review of aerial photographs and historical topographic maps, the adjacent properties have been used as agricultural land since at least 1940. The first major land-use changes occurred between the 1916 historical topographic map and the 1950 aerial photograph. Over this 34-year time span a branch of the ICRR that makes up the current western border of subject property B was added to its main line. With the addition of the railroad line, small residential buildings were constructed to the north and east of subject property B. Further construction of small, single family and multi-family residential structures were built around the adjacent properties between 1952 and 1981. The concentration of this construction occurred to the east of subject property B across Canoe Creek.

No historical off-site sources of concern in the surrounding properties were identified in the city directories reviewed for this report.

4.3 Interviews

During the site visit, no interviews with current or previous landowners were conducted. In accordance with the scope of work and ASTM 1527-13, the property owners were contacted to provide information regarding their property, and the surrounding properties. Based on the responses of the property owners, this assessment revealed no RECs, CRECs, or HRECs in connection with the properties.

Refer to **Appendix B** for the landowner completed questionnaires.

4.4 Previously Prepared Environmental Reports

AECOM inquired about existing environmental reports associated with the subject property. Previously prepared environmental reports were not identified during this assessment. The client indicated that there were no previous environmental assessments or reports associated with the subject property.

5. Database and Records Review

5.1 User Provided Information

Section 6 of ASTM E1527-13 states that certain tasks, which will help to determine the possibility of RECs associated with the subject property, are generally conducted by the Phase I ESA report user. This includes the following: reviewing title records for environmental liens or activity and land use limitations and considering awareness of any specialized knowledge (e.g., information about previous ownership or environmental litigation), experience related to RECs at the subject property, or significant reduction in the purchase price of the subject property. Per the agreed scope-of-work, information related to these items should be provided by the Phase I ESA report user to AECOM.

5.2 Title Records/Environmental Liens

Per the agreed upon scope of work, a chain-of-title and an environmental lien search were not performed as part of this assessment.

5.3 Database Information

In accordance with the scope of work and ASTM E1527-13, a search of various governmental databases was conducted by EDR. The site-specific environmental database report was reviewed to evaluate if soil and/or groundwater from on-site and/or off-site sources of concern has the potential to impact the subject property. The database abbreviations are provided in the site-specific environmental database report.

The database report includes various reports detailing database information for each of the sites identified or geocoded within the specified radius. Additional sites were identified within the database report; however, EDR was not able to map them to specific locations due to insufficient or contradicting address information. These sites were included in the database report as "orphan" sites. Based upon AECOM's review, there does not appear to be any significant concerns associated with any of the orphan sites. A summary of AECOM's review and analysis of the site-specific environmental database report is presented below. A copy of the database report is provided in **Appendix C**.

5.3.1 Subject Property

The subject property is identified in the following databases:

- The State Spills (SPILLS) database; and
- The Underground Injection Control (UIC) wells database.

The UIC database is a listing of wells identified as underground injection wells in the Kentucky Oil & Gas industry. The database indicated an underground injection well was located on the subject property. The database stated the well was installed on August 2, 1982 and the well was plugged and abandoned on June 19, 1990. The well was located on a property previously owned by A. G. Pritchett. A permit was issued for the well under the Kentucky Division of Oil and Gas under permit number 50735.

The spills database is a listing of spills and/or releases related incidents from the state of Kentucky Department of Environmental Protection (DEP). An open dumping report exists for subject property A at 7248 Old Corydon Road. The substance of the solid waste was not reported in the database. The report was closed with a remark indicating that the incident had been “closed-managed”.

5.3.2 Surrounding Sites

Additional sites, including State and tribal sites, were identified within the respective ASTM E1527-13 or EDR search distances from the subject property. Based on AECOM's review of the database listings, none of the sites are expected to present a REC to the subject property based on their distance and topographic gradient from the subject site. Therefore, no impact from the adjacent properties to the subject properties was concluded at the time of the Phase I ESA.

5.4 Vapor Encroachment Screening

No on-site sources of vapor encroachment (e.g., UST, contaminated soil, groundwater plume, etc.) were identified during this assessment. A review of the EDR database indicated that no impacted sites are located within 0.25 mile of the subject property. Based on the EDR information, and observations made during the site visit a vapor encroachment issue due to an on-site source does not appear to exist for the subject property.

5.5 Agency File Review

5.5.1 Local

AECOM submitted Freedom of Information Act (FOIA) requests to the City of Henderson Fire Department to determine if they have files related to historical hazardous materials releases that may have occurred at the subject property. As of the date of this report, a response to AECOM's FOIA request has not been received. Based on AECOM's research, AECOM does not anticipate the response (if any) from the City of Henderson Fire Department to the FOIA request will significantly alter the conclusions or recommendations of this report. However, if information is received from this FOIA request that significantly impacts the conclusions of this report, this information will be forwarded upon receipt.

5.5.2 County

AECOM reviewed the Henderson City-County geographic information systems (GIS) database for records pertaining to the subject property's physical and parcel addresses. Data obtained from the records is used to designate parcels that make-up the subject areas in this report.

5.5.3 State

In addition, AECOM submitted a FOIA request to the KGS Oil and Gas Records for information pertaining to exploration wells previously drilled on the property. AECOM has not received information pertaining to the subject properties or adjacent properties. Based on AECOM's research and observations made while on-site, it is not likely that any information received from the State would significantly impact the conclusions made herein. However, if information is received from this FOIA request that significantly impacts the conclusions of this report, this information will be forwarded upon receipt.

6. Findings and Opinions

AECOM performed a Phase I ESA of the subject property in conformance with the scope and limitations of ASTM E1527-13, which meets the requirements of Title 40, Code of Federal Regulations Part 312 and is intended to constitute *all appropriate inquiry* for purposes of the landowner liability protections. Any exceptions to, or deletions from, this practice are described in Section 1.3 through 1.5 of this report.

The following sections summarize the findings and opinions of this Phase I ESA of the subject property.

6.1 Recognized Environmental Conditions

Based on the above-described activities, no RECs were identified in connection with the subject property.

6.2 Controlled Recognized Environmental Conditions

Based on the above-described activities, no CRECs were identified in connection with the subject property.

6.3 Historical Recognized Environmental Conditions

Based on the above-described activities, no HRECs were identified in connection with the subject property.

6.4 Vapor Encroachment Conditions

Based on the above-described activities, no VECs were identified in connection with the subject property.

6.5 De Minimis Conditions

Based on the above-described activities, no DMC's were identified in connection with the subject property.

7. Conclusions

AECOM performed a Phase I ESA in conformance with the scope and limitations of ASTM Standard Practice Designation E 1527-13 of the subject properties located in Henderson County, Kentucky. Any exception to, or deletions from, this practice are described in Sections 1.3 through 1.5 of this report. This assessment has revealed no RECs, CRECs, or HRECs in connection with the properties.

8. Environmental Professional Statement

Mr. Dennis Mihalek was the Environmental Professional (EP) for this project. Mr. Mihalek's EP statement is below, and his resume is provided in **Appendix D**:

I declare that, to the best of my professional knowledge and belief, I meet the definition of an EP as defined in §312.10 of 40 Code of Federal Regulations (CFR) and that I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. I have developed and performed all the appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

Signature:



Date: August 24, 2020

9. References

9.1 Agencies Contacted

Record and parcel information, reviewed for Henderson County, Kentucky at <http://hendkygis.maps.arcgis.com/>

City of Henderson Fire Department, 332 Washington Street, (270) 831-1270. Contacted by Mr. Heidner with AECOM on June 12, 2020 for information on potential hazardous materials releases that may have occurred at the subject property.

University of Kentucky, Kentucky Geological Survey, Oil and Gas Records, 1401 Corporate Circuit, Henderson, Kentucky 42420, (270) 827-3414. Contacted by Mr. Heidner with AECOM on June 12, 2020 for information on wildcat wells previously drilled on the subject property. Also at <https://kgs.uky.edu/kygeode/services/oilgas/>

9.2 Documents Reviewed

ASTM E1527-13, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, dated November 2013. www.astm.org

ASTM E2600-15, Standard Guide for Vapor Encroachment Screening on Property Involved in Real Estate Transactions, dated October 2015. www.astm.org

EDR 7.5 Minute Topographic Maps, prepared for Henderson County, Kentucky, dated May 14, 2020. Inquiry number 6063350.5. Topographic Maps 1914, 1916, 1952, 1959, 1971, 1980, 1981, 1993, and 2013. Report prepared by Environmental Data Resources Inc., 6 Armstrong Road, Shelton, Connecticut 06484, (800) 352-0050, www.edrnet.com.

EDR Aerial Photos Decade Package prepared for Henderson County, Kentucky, dated May 15, 2020. Inquiry number 6063350.8. Aerial photographs dated 1940, 1950, 1958, 1970, 1973, 1983, 1998, 2008, 2012, and 2016. Report prepared by Environmental Data Resources Inc., 6 Armstrong Road, Shelton, Connecticut 06484, (800) 352-0050, www.edrnet.com.

EDR City Directories Image Report prepared for Henderson County, Kentucky, dated May 18, 2020. Inquiry number 6063350.9. City directories reviewed included 1963, 1966, 1992, 1995, 2000, 2005, 2010, 2014, and 2017. Report prepared by Environmental Data Resources Inc., 6 Armstrong Road, Shelton, Connecticut 06484, (800) 352-0050, www.edrnet.com.

EDR Area/ Corridor Map, prepared for Henderson County, Kentucky, dated May 14, 2020. Inquiry number 6063350.10s. Report prepared by Environmental Data Resources Inc., 6 Armstrong Road, Shelton, Connecticut 06484, (800) 352-0050, www.edrnet.com.

EDR Sanborn Map Report, prepared for Henderson County, Kentucky, dated May 15, 2020. Inquiry number 6063350.6. Report prepared by Environmental Data Resources Inc., 6 Armstrong Road, Shelton, Connecticut 06484, (800) 352-0050, www.edrnet.com.

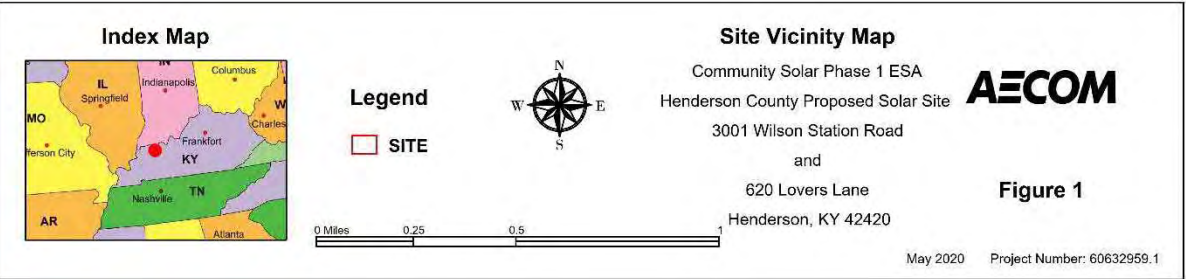
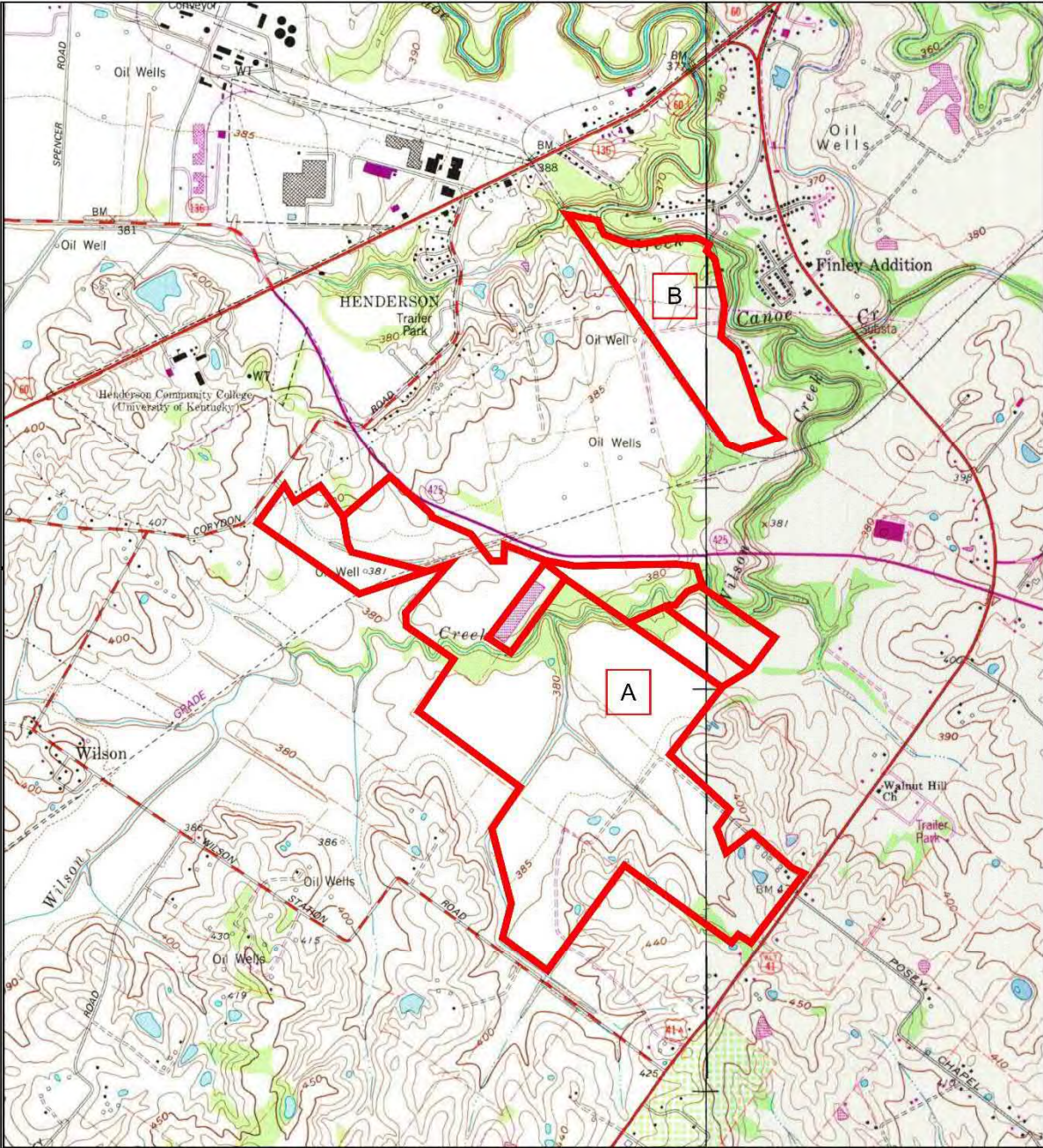
Google Earth website, www.google.earth.com. This information was reviewed online by Mr. Heidner with AECOM on May 15, 2020.

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U.S. Environmental Protection Agency, Technical Guide for Addressing Petroleum Vapor Intrusion at Leaking Underground Storage Tank Sites dated June 2015,
<https://www.epa.gov/sites/production/files/2015-06/documents/pvi-guide-final-6-10-15.pdf>

Web Soil Survey. U.S. Department of Agriculture, Natural Resources Conservation Service website
- <http://websoilsurvey.nrcs.usda.gov/app/>

Figure 1



Phase I Environmental Site Assessment of The Proposed Solar Site (Additional Properties) Henderson, Kentucky


Prepared for:
Community Energy Solar, LLC
Henderson County Solar LLC

Project Number: 60632959

January 2021


Quality information

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Executive Summary

Community Energy Solar, LLC (CES), on behalf of Henderson County Solar LLC, contracted AECOM to perform a Phase I Environmental Site Assessment (ESA) at three rural land areas located southwest of Henderson, Kentucky. The land areas are located at 2230 Highway 60 West (Area #1); 6300 Highway 425 (Area #2); and 1173 and 2517 Wilson Station Road (Area #3) in Henderson, Henderson County, Kentucky (subject properties). The Phase I ESA was performed in general conformance with the scope and limitations of American Society for Testing and Materials (ASTM) Standard Practice Designation E 1527-13 for ESAs. Exceptions to, or deletions from, this practice are described in this report.

The largest of the three subject properties (Area #3), at approximately 36.75 acres, is situated approximately 5,000 feet northwest of the intersection of US Highway 41A and Wilson Station Road. The second subject property (Area #2), at approximately 21.25 acres, is situated approximately 5,000 feet west of the intersection of US Highway 41A and Kentucky Route 425 (Henderson Bypass). The smallest of the three subject properties (Area #1), at approximately 6.88 acres, is situated approximately 500 feet southwest of the intersection of U.S. Route 60 and Old Corydon Road. The subject properties are in a predominantly agricultural district with scattered heavy industrial and light industrial zonings. The smallest of the three subject properties is classified as exempt city.

The subject properties are bordered to the north, east, south, and west by a mixture of light industrial, heavy industrial, agricultural, highway, commercial, single family residential, two family residential, and general business district zoning. The historical land use for the two largest subject properties has been, and currently remains, for agricultural purposes. The historical land use for the smallest subject property, currently the location of a substation, was undeveloped land.

No recognized environmental controls (RECs), controlled RECs (CRECs), or historical RECs (HRECs) were identified during this assessment.

1. Introduction

Community Energy Solar, LLC (CES), on behalf of Henderson County Solar LLC, contracted AECOM to perform a Phase I Environmental Site Assessment (ESA) at three rural land areas located southwest of Henderson, Kentucky. The land areas are located at 2230 Highway 60 West (Area #1); 6300 Highway 425 (Area #2); and 1173 and 2517 Wilson Station Road (Area #3) in Henderson, Henderson County, Kentucky (subject properties). The Phase I ESA was performed in general conformance with the scope and limitations of American Society for Testing and Materials (ASTM) Standard Practice Designation E 1527-13 for ESAs. Exceptions to, or deletions from, this practice are described in this report.

1.1 Purpose

The Phase I ESA was performed pursuant to AECOM's written proposal. The purpose of the Phase I ESA is to provide CES with information for use in evaluating recognized environmental conditions (RECs) associated with the subject property.

Per the ASTM standard, potential findings can include RECs, historical RECs (HRECs), controlled RECs (CRECs), and *de minimis* conditions. A REC is defined by the ASTM standard as “the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment.” The term includes hazardous substances or petroleum products even under conditions in compliance with laws. HRECs are past releases of any hazardous substances or petroleum products that have occurred in connection with the property and have been addressed to the satisfaction of the applicable regulatory authority or meet unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls. CRECs are recognized environmental conditions resulting from past releases of hazardous substances or petroleum products that have been addressed to the satisfaction of the applicable regulatory authority, with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls. *de minimis* conditions are those situations that do not present a material risk of harm to public health or the environment and generally would not be subject to enforcement action if brought to the attention of the regulating authority.

This assessment is based on a review of existing conditions, reported pre-existing conditions, and observed operations at the subject property and adjacent properties.

1.2 Scope of Work

The Phase I ESA included a site visit, regulatory research, historical review, and environmental database analysis of the subject property. In conducting the Phase I ESA, AECOM assessed the subject property for visible signs of potential contamination and researched public records for the subject property and adjacent properties (as applicable).

This project was performed in general accordance with ASTM Standard Practice Designation E 1527-13. Conclusions reached in this report are based upon the assessment performed and are subject to limitations set forth in Sections 1.3, 1.4, and 1.5 below.

1.3 Study Limitations

This report describes the results of AECOM's Phase I ESA to identify the presence of contamination-related liabilities materially affecting the subject properties. In the conduct of this assessment, AECOM assessed the presence of such problems within the limits of the established scope of work described in the proposal.

As with any due diligence assessment, there is a certain degree of dependence upon oral information provided by facility or site representatives, which is not readily verifiable through visual observations or supported by any available written documentation. AECOM shall not be held responsible for conditions or consequences arising from relevant facts that were concealed, withheld, or not fully disclosed by facility or site representatives at the time this assessment was performed. In addition, the findings and opinions expressed in this report are subject to certain conditions and assumptions, which are noted in the report. Any party reviewing the findings of the report must carefully review and consider all such conditions and assumptions.

This report, all field data, and notes were gathered and/or prepared by AECOM in accordance with the agreed upon scope of work and generally accepted engineering and scientific practice in effect at the time of AECOM's assessment of the subject property. The statements, findings, and opinions contained in this report are only intended to give approximations of the environmental conditions at the subject properties.

As specified in the ASTM standard (referred to below as "this practice"), it is incumbent on the client and any other parties who review and rely upon this report to understand the following inherent conditions surrounding any Phase I ESA:

- **Uncertainty Not Eliminated:** No ESA can wholly eliminate uncertainty regarding the potential for RECs in connection with a property. Performance of this practice is intended to reduce, but not eliminate, uncertainty regarding the potential for REC in connection with a property, and this practice recognizes reasonable limits of time and costs (Section 4.5.1 of the ASTM standard).
- **Not Exhaustive:** "All appropriate inquiry" does not mean an exhaustive assessment of a clean property. There is a point at which the cost of information obtained outweighs the usefulness of the information and, in fact, may be a material detriment to the orderly completion of transactions. One of the purposes of this practice is to identify a balance between the competing goals of limiting the costs and time demands inherent in performing an ESA and the reduction of uncertainty about unknown conditions resulting from additional information (Section 4.5.2 of the ASTM Standard).
- **Comparison with Subsequent Inquiry:** ESAs must be evaluated based on the reasonableness of judgments made at the time and under the circumstances in which they were made. Subsequent ESAs should not be considered valid standards to judge the appropriateness of any prior assessment based on hindsight, new information, use of developing technology or analytical techniques, or other factors (Section 4.5.4 of the ASTM Standard).

This report was prepared pursuant to an agreement between Community Energy Solar, LLC, Henderson County Solar, LLC, and AECOM and is for the exclusive use of CES and HCS. No other party is entitled to rely on the conclusions, observations, specifications, or data contained herein

without first obtaining AECOM's written consent and provided any such party signs an AECOM-generated Reliance Letter. A third party's signing of the AECOM Reliance Letter and AECOM's written consent are conditions precedent to any additional use or reliance on this report.

The passage of time may result in changes in technology, economic conditions, site variations, or regulatory provisions, which would render the report inaccurate. Reliance on this report after the date of issuance as an accurate representation of current site conditions shall be at the user's sole risk.

1.4 Site-Related Limiting Conditions

The following site-specific limitations were encountered during the course of this assessment:

- During the site visit, AECOM did not have contact with any facility or site representative. AECOM's evaluation of the subject properties therefore solely relies on due diligence and the accuracy of the site visit, regulatory research, historical review, and environmental database analysis of the subject properties. This site-related limiting condition is not expected to impact the results of this assessment.
- Due to the property size and thick vegetation on portions of the subject property, it was not possible to traverse all areas of the subject properties during the site reconnaissance. AECOM traversed and visually observed the perimeter of the subject properties and interior portions of the subject properties. Based on the current state of the subject properties (primarily agricultural land), this particular site-related limiting condition is not expected to have a significant impact to the results of this assessment.

1.5 Data Gaps/Data Failure

The following data failure/data gaps were encountered during this assessment:

- As specified in the agreed upon scope of work, a title search and environmental lien search were not conducted as part of this ESA. However, based upon historical data collected from other sources, this data gap is not expected to impact the results of this assessment. In addition, the user was not aware of environmental liens or activity use limitations that have been placed on the subject property.
- Per ASTM, past owners, operators, and occupants of the subject property who are likely to have material information regarding the potential for contamination at the subject property shall be contacted to the extent that they can be identified and that the information likely to be obtained is not duplicative of information already obtained from other sources. AECOM was unable to interview past owners and operators at the subject property. However, based upon historical data collected from other sources, this data gap is not expected to impact the results of this assessment.
- A limitation was encountered in determining the historical use of the subject property. The earliest source of historical information reasonably ascertainable within the time frame of this report in which usage could be determined was an aerial photograph from 1916. At the time of the photograph, the subject property appeared to be agricultural land (a developed use per ASTM E1527-13) and a portion of railway line. Therefore, the ASTM E1527-133 requirement

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to determine all obvious uses of the property from the present back to the 1940, whichever is earlier, could not be achieved.

2. Site Description

2.1 Site Location and Parcel Description

Three rural land areas located approximately 4 miles southwest of the town of Henderson, Kentucky comprise the focus of the Phase I ESA. The land areas, made up of four designated parcels, are located at 2230 Highway 60 West (Area #1); 6300 Highway 425 (Area #2); and 1173 and 2517 Wilson Station Road (Area #3) in Henderson, Henderson County, Kentucky (subject properties).

Area #1 is an irregular shaped, 6.88-acre property owned by the City of Henderson Utility Department. The Henderson County Geographic Information Systems (GIS) Department lists the property as parcel number 46-84 in plat book 007, page 63. The property class is listed as exempt city. Area #1 is located along Highway 60, a four-lane all-purpose asphalt surface road, which forms the north property boundary. The property boundary to the south is marked by an area of dense deciduous trees, and the property boundary to the east is marked by residential homes. A railroad marks the property boundary to the west. An electrical substation, Conex container, and overhead power lines are located on the parcel.

Area #2, located approximately 0.25 miles southeast from Area #1, is an irregular shaped, 21.25-acre property. Area #2 is a section of the greater 212.59-acre parcel listed as parcel number 46-19.2 in plat book 010, page 44 of the Henderson County Tax Assessor records as indicated by the Henderson County GIS Department. The property is located adjacent to 6300 Highway 425, a two-lane all-purpose asphalt surface road, which is located adjacent to the south property boundary. The north and west areas are unmarked, and the east property boundary is indicated by a railroad and areas of dense deciduous vegetation. The property is undeveloped with a farmland property class.

Area #3 is located approximately 1 mile southwest of Area #2 and approximately 0.25 miles northeast of Wilson Station Road, a one-lane, residential road. Area #3 is comprised of segments of two land parcels, parcel number 39-2-64, a 219.55-acre area; and parcel 39-2-53, a 77.90-acre parcel; both with farmland property classes. The segments that comprise Area #3 form an irregular shaped, 36.75-acre, undeveloped area. The north area boundaries are delineated by Wilson Creek, a perennial creek which flows from west to east at the property. The south property boundaries are marked by an unnamed intermittent tributary to Wilson Creek, and a fence. The east property boundaries are marked by a fence, and the west property boundary is unmarked.

The approximate location of the subject properties is shown on **Figure 1**.

2.2 Site Ownership

AECOM attained ownership information for the subject properties from Henderson County GIS records. The following table lists the parcel number, parcel size, and parcel owner for the land parcels that form Areas #1, 2, and 3.

Table 1

Parcel Ownership				
Subject Area	County Parcel Number	Parcel Size (Acres)	Subject Area Size (Acres)	Ownership
Area #1	46-84	6.88	6.88	City of Henderson
Area #2	46-19.2	212.59	21.25	Beth Ann and Jeff Francis
Area #3	39-2-64	219.55	36.75	Gary H. Thomas
	39-2-53	77.90		David Vetel Dossett

The parcel boundaries for each area are depicted on **Figure 1**.

2.3 Site Visit

Mr. Niels Heidner, Geologist I with AECOM's Franklin, Tennessee office, visited the subject property on December 14, 2020. Mr. Heidner inspected the interior areas and perimeters of the subject properties on foot. The site visit methodology consisted of walking over accessible areas of the subject properties, including the perimeter and interior of each individual parcel. The following sections summarize the results of the site visit.

Site related limiting conditions encountered during this assessment are summarized in Section 1.4.

2.3.1 Site Description

2.3.1.1 Area #1

The subject property contains approximately 6.88 acres of class exempt city land. A City of Henderson substation is located onsite, and any liability associated with the onsite utility-owned transformers and power poles would be the responsibility of the City of Henderson. The electrical substation is located near the northwest corner of the property adjacent to Highway 60 and the railroad. A gravel access road, entering the property from Highway 60, runs across the north and east side of the substation, terminating in line with the southern-perimeter fence; which encircles the substation. Much of the property is made up of a flat lying grass field; however, the property abruptly drops off at the southwest corner along Canoe Creek. According to the historical topographic maps, the elevation change is approximately 30 feet. Canoe Creek, a perennial sediment loaded stream, drains all of Area #1. The majority of the trees observed at Area #1 were concentrated along the south property boundary and along the terraced flood plain on and below the slope break. Prior to a time between 1983 and 1998 the historical use of the land was primarily utilized for agriculture starting at least by 1940.

2.3.1.2 Area #2

The subject property contains approximately 21.25 acres of undeveloped land classed as farmland. Observations made in the field, aligning with historic topographic depictions, located abandoned structures of a former railroad line which previously transected the subject property from west to east. Approximately 50 feet north of the former rail line is a barbed wire fence that runs west to east dividing the subject property. The located structures appeared to be supports to elevate the railway over the low-lying wetland, and stream which runs north to south through the subject property. The stream makes up much of the subject property's eastern property boundary south of the relic

railway structures. North of the abandoned railway structure, the subject property is primarily composed of an agricultural field with deciduous vegetation present along the active rail line. South of the previous transecting rail line the subject property is composed of deciduous vegetation and undeveloped land. South of the former rail line, the west property boundary is unmarked and is currently used as a golf driving-range. Upon review of historic topographic maps, the abandoned section of railway line was in place as early as 1914 as the Illinois Central Railroad and was abandoned between 1981 and 1993. The northern railway, still in use, was constructed between 1916 and 1952. According to historic aerial photographs, the subject property has been used: to the north; as agricultural land, and to the south; as mixed agricultural land and undeveloped, deciduous vegetated land. According to the historic topographic maps Highway 425, the south property boundary, was constructed between 1983 and 1998.

2.3.1.3 Area #3

The subject property contains approximately 36.75 acres of land classed as farmland. Area 3 is comprised of two agricultural fields separated by a fence. The runoff from the fields drain the properties into Wilson Creek. Wilson Creek, a perennial sediment loaded stream, is deeply immured within its banks with evidence of engineered shoring in place to prevent evulsion or meandering. The subject properties have historically been utilized for agriculture. During the site visit the acreage comprising the subject properties was cultivated and plowed or sewn. The most heavily forested areas were located around Wilson Creek. Few trees were observed within the agriculturally active fields which made up the majority of the acreage on area #3. Wild vegetation and mature trees were concentrated along property boundaries and along the floodplain of Wilson Creek.

During the site visit, no visual evidence of potable water wells, monitoring wells, dry wells, clarifiers, septic tanks, or leach fields was observed on the subject properties. No visual evidence of discolored soil, water, or unusual vegetative conditions or odors were detected during the site visit. Representative site photographs are provided in **Appendix A**.

2.3.2 Surrounding Properties

2.3.2.1 Area #1

Commercial, industrial, residential, and agricultural areas are located around Area #1. The adjacent properties to the north, located across Highway 60, are occupied by Safety & Environmental Technologies, Inc. and Gibbs Die Casting. The south adjacent property is marked by an area of deciduous trees and Canoe Creek, a perennial water body. The east adjacent properties are occupied by residential dwellings and Old Corydon Road, a two-lane asphalt surface road. A residential home, located across the railroad, occupies the west adjacent property.

2.3.2.2 Area #2

Area #2 is surrounded primarily by agricultural land; however, Highway 425 is located immediately south of the southern adjacent property and a railroad is located immediately adjacent to the east side of the area and on the eastern adjacent property. The general area is designated as agricultural land.

2.3.2.3 Area #3

The subject properties comprising Area #3 are surrounded entirely by agricultural land; however, an unpaved road and two, one-story storage barns are located on the adjacent property to the south. The structures were previously identified in a previous Phase I ESA completed by AECOM in May 2020. Refer to **Appendix C** for additional details concerning the storage barns.

AECOM did not observe any gasoline service stations or dry cleaners within 500 ft of the subject properties. In addition, no day care centers, schools, or hospitals are located adjacent to the subject properties. Based on AECOM's site reconnaissance of the surrounding neighborhood, no off-site sources of concern were identified.

2.3.3 Petroleum Products, Hazardous Waste, and Hazardous Materials

No hazardous waste or hazardous materials were observed at the subject properties. Approximately 20 new telephone poles, treated with creosote, were staged at Area #1, between the substations east perimeter fence and the gravel access. The creosote coating applied to the telephone poles is a category of carbonaceous chemicals formed by the distillation of various tars and pyrolysis of plant-derived material, such as wood or fossil fuel and are typically used as preservatives or antiseptics. Any liability associated with the onsite utility-owned power poles would be the responsibility of the City of Henderson.

2.3.4 Polychlorinated Biphenyls

Polychlorinated biphenyl (PCB)-containing dielectric fluids have been widely used as coolants and lubricants in transformers, capacitors, and other electric equipment due to their insulating and nonflammable properties.

AECOM observed multiple pole-mounted and pad-mounted transformers situated across Area #1. No damage or leaks were observed from the transformers. No PCB-free labeling was observed on the transformers; however, they appeared to be constructed after 1979. Any liability associated with the onsite utility-owned transformers would be the responsibility of the City of Henderson.

2.3.5 Storage Tanks (Aboveground and Underground)

Aboveground storage tanks (ASTs) and underground storage tanks (UST's) were not identified during the site visit.

2.3.6 Solid Waste

No evidence of inappropriate disposal activities by the current property owners and no soil staining was observed during the site visit.

2.3.7 Water

No facilities with water access were identified during the site visit. No potable water wells were identified at the subject property at the time of AECOM's site visit.

2.3.8 Stormwater

Stormwater at the subject properties infiltrates the bare soil and infiltrates the subsurface. If flooded, the ground surface is expected to flow off-site as sheet flow towards Wilson Creek, or a tributary of Wilson Creek. Wilson Creek, which drains Areas #1, 2, and 3 into the Ohio River to the north.

3. Environmental Setting

3.1 Topography

AECOM analyzed the United States Geological Survey (USGS) Wilson and Henderson topographic quadrangles to topographically assess the subject areas. The topography for each area is described in the following subsections.

3.1.1.1 Area #1

Surface elevation at Area #1 is 388 feet above mean sea level (MSL) as indicated by a USGS benchmark located adjacent to Highway 60. The site's surface is relatively level throughout with a slight decrease toward the southwest. The site is covered primarily with natural grass. Near the southwest side of the property the surface elevation decreases with a very steep slope toward Canoe Creek, located immediately adjacent to the property. The elevation at Canoe Creek is 370 feet above MSL. Canoe Creek is a perennial creek with surface water flow to the east below Area #1. Deciduous vegetation consisting of trees and brush is located at the Area #1 southern property boundary.

3.1.1.2 Area #2

Surface elevation at Area #2 is 385 feet above MSL as indicated by USGS historical topographic maps. The site's surface is relatively level throughout with a slight decrease near the center of the property along an un-named tributary of Wilson Creek. North of the tributary, the site was cultivated and plowed or sewn. South of the tributary, the site is covered with deciduous vegetation consisting of trees and brush and undeveloped land covered with natural grass. The elevation of the Wilson Creek tributary is approximately 370 feet above MSL.

3.1.1.3 Area #3

Surface elevation at Area #3 is 380 feet above MSL as indicated by USGS historical topographic maps. The site's surface is relatively level throughout with a slight decrease towards the north along Wilson Creek. The site was cultivated and plowed or sewn. Near the north side of the property, the surface elevation decreases with a very steep, near vertical, slope toward Wilson Creek, located immediately adjacent to the property. The elevation at Wilson Creek is 370 feet above MSL. Wilson Creek, a perennial sediment loaded stream, is deeply immured within its banks with evidence of engineered shoring in place to prevent evulsion or meandering.

3.2 Site Soil and Geology

According to the Department of the Interior, United States Geological Survey, Geologic Map of the Wilson Quadrangle, Henderson County, Kentucky (1973), the subject properties are underlain by alluvial sediment which is intermixed Quaternary Alluvium and Quaternary Loess. The alluvium has a local thickness up to 190 feet. The aeolian loess has a regional occurrence between 0-50 feet in thickness. These two formations are characterized by clay, silt, sand, and gravel.

3.3 Groundwater and Hydrogeology

Site-specific hydrologic information was not identified during this assessment. Based on the surface topography of Area #1, the groundwater flow direction drains from the northwest into Canoe Creek. Based on the surface topography of Area #2, the groundwater flow direction is to the east towards Canoe Creek. Based on the surface topography of Area #3, the groundwater flow direction drains to the north-northeast towards Wilson Creek. Canoe Creek, which joins Wilson Creek, drains the subject properties into the Ohio River. The actual depth and flow direction of groundwater beneath the subject properties cannot be determined without site-specific groundwater monitoring well data but is assumed to regionally trend north towards the Ohio River.

4. Site and Area History

Historical information for the subject property and surrounding properties is based on AECOM's review and analysis of the following historical sources provided by Environmental Data Resources, Inc. (EDR):

- Aerial photographs dated 1940 (partial), 1950, 1958, 1970, 1973, 1983, 1998, 2008, 2012, and 2016.
- Historic topographic maps dated 1914, 1916, 1952, 1959, 1971, 1980, 1981, 1993, and 2013.
- City directories for the years 1963, 1966, 1992, 1995, 2000, 2005, 2010, 2014, and 2017.

In addition, according to EDR, Sanborn® Fire Insurance Map coverage is not available for the subject property. Refer to **Appendix D** for the historical sources, which include the historical aerial photographs, topographic maps, city directories, and property record cards. EDR reports were initially obtained in May 2020 for the Phase 1 ESA conducted on 'the original parcels' associated with the Henderson County Solar site (see Appendices B and C for 'Previously Prepared Reports'). Because of the proximity of Areas #1-3 to the original parcels, and the buffer integrated into the EDR reports, Areas #1-3 are included in the EDR search radius and thus there are no separate EDR reports for Areas #1-3.

4.1 Subject Property

Based on a review of aerial photographs and historical topographic maps the subject properties have been used as predominantly agricultural land since at least 1940. According to the 1914 historical topographic map, Wilson Station Road, the Illinois Central Railroad (ICRR), Madisonville Road which would later become US Highway 41A, and Old Corydon Road were established. Between the historical topographic map for 1916 and the 1950 aerial photograph additional construction occurred on the ICRR. Between 1981 and 1993, Kentucky Route 425 was constructed and forms the south property border for Area #2. According to historic topographic maps and aerial photographs, Area #1 was an undeveloped plot with dispersed deciduous vegetation. According to the aerial photographs, construction of the substation at Area #1 occurred between 1983 and 1998. The substation is not present on the 1993 historic topographic map.

City directories for the years 1963, 1966, 1992, 1995, 2000, 2005, 2010, 2014, and 2017 were provided by EDR. The land areas are located at 2230 Highway 60 West; 6300 Highway 425; and 1173 and 2517 Wilson Station Road in Henderson, Henderson County, Kentucky.

4.2 Adjacent Properties

Based on a review of aerial photographs and historical topographic maps, the adjacent properties have been used as agricultural land since at least 1940. The first major land-use changes occurred between the 1916 historical topographic map and the 1950 aerial photograph. Over this 34-year time span a branch of the ICRR that makes up the current eastern border of Area #2 was added to its main line. With the addition of the railroad line, small residential buildings were constructed to the north and east of Area #1. Further construction of small, single family and multi-family residential structures were built around the adjacent properties between 1952 and 1981. The concentration of this construction occurred to the east of Area #1.

No historical off-site sources of concern in the surrounding properties were identified in the city directories reviewed for this report.

4.3 Interviews

During the site visit, no interviews with current or previous landowners were conducted. In accordance with the scope of work and ASTM 1527-13, the property owners were contacted to provide information regarding their property, and the surrounding properties. Based on the responses of the property owners, this assessment revealed no RECs, CRECs, or HRECs in connection with the properties.

Refer to **Appendix B** for the landowner completed questionnaire.

4.4 Previously Prepared Environmental Reports

A previously prepared environmental report was provided for AECOM's review during this assessment. The provided environmental data from the subject property included the 2020 Phase I Environmental Site Assessment Report.

- Community Energy Solar, LLC (CES), on behalf of Henderson County Solar LLC, contacted AECOM to perform a Phase I Environmental Site Assessment (ESA) at the subject properties located in Henderson County, Kentucky. The subject properties are located at 620 Lovers Lane, Henderson, Kentucky; and, 3001 Wilson Station Road, Henderson, Kentucky. The Phase I ESA was performed in general conformance with the scope and limitations of American Society for Testing and Materials (ASTM) Standard Practice Designation E 1527-13 for ESAs. Exceptions to, or deletions from, this practice are described in this report.
- The larger of the two subject properties, at approximately 625 acres, is situated approximately 3,000 feet northeast of the intersect of US Highway 41A and Wilson Station Road. The smaller of the two subject properties, at approximately 94 acres, is situated approximately 800 feet south-southwest of the intersection of Collier Road and Lovers Lane. Both subject properties are situated within a predominantly agricultural district with scattered heavy industrial and light industrial zonings.
- The subject properties are bordered to the north, east, south, and west by a mixture of light industrial, heavy industrial, agricultural, highway commercial, single family residential, two family residential, and general business district zoning. The historical land use for both subject properties has been, and currently remains, for agricultural purposes.
- No recognized environmental controls (RECs), controlled RECs (CRECs), or historical RECs (HRECs) were identified during this assessment.

A review of this report indicated that the site history and regulatory research contained within this report is consistent with AECOM's own independent research and analysis. Refer to **Appendix C** for the previously prepared environmental report.

5. Database and Records Review

5.1 User Provided Information

Section 6 of ASTM E1527-13 states that certain tasks, which will help to determine the possibility of RECs associated with the subject property, are generally conducted by the Phase I ESA report user. This includes the following: reviewing title records for environmental liens or activity and land use limitations and considering awareness of any specialized knowledge (e.g., information about previous ownership or environmental litigation), experience related to RECs at the subject property, or significant reduction in the purchase price of the subject property. Per the agreed scope-of-work, information related to these items should be provided by the Phase I ESA report user to AECOM.

5.2 Title Records/Environmental Liens

Per the agreed upon scope of work, a chain-of-title and an environmental lien search were not performed as part of this assessment.

5.3 Database Information

In accordance with the scope of work and ASTM E1527-13, a search of various governmental databases was conducted by EDR. The site-specific environmental database report was reviewed to evaluate if soil and or groundwater from on-site and/or off-site sources of concern has the potential to impact the subject property. The database abbreviations are provided in the site-specific environmental database report.

The database report includes various reports detailing database information for each of the sites identified or geocoded within the specified radius. Additional sites were identified within the database report; however, EDR was not able to map them to specific locations due to insufficient or contradicting address information. These sites were included in the database report as "orphan" sites, or sites without clear locations or addresses within the EDR radius. Based upon AECOM's review, there does not appear to be any significant concerns associated with any of the orphan sites. A summary of AECOM's review and analysis of the site-specific environmental database report is presented below. A copy of the database report is provided in **Appendix D**.

5.3.1 Subject Property

The subject property is not identified in the EDR Area / Corridor Report databases. The EDR Area / Corridor Report database includes information such as UIC wells databases and The State Spills (SPILLS) database. To not be identified in the EDR Area / Corridor Report database implies no reports have been submitted at the state or federal level associated with the subject properties.

5.3.2 Surrounding Sites

Additional sites, including State and tribal sites, were identified within the respective ASTM E1527-13 or EDR search distances from the subject property. Based on AECOM's review of the database listings, none of the sites are expected to present a REC to the subject property based on their distance and topographic gradient from the subject site.

5.4 Vapor Encroachment Screening

No on-site sources of vapor encroachment (e.g., UST, contaminated soil, groundwater plume, etc.) were identified during this assessment. A review of the EDR database indicated that no impacted sites are located within 0.25 mile of the subject property. Based on the EDR information, and observations made during the site visit a vapor encroachment condition due to an off-site source does not appear to exist for the subject property.

5.5 Agency File Review

5.5.1 Local

AECOM submitted Freedom of Information Act (FOIA) requests to the City of Henderson Fire Department to determine if they have files related to historical hazardous materials releases that may have occurred at the subject property. No records were on file for the subject property.

5.5.2 County

AECOM reviewed the Henderson City-County GIS database for records pertaining to the subject property's physical and parcel addresses. Data obtained from the records is used to designate parcels that make-up the subject areas in this report.

5.5.3 State

In addition, AECOM submitted a FOIA request to the KGS Oil and Gas Records for information pertaining to the exploration wells previously drilled Area #2. The wells, including an injection well, were drilled on the main property of a previously prepared environmental report:

- The Underground Injection Control (UIC) database is a listing of wells identified as underground injection wells in the Kentucky Oil & Gas industry. The database indicated an underground injection well was located on the subject property. The database stated the well was installed on August 2, 1982 and the well was plugged and abandoned on June 19, 1990. The well was located on a property previously owned by A. G. Pritchett. A permit was issued for the well under the Kentucky Division of Oil and Gas under permit number 50735.

AECOM has not received information pertaining to the subject properties or adjacent properties. Based on AECOM's research, and observations made while on-site, it is not likely that any information received from the state would significantly impact the conclusions made herein.

6. Findings and Opinions

AECOM performed a Phase I ESA of the subject property in conformance with the scope and limitations of ASTM E1527-13, which meets the requirements of Title 40, Code of Federal Regulations Part 312 and is intended to constitute *all appropriate inquiry* for purposes of the landowner liability protections. Any exceptions to, or deletions from, this practice are described in Section 1.3 through 1.5 of this report.

The following sections summarize the findings and opinions of this Phase I ESA of the subject property.

6.1 Recognized Environmental Conditions

Based on the above-described activities, no RECs were identified in connection with the subject property.

6.2 Controlled Recognized Environmental Conditions

Based on the above-described activities, no CRECs were identified in connection with the subject property.

6.3 Historical Recognized Environmental Conditions

Based on the above-described activities, no HRECs were identified in connection with the subject property.

6.4 Vapor Encroachment Conditions

Based on the above-described activities, no VECs were identified in connection with the subject property.

6.5 De Minimis Conditions

Based on the above-described activities, no DMC's were identified in connection with the subject property.

7. Conclusions

AECOM performed a Phase I ESA in conformance with the scope and limitations of ASTM Standard Practice Designation E 1527-13 of the subject properties located in Henderson County, Kentucky. Any exception to, or deletions from, this practice are described in Sections 1.3 through 1.5 of this report. This assessment has revealed no RECs, CRECs, or HRECs in connection with the property.

8. Environmental Professional Statement

Mr. Dennis Mihalek, Jr. was the Environmental Professional (EP) for this project. Mr. Mihalek's EP statement is below, and his resume is provided in **Appendix E**:

I declare that, to the best of my professional knowledge and belief, I meet the definition of an EP as defined in §312.10 of 40 Code of Federal Regulations (CFR) and that I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. I have developed and performed all the appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

Signature:



Date: January 20, 2021

9. References

9.1 Agencies Contacted

Record and parcel information, reviewed for Henderson County, Kentucky at <http://hendkygis.maps.arcgis.com/>

City of Henderson Fire Department, 332 Washington Street, (270) 831-1270. Contacted by Mr. Heidner with AECOM on January 11, 2021 for information on potential hazardous materials releases that may have occurred at the subject property.

University of Kentucky, Kentucky Geological Survey, Oil and Gas Records, 1401 Corporate Circuit, Henderson, Kentucky 42420, (270) 827-3414. Contacted by Mr. Heidner with AECOM on January 12, 2021 for information on wildcat wells previously drilled near the subject property. Also, at <https://kgs.uky.edu/kygeode/services/oilgas/>

9.2 Documents Reviewed

ASTM E1527-13, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, dated November 2013. www.astm.org

ASTM E2600-15, Standard Guide for Vapor Encroachment Screening on Property Involved in Real Estate Transactions, dated October 2015. www.astm.org

EDR 7.5 Minute Topographic Maps, prepared for Henderson County, Kentucky, dated May 14, 2020. Inquiry number 6063350.5. Topographic Maps 1914, 1916, 1952, 1959, 1971, 1980, 1981, 1993, and 2013. Report prepared by Environmental Data Resources Inc., 6 Armstrong Road, Shelton, Connecticut 06484, (800) 352-0050, www.edrnet.com.

EDR Aerial Photos Decade Package prepared for Henderson County, Kentucky, dated May 15, 2020. Inquiry number 6063350.8. Aerial photographs dated 1940, 1950, 1958, 1970, 1973, 1983, 1998, 2008, 2012, and 2016. Report prepared by Environmental Data Resources Inc., 6 Armstrong Road, Shelton, Connecticut 06484, (800) 352-0050, www.edrnet.com.

EDR City Directories Image Report prepared for Henderson County, Kentucky, dated May 18, 2020. Inquiry number 6063350.9. City directories reviewed included 1963, 1966, 1992, 1995, 2000, 2005, 2010, 2014, and 2017. Report prepared by Environmental Data Resources Inc., 6 Armstrong Road, Shelton, Connecticut 06484, (800) 352-0050, www.edrnet.com.

EDR Area/ Corridor Map, prepared for Henderson County, Kentucky, dated May 14, 2020. Inquiry number 6063350.10s. Report prepared by Environmental Data Resources Inc., 6 Armstrong Road, Shelton, Connecticut 06484, (800) 352-0050, www.edrnet.com.

EDR Sanborn Map Report, prepared for Henderson County, Kentucky, dated May 15, 2020. Inquiry number 6063350.6. Report prepared by Environmental Data Resources Inc., 6 Armstrong Road, Shelton, Connecticut 06484, (800) 352-0050, www.edrnet.com.

Google Earth website, www.google.earth.com. This information was reviewed online by Mr. Heidner with AECOM on January 15, 2021.

AECOM

U.S. Environmental Protection Agency, Technical Guide for Addressing Petroleum Vapor Intrusion at Leaking Underground Storage Tank Sites dated June 2015,
<https://www.epa.gov/sites/production/files/2015-06/documents/pvi-guide-final-6-10-15.pdf>

Web Soil Survey. U.S. Department of Agriculture, Natural Resources Conservation Service website
- <http://websoilsurvey.nrcs.usda.gov/app/>

Figure

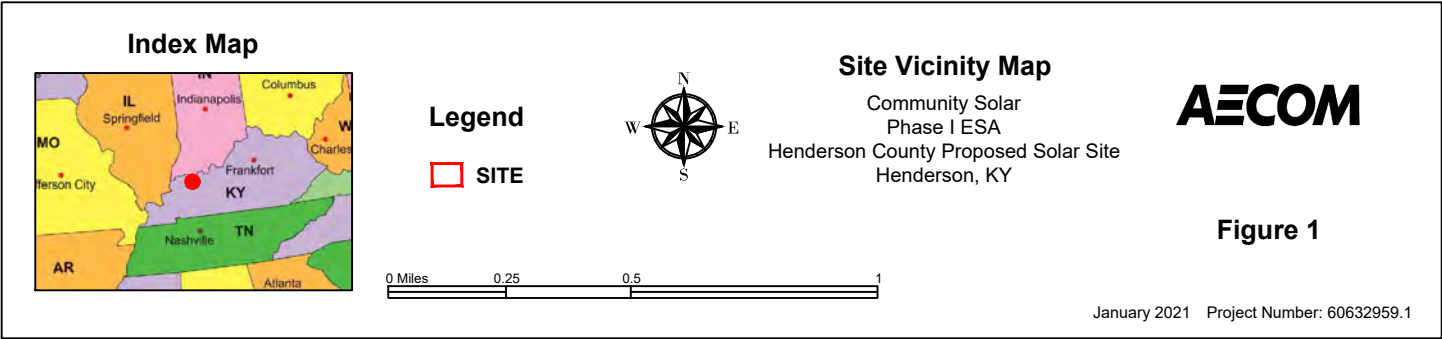
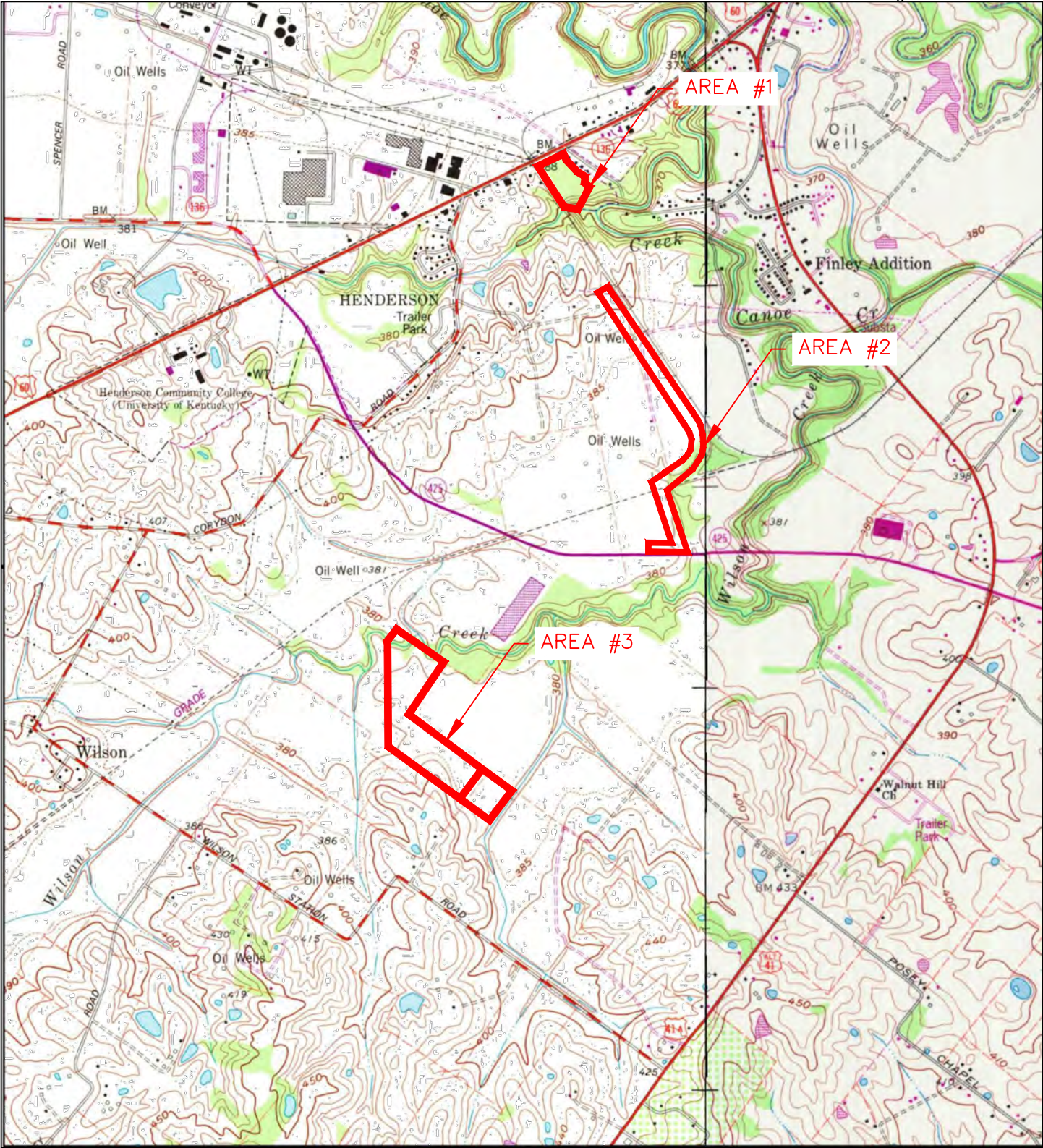


Figure 1

EXHIBIT 14
ATTACHMENT 14.3

VIA ELECTRONIC MAIL

April 19, 2021

Community Energy Solar, LLC
Henderson County Solar LLCSubject: Cultural Resources Desktop Review and Field Assessments
Henderson County Solar Site in Henderson County, Kentucky

To Whom it May Concern:

AECOM Technical Services, Inc. (AECOM) conducted a cultural resources desktop review and two field assessments for the proposed Henderson County Solar Project Site in Henderson County, Kentucky (the "Project Site") in May and December 2020. As detailed herein, these reviews and assessments were undertaken to identify potential cultural resources issues associated with the future development of two Project Site locations, and to provide an outline for additional work that may be required under applicable federal or state law. This effort represents an environmental due diligence review and is not intended to coordinate compliance with Section 106 of the National Historic Preservation Act of 1996; the discussion of specific cultural resources detailed within this volume and the associated mapping is considered privileged and confidential information, and not intended for public disclosure. In the event that a federal or state nexus is identified for the Henderson County Solar Project at a future time, elements of this desktop review and assessment can be used as the basis for correspondence designed to initiate Section 106 consultation with appropriate federal or state agencies.

Project Site Location and Setting

The Project Site consists of several potential properties in Henderson, Kentucky, situated across primarily rural agrarian fields and scattered woodlots. The larger Project Site area is located approximately 914 meters (3000 feet) northeast of the intersection formed by US Highway 41A and Wilson Station Road. This area is bordered by agricultural land to the east, west and south, with residential and commercial property to the north, particularly along State Highway 60. Rural route 425 is located on the north side of the Project with State Highway 41 to the south. The smaller Project Site area is located to the north, approximately 243 meters (800 feet) south of the intersection of Collier Road and Lovers Lane. This section is situated on a terrace of Canoe Creek and is largely surrounded by wooded lots and treelines, with cultivated fields beyond the trees to the west and south, and a modern residential development on the opposite side of the creek to the east. Wilson Creek flows west to east through this area, and confluences with Canoe Creek on the east side of the Project. A small tributary to Wilson Creek flows from south to north to Wilson Creek on the east side of the Project.

The Project Site is shaded in red on the mapping provided as **Attachment A** to this desktop report. The potential Project limits utilized during the two field reconnaissance visits in 2020 are color-coded for ease of reference on the mapping, with the May 2020 areas indicated in teal outline, and the additional areas examined in December 2020 outlined in blue.

The topography across this portion of Henderson County is primarily flat, ranging between 134 meters (440 feet) above mean sea level (AMSL) on the rolling hills which form the southern extent of the Project, to approximately 110 meters (360 feet) AMSL in the narrow drainage valley along the Wilson Creek bottom. Most of the northern extent of the Project occurs at approximately 117 meters (385 feet) AMSL, situated across a broad natural terrace of Canoe Creek.

Current land-use within the Project Site is primarily seasonal agriculture, with smaller areas of wood lots and pasture present. The Project Site is situated in Kentucky Ecoregion 72, the Interior River Lowland, characterized by wide, level to nearly level lowlands and terraced valleys, covered in the modern era by large tracts agricultural fields and pasture. The underlying geological composition of this area is primarily carboniferous sedimentary rock, overlain with alluvium, loess, and lacustrine deposits.

Soils present across the Project Site are primarily classified within the Uniontown-Dekoven-Henshaw association, which are typically found on landforms associated with creeks (particularly level or nearly level terraces and bottom lands or floodplains). Terraces can extend for up to 3.6 kilometers (2.0 miles) in width adjacent to creek bottoms. The 1967 *Soil Survey of Henderson County, Kentucky* indicates that most of this soil association in Henderson County had been cleared at that time of trees and was turned over to seasonal cultivation for a wide variety of different crops (including corn and soybeans, but also tobacco and small grains). These soils are generally prone to flooding, particularly along bottom lands;

the terraces are noted as occurring above the annual flood level (which would be the case for most of the Project Site). The following table provides the list of the soils present within the proposed Project Site, ordered by the overall percentage of the Project Site area.

Table 1. Soils Listed Within the Proposed Project Site

Soil ID	Soil Name/ Description	Extent within the Project Site	Percentage of the Project Site
He	Henshaw silt loam	48.2 hectares	17.1%
De	Dekoven silt loam	41.4 hectares	14.7%
uWPoA	Wakeland-Patton overwash, silt loams, 0 to 2 percent slopes, occasionally flooded	39.0 hectares	13.8%
Dk	Dekoven silty clay loam	26.2 hectares	9.3%
uUnB	Uniontown silt loam, 2 to 6 percent slopes	21.9 hectares	7.8%
uWiA	Wilbur silt loam	19.8 hectares	7.0%
uHosB2	Hosmer silt loam, 2 to 6 percent slopes, eroded	16.0 hectares	5.7%
uUnA	Uniontown silt loam, 0 to 2 percent slopes	12.9 hectares	4.6%
uWakA	Wakeland silt loam	9.5 hectares	3.4%
uAlfB	Alford silt loam, 2 to 6 percent slopes	6.4 hectares	2.3%
uBelA	Belknap silt loam, 0 to 2 percent slopes, occasionally eroded	5.8 hectares	2.1%
Pa	Patton silt loam	5.8 hectares	2.1%
uUnC2	Uniontown silt loam, 6 to 12 percent slopes, eroded	5.6 hectares	2.0%
uAlfB2	Alford silt loam, 2 to 6 percent slopes, eroded	5.1 hectares	1.8%
uHosB	Hosmer silt loam, 2 to 6 percent slopes	4.6 hectares	1.6%
uUtE	Uniontown silt loams, 12 to 35 percent slopes	4.0 hectares	1.4%
uHosC3	Hosmer silt loam, 6 to 12 percent slopes, severely eroded	3.8 hectares	1.4%
uUoC3	Uniontown silty clay loam, 6 to 12 percent slopes, severely eroded	2.0 hectares	0.7%
uUnB2	Uniontown silt loam, 2 to 6 percent slopes, eroded	1.7 hectares	0.6%
uShaA	Sharon silt loam, 0 to 2 percent slopes, occasionally flooded	1.1 hectares	0.4%
W	Wet	0.8 hectares	0.3%
uAlfC2	Alford silt loam, 6 to 12 percent slopes, eroded	0.7 hectares	0.2%

Desktop Archival Research

AECOM conducted the Section 106 archival research and records check for the Project Site in May 2020, by obtaining the information from the Office of State Archaeology (OSA) in Lexington and Kentucky Heritage Council (KHC) in Frankfort. The parameters of this record check involved examination of the OSA and KHC-inventoried cultural resources and surveys within a 2.0-kilometer (1.2-mile) buffer from the proposed Project Site location, as required by Kentucky. This record check therefore included the National Register of Historic Places (NRHP), archaeological sites, above ground resources, cemeteries, and cultural resources management (CRM)-related surveys and reports on-file with the OSA and KHC. The following table quantifies the data collected from the archival research within 2.0 kilometers (1.2 miles) of the Project. The associated mapping is provided as **Attachment A** to this document.

Table 2. Inventoried Cultural Resources and Reporting Within 2.0 Kilometers (1.2 Miles) of the Project Site

Archival Data	Within 2.0 Kilometers (1.2 Miles)	Within 1.0 Kilometer (0.6 Miles)	Within 150 Meters (500 Feet)	Within
NRHP-Listed Properties	1	0	0	0
OSA-Listed Archaeological Sites	29	14	2	0
KHC-Listed Aboveground Resources	41	21	6	2
Cemetery	2	0	0	0
Previous CRM-Related Reports	20	14	4	2

As indicated in the table above, a total of 73 inventoried resources are noted in the KY OSA and KHC archival data as occurring within 2.0 kilometers (1.2 miles) of the Project Site. That total, however, includes several resources which have been cross-listed in two of the inventories consulted for the Project Site (such as the Fairmount Cemetery, which represents both a KHC aboveground resource and an OSA archaeological site). In summary, these data indicate that within the 2.0-kilometer (1.2-mile) desktop study area:

- One property, the Barrett-Keach Farm, has been listed in the NRHP;
- A total of 41 aboveground resources have been inventoried with the KHC, two of which partially occur within the Project;
- A total of 29 archaeological sites have been inventoried with the OSA, the most proximal of which is located 89.9 meters (294.6 feet) from the Project;
- Two historic cemeteries have been inventoried with the KHC; and,
- The OSA has 20 reports on-file which detail prior cultural resources survey investigations, including two which extend within the proposed Project Site limits.

The two previously inventoried resources which occur within the Project Site, both historic-age farmsteads listed in the KHC (HE 013 and HE 014), have been documented as large properties which extend within the proposed limits of the southern elements of the Project Site. Neither of these resources has been assessed for NRHP eligibility. The following section outlines the results of the archival research by resource type, followed by a discussion and review of available historic-era mapping and aerial photography of the Project Site.

National Register of Historic Places Properties

There is one NRHP property listed within the 1.2-mile (2-kilometer) study area considered for this desktop review. This property, the Barrett-Keach Farm (KHC# HE31), is located approximately 816 meters (2679.9 feet) northwest of the Project and is also inventoried in the KHC inventory as resource #HE31. Also known as “The Elms”, this property is historically significant for its contributions to agricultural development in Henderson County between 1852 and 1958. The farm has multiple contributing structures including the Barrett-Keach house, constructed in 1852, which exhibits both Federal and Italianate styles, and its two service structures, the Smokehouse and the Kitchen, in addition to nine other contributing structures spread across 165 acres of farmland. The resource also includes the Keach Tenant House (inventoried with the KHC as resource #HE 67) built in 1900. Given the intervening distance and topography between the Project Site and this NRHP property, it is unlikely that any new aboveground infrastructure would be directly visible from the Barrett-Keach Farm.

KY OSA-Listed Archaeological Resources

There are 29 previously inventoried archaeological resource sites present within 1.2-miles (2 kilometers) of the Project. Of these 29 sites, 16 are exclusively prehistoric in character, seven are historic, and five contained both prehistoric and historic components. One of these sites, an historic cemetery inventoried as site He864, is considered eligible for the NRHP, and is situated 1210 meters (3968 feet) northeast of the Project Site. The most proximal site to the Project, He992, is located approximately 89.9 meters (294.6 feet) to the southwest; as this resource was recorded with the OSA in July 2019, the site is noted as “preliminary” in the archive and no further data regarding the nature or context of this resource, apart from the spatial location, was available at the time of this desktop review. The following table lists all 29 archaeological sites recorded within 2.0 kilometers (1.2 miles) of the Project Site.

Table 3. Archaeological Inventory Resources Within 2.0 kilometers (1.2 miles) of the Project

Site ID	Temporal Period/ Cultural Affiliation	Site Type	NRHP Status	Distance from the Project
He992	Not noted	Not noted	Not noted	294.6 feet (89.9 meters)
He453	Prehistoric: Indeterminate; Historic	Open habitation without mounds	Not assessed	363.5 feet (110.8 meters)
He452	Prehistoric: Indeterminate; Historic	Open habitation without mounds	Not assessed	681.9 feet (207.8 meters)
He452	Prehistoric: Indeterminate; Historic	Open habitation without mounds	Not assessed	996.6 feet (303.8 meters)
He186	Prehistoric: Early Archaic, Middle Woodland	Undetermined	Inventory site	2387.9 feet (727.8 meters)
He185	Prehistoric: Indeterminate	Undetermined	Not assessed	2392.0 feet (729.1 meters)
He184	Prehistoric: Indeterminate	Undetermined	Not assessed	2845.5 feet (867.3 meters)
He187	Prehistoric: Indeterminate	Undetermined	Inventory site	2866.0 feet (873.5 meters)
He168	Prehistoric: Late Woodland	Undetermined	Not assessed	3063.8 feet (933.8 meters)
He948	Historic: Euro-American	Historic farm/ residence	Inventory site	3169.9 feet (966.2 meters)
He170	Prehistoric: Early Archaic	Undetermined	Inventory site	3195.4 feet (974.0 meters)
He8	Prehistoric	Earth Mound	Not assessed	3202.3 feet (976.1 meters)
He449	Historic: Euro-American	Open habitation without mounds	Not assessed	3232.8 feet (985.3 meters)
He830	Historic: Euro-American	Historic farm/ residence	Inventory site	3241.5 feet (988.0 meters)
He949	Prehistoric: Indeterminate	Open habitation without mounds	Inventory site	3362.5 feet (1024.9 meters)
He449	Historic: Euro-American	Open habitation without mounds	Not assessed	3647.3 feet (1111.7 meters)
He947	Historic: Euro-American	Historic farm/ residence	Inventory site	3841.9 feet (1171.0 meters)
He864	Historic: Euro-American	Cemetery	Eligible for NRHP	3968.3 feet (1209.6 meters)
He475	Prehistoric: Archaic	Open habitation without mounds	Not assessed	4184.1 feet (1275.3 meters)
He478	Prehistoric: Mississippian	Open habitation without mounds	Not assessed	4293.3 feet (1308.3 meters)
He169	Prehistoric: Indeterminate	Undetermined	Inventory site	4734.8 feet (1443.2 meters)
He198	Historic: Euro-American	Historic farm/ residence	Inventory site	5213.1 feet (1588.9 meters)
He199	Prehistoric: Indeterminate; Historic: Euro-American	Other/ Not noted	Inventory site	5388.1 feet (1642.3 meters)
He197	Prehistoric: Early Woodland; Historic: Euro-American	Other/ Not noted	Inventory site	5480.7 feet (1670.5 meters)
He194	Prehistoric: Indeterminate	Open habitation without mounds	Inventory site	5547.5 feet (1690.9 meters)
He195	Prehistoric: Late Woodland	Open habitation without mounds	Inventory site	5746.9 feet (1751.6 meters)

Site ID	Temporal Period/ Cultural Affiliation	Site Type	NRHP Status	Distance from the Project
He196	Prehistoric: Indeterminate	Open habitation without mounds	Inventory site	5797.0 feet (1766.9 meters)
He193	Prehistoric: Indeterminate	Open habitation without mounds	Inventory site	6108.7 feet (1861.9 meters)
He238	Prehistoric: Indeterminate	Isolated find	Inventory site	6265.6 feet (1909.8 meters)

KHC-Listed Aboveground Historic Resources

A total of 41 historic aboveground resources have been inventoried by the KHC within 2.0 kilometers (1.2 miles) of the Project Site, spread adjacent to the road network surrounding the proposed Project Site locations. Of this total inventory, two resources, HE 014 and HE 013, represent farmsteads whose properties extend into the Project Site limits; the associated structures on both properties, however, are situated outside Project Site. **Table 4** provides additional detail on these resources.

Table 4. KHC-Listed Historic Properties and Resources Within 2.0 Kilometers (1.2 Miles) of the Project

KHC ID	Name	Architectural Style	Historic Use	Date of Significance	NRHP Eligibility	Distance from the Project
HE 014	Marshall-Mccollum Farm (see HE 33)	N/A	N/A	N/A	Undetermined	Within
HE 013	Carroll-Dossett Farm (see HE 32)	N/A	Single Dwelling	1875-1899	Undetermined	Within
HE 75	House	N/A	Single Dwelling	1875-1899	Undetermined	145.9 feet (136.2 meters)
HE 33	Marshall Foreman House	Craftsman	Single Dwelling	1900-1924	Undetermined	307.90 feet (93.9 meters)
HE 77	House	Craftsman	Single Dwelling	1925-1949	Undetermined	433.36 feet (132.1 meters)
HE 13	Moseley House	Federal	Single Dwelling	1825-1849	Demolished	446.8 feet (136.2 meters)
HE 80	House	N/A	Single Dwelling	1950-1974	Undetermined	744.2 feet (226.9 meters)
HE 79	House	Queen Anne	Single Dwelling	1875-1899	Undetermined	1150.8 feet (350.8 meters)
HE 32	Frank Carroll House	N/A	Single Dwelling	1875-1899	Undetermined	1167.9 feet (356.0 meters)
HE 013	Carroll-Dossett Farm (see HE 32)	N/A	Single Dwelling	1875-1899	Undetermined	1172.2 feet (357.3 meters)
HE 78	House	Craftsman	Single Dwelling	1925-1949	Undetermined	1678.7 feet (511.7 meters)
HE 74	Church	N/A	Church/religious struct	1925-1949	Undetermined	1724.9 feet (525.8 meters)
HE 81	House	N/A	Single Dwelling	1925-1949	Undetermined	1779.2 feet (542.3 meters)
HE 73	House	Gothic Revival	Single Dwelling	1850-1874	Undetermined	2222.1 feet (677.3 meters)
HEH 225	The Point	N/A	Agricultural fields		Undetermined	2361.4 feet (719.8 meters)

KHC ID	Name	Architectural Style	Historic Use	Date of Significance	NRHP Eligibility	Distance from the Project
HE 012	Barrett-Keach Farm (The Elms; see HE 31, HE 62)	Federal	Single Dwelling	1850-1874	NRHP-Listed Property	2578.4 feet (785.9 meters)
HE 76	House	N/A	Single Dwelling	1850-1874	Undetermined	2589.6 feet (789.3 meters)
HEH 521	House	Craftsman	Single Dwelling	1925-1949	Undetermined	2636.4 feet (803.6 meters)
HE 67	Keach Tenant House	N/A	Single Dwelling	1900-1924	NRHP-Listed Property	2868.6 feet (874.4 meters)
HEH 522	House	Tudor Revival	Single Dwelling	1925-1949	Undetermined	2941.8 feet (896.7 meters)
HE 72	House	Craftsman	Single Dwelling	1925-1949	Undetermined	2974.4 feet (906.6 meters)
HE 71	House	Craftsman	Single Dwelling	1925-1949	Undetermined	3198.7 feet (975.0 meters)
HE 31	Barrett-Keach House (The Elms), Farmstead and Outbuildings	Federal (House)	Single Dwelling	1850-1874	NRHP-Listed Property	3300.0 feet (1005.8 meters)
HEH 532	Dairy Farm	Italianate	Food storage	1950-1974	Undetermined	3497.8 feet (1066.1 meters)
HEH 520	House (Now Commercial Building/ Restaurant)	Craftsman	Single Dwelling	1925-1949	Undetermined	3563.8 feet (1086.2 meters)
HEH 227	The Elms (Towles-Barret Farm; A H Keach Estate)	Not Reported/Applicable	Agri complex/farm	1850-1874	Undetermined	3667.9 feet (1118.0 meters)
HEH 523	Mt Zion Cemetery	N/A	Cemetery, general	1900-1924	Undetermined	4316.86 feet (1315.8 meters)
HEH 519	Fairmont Cemetery	N/A	Cemetery, general	1925-1949	Undetermined	4517.14 feet (1376.8 meters)
HE 215	House (Struck by Falling Tree)	N/A	Single Dwelling	1925-1949	Undetermined	4712.2 feet (1436.2 meters)
HE 214	House	N/A	Single Dwelling	1925-1949	Undetermined	4822.8 feet (1470.0 meters)
HEH 524	House	Italianate	Single Dwelling	1875-1899	Undetermined	4875.8 feet (1486.1 meters)
HE 213	House	N/A	Single Dwelling	1925-1949	Undetermined	5016.5 meters (1529.0 meters)
HE 015	Konsler-Thomas Farm (see HE 34)	N/A	Single Dwelling	1875-1899	Undetermined	5044.6 feet (meters 1537.6)
HE 212	House	N/A	Single Dwelling	1875-1899	Undetermined	5478.0 feet (1667.7 meters)
HE 211	House	N/A	Single Dwelling	1925-1949	Undetermined	5771.7 feet (1759.2 meters)
HE 210	House	N/A	Single Dwelling	1925-1949	Undetermined	5934.4 feet (1808.8 meters)

KHC ID	Name	Architectural Style	Historic Use	Date of Significance	NRHP Eligibility	Distance from the Project
HEH 529	House	Craftsman	Single Dwelling	1925-1949	Undetermined	5952.3 feet (1814.3 meters)
HEH 530	House	Italianate	Single Dwelling	1900-1924	Undetermined	6021.5 feet (1835.4 meters)
HE 209	Motel	N/A	Hotel/ Inn	1925-1949	Undetermined	6049.8 feet (1844.0 meters)
HEH 531	House	Italianate	Single Dwelling	1875-1899	Undetermined	6128.2 feet (1867.9 meters)
HEH 533	House	Italianate	Single Dwelling	1875-1899	Undetermined	6174.2 feet (1881.9 meters)

The majority of the KHC-listed historic resources represent single dwelling residential structures, dating from the last quarter of the nineteenth century and first half of the twentieth century. Several larger farmsteads are also present within this data set, in addition to two cemeteries, a church and a motel. Apart from the NRHP-listed elements of the Barrett-Keach Farm (inventoried with the KHC as HE 12, HE 31 and HE 67), none of the other KHC resources have been assessed previously for NRHP eligibility.

Cemeteries

There are two historic cemeteries, the Mount Zion Cemetery (1900-1924) and the Fairmont Cemetery (1925-1949), inventoried with the KHC within the 2.0-kilometer (1.2-mile) study area considered for this desktop review. The Mount Zion Cemetery (KHC HEH 523) is located 1315.8 meters (4316.8 feet) from the Project, while the Fairmont Cemetery (KHC HEH 519) is located 1376.8 meters (4517.4 feet) from the Project. The Fairmont Cemetery is also inventoried by the OSA as archaeological site He864; while the KHC data lists this cemetery's NRHP status as "undetermined", the OSA file for the archaeological site classifies it as "eligible" for the NRHP. The oldest interment is John Davis, with recorded death of Jan. 13, 1827, and the cemetery is still in use to this day.

Prior CRM Survey Reporting

There are twenty reports currently on file with the OSA detailing cultural resources work conducted within 2.0 kilometers (1.2 miles) of the Project Site. Of these reports, two describe fieldwork which extend into the Project, including survey of the Henderson By-Pass (OSA report 051-005) conducted in 1976 and located adjacent to Project boundary, and 2002 survey conducted for a cellular communications tower (OSA report 051-113) located in the southwest section of the Project. The following table lists all of the prior reports filed with the OSA within 2.0 kilometers (1.2 miles) of the Project Site.

Table 5. Previous CRM-Related Surveys Within 2.0 Kilometers (1.2 Miles) of the Project

OSA ID	Authors	Date	Report Title	Surveyed Area	Distance to the Project
051-005	Foster, Gary, et al	1976	<i>An Archaeological Survey for the Proposed Construction of the Henderson By-Pass, Henderson County, Kentucky</i>	38 acres (1.52 hectares)	0 feet (0 meters)
051-113	Fishel, Devin and Robert McCullough	2002	<i>Records Review and Phase 1a Archaeological Reconnaissance for a Proposed Cellular Communications Tower in Henderson County, Kentucky</i>	0 acres (0 hectares)	0 feet (0 meters)
051-093	Carstens, Kenneth	2003	<i>A Phase I Archaeological Reconnaissance of the Kenergy Office Property, Henderson (Henderson County), Kentucky</i>	8 acres (0.32 hectares)	96.1 feet (29.3 meters)
051-005	Foster, Gary et al	1976	<i>An Archaeological Survey for the Proposed Construction of the Henderson By-Pass, Henderson County, Kentucky</i>	106 acres (4.24 hectares)	178 feet (54.3 meters)

OSA ID	Authors	Date	Report Title	Surveyed Area	Distance to the Project
051-081	Carstens Kenneth and Nancy Carstens	2000	<i>A Phase I Archaeological Reconnaissance of a 100 x 100 Square Foot Cell Tower, Henderson County, Kentucky</i>	0 acres (0 hectares)	607.2 feet (185.1 meters)
051-079	Davis, Daniel and Don Linebaugh	2000	<i>A Phase I Archaeological Survey of Two Cellular Telephone Tower Parcels (Divine Tower sites EV018-A and EV031-A), Henderson County, Kentucky</i>	0 acres (0 hectares)	613.7 feet (187 meters)
051-085	Moldenhauer, David and Steven Creasman	2001	<i>An Archaeological Survey of the Proposed Upgrade of US 60 from the Intersection of KY 425 to the Intersection of US 60</i>	67 acres (2.68 hectares)	680.4 feet (207.4 meters)
051-064	Evans, Mark	1996	<i>Phase I Archaeological Reconnaissance of the Gibbs Diecasting Pipeline Project in Henderson County, Kentucky</i>	7 acres (0.28 hectares)	797 feet (242.9 meters)
051-065	Evans, Mark	1966	<i>Phase I Archaeological Reconnaissance of the Proposed Texas Gas Gibb's Meter Station in Henderson County, Kentucky</i>	1 acre (0.04 hectares)	900.8 feet (274.6 meters)
051-119	Bundy, Paul and Steven Creasman	2006	<i>A Summary of Archaeological Investigations Conducted for the U.S. 60 Reconstruction Project in Union and Henderson Counties, Kentucky and an Assessment of the Archaeological Potential of Alternates 4-6 and 5-6</i>	552 acres (20.88 hectares)	2432.4 feet (741.4 meters)
051-073	Richmond, Michael and Derek Wingfield	1999	<i>An Archeological Reconnaissance of the Proposed Upgrade of U.S. 60 from the Waverly Bypass to the Henderson Bypass in Union and Henderson Counties, Kentucky</i>	176 acres (7.04 hectares)	2548.9 feet (776.9 meters)
051-096	King, Biran and James Kirkwood	2003	<i>Additional Archaeological Survey of the Proposed Upgrade of U.S. 60 in Union and Henderson Counties, Kentucky</i>	236 acres (9.44 hectares)	2598.4 feet (792 meters)
051-108	Bundy, Paul and Lori O'Connor	2006	<i>An Archaeological Survey Targeting Areas of High Archaeological Potential Within the Proposed Alternates 4, 5, and 6 for the U.S. 60 Reconstruction in Union and Henderson Counties, Kentucky</i>	259 acres (10.36 hectares)	2610.4 feet (795.7 meters)
051-074	Schock, Jack	1977	<i>An Archaeological Survey for the Third Year Channel Improvements Along Canoe Creek in Henderson County, Kentucky</i>	330 acres (13.2 hectares)	3161.1 feet (963.5 meters)
051-090	Carstens, Kenneth and Nancy Carstens	2002	<i>A Phase I Archaeological Reconnaissance of an Elevated Water Tank Site in Henderson County, Kentucky</i>	1 acre 0.04 hectares)	3500.5 feet (1067 meters)
051-020	Robinson, Kenneth	1982	<i>A Cultural Resource Assessment of the Tri-State Synfuels Project Areas</i>	364 acres (14.56 hectares)	4560.6 feet (1390.1 meters)
051-069	Schock, Jack	1998	<i>A Cultural Reconnaissance of Approximately 15 Acres for the Proposed Senior Cottages of Henderson in Henderson County, Kentucky</i>	10 acres (0.4 hectares)	4841.9 feet (1475.8 meters)
051-092	Koeppel Christopher and Cally Lance	2002	<i>Phase I Cultural Resources Investigation of the Proposed Canoe Creek Wastewater Interceptor and Lift Station, Henderson County, Kentucky</i>	108 acres (4.32 hectares)	4875.4 feet (1486 meters)

OSA ID	Authors	Date	Report Title	Surveyed Area	Distance to the Project
051-155	Harth, Aaron et al	2012	<i>A Cultural Resource Survey of the Proposed Canoe Creek Pump Station and Sewer Line Improvements in Henderson County, Kentucky</i>	29 acres (1.16 hectares)	5397.4 feet (1645.1 meters)
051-128	Schock, Jack	2008	<i>An Archaeological Survey of Four Acres for a Soil Borrow Pit for Henderson U.S. 60 in Henderson, Kentucky</i>	3 acres (0.12 hectares)	6221.7 feet (1896.4 meters)

Historic Mapping and Aerial Photography Review

Concurrent with review of the data obtained from the KHC and the OSA, AECOM also examined available historic-era images, including maps and topographic quadrangles, to define areas of potential historic activity (and therefore increased potential for archaeological deposits) within the proposed Project. Also, available aerial mapping was examined to better define historic activity. The following table provides the inventory of historic-era maps and aerials examined for the Project Site.

Table 6. Historic Mapping and Aerials Examined for the Project

Date	Reference	Title
1880	D.J. Lake and Company	<i>An Illustrated Historical Atlas of Henderson and Union Counties, Kentucky</i>
1950-2016	online historic aerials	<i>NETRonline historicaerials.com</i>
1914-2016	online historic topographic quadrangle	<i>NETRonline historicaerials.com</i>

The earliest available historic mapping for this area dates to 1880. The *Illustrated Historical Atlas of Henderson and Union Counties, Kentucky* indicates that most of the Project Site area at that time was owned by W. T. Barret. There are several other landowners and houses depicted on the map on the north side of Canoe Creek, J. H. Barrel, T. Graves, and Mrs. L. Towles. It is unclear if any of these structures are within the Project Site.

The earliest available U.S. Geological Survey (USGS) topographic quadrangle for the northern extent of the Project dates to 1914, and depicts roadways, railroads, and structures. The alignment of Lover’s Lane Road is evident on the map in the same general location as the current road, but no structures are shown along this road on the 1914 map. A second road extended to the west and across the Project, and two structures are present along that road which may have been situated within the current northern extent of the Project limits in 1914. A third structure is shown to the north of this road that may have been located either within or immediately adjacent to the Project. Subsequent USGS mapping up to the 1930s remains constant in the vicinity of the Project.

The 1953 USGS topographic map indicates several changes along Lover’s Lane. One structure is depicted on the east side of the road, outside of the Project boundaries. Another structure is depicted at the southern end of the area, just outside of the Project. The structure indicated on the earlier mapping to the north of the unnamed road is not present on the 1953 topographic map. No structures are depicted on the unnamed road extending to the west off of Lover’s Lane. A further increase of structures can be seen on the 1969 topographic map. Approximately four structures are depicted along Lover’s Lane adjacent to the Project Site. Also, the structure depicted at the southern end of the Project is no longer shown on the 1973 topographic map. Two additional structures are depicted along Lover’s Lane on the 1981 topographic map, although none are shown within the Project Site.

The available online historic aerials, dating from the 1950s through the modern era, also show the development along Lover’s Lane adjacent to the Project that likely occurred between the 1950s and early 1980s, along with an absence of any visual evidence for sustained occupations within the Project over the second half of the twentieth century. The available aerials from 1958 and 1950 show a structure adjacent to the Project but is no longer visible in the 1970 aerial. These images, and the contemporaneous USGS quadrangle mapping, indicate that the northern portions of the Project have almost certainly been used as an agricultural field since at least the 1950s.

The southern extent of the Project is also evident on USGS quadrangles starting in 1914; this 1914 topographic quad labels the southeast portion of the Project as “Marshall Corner”. This label generally coincides with the archival research obtained from the KHC, which has recorded a large historic property and house known as the Marshall-McCollum Farm (KHC# 14) across the southeastern portion of the Project. There are two structures and a church depicted on the 1914 map along the western side of Madisonville Road (today known as US Hwy 41A) in close proximity to the Project Site. While the exact location of the church is unclear (due to the scale of the mapping), it appears to have been located just within the Project limits. There is an unnamed road that extends from Madisonville Road and heads northwest to join with Corydon Road. There is just one other structure depicted along this unnamed road located to the north of Wilson Creek. A small road with a structure at the end extending off of the unnamed road to the north of Marshall Corner is also depicted on the 1914 topo.

The next available topographic maps of 1916, 1925, and 1932 depict the same general landscape as that evident on the 1914 mapping, with no new structures or roads depicted within or near the southern extent of the Project. The next available quadrangle, published in 1960, shows no structures within the southern portion of the Project, with the exception of the one structure located to the north of the area labeled previously as “Marshall Corner”; this structure is still shown on the 1969 topographic quad. The Marshall Corner label and (likely) associated structures and church are not present on the 1960 map. Subsequent topographic mapping published from 1981 to 2016 suggests that very little development occurred across this portion of the Project during the modern era, with a majority of the Project utilized for seasonal crop agriculture during this period.

The available aerials for the southern extent of the Project date from 1950 to 2016. As with the northern portions of the Project, the Project elements to the south have been agricultural fields and small wood lots since the 1950s, with a scattering of farmhouses adjacent to the Project along US Hwy 41. The only portion in the southern extent of the Project which has experienced development appears to have been near the Kenergy Corporate Headquarters adjacent to the Project. The aerials indicate that this headquarters was built sometime between 1983 and 1998. There is also a small pond within the Project near Wilson Creek that does not appear on aerial imagery until 1998. The aerial imagery from 1950 and 1958 indicate that there was a farmhouse at the approximate location of the Kenergy Corporate Headquarters, however this farmhouse does not appear to be on the 1970 imagery. The historic aerials suggest that this portion of the Project between 1970 and 1998 was primarily agricultural fields and wood lots.

In summary, the available historic aerials and topographic map depict the Project Site within a rural agricultural setting, largely absent extensive modern development. There is some evidence for historic-period sustained occupations within the northern and southern extent of the Project Site, although both locations appear to have been largely turned over to seasonal crop agriculture by at least the 1950s, which suggests these landforms have been systematically cultivated over the past seven decades. Historic-age structures are evident along the road network in close proximity to the southern portion of the Project, the majority of which appear to coincide with structures inventoried previously by the KHC (see **Table 4**, above). The built environment in the vicinity of the northern extent of the Project is significantly less pronounced and appears to be centered on a small area of residential development along Lover’s Lane Road.

Cultural Resources Field Assessment- May 2020

In May 2020, AECOM conducted a preliminary cultural resources field assessment of the proposed Project Site, to further define the potential for the presence of inventoried and undocumented cultural resources within and close to the Project Site. This informal field visit was also designed to identify potential red flags with regard to cultural resources, in light of the archival data obtained from the KY OSA and KHC outlined above. The results of this field assessment are provided below, by Project Site area.

Southern Extent of the Project (South of the Bypass)

The May 2020 field reconnaissance conducted on the southern portions of the Project indicated that a majority of the proposed Project limits extend across actively cultivated agricultural properties, alternating between tilled and no-till fields. Ground surface visibility levels at the time of the field visit varied considerably, with several fields displaying effectively no surface visibility while others were recently tilled and provided relatively high visibility. While the field inspection was not designed to collect any archaeological materials, several isolated prehistoric specimens (lithic debitage and tool fragments) were visually observed sporadically across the Project. An historic-era farmstead was also identified in the far eastern

corner of the Project, adjacent to US 41A, and historic debris was observed across the adjoining cultivated field (likely associated with the farmstead). Several wetland-type environments were encountered within the wooded portions of the Project. Given the identification of multiple prehistoric resources across these landforms, and the presence of Wilson Creek through the center of the Project Site, there appears to be a heightened potential for the presence of prehistoric archaeological deposits at these locations. The extent of historic-era activity across this portion of the county also suggests an increased potential for historic archaeological deposits.

With regard to the surrounding viewshed, there are at least 12 extant historic-age structures inventoried with the KHC which are directly visible from the southern extent of the Project, situated primarily within 300 meters (1,000 feet) to the south and east. The preliminary recon confirmed the presence of these resources, in addition to multiple undocumented structures, particularly along the US 41A corridor, which are visible from the Project limits and may also represent historic-age structural resources.

North Extent of the Project Site (North of the Bypass)

The field reconnaissance of Project elements located north of the Bypass confirmed that nearly all of this portion of the Project is situated across a large tilled agricultural field on a terrace directly above Canoe Creek. At the time of the field reconnaissance, vegetation obscured the surface across most of this field, providing generally low levels of visibility and preventing any systematic pedestrian reconnaissance. While no archaeological specimens were observed on the ground surface during this walkover, the poor surface visibility conditions were likely a contributing factor, particularly given the proximity of this landform to a permanent water source (as Canoe Creek generally forms the eastern boundary of the site). As with southern extent of the Project, the northern portions are most appropriately characterized as displaying a heightened potential for the presence of prehistoric resources. The potential for historic archaeological deposits is significantly lower, as the historic road network (visible on the mapping and aerials consulted for the Project Site, as discussed earlier in this document) did not extend directly adjacent to the northern extent of the Project.

The preliminary field assessment of the northern Project Site indicated that most of this area is surrounded by mature wood lots, which would significantly reduce the potential for visual impacts to historic-age aboveground structures. Further, none of the KHC-listed aboveground resources present within 2.0 kilometers (1.2 miles) of the Project Site are currently visible from these elements of the Project, and would likely not be directly visible even in the absence of the adjoining wood lots (due to intervening topography and modern infrastructure). A modern subdivision is present on the opposite side of Canoe Creek to the east of the Project, nearly all of which is not visible due to wood lots. Several residences are located along the eastern side of Lovers Lane, directly opposite the Project; review of historic aerials suggests that at least one or two of these residences were constructed in the 1950s, with the majority dating to the 1970s-1980s.

Cultural Resources Field Assessment- December 2020

In December 2020, AECOM conducted additional cultural field assessment of three additional locations at the proposed Project Site, to further define the potential for the presence of inventoried and undocumented cultural resources within and close to the Project Site. These three areas are outlined in blue on the attached map set. This informal field visit was also designed to identify potential red flags with regard to cultural resources, in light of the archival data obtained from the KY OSA and KHC outlined above. For ease of reference, these three additional areas were numbered 2-1, 2-2 and 2-3, to clearly delineate each from the areas examined previously in May 2020. Of these three additional areas, only Area 2-3, located along the southern extent of the Project, remains within the current Project location. The results of this field assessment are provided below, by Project Site area.

Area 2-1 (Adjacent to the South Side of US-60)

The December 2020 field reconnaissance conducted at Area 2-1 identified modern disturbance associated with an electrical substation at the northwest corner of the workspace, along with disturbances adjacent to US-60 (South Green Street). The remaining portion of Area 2-1 was situated within a grass field displaying no almost ground surface visibility at the time of the field visit. The location of the workspace adjacent to Canoe Creek, as well as the minimal amount of ground disturbance depicted on historic aerials, may allow for the presence of intact prehistoric resources. The numerous residences shown in historic mapping situated adjacent to the work area suggests the potential for subsurface historic artifacts, as well.

With regard to the surrounding viewshed, there has been significant residential and commercial development of the area since the mid-1950s. The majority of structures visible in historic mapping are likely no longer extant, with the exception of a pre-1950 residence near the western boundary of Area 2-1. There are also a few extant post-1950 structures along Old Corydon Road to the east of the work area and to the north of US-60.

Area 2-2 (Between Henderson Bypass and Railroad)

The proposed construction footprint of Area 2-2, located between Henderson Bypass and the CRX railroad, covers multiple agricultural fields and pastures that displayed minimal ground surface visibility at the time of field reconnaissance. A previously recorded prehistoric site is located near the northern part of Area 2-2, but no archaeological specimens were observed on the ground surface during the walkover of this workspace. However, there is still a heightened potential for prehistoric resources at this location, due to its proximity to permanent water sources. While there are no known historic structures or roadways within Area 2-2, a section of the Central Illinois railroad was present in the proposed Project footprint from at least 1914 through the modern era. The section of rail that traversed the Project area appears to have been removed between 1981 and 1993. The potential for historic archaeological deposits is low, but still possible, due to the former railroad and surrounding farmsteads.

The preliminary field assessment of Area 2-2 indicated that mature wood lots surround the northern, eastern, and southern boundaries, which would significantly reduce the potential for visual impacts to historic-age aboveground structures. However, the western side of Area 2-2 is relatively exposed to the surrounding landscape. It appears, however, that none of the KHC-listed aboveground resources present within 2.0 kilometers (1.2 miles) of the Project Site are currently visible from Area 2-2, and would likely not be directly visible even in the absence of the adjoining wood lots (due to intervening topography and modern infrastructure). Several residences are located along the eastern side of Lovers Lane, directly opposite the southeastern corner of the North Site; review of historic aerials suggests that at least one or two of these residences were constructed in the 1950s, with the majority dating to the 1970s-1980s.

Area 2-3 (Between Henderson Bypass and Wilson Station Road)

Area 2-3 is primarily located within agricultural fields between Kentucky Route 425 (Henderson Bypass) and Wilson Station Road. At the time of the field reconnaissance, there was limited ground surface visibility within these agricultural fields, due to recent crop harvesting. The northern terminus of this proposed workspace falls within a wood line adjacent to Wilson Creek, while the southern extent is tree line next to a tributary of the creek. As with the previous proposed workspaces, this area contains at least a moderate potential for prehistoric resources, due to its proximity to permanent water sources. The likelihood of historic resources within Area 2-3 is relatively low, as there have been no documented structures within the proposed footprint.

While Area 2-3 is located in an open agricultural field, it is surrounded by woodlots and tree lines, and is at least partially obscured by a hillside, which likely prevents visual impacts to any nearby historic-age structures. None of the KHC-listed aboveground resources present within 2.0 kilometers (1.2 miles) of the proposed workspace are currently visible from Area 2-3.

Potential for the Presence of Archaeological Sites and Aboveground Resources

Prehistoric Archaeological Sites and Aboveground Resources

Review of the prehistoric sites archived with the KY OSA, both within 2.0 kilometers (1.2 miles) of the Project Site and from across the general region, suggests that prehistoric occupations tend to be situated adjacent to extant waterways and documented sources of lithic materials. Based on analysis of the various factors described in this desktop review, both the northern extent of the Project Site and several landforms across the southern portions of the Project can most appropriately be characterized as displaying at least a moderate potential for the presence of prehistoric resources. The northern portion of the Project is located on a natural terrace above and adjacent to Canoe Creek, a waterway which confluences with the southern side of the Ohio River just over 2.0 kilometers (1.2 miles) north of the Project Site. While no prehistoric resources were observed as a result of the 2020 field reconnaissance or previously inventoried with the OSA, this type of landform setting is highly conducive for the presence of prehistoric archaeological deposits (and given ground surface conditions in

May 2020, the absence of prehistoric materials should not be viewed as a mitigating factor against the presence of prehistoric resources at this location). For the southern extent of the Project Site, the presence of Wilson Creek across this area suggests an increased potential for prehistoric resources, similar to that observed for all of the northern elements of the Project Site. Given the proximity of the Ohio River, and location of the Project Site areas on uplands directly above that large watershed, there is the potential for prehistoric deposits dating to any of the recognized temporal periods for this portion of western Kentucky, as sites diagnostic to every major cultural and temporal period have been identified in similar settings from across the region.

Historic Archaeological Sites and Aboveground Resources

Whereas the potential for prehistoric sites is based on distribution patterns of documented prehistoric occupations and observations as to landform and topography, the potential for historic archaeological sites can be more effectively defined through review of additional data sources, particularly historic maps, aerial photography and county histories. Historic archaeological sites generally have excellent surface visibility because they are usually either not buried as deeply as prehistoric sites, contain extant aboveground elements, or are clearly depicted on maps or visible on aerial photographs. These resources are often associated with surface features, such as wells, cisterns, and buildings, and frequently contain a much higher frequency of materials. Historic sites tend to be located on uplands, near historic transportation routes and/or water resources (such as streams, springs and wells).

As indicated in the review of available maps and aerial photographs outlined in this document, there has been a general consistency in the road network and land-use patterns from the late nineteenth/early twentieth century into the modern era, which suggests that historic deposits are most likely to be encountered adjacent to, and within 60 meters (200 feet) of modern roads. Portions of the Project Site situated within or near to the locations of structures depicted on the historic mapping and aerial photographs should also be considered to possess an increased potential for the presence of historic archaeological deposits, particularly along the margins of the Project Site to the south, and the southeastern corner of the northern extent of the Project. Further, should any aboveground facilities be proposed within the Project Site, there is a high probability for the presence of extant mid-late nineteenth and twentieth century structures (most likely residential dwellings, barns and farmstead outbuildings) within the viewshed of the Project, particularly as multiple structures are listed in the KHC in the vicinity. As noted above, most of the northern extent of the Project Site is screened by adjoining wood lots and trees and, with the exception of several possible mid-twentieth century residential structures adjacent to the Project on the opposite side of Lover's Lane, unlikely to be visible from any historic-age structures.

Summary

As indicated in the sections above, the Project Site locations display the potential for the presence of both archaeological deposits within the proposed limits of construction and extant aboveground historic-age resources in the surrounding viewshed. While no archaeological sites have been inventoried within either Project Site area, the preliminary field assessment encountered both prehistoric and historic archaeological specimens within the southern extent of the Project, and the characteristics of landforms in the northern portion of the Site appear conducive for the presence of prehistoric archaeological sites. The viewshed surrounding the Project to the south contains multiple inventoried historic structures which have not been formally assessed for the NRHP and are likely directly visible from the Project Site. The viewshed surrounding the northern portion is significantly more limited, due to the presence of mature woodlots around most of that location (although several mid-twentieth century structures are likely extant directly across Lovers Lane from the Project Site).

Should Section 106 consultation be required for the Project Site, the KY SHPO will likely request some level of field investigations to consider the potential for impacts to both archaeological and aboveground resources. Recent experience suggests that the KY SHPO would expect full application of their cultural resources survey guidelines on any areas proposed for ground disturbance, which would require a Phase I archaeological field reconnaissance at a 20-meter (67.4-foot) testing interval, and documentation and assessment of any extant historic-age structures visible within at least 0.8 kilometers (0.5 miles) of the Project Site. Further, if Section 106 consultation is required, coordination with tribal entities which have expressed an interest in this portion of Kentucky would also be anticipated. The results of this desktop review and preliminary field assessment can be utilized as elements of an initial consultation letter with the KY SHPO, in the event a Section 106 path is defined for the Project Site.

Henderson County Solar Site

April 19, 2021

AECOM appreciates the opportunity to continue supporting Community Energy and Henderson County Solar on this Project. In the event you have any questions or comments regarding this cultural resources summary, or if you desire additional information regarding the information provided in this document, please contact either myself (as listed below) or Bobbie Hurley at (864) 234-8913, or at bobbie.hurley@aecom.com.

Sincerely,

AECOM Technical Services, Inc.



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ATTACHMENT A
ARCHIVAL RESEARCH MAPPING

EXHIBIT 14
ATTACHMENT 14.4

ENDANGERED SPECIES ASSESSMENT

Of the Proposed Henderson County Solar Site

Henderson County, Kentucky

July 2020



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Table 1. Federal and State Listed Threatened and Endangered Species with the Potential to Occur at or near the Proposed Project Site in Henderson County, Kentucky

1. Introduction

AECOM was contracted to conduct an ecological survey to include an endangered species review associated with the Proposed Henderson County Solar Project Site (“site”) near Henderson in Henderson County, Kentucky (**Figure 1**). The site is located on the southwest side of Henderson, which is located near the Ohio River. The survey included land located in two sites of approximately 625 and 94 acres, for a total area of approximately 719 acres.

The purpose of the survey was to identify the potential for endangered or other protected species and/or their habitat to be present at the site and evaluate the possibility that they might be impacted by future construction activities. The site on which the survey was conducted consisted mostly of agricultural land with no buildings present.

The potential footprint of the project would cover approximately 719 acres, all of which are outside of the city limits. This includes agricultural fields, vegetated areas (woodlands) along Wilson Creek and Canoe Creek, and small farm ponds.

Searches of publicly available information were conducted, including:

- Aerial photography;
- U.S. Geological Survey (USGS) quadrangle maps;
- U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) soil survey;
- U.S. Fish and Wildlife Service (USFWS), National Wetlands Inventory (NWI) maps;
- USFWS, Information for Planning and Consultation (IPaC) online reports;
- Kentucky Department of Fish and Wildlife Resources (KDFWR), Natural Heritage Database.

There are two figures and four attachments associated with this report. Figures include:

- Figure 1 - Site Location Map
- Figure 2 - Potential Bat Roost Trees, 94 Ac Site
- Figure 3 – Potential Bat Roost Trees, 625 Ac Site

Attachments include:

- Attachment 1 – Photo log
- Attachment 2 - USFWS IPaC Report and State-listed Species for the Henderson Quadrangle
- Attachment 3 – Potential Bat Roost Tree Data Forms.

2. Literature Review

The USFWS IPaC report (USFWS 2020), accessed May 8, 2020, and the KDFWR Natural Heritage website ([KDFWR 2020](#)), accessed May 8, 2020, as well as topographic mapping, aerial survey, soils, geology, and other information were reviewed to determine the potential presence of endangered species. The potential for certain birds protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act to utilize habitat at the site also was considered. Following review of the available literature, a field survey and habitat characterization were performed in accordance with standard habitat inspection and wildlife survey methods as well as Indiana Bat Survey Guidelines (FWS 2019).

The survey included visual observation of the site and characterization of the vegetation, land use, crops, water bodies, and other features to determine if habitat for endangered species or other protected species identified by the FWS or state databases was on site. The NRCS website was utilized to determine the soil types present on the site as a potential indicator of hydric soils and wetlands.

Following review of these data, a field survey was conducted of the site on May 14 and 15, 2020. The field team was conducted by Mr. Ben Sadler and Mr. Hayden Orr.

2.1 Site Setting

The site consists of two properties located at 620 Lovers Lane and 3001 Wilson Station Road, Henderson, Kentucky. The larger of the two properties, at approximately 625 acres, is situated approximately 3,000 feet northeast of the intersection of US Highway 41A and Wilson Station Road. The smaller of the two properties, at approximately 94 acres, is situated approximately 800 feet south-southwest of the intersection of Collier Road and Lovers Lane. Both properties are within a predominantly agricultural district with scattered heavy industrial and light industrial zonings.

The site is bordered by agricultural land to the east, west, and south, with more developed residential and commercial property to the north, particularly along State Highway 60. Rural route 425 is located on the north side of the larger site, with State Highway 41 to the south. The smaller site located north and east of the larger tract is bordered by the riparian area of Canoe Creek to the east and agricultural land to the west and south. Wilson Creek flows west to east through the larger site, and its confluence with Canoe Creek is on the east side of the smaller site. A small tributary to Wilson Creek flows from south to north to Wilson Creek on the east side of the larger site.

The topography is primarily flat with some rolling hills on the south side of the larger site with elevations from 440 feet above sea level (ASL) to about 360 feet ASL in the Wilson Creek bottom. There are few undisturbed areas on the site. Most of the site was planted in corn, soybeans or left fallow, with some open grassland, farm ponds and berms. Wilson Creek runs through the middle of the larger site, with all of the site runoff flowing to Wilson Creek and eventually to Canoe Creek and the Ohio River. Neither Wilson nor Canoe Creek are classified in Kentucky as an Exceptional Water.

The site is located in Ecoregion 72 in Kentucky (Shawnee Hills), which is made up of nearly level lowlands that are dominated by agriculture and forested hills. It is characteristically underlain by

carboniferous sedimentary rock and is lithologically distinct from the limestones, calcareous shales, and dolomites of the Interior Plateau (71) and the unconsolidated coastal plain sediments of the Mississippi Valley Loess Plains (74). Broad, low gradient valleys occur and are filled with alluvium, loess, and lacustrine deposits, including the Green River. Drainage conditions and terrain strongly affect land use. Wetlands are common on lowlands and bottomlands. Bottomland deciduous forests and swamp forests were once extensive on poorly drained, nearly level, lowland sites but most have been replaced by cropland and pastureland. Hilly uplands remain mostly forested. Ecoregion 72 includes Kentucky's Western Coal Fields. Extensive surface and underground coal mines occur and have significantly degraded downstream habitat and water quality. Silt and sand dominate lowland channels, while upland streams are rockier. Streams typically have lower nutrient, alkalinity, and hardness levels than Ecoregion 71. Fish assemblages are lowland in character and are rather similar to those found in Ecoregion 74, http://ecologicalregions.info/data/ky/ky_front.pdf.

3. Methods

Data were collected to characterize areas of the site in terms of habitat, including geology, hydrology, dominant plant species, and vegetation type. Specific site features are depicted in **Figures 2** and **3** for the 94 and 625 acre sites, respectively. Photographs of habitats and surrounding areas is provided in **Attachment 1**.

Endangered species were reviewed from the US Fish and Wildlife Service IPaC database and the State of Kentucky listing of Rare Species for the Henderson Quadrangle http://environment-online.state.ky.us:8080/pls/enf_reports/, accessed May 11, 2020, **Attachment 2**. These species as well as their preferred habitat are summarized in Table 1. The need for a clearance survey of specific species is also summarized in **Table 1**. Coordination with the USFWS would be required prior to site development and additional clearance surveys may be required. In the field, habitats common to the listed species were surveyed for potential presence or absence. Specifically, endangered bat species utilize trees with exfoliated bark, cracks and crevices. Where potential bat roost trees were located, a Phase I bat survey form was completed and photos taken, **Attachment 3**.

4. Field Survey

4.1 Site Habitats

The site includes two main areas. The larger of the two sites (625 ac) is confined by Henderson Bypass to the north, US HWY 41A to the east and Wilson Station road to the south. The smaller of the two sites (94 ac) is accessible by Lovers Lane, which forms the eastern boundary, and is confined by Canoe Creek to the north and a railroad to the west and south. The larger site contains 1.82 miles of Wilson Creek, which runs directly through the center of the property from west to east. In addition to several smaller ponds, a large 5.2-acre pond is located on the south side of Wilson Creek in the larger site and drains into Wilson Creek. Wilson creek is bordered with woods for most of the 1.82 miles that it is on the site. These woods were dominated by oak timber but also exhibit hickory, hackberry, maple, sweetgum, boxelder, and sycamore trees. There are several locations where the agricultural fields come right up to the bank to the creek. Wilson creek features many vertical soil embankments between 5 and 20 feet in height. Additionally, two main drainage ditches drain the fields on the south side of the property and flow into Wilson Creek. These ditches are approximately 10 feet deep and 20 feet wide. Trees growing in the ditches have an average diameter at breast height (dbh) of approximately 8 inches, and hackberry and box elder are the dominant species. During the field investigation, both ditches had flowing water and appeared to be intermittent streams. These two ditches converge and then flow down a natural drain path 1,050 ft to join Wilson Creek.

The longitude and latitude point 37.786107, -87.627591 is the center of a 6.4 acre area of the site that was harvested for timber. There is extensive fallen timber and standing dead wood in this area with few live trees. A coyote burrow with pups was discovered in this area. Adjacent to the east of this area is a 13-acre area centered on the longitude and latitude point 37.785628, -87.624103. This area appears to be maintained to attract whitetail deer. Multiple deer feed stations were spotted; the area had been bush-hogged and allowed to grow back. As of the May site visit the area exhibited dense groves of cottonwood, sweetgum, and sycamore saplings. These are the only two areas of the site that provided wildlife habitat. The remainder of the site was open cropland that was planted in either corn or soybeans or was left fallow.

The smaller 94-acre site exhibited the same characteristics as the majority of the larger site. Open cropland that has not been planted was bordered by hedge rows exhibiting a variety of trees dominated by hackberry and oak. The portion of the site nearest Canoe Creek includes streamside habitats that provide richer wildlife habitat and a greater variety of trees, including sycamore, river birch, sweetgum, and various oak, maple, and hickory species.

4.2 Vegetation

The sites include primarily row crop fields, wooded areas, retention ponds, and some wetlands. The dominant tree species on the property is hackberry (*Celtis occidentalis*), which is found on all field borders. Also present are a variety of black willow (*Salix nigra*), American sycamore (*Plantanus occidentalis*), cottonwood (*Populus deltoides*), boxelder (*Acer negundo*), hickory species (*Carya* sp.), oak species (*Quercus* sp.), American elm (*Ulmus americana*) and sugar maple (*Acer saccharum*). A variety of herbaceous plants and shrubs are located in the open areas, including Johnson grass (*Sorghum halepense*), golden rod (*Solidago* sp.), fescue grass (*Festuca* sp.) and numerous annual weeds.

There are no state-protected plant species listed for the Henderson Quadrangle, and no federally-protected plant species are potentially located near the site according to the FWS IPaC report.

4.3 Wildlife

Wildlife common to the Shawnee Hills Ecoregion include: whitetail deer (*Odocoileus virginianus*), wild turkey (*Meleagris gallopavo*), cottontail rabbit (*Sylvilagus floridanus*), gray and fox squirrels (*Sciurus* spp.), raccoon (*Procyon lotor*), skunk (*Mephitis mephitis*), opossum (*Didelphis virginiana*), coyote (*Canis latrans*), and numerous reptiles, amphibians, small mammals, songbirds, raptors, and waterfowl. The site has marginal wildlife value due to the lack of natural areas and dominance of agricultural land. The Wilson and Canoe Creek riparian areas do provide a wildlife corridor and habitat for a number of animal species. Whitetail deer and a variety of birds were observed during the site survey. Protected wildlife species are discussed in the Section 5 – Results.

5. Results

5.1 Federally-Listed Threatened and Endangered Wildlife Species

The USFWS IPaC report for the subject site identifies 15 federally listed endangered or threatened wildlife species with a potential to occur in the project vicinity (**Table 1**). These include three bats (gray bat, Indiana bat, and northern long-eared bat [NLEB]), one bird (least tern), and 11 mussels.

The gray bat is a cave dweller year-round, but the property does not appear to have any caves present; therefore, neither roosting nor wintering habitat for this species is located on site. According to the USFWS IPaC report, designated critical habitat for the Indiana bat is located outside of the project location, and there is no critical habitat designated for the NLEB. However, suitable spring/summer roosting and maternity habitat for the Indiana bat and NLEB potentially could occur on the site. Therefore, the AECOM field team conducted a survey for suitable bat summer roosting habitat. This habitat includes exfoliated bark, cracks, crevices, and hollows in living and dead trees that are at least 10 feet off the ground as well as flaking bark on standing dead trees.

The survey of bat habitat found 38 suitable potential roost trees on the two sites: two on the 94-acre site and 36 on the 625-acre site. On the 94-acre site, the trees were in the northern woods along Canoe Creek. They were a standing dead black locust tree, also known as a snag, and a hackberry tree with a suitable hollow. On the larger property, the trees were mostly hackberries (52%), and most were living trees featuring hollows and crevices. The second most common habitat trees were box elder (21%), and these trees were typically snags. The remaining 27% of the habitat trees were spread among six other species. All of the habitat on the 625-acre site is in the woods around Wilson Creek, which is also a forage corridor. The field border along the Wilson Creek riparian area also provides foraging opportunity.

In addition to the bat species that might potentially be impacted by site construction, one bird – least tern, and 11 mussel species are potentially located in the project area. Least tern is a shore bird which nests along large river banks, such as the Ohio River. The sites do not contain suitable habitat for this species. With the exception of two mussel species, clubshell and little spectaclecase, the habitat for mussels species is limited to large rivers or specific river locations indicated in Table 1. In the event impacts to Wilson or Canoe Creeks are planned, consultation with the USFWS is recommended.

Table 1. Federal and State Listed Threatened and Endangered Species with the Potential to Occur at or near the Henderson County Solar Project Site in Henderson County, Kentucky.

Common Name Scientific Name	Status Fed, State	Habitat	Clearance Survey Recommended if impacts to habitat expected**
Mammals			
Gray bat <i>Myotis grisescens</i>	FE, SE	Cave obligate, frequents forested areas	No
Indiana bat <i>M. sodalis</i>	FE, SE	Hibernates in caves, spring/summer maternity roosts normally under bark of standing trees	Yes
Northern long-eared bat <i>M. septentrionalis</i>	FT, NL	Hibernates in caves or mines, summer roosting under bark or in cavities of trees, rarely roosts in barns or sheds	Yes
Birds			
Least Tern, <i>Sterna antillarum</i>	FE, SE	Sand and gravel pits, agricultural fields	No
American Coot <i>Fulica americana</i>	NL, SE	Ponds, lakes and marshes, Requires shallow marshes for breeding	No
Bald Eagle <i>Haliaeetus leucocephalus</i>	NL, ST	Coastlines, rivers, and large lakes	No
Bank Swallow <i>Riparia riparia</i>	NL, SS	Nests on vertical banks of dirt or sand along rivers or ponds	No
Blue-Winged Teal <i>Spatula discors</i>	NL, ST	Shallow freshwater or brackish marshes	No
Brown Creeper <i>Certhia americana</i>	NL, SE	Woodlands, needs mature forest for breeding	No
Dark-Eyed Junco <i>Junco hyemalis</i>	NL, SS	Edges of woodlands by open fields	No
Double-Crested Cormorant <i>Phalacrocorax auritus</i>	NL, ST	Coasts, bays, lakes, rivers	No
Henslow's Sparrow <i>Centronyx henslowii</i>	NL, SS	Weedy fields and meadows with sparse shrubs	No
Hooded Merganser <i>Lophodytes cucullatus</i>	NL, ST	Wooded lakes, ponds, and rivers	No
Northern Harrier <i>Circus hudsonius</i>	NL, ST	Marshes, fields, or prairies	No
Northern Shoveler <i>Spatula clypeata</i>	NL, SE	Marshes and ponds	No
Pied-billed Grebe <i>Podilymbus podiceps</i>	NL, SE	Breeds in dense marshes with little open water	No
Red-breasted Nuthatch <i>Sitta canadensis</i>	NL, SE	Conifer trees including spruce, fir and hemlock	No
Red-headed Woodpecker <i>Melanerpes erythrocephalus</i>	NL, SS	Forest edges or open woods	No
Sharp-shinned Hawk <i>Accipiter striatus</i>	NL, SS	Dense forest avoids open country	No
Short-eared Owl <i>Asio flammeus</i>	NL, SE	Prairies, marshes, dunes and tundra	No
Mussels			
Clubshell, <i>Pleurobema clava</i>	FE, ST	Small to medium upland rivers with bedrock or gravel substrate and boulders	Potential
Fanshell, <i>Cyprogenia stegaria</i>	FE, NL	Medium to large rivers, deep sand/gravel bottoms	No
Fat Pocketbook <i>Potamilus capax</i>	FE	Mixed substrate of silt, mud, and sand in large rivers	No

Common Name Scientific Name	Status Fed, State	Habitat	Clearance Survey Recommended if impacts to habitat expected**
Northern Riffleshell <i>Epioblasma torulosa rangiana</i>	FE	Short reaches of the Green River	No
Orangefoot Pimpleback <i>Plethobasus cooperainus</i>	FE	Lower Ohio River	No
Purple Cat's Paw <i>Epioblasma obliquata obliquata</i>	FE	Killbuck Creek, OH	No
Rabbitsfoot <i>Quadrula cylindrica cylindrica</i>	FT	Ohio River, KY	No
Ring Pink <i>Obovaria retusa</i>	FE	Green River, KY	No
Rough Pigtoe <i>Pleurobema plenum</i>	FE	Green River and Barren River, KY	No
Sheepnose Mussel <i>Plethobasus cyphus</i>	FE, SE	Shallow portions of large rivers in coarse sand and gravel	No
Spectaclecase <i>Cumberlandia monodonta</i>	FE	Sheltered areas of firm mud in large rivers	No
Pocketbook <i>Lampsilis ovata</i>	NL, SE	Large rivers in coarse sand and gravel	No
Little Spectaclecase <i>Villosa lienosa</i>	NL, SS	Silty, clay substrates in tributary streams	Potential
Fish			
Spottail shiner, <i>Notropis hudsonius</i>	NL, SS	Spawn in sandy shoals, tributary streams and lakes, avoids strong currents	No
*F=federal, S=state, E=endangered, T=threatened, NL=Not Listed, S=Special Concern **Clearance survey is recommended if respective habitat is to be disturbed by construction			

5.2 State-Listed Threatened and Endangered Species

Twenty state-protected species were identified by KDFWR for Henderson County (Table 1). These consist of one bat, 15 birds, one fish, and three mussel species. Based on the mature hardwoods in the riparian area of the two streams of the site, the presence of habitat for the bat species is possible. If any of the habitats for bat species would be disturbed during construction, clearance surveys are recommended for these species, as summarized in Table 1. Habitat for all of the other state-listed species does not appear to be present, or is not present in sufficient quantity, to support the species on or adjacent to the site where it could be affected. However, if impacts to Wilson or Canoe Creeks are planned consultation with the Kentucky Department of Fish and Wildlife Resources is recommended.

5.3 Migratory Birds

A migratory bird of conservation concern (BCC) identified in the IPaC report as potentially occurring in or near the site is the red-headed woodpecker (*Melanerpes erythrocephalus*) (see **Attachment 3**). The breeding period for the red-headed woodpecker is May 10 to September 10 (USFWS 2020). This species was not observed during the May 2020 site visit. The IPaC report also noted that the bald eagle (*Haliaeetus leucocephalus*), while not a BCC, warrants attention based on the Bald and Golden Eagle Protection Act.

The migratory bird nesting period in Kentucky is from April 15 to July 31. This time period is critical for migratory bird reproduction. None of these species listed in Table 1 were observed during the May, 2020 site visit.

6.0 Regulatory Requirements

Federal Regulations

Federal permits pertaining to endangered and threatened species may be necessary in the event that these sensitive resources cannot be avoided during the design and construction phase of the project. Consultation with the USFWS should be undertaken to ensure lack of, or minimal impact to, federally listed species. If threatened and endangered species cannot be avoided, a Section 10 incidental take permit may be required. Removal of summer roost trees for the Indiana bat and NLEB is dependent on location related to hibernacula buffers. If the site is within a hibernacula buffer, then the tree clearing dates are from November 15th to March 31st. If the site is not within a buffer, then the window is from October 15th to March 31st. If tree clearing is required, mitigation multipliers are based on habitat type and season (FWS 2016). Based on the maps of known ranges of the Indiana bat and NLEB in Kentucky, the site is potentially located in NLEB known summer roost habitat (FWS 2020) https://www.fws.gov/frankfort/indiana_bat_procedures.html.

Based on the presence of potential bat roost trees on the site, and location of potential NLEB summer habitat near the project area, consultation with the USFWS is required prior to any tree clearing. Mitigation for tree clearing any time of the year may be required.

The Migratory Bird Treaty Act (MTBA) prohibits taking, attempting to take, capturing, killing, selling/purchasing, possessing, transporting, and importing migratory birds, their eggs, parts, and nests, except when specifically authorized by the USFWS. Nesting periods in Kentucky for migratory birds are from April 15 to July 31. Nest habitat, particularly for the species identified on the IPaC report, was very limited within the project area.

7. References

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- USFWS, 2020. Planning and Consultation (IPaC), accessed May 2020.
- USFWS, 2020. <https://www.fws.gov/midwest/endangered/clams>, accessed May 2020

Figures

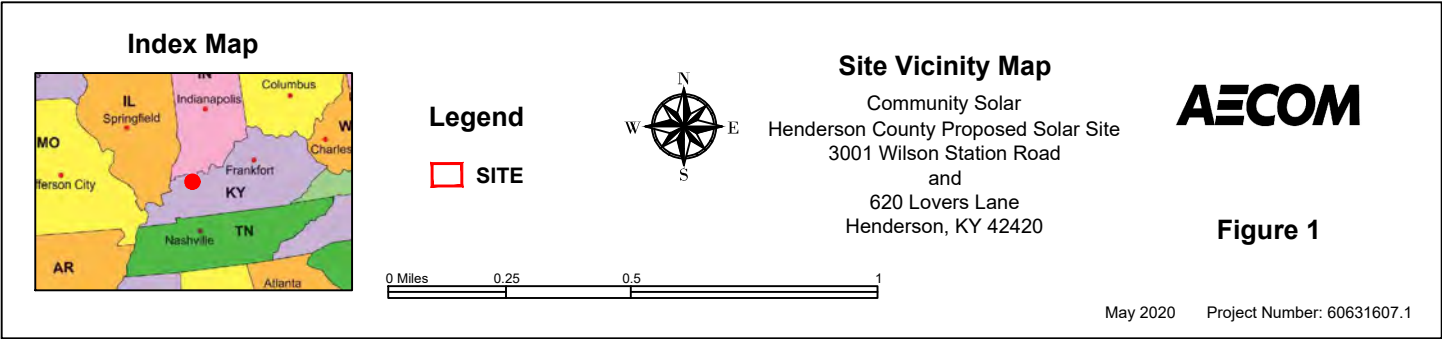
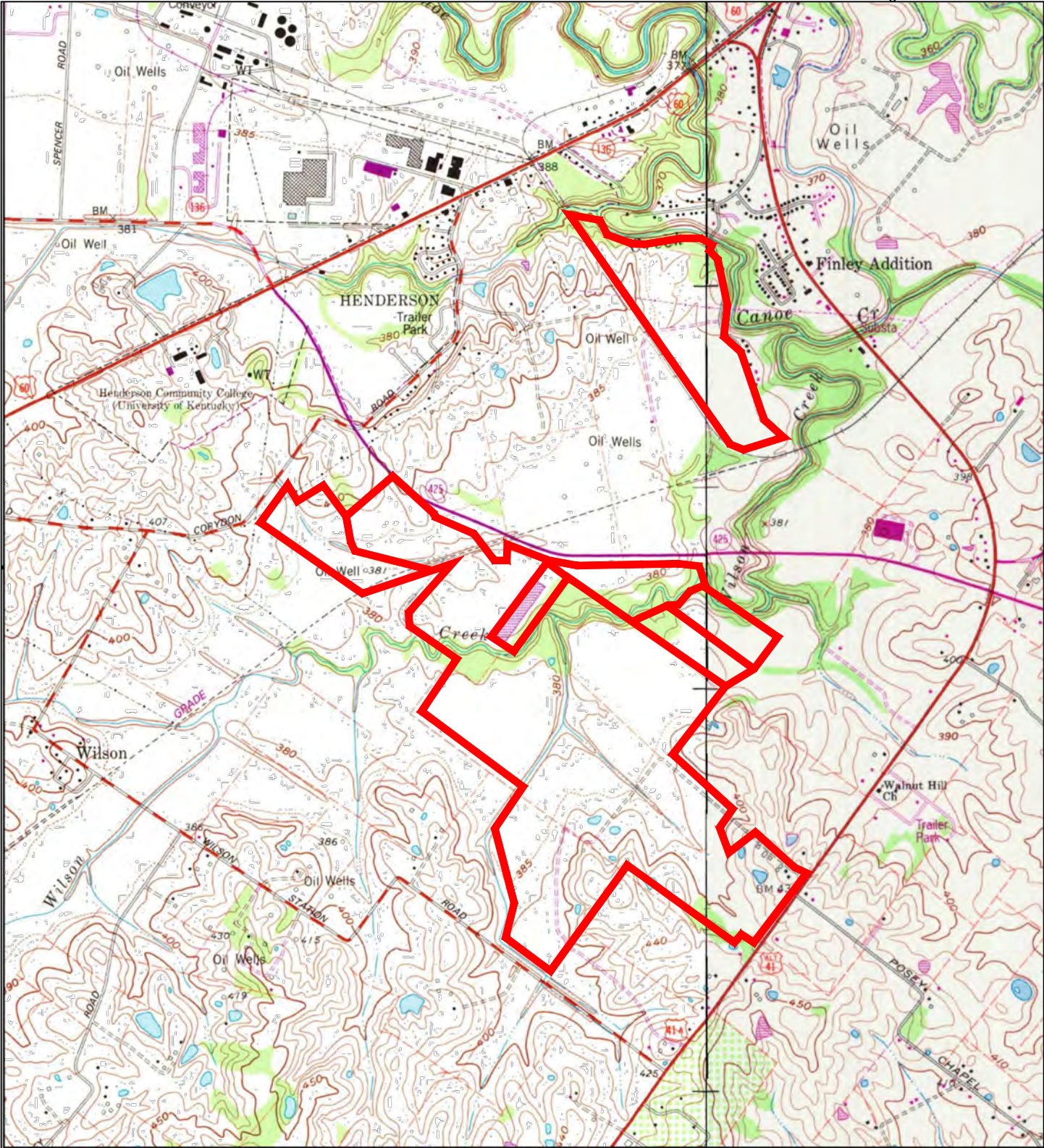
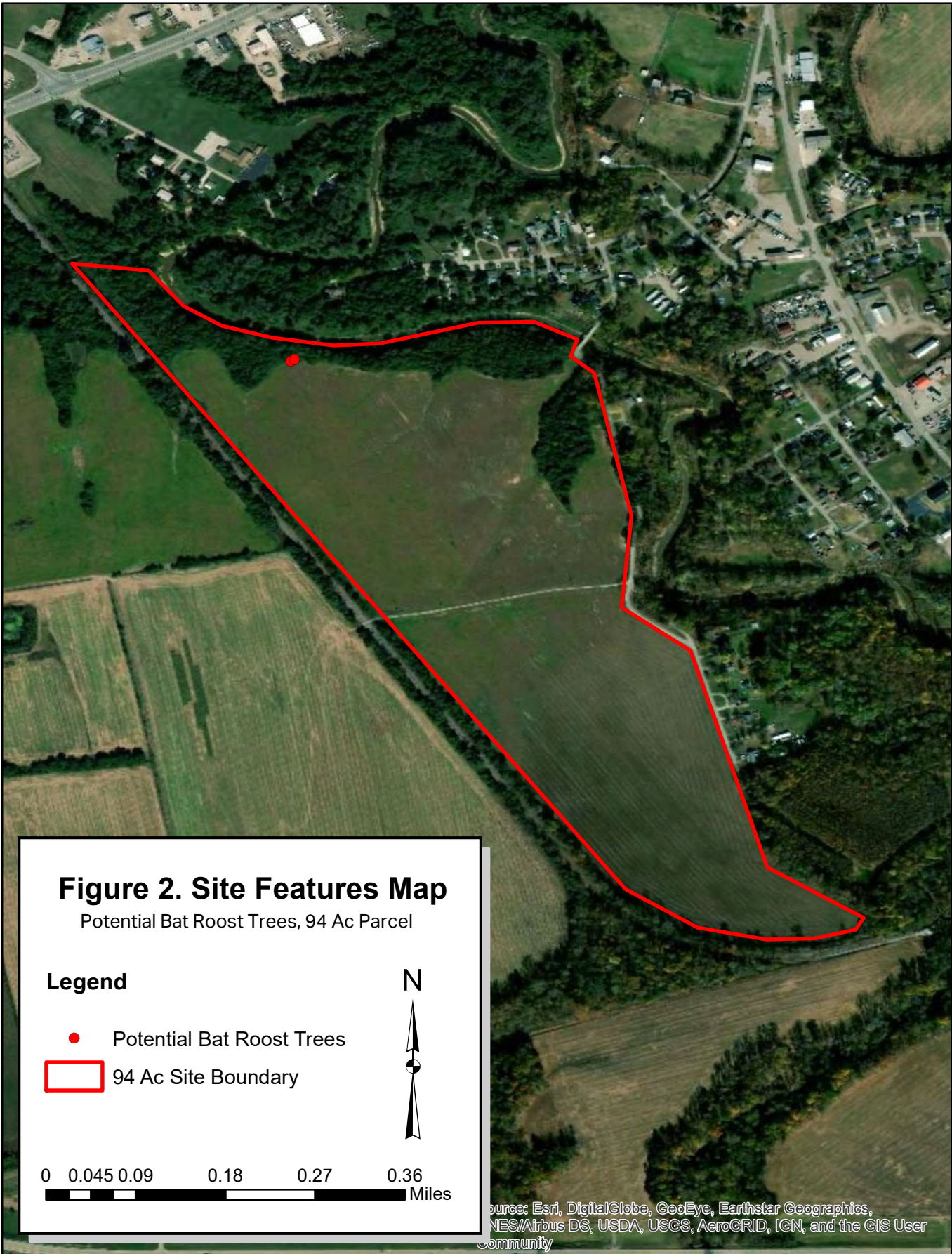
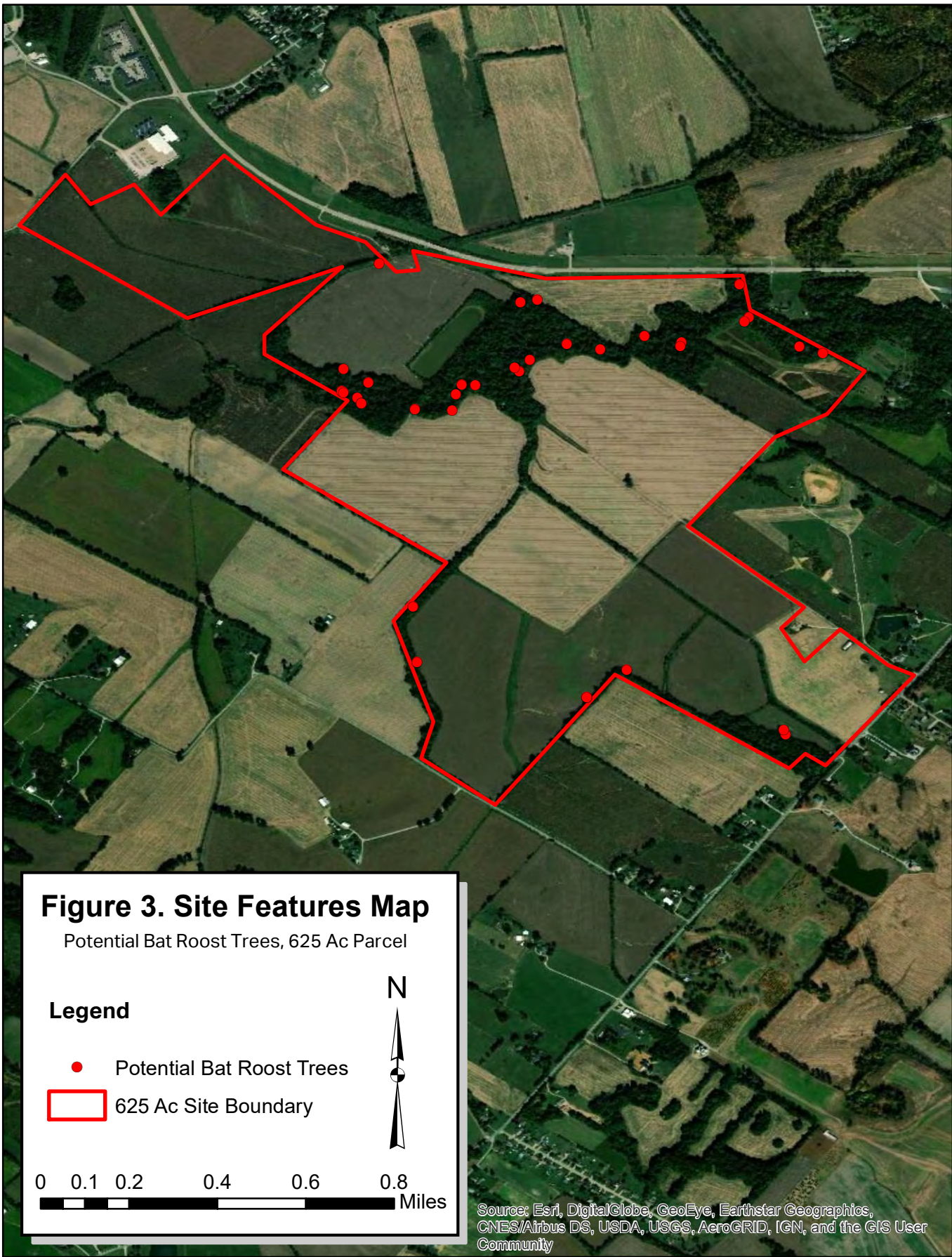


Figure 1





Attachment 1 Photo Log



PHOTOGRAPH LOG

Client Name: Community Solar	Site Location: Henderson Co, KY	Project No.: 60631607.2f
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Photo No. 1	Date: 05/13/20
Direction Photo Taken: Southeast	
Description: Southern portion of the 94-acre parcel. Lover's Ln is on the left of the photo. The field has not been planted.	



Photo No. 2	Date: 05/13/20
Direction Photo Taken: Southwest	
Description: Southern portion of the 94-acre parcel. Shows the tree line on the western boundary of the property.	





PHOTOGRAPH LOG

Client Name: Community Solar	Site Location: Henderson Co, KY	Project No. 60631607.2f
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Photo No. 3	Date: 05/13/20
Direction Photo Taken: West	
Description: Power line right-of-way (ROW) passing through the 94-acre parcel as well as an access road.	



Photo No. 4	Date: 05/13/20
Direction Photo Taken: Northwest	
Description: Northern portion of the 94-acre parcel. Powerline crisscross the field but it is otherwise open country.	





PHOTOGRAPH LOG

Client Name: Community Solar	Site Location: Henderson Co, KY	Project No. 60631607.2f
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Photo No. 5	Date: 05/13/20
Direction Photo Taken: North	
Description: Northern portion of the 94-acre parcel. Lover's Ln is to the right. A small wooded drainage is on the left of the photo. This drainage goes to a culvert that is connected to Canoe Creek.	



Photo No. 6	Date: 05/13/20
Direction Photo Taken: Northwest	
Description: A view from the southern end of the 94-acre parcel looking back north. The parcel is completely open and freshly tilled throughout the open area.	





PHOTOGRAPH LOG

Client Name: Community Solar	Site Location: Henderson Co, KY	Project No. 60631607.2f
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Photo No. 7	Date: 05/13/20
Direction Photo Taken: North	
Description: Houses on Lover's Ln adjacent to the 94-acre parcel.	



Photo No. 8	Date: 05/13/20
Direction Photo Taken: South	
Description: Wet Weather Conveyance (WWC) in the northern woodlot of the Lover's Ln parcel.	





PHOTOGRAPH LOG

Client Name: Community Solar	Site Location: Henderson Co, KY	Project No. 60631607.2f
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Photo No. 9	Date: 05/13/20
Direction Photo Taken: Northwest	
Description: Canoe Creek on the northern border of the 94 ac parcel. The water is murky due to recent rains. Carp were seen near the surface of the creek and a Kingfisher was heard.	



Photo No. 10	Date: 05/13/20
Direction Photo Taken: Northeast	
Description: The view from the southern tip of the 625-acre parcel. The fields are freshly planted with soybeans and corn.	





PHOTOGRAPH LOG

Client Name: Community Solar	Site Location: Henderson Co, KY	Project No. 60631607.2f
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Photo No. 11	Date: 05/13/20
Direction Photo Taken: North	
Description: The view from the southern tip of the 625-acre parcel. The fields are freshly planted with soybeans and corn. Mulberry trees were common along the edges of the fields. The berries of these trees are popular with a variety of birds.	



Photo No. 12	Date: 05/13/20
Direction Photo Taken: East	
Description: The highest point of elevation on the property is the slight rise seen in the background where the tree line abruptly ends.	





PHOTOGRAPH LOG

Client Name: Community Solar	Site Location: Henderson Co, KY	Project No. 60631607.2f
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Photo No. 13	Date: 05/13/20
Direction Photo Taken: South	
Description: Looking south to the southern border of the property.	



Photo No. 14	Date: 05/13/20
Direction Photo Taken: North	
Description: A field planted in corn on the west of the site south of Wilson Creek. Wilson Creek lies in the woods in the background.	





PHOTOGRAPH LOG

Client Name: Community Solar	Site Location: Henderson Co, KY	Project No. 60631607.2f
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Photo No. 15	Date: 05/13/20	
Direction Photo Taken: East		108°E (T) 37°46'33"N, 87°37'45"W ±13ft ▲ 422ft
Description: Soybean fields. The drainage ditch between the fields is vegetated and has black willow trees growing in it.		

Photo No. 16	Date: 05/13/20	
Direction Photo Taken: East		105°E (T) 37°46'28"N, 87°37'34"W ±32ft ▲ 432ft
Description: The eastern border of the property that meets US HWY 41A		



PHOTOGRAPH LOG

Client Name: Community Solar	Site Location: Henderson Co, KY	Project No. 60631607.2f
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Photo No. 17	Date: 05/13/20
Direction Photo Taken: Northwest	
Description: A fallow field central to the property on the south side of Wilson Creek.	



Photo No. 18	Date: 05/13/20
Direction Photo Taken: Northeast	
Description: An area managed as a wildlife foodplot. This area is in the eastern corner of the property south of Wilson Creek.	





PHOTOGRAPH LOG

Client Name: Community Solar	Site Location: Henderson Co, KY	Project No. 60631607.2f
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Photo No. 19	Date: 05/13/20
Direction Photo Taken: Northwest	
Description: Habitat typical of the site in the woods around Wilson Creek.	



Photo No. 20	Date: 05/13/20
Direction Photo Taken: Northwest	
Description: Wilson Creek	





PHOTOGRAPH LOG

Client Name: Community Solar	Site Location: Henderson Co, KY	Project No. 60631607.2f
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Photo No. 21	Date: 05/13/20
Direction Photo Taken: Southwest	
Description: Woodland habitat around Wilson Creek. The flood plain of Wilson Creek is to the right and cropland is to the left.	



Photo No. 22	Date: 05/13/20
Direction Photo Taken: Northwest	
Description: The banks for the reach of Wilson Creek that are on the site are heavily eroded and steep.	





PHOTOGRAPH LOG

Client Name: Community Solar	Site Location: Henderson Co, KY	Project No. 60631607.2f
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Photo No. 23	Date: 05/13/20
Direction Photo Taken: East	
Description: Looking downstream on Wilson Creek.	



Photo No. 24	Date: 05/13/20
Direction Photo Taken: South	
Description: Looking upstream on Wilson Creek.	





PHOTOGRAPH LOG

Client Name: Community Solar	Site Location: Henderson Co, KY	Project No. 60631607.2f
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Photo No. 25	Date: 05/13/20
Direction Photo Taken: Northwest	
Description: Wilson Creek riparian habitat	



Photo No. 26	Date: 05/13/20
Direction Photo Taken: East	
Description: Wilson Creek riparian habitat	



**Attachment 2
USFWS IPaC Report
and
State Listed Species for the Henderson County**

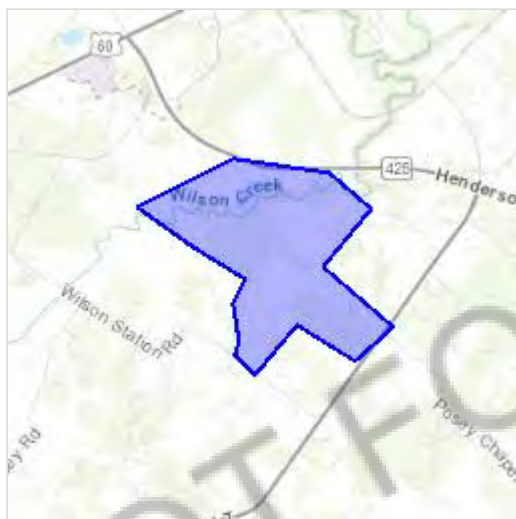
IPaC resource list

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

Henderson County, Kentucky



Local office

Kentucky Ecological Services Field Office

☎ (502) 695-0468

📅 (502) 695-1024

J C Watts Federal Building, Room 265
330 West Broadway
Frankfort, KY 40601-8670

<http://www.fws.gov/frankfort/>

NOT FOR CONSULTATION

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 species¹ 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 Fisheries²).

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.
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
<p>Gray Bat <i>Myotis grisescens</i></p> <p>This species only needs to be considered if the following condition applies:</p> <ul style="list-style-type: none"> • The project area includes potential gray bat habitat. <p>No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6329</p>	Endangered
<p>Indiana Bat <i>Myotis sodalis</i></p> <p>This species only needs to be considered if the following condition applies:</p> <ul style="list-style-type: none"> • The project area includes 'potential' habitat. All activities in this location should consider possible effects to this species. <p>There is final critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/5949</p>	Endangered
<p>Northern Long-eared Bat <i>Myotis septentrionalis</i></p> <p>This species only needs to be considered if the following condition applies:</p> <ul style="list-style-type: none"> • The specified area includes areas in which incidental take would not be prohibited under the 4(d) rule. For reporting purposes, please use the "streamlined consultation form," linked in the "general project design guidelines" for the species. <p>No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045</p>	Threatened

Birds

NAME

STATUS

Least Tern *Sterna antillarum*

Endangered

This species only needs to be considered if the following condition applies:

- This species should be addressed if the action area includes bare open areas with sparse to no vegetation (e.g., sand and gravel pits, agricultural fields) and the action would occur during the nesting season (April - August).

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/8505>

Clams

NAME

STATUS

Clubshell *Pleurobema clava*

Endangered

This species only needs to be considered if the following condition applies:

- The species may be affected by projects that significantly impact, directly or indirectly, the following rivers: Barren, Green, Licking, or Ohio.

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/3789>

Fanshell *Cyprogenia stegaria*

Endangered

This species only needs to be considered if the following condition applies:

- The species may be affected by projects that significantly impact, directly or indirectly, the following rivers: Barren, Green, Licking, Ohio, Rolling Fork Salt, or Tennessee.

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/4822>

Fat Pocketbook *Potamilus capax*

Endangered

This species only needs to be considered if the following condition applies:

- The species may be affected by projects that significantly impact, directly or indirectly, the following rivers: Clarks, Cumberland, Green, Mississippi, Ohio, Tradewater, or Tennessee.

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/2780>

Northern Riffleshell *Epioblasma torulosa rangiana*

Endangered

This species only needs to be considered if the following condition applies:

- The species may be affected by projects that significantly impact, directly or indirectly, the following rivers: Green, Licking, or Ohio.

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/527>

Orangefoot Pimpleback (pearlymussel) *Plethobasus cooperianus*

Endangered

This species only needs to be considered if the following condition applies:

- The species may be affected by projects that significantly impact, directly or indirectly, the following rivers: Green, Ohio, Salt, or Tennessee.

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/1132>

Purple Cat's Paw (=purple Cat's Paw Pearlymussel) *Epioblasma obliquata obliquata*

Endangered

This species only needs to be considered if the following condition applies:

- The species may be affected by projects that significantly impact, directly or indirectly, the following rivers: Green, Licking, or Ohio.

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/5602>

Rabbitsfoot *Quadrula cylindrica cylindrica*

Threatened

This species only needs to be considered if the following condition applies:

- The species may be affected by projects that significantly impact, directly or indirectly, the following rivers: Barren, Cumberland (below the falls), Green, Ohio, Rolling Fork Salt, South Fork Kentucky, or Tennessee.

There is **final** critical habitat for this species. Your location is outside the critical habitat.

<https://ecos.fws.gov/ecp/species/5165>

Ring Pink (mussel) *Obovaria retusa*

Endangered

This species only needs to be considered if the following condition applies:

- The species may be affected by projects that significantly impact, directly or indirectly, the following rivers: Barren, Cumberland (below the falls), Green, Ohio, or Tennessee.

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/4128>

Rough Pigtoe *Pleurobema plenum*

Endangered

This species only needs to be considered if the following condition applies:

- The species may be affected by projects that significantly impact, directly or indirectly, the following rivers: Barren, Green, Licking, or Ohio.

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/6894>

Sheepnose Mussel *Plethobasus cyphus*

Endangered

This species only needs to be considered if the following condition applies:

- The species may be affected by projects that significantly impact, directly or indirectly, the following rivers: Barren, Green, Kentucky, Licking, Ohio, Salt, or Tennessee.

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/6903>

Spectaclecase (mussel) *Cumberlandia monodonta*

Endangered

This species only needs to be considered if the following condition applies:

- The species may be affected by projects that significantly impact, directly or indirectly, the following rivers: Barren, Cumberland (below the falls), Green, Little South Fork of the Cumberland, Ohio, or Tennessee.

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/7867>

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.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

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 <http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Measures for avoiding and minimizing impacts to birds <http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/>

[conservation-measures.php](#)

- Nationwide conservation measures for birds

<http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf>

The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern](#) (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
------	--

Bald Eagle *Haliaeetus leucocephalus*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

<https://ecos.fws.gov/ecp/species/1626>

Breeds Sep 1 to Jul 31

Red-headed Woodpecker *Melanerpes erythrocephalus*

Breeds May 10 to Sep 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (I)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

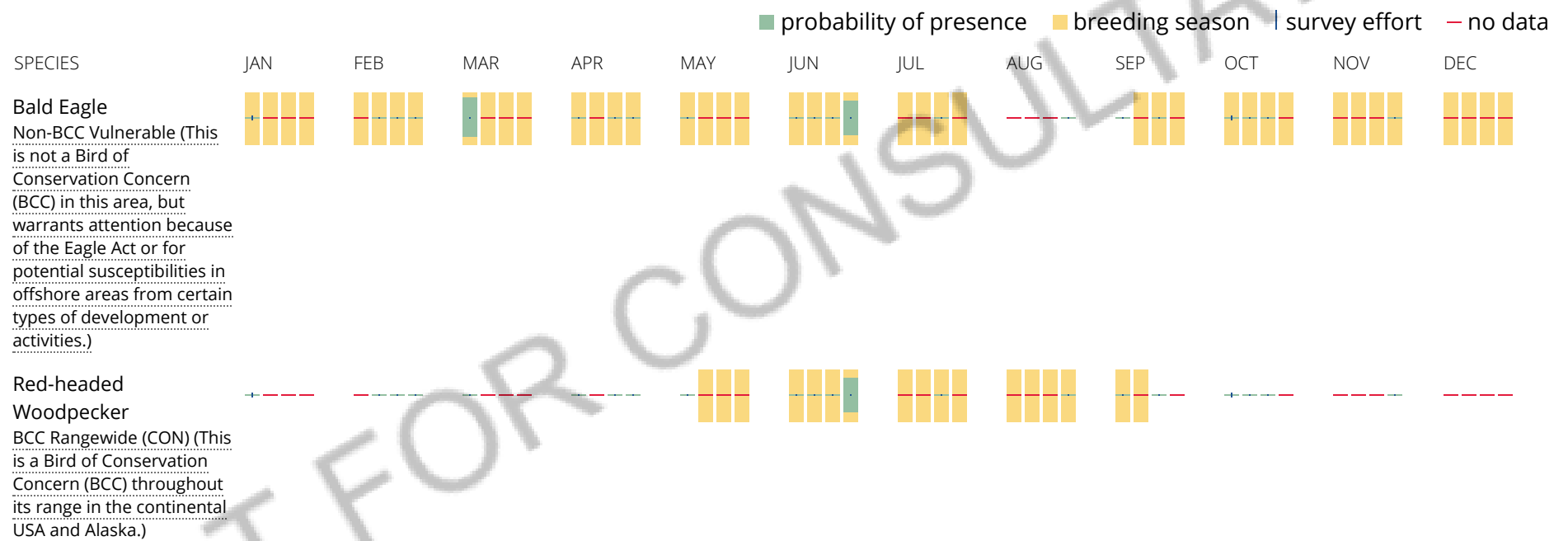
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (-)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



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](#) and/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 migratory birds potentially occurring 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 [AKN Phenology 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, migrating or present year-round in my project 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 refer to the following resources: [The Cornell Lab of Ornithology All About Birds Bird Guide](#), or (if you are unsuccessful in locating the bird of interest there), the [Cornell Lab of Ornithology Neotropical Birds guide](#). 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

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 tubercid 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.



Species Information

State Threatened, Endangered, and Special Concern Species observations for selected quads

Linked life history provided courtesy of NatureServe Explorer .

Records may include both recent and historical observations.

[US Status Definitions](#) [Kentucky Status Definitions](#)

List State Threatened, Endangered, and Special Concern Species observations in 1 selected quad.

Selected quad is: Henderson.

Scientific Name and Life History	Common Name and Pictures	Class	Quad	US Status	KY Status	WAP	Reference
<i>Fulica americana</i>	American Coot	Aves	Henderson	N	E		Reference
<i>Haliaeetus leucocephalus</i>	Bald Eagle	Aves	Henderson	N	T	Yes	Reference
<i>Riparia riparia</i>	Bank Swallow	Aves	Henderson	N	S	Yes	Reference
<i>Spatula discors</i>	Blue-winged Teal	Aves	Henderson	N	T		Reference
<i>Certhia americana</i>	Brown Creeper	Aves	Henderson	N	E	Yes	Reference
<i>Junco hyemalis</i>	Dark-eyed Junco	Aves	Henderson	N	S		Reference
<i>Phalacrocorax auritus</i>	Double-crested Cormorant	Aves	Henderson	N	T		Reference
<i>Centronyx henslowii</i>	Henslow's Sparrow	Aves	Henderson	N	S	Yes	Reference
<i>Lophodytes cucullatus</i>	Hooded Merganser	Aves	Henderson	N	T	Yes	Reference
<i>Villosa lienosa</i>	Little Spectaclecase	Bivalvia	Henderson	N	S	Yes	Reference
<i>Circus hudsonius</i>	Northern Harrier	Aves	Henderson	N	T	Yes	Reference

<i>Myotis septentrionalis</i>	Northern Myotis	Mammalia	Henderson	T	E		Reference
<i>Spatula clypeata</i>	Northern Shoveler	Aves	Henderson	N	E		Reference
<i>Podilymbus podiceps</i>	Pied-billed Grebe	Aves	Henderson	N	E	Yes	Reference
<i>Lampsilis ovata</i>	Pocketbook	Bivalvia	Henderson	N	E	Yes	Reference
<i>Sitta canadensis</i>	Red-breasted Nuthatch	Aves	Henderson	N	E	Yes	Reference
<i>Accipiter striatus</i>	Sharp-shinned Hawk	Aves	Henderson	N	S	Yes	Reference
<i>Plethobasus cyphus</i>	Sheepnose	Bivalvia	Henderson	E	E	Yes	Reference
<i>Asio flammeus</i>	Short-eared Owl	Aves	Henderson	N	E	Yes	Reference
<i>Notropis hudsonius</i>	Spottail Shiner	Actinopterygii	Henderson	N	S		Reference

20 species are listed.

Attachment 3 Potential Bat Roost Tree Data Forms

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/13/20
 Location Henderson/ Lover's Lane Parcel County Henderson State KY
 Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 1
 Latitude / Longitude 37.801769/-87.629123 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	Few-no branches	Limb stubs to none	none
Bark Tightness	80-100% remaining	30-80% remaining	If snag has most of height and \leq 30% bark, or if snag has <50% of height and \geq 80% bark	<80% bark
Height	Full-broken top	Broken top	Broken top to 50% height	<50 % of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 18

Tree species (if known) Black Locust

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 2

Area of the project site to be cleared 0%

Percent of the project site forested 15%

Dominant canopy tree species in project area Green Ash

Dominant midstory tree species in project area Sweet Gum

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt1

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/13/20
 Location Henderson/ Lover's Lane Parcel County Henderson State KY
 Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 2
 Latitude / Longitude 37.801794/-87.629071 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	Few-no branches	Limb stubs to none	none
Bark Tightness	80-100% remaining	30-80% remaining	If snag has most of height and \leq 30% bark, or if snag has $<50\%$ of height and \geq 80% bark	$<80\%$ bark
Height	Full-broken top	Broken top	Broken top to 50% height	$<50\%$ of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 24

Tree species (if known) Hackberry

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 2

Area of the project site to be cleared 0%

Percent of the project site forested 15%

Dominant canopy tree species in project area Green Ash

Dominant midstory tree species in project area Sweet Gum

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt2

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/13/20
 Location Henderson/ Wilson Creek County Henderson State KY
 Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 3
 Latitude / Longitude 37.789029/-87.637266 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	Few-no branches	Limb stubs to none	none
Bark Tightness	80-100% remaining	30-80% remaining	If snag has most of height and \leq 30% bark, or if snag has $<50\%$ of height and \geq 80% bark	$<80\%$ bark
Height	Full-broken top	Broken top	Broken top to 50% height	$<50\%$ of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 36

Tree species (if known) Hackberry

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Sycamore

Dominant midstory tree species in project area Hackberry

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt3

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/13/20
 Location Henderson/ Wilson Creek County Henderson State KY
 Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 4
 Latitude / Longitude 37.785591/-87.63843 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	Few-no branches	Limb stubs to none	none
Bark Tightness	80-100% remaining	30-80% remaining	If snag has most of height and \leq 30% bark, or if snag has $<50\%$ of height and \geq 80% bark	$<80\%$ bark
Height	Full-broken top	Broken top	Broken top to 50% height	$<50\%$ of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 20

Tree species (if known) Oak (Northern Red)

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Sycamore, Red Oak

Dominant midstory tree species in project area Hackberry

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt4

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/13/20
 Location Henderson/ Wilson Creek County Henderson State KY
 Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 5
 Latitude / Longitude 37.785145/-87.637615 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	Few-no branches	Limb stubs to none	none
Bark Tightness	80-100% remaining	30-80% remaining	If snag has most of height and \leq 30% bark, or if snag has <50% of height and \geq 80% bark	<80% bark
Height	Full-broken top	Broken top	Broken top to 50% height	<50 % of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 28

Tree species (if known) Hackberry

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Sycamore, Red Oak

Dominant midstory tree species in project area Hackberry

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt5

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/13/20
 Location Henderson/ Wilson Creek County Henderson State KY
 Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 6
 Latitude / Longitude 37.787778/-87.632636 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	<u>Few-no branches</u>	Limb stubs to none	none
Bark Tightness	80-100% remaining	30-80% remaining	If snag has most of height and \leq 30% bark, or if snag has $<$ 50% of height and \geq 80% bark	<u><80% bark</u>
Height	Full-broken top	<u>Broken top</u>	Broken top to 50% height	<50 % of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 14

Tree species (if known) Red Maple

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Green Ash

Dominant midstory tree species in project area Red Maple

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt6

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/13/20
 Location Henderson/ Wilson Creek County Henderson State KY
 Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 7
 Latitude / Longitude 37.787851/-87.632086 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	Few-no branches	Limb stubs to none	none
Bark Tightness	80-100% remaining	30-80% remaining	If snag has most of height and \leq 30% bark, or if snag has <50% of height and \geq 80% bark	<80% bark
Height	Full-broken top	Broken top	Broken top to 50% height	<50 % of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 30

Tree species (if known) Hackberry

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Hackberry

Dominant midstory tree species in project area Hackberry

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt7

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/13/20
 Location Henderson/ Wilson Creek County Henderson State KY
 Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 8
 Latitude / Longitude 37.788358/-87.625459 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	<u>Few-no branches</u>	Limb stubs to none	none
Bark Tightness	80-100% remaining	30-80% remaining	If snag has most of height and \leq 30% bark, or if snag has $<$ 50% of height and \geq 80% bark	<u><80% bark</u>
Height	Full-broken top	<u>Broken top</u>	Broken top to 50% height	<50 % of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 30

Tree species (if known) Hackberry

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Sycamore

Dominant midstory tree species in project area Red maple

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt8

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/14/20
 Location Henderson/ Wilson Creek County Henderson State KY
 Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 9
 Latitude / Longitude 37.773645/-87.623943 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	Few-no branches	Limb stubs to none	none
Bark Tightness	80-100% remaining	30-80% remaining	If snag has most of height and \leq 30% bark, or if snag has $<$ 50% of height and \geq 80% bark	$<$ 80% bark
Height	Full-broken top	Broken top	Broken top to 50% height	$<$ 50 % of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 30

Tree species (if known) Black Locust

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Hackberry

Dominant midstory tree species in project area Hackberry

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt9

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/14/20
 Location Henderson/ Wilson Creek County Henderson State KY
 Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 10
 Latitude / Longitude 37.773783/-87.624006 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	Few-no branches	Limb stubs to none	none
Bark Tightness	80-100% remaining	30-80% remaining	If snag has most of height and \leq 30% bark, or if snag has $<50\%$ of height and \geq 80% bark	$<80\%$ bark
Height	Full-broken top	Broken top	Broken top to 50% height	$<50\%$ of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 30

Tree species (if known) Hackberry

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Hackberry

Dominant midstory tree species in project area Osage orange

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt10

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/14/20
 Location Henderson/ Wilson Creek County Henderson State KY
 Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 11
 Latitude / Longitude 37.775758/-87.629157 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	Few-no branches	Limb stubs to none	none
Bark Tightness	80-100% remaining	30-80% remaining	If snag has most of height and \leq 30% bark, or if snag has <50% of height and \geq 80% bark	<80% bark
Height	Full-broken top	Broken top	Broken top to 50% height	<50 % of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 30

Tree species (if known) Hackberry

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Hackberry

Dominant midstory tree species in project area Osage orange

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt11

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/14/20
 Location Henderson/ Wilson Creek County Henderson State KY
 Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 12
 Latitude / Longitude 37.774857/-87.630463 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	<u>Few-no branches</u>	Limb stubs to none	none
Bark Tightness	80-100% remaining	<u>30-80% remaining</u>	If snag has most of height and \leq 30% bark, or if snag has $<50\%$ of height and \geq 80% bark	$<80\%$ bark
Height	Full-broken top	<u>Broken top</u>	Broken top to 50% height	$<50\%$ of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 18

Tree species (if known) Sassafras

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Hackberry

Dominant midstory tree species in project area Osage orange

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt12

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/14/20
 Location Henderson/ Wilson Creek County Henderson State KY
 Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 13
 Latitude / Longitude 37.774857/-87.630463 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	Few-no branches	Limb stubs to none	none
Bark Tightness	80-100% remaining	30-80% remaining	If snag has most of height and \leq 30% bark, or if snag has $<50\%$ of height and \geq 80% bark	$<80\%$ bark
Height	Full-broken top	Broken top	Broken top to 50% height	$<50\%$ of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 18

Tree species (if known) Hackberry

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Hackberry

Dominant midstory tree species in project area Osage orange

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt13

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/14/20
 Location Henderson/ Wilson Creek County Henderson State KY
 Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 14
 Latitude / Longitude 37.776007/-87.636025 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	Few-no branches	Limb stubs to none	none
Bark Tightness	80-100% remaining	30-80% remaining	If snag has most of height and \leq 30% bark, or if snag has <50% of height and \geq 80% bark	<80% bark
Height	Full-broken top	Broken top	Broken top to 50% height	<50 % of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 12

Tree species (if known) Box Elder

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Hackberry

Dominant midstory tree species in project area Box Elder

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt14

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/14/20
 Location Henderson/ Wilson Creek County Henderson State KY
 Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 15
 Latitude / Longitude 37.777814/-87.636153 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	Few-no branches	Limb stubs to none	none
Bark Tightness	80-100% remaining	30-80% remaining	If snag has most of height and \leq 30% bark, or if snag has $<50\%$ of height and \geq 80% bark	$<80\%$ bark
Height	Full-broken top	Broken top	Broken top to 50% height	$<50\%$ of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 18

Tree species (if known) Hackberry

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Hackberry

Dominant midstory tree species in project area Hackberry

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt15

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/14/20
Location Henderson/ Wilson Creek County Henderson State KY
Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 16
Latitude / Longitude 37.784874/-87.638493 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	Few-no branches	Limb stubs to none	none
Bark Tightness	80-100% remaining	30-80% remaining	If snag has most of height and \leq 30% bark, or if snag has $<50\%$ of height and \geq 80% bark	$<80\%$ bark
Height	Full-broken top	Broken top	Broken top to 50% height	$<50\%$ of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 18

Tree species (if known) Sassafras

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Hackberry

Dominant midstory tree species in project area Osage orange

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt16

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/14/20
 Location Henderson/ Wilson Creek County Henderson State KY
 Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 17
 Latitude / Longitude 37.784818/-87.638431 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	Few-no branches	Limb stubs to none	none
Bark Tightness	80-100% remaining	30-80% remaining	If snag has most of height and \leq 30% bark, or if snag has $<$ 50% of height and \geq 80% bark	$<$ 80% bark
Height	Full-broken top	Broken top	Broken top to 50% height	$<$ 50 % of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 24

Tree species (if known) Hackberry

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Hackberry

Dominant midstory tree species in project area Hackberry

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt17

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/14/20
 Location Henderson/ Wilson Creek County Henderson State KY
 Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 18
 Latitude / Longitude 37.784654/-87.637975 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	Few-no branches	Limb stubs to none	none
Bark Tightness	80-100% remaining	30-80% remaining	If snag has most of height and ≤ 30% bark, or if snag has <50% of height and ≥ 80% bark	<80% bark
Height	Full-broken top	Broken top	Broken top to 50% height	<50 % of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 24

Tree species (if known) Box Elder

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Hackberry

Dominant midstory tree species in project area Hackberry

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt18

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/14/20
 Location Henderson/ Wilson Creek County Henderson State KY
 Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 19
 Latitude / Longitude 37.784654/-87.637975 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	Few-no branches	Limb stubs to none	none
Bark Tightness	80-100% remaining	30-80% remaining	If snag has most of height and \leq 30% bark, or if snag has $<$ 50% of height and \geq 80% bark	$<$ 80% bark
Height	Full-broken top	Broken top	Broken top to 50% height	$<$ 50 % of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 18

Tree species (if known) Box Elder

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Hackberry

Dominant midstory tree species in project area Hackberry

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt19

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/14/20
 Location Henderson/ Wilson Creek County Henderson State KY
 Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 20
 Latitude / Longitude 37.784471/-87.637844 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	<u>Few-no branches</u>	Limb stubs to none	none
Bark Tightness	80-100% remaining	<u>30-80% remaining</u>	If snag has most of height and \leq 30% bark, or if snag has $<50\%$ of height and \geq 80% bark	$<80\%$ bark
Height	<u>Full-broken top</u>	Broken top	Broken top to 50% height	$<50\%$ of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 24

Tree species (if known) Hackberry

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Hackberry

Dominant midstory tree species in project area Hackberry

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt20

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/14/20
 Location Henderson/ Wilson Creek County Henderson State KY
 Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 21
 Latitude / Longitude 37.784471/-87.637844 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	Few-no branches	Limb stubs to none	none
Bark Tightness	80-100% remaining	30-80% remaining	If snag has most of height and ≤ 30% bark, or if snag has <50% of height and ≥ 80% bark	<80% bark
Height	Full-broken top	Broken top	Broken top to 50% height	<50 % of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 20

Tree species (if known) Hackberry

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Red Oak

Dominant midstory tree species in project area Hackberry

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt21

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/14/20
Location Henderson/ Wilson Creek County Henderson State KY
Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 22
Latitude / Longitude 37.784265/-87.636091 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	<u>Few-no branches</u>	Limb stubs to none	none
Bark Tightness	80-100% remaining	30-80% remaining	<u>If snag has most of height and \leq 30% bark, or if snag has <50% of height and $>$ 80% bark</u>	<80% bark
Height	<u>Full-broken top</u>	Broken top	Broken top to 50% height	<50 % of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 18

Tree species (if known) Box Elder

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Red Oak

Dominant midstory tree species in project area Hackberry

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt22

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/14/20
 Location Henderson/ Wilson Creek County Henderson State KY
 Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 23
 Latitude / Longitude 37.784237/-87.634869 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	Few-no branches	Limb stubs to none	none
Bark Tightness	80-100% remaining	30-80% remaining	If snag has most of height and \leq 30% bark, or if snag has $<50\%$ of height and \geq 80% bark	$<80\%$ bark
Height	Full-broken top	Broken top	Broken top to 50% height	$<50\%$ of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 48

Tree species (if known) Hackberry

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Hackberry

Dominant midstory tree species in project area Hackberry

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt23

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/14/20
 Location Henderson/ Wilson Creek County Henderson State KY
 Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 24
 Latitude / Longitude 37.784763/-87.634757 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	Few-no branches	Limb stubs to none	none
Bark Tightness	80-100% remaining	30-80% remaining	If snag has most of height and ≤ 30% bark, or if snag has <50% of height and ≥ 80% bark	<80% bark
Height	Full-broken top	Broken top	Broken top to 50% height	<50 % of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 30

Tree species (if known) Hackberry

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Hackberry

Dominant midstory tree species in project area Hackberry

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt24

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/14/20
 Location Henderson/ Wilson Creek County Henderson State KY
 Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 25
 Latitude / Longitude 37.785078/-87.634559 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	Few-no branches	Limb stubs to none	none
Bark Tightness	80-100% remaining	30-80% remaining	If snag has most of height and ≤ 30% bark, or if snag has <50% of height and ≥ 80% bark	<80% bark
Height	Full-broken top	Broken top	Broken top to 50% height	<50% of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 36

Tree species (if known) Hackberry

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Hackberry

Dominant midstory tree species in project area Hackberry

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt25

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/14/20
 Location Henderson/ Wilson Creek County Henderson State KY
 Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 26
 Latitude / Longitude 37.78506/-87.634113 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	Few-no branches	Limb stubs to none	none
Bark Tightness	80-100% remaining	30-80% remaining	If snag has most of height and \leq 30% bark, or if snag has $<$ 50% of height and \geq 80% bark	$<$ 80% bark
Height	Full-broken top	Broken top	Broken top to 50% height	$<$ 50 % of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 12

Tree species (if known) Hackberry

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Hackberry

Dominant midstory tree species in project area Hackberry

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt26

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/14/20
 Location Henderson/ Wilson Creek County Henderson State KY
 Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 27
 Latitude / Longitude 37.786105/-87.622729 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	Few-no branches	Limb stubs to none	none
Bark Tightness	80-100% remaining	30-80% remaining	If snag has most of height and \leq 30% bark, or if snag has $<50\%$ of height and \geq 80% bark	$<80\%$ bark
Height	Full-broken top	Broken top	Broken top to 50% height	$<50\%$ of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 20

Tree species (if known) Sycamore

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Hackberry

Dominant midstory tree species in project area Hackberry

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt27

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/14/20
 Location Henderson/ Wilson Creek County Henderson State KY
 Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 28
 Latitude / Longitude 37.786338/-87.623492 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	<u>Few-no branches</u>	Limb stubs to none	none
Bark Tightness	80-100% remaining	30-80% remaining	If snag has most of height and ≤ 30% bark, or if snag has <50% of height and ≥ 80% bark	<u><80% bark</u>
Height	Full-broken top	Broken top	<u>Broken top to 50% height</u>	<50 % of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 10

Tree species (if known) Box Elder

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Black Walnut

Dominant midstory tree species in project area Hackberry

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt28

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/14/20
 Location Henderson/ Wilson Creek County Henderson State KY
 Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 29
 Latitude / Longitude 37.787283/-87.625156 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	Few-no branches	Limb stubs to none	none
Bark Tightness	80-100% remaining	30-80% remaining	If snag has most of height and \leq 30% bark, or if snag has $<50\%$ of height and \geq 80% bark	$<80\%$ bark
Height	Full-broken top	Broken top	Broken top to 50% height	$<50\%$ of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 20

Tree species (if known) Hackberry

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Red Oak

Dominant midstory tree species in project area Red Maple

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt29

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/14/20
 Location Henderson/ Wilson Creek County Henderson State KY
 Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 30
 Latitude / Longitude 37.787144/-87.625299 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	Few-no branches	Limb stubs to none	none
Bark Tightness	80-100% remaining	30-80% remaining	If snag has most of height and \leq 30% bark, or if snag has $<$ 50% of height and \geq 80% bark	$<$ 80% bark
Height	Full-broken top	Broken top	Broken top to 50% height	$<$ 50 % of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 20

Tree species (if known) Red Maple

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Red Oak

Dominant midstory tree species in project area Red Maple

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt30

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/14/20
 Location Henderson/ Wilson Creek County Henderson State KY
 Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 31
 Latitude / Longitude 37.786458/-87.627357 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	Few-no branches	Limb stubs to none	none
Bark Tightness	80-100% remaining	30-80% remaining	If snag has most of height and \leq 30% bark, or if snag has $<$ 50% of height and \geq 80% bark	$<$ 80% bark
Height	Full-broken top	Broken top	Broken top to 50% height	$<$ 50 % of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 24

Tree species (if known) Green Ash

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Hackberry

Dominant midstory tree species in project area Hackberry

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt31

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/14/20
 Location Henderson/ Wilson Creek County Henderson State KY
 Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 32
 Latitude / Longitude 37.786341/-87.627407 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	<u>Few-no branches</u>	Limb stubs to none	none
Bark Tightness	80-100% remaining	<u>30-80% remaining</u>	If snag has most of height and \leq 30% bark, or if snag has $<$ 50% of height and \geq 80% bark	$<$ 80% bark
Height	<u>Full-broken top</u>	Broken top	Broken top to 50% height	$<$ 50 % of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 48

Tree species (if known) Red Oak

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Hackberry

Dominant midstory tree species in project area Hackberry

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt32

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/14/20
 Location Henderson/ Wilson Creek County Henderson State KY
 Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 33
 Latitude / Longitude 37.786683/-87.628576 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	Few-no branches	Limb stubs to none	none
Bark Tightness	80-100% remaining	30-80% remaining	If snag has most of height and \leq 30% bark, or if snag has <50% of height and \geq 80% bark	<80% bark
Height	Full-broken top	Broken top	Broken top to 50% height	<50 % of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 20

Tree species (if known) Hackberry

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Hackberry

Dominant midstory tree species in project area Hackberry

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt33

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/14/20
 Location Henderson/ Wilson Creek County Henderson State KY
 Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 34
 Latitude / Longitude 37.786243/-87.630024 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	Few-no branches	<u>Limb stubs to none</u>	none
Bark Tightness	80-100% remaining	30-80% remaining	If snag has most of height and ≤ 30% bark, or if snag has <50% of height and ≥ 80% bark	<u><80% bark</u>
Height	Full-broken top	Broken top	<u>Broken top to 50% height</u>	<50 % of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 20

Tree species (if known) Box Elder

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Hackberry

Dominant midstory tree species in project area Hackberry

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt34

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/14/20
Location Henderson/ Wilson Creek County Henderson State KY
Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 35
Latitude / Longitude 37.786412/-87.631121 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	Few-no branches	<u>Limb stubs to none</u>	none
Bark Tightness	80-100% remaining	30-80% remaining	If snag has most of height and ≤ 30% bark, or if snag has <50% of height and ≥ 80% bark	<u><80% bark</u>
Height	Full-broken top	Broken top	<u>Broken top to 50% height</u>	<50 % of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 24

Tree species (if known) Box Elder

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Hackberry

Dominant midstory tree species in project area Hackberry

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt35

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/14/20
 Location Henderson/ Wilson Creek County Henderson State KY
 Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 36
 Latitude / Longitude 37.785884/-87.632331 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	Few-no branches	Limb stubs to none	none
Bark Tightness	80-100% remaining	30-80% remaining	If snag has most of height and \leq 30% bark, or if snag has $<50\%$ of height and \geq 80% bark	$<80\%$ bark
Height	Full-broken top	Broken top	Broken top to 50% height	$<50\%$ of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 36

Tree species (if known) Hackberry

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Hackberry

Dominant midstory tree species in project area Hackberry

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt36

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/14/20
 Location Henderson/ Wilson Creek County Henderson State KY
 Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 37
 Latitude / Longitude 37.785514/-87.632671 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	Few-no branches	Limb stubs to none	none
Bark Tightness	80-100% remaining	30-80% remaining	If snag has most of height and \leq 30% bark, or if snag has <50% of height and \geq 80% bark	<80% bark
Height	Full-broken top	Broken top	Broken top to 50% height	<50 % of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 30

Tree species (if known) Box Elder

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Hackberry

Dominant midstory tree species in project area Hackberry

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt37

Bat Habitat Preliminary Assessment

Project Name Community Solar Date 5/14/20
 Location Henderson/ Wilson Creek County Henderson State KY
 Transmission line # (if applicable) _____ Associated Structures (if applicable) Bat Tree 38
 Latitude / Longitude 37.785635/-87.632825 Surveyor HO, BS

Pictures documenting project site (Pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area that includes the tree being documented along with showing the density of the surrounding forest

Check all that apply for specific trees

- Live tree
- Snag (dead or dying tree still standing)

Description of level of decay if tree is a snag (use following table to make determination) _____

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	Few-no branches	Limb stubs to none	none
Bark Tightness	80-100% remaining	30-80% remaining	If snag has most of height and \leq 30% bark, or if snag has $<50\%$ of height and \geq 80% bark	$<80\%$ bark
Height	Full-broken top	Broken top	Broken top to 50% height	$<50\%$ of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Needed documentation for specific trees

DBH – diameter of tree at breast height (inches) 36

Tree species (if known) Hackberry

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site 36

Area of the project site to be cleared 0%

Percent of the project site forested 14%

Dominant canopy tree species in project area Hackberry

Dominant midstory tree species in project area Hackberry

Note: Include reference so corresponding pictures can be matched correctly with this check sheet Bt38

ENDANGERED SPECIES ASSESSMENT Of the Proposed Henderson County Solar Site Henderson County, Kentucky Additional Parcels

April 2021



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Tables

Table 1. Federal and State Listed Threatened and Endangered Species with the Potential to Occur at or near the CS Additional Sites in Henderson County, Kentucky

1. Introduction

AECOM was contracted to conduct an ecological survey focused on an endangered species review associated with the Proposed Henderson County Solar Project Site (“site”) near Henderson in Henderson County, Kentucky in June 2020 (**Figure 1**). The site is located on the southwest side of Henderson, which is located near the Ohio River. The survey included land located in two sites of approximately 625 and 94 acres, for a total area of approximately 719 acres. In December 2020 the site was revisited to include three additional tracts totaling 71 acres, **Figure 2**. The additional property included three new tracts identified as the north tract, 6.7 acres; middle tract 25.4 acres and the south tract 38.9 acres.

The purpose of the survey was to identify the potential for endangered or other protected species and/or their habitat to be present at the site and evaluate the possibility that they might be impacted by future construction activities. The site on which the survey was conducted consisted mostly of agricultural land with no buildings present other than an electric transfer station on the north tract.

The proposed additional footprint of the project would cover approximately 71 additional acres. This includes agricultural fields, vegetated areas (woodlands) along Wilson Creek and Canoe Creek, and the transfer station.

Searches of publicly available information were conducted, including:

- Aerial photography;
- U.S. Geological Survey (USGS) quadrangle maps;
- U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) soil survey;
- U.S. Fish and Wildlife Service (USFWS), National Wetlands Inventory (NWI) maps;
- USFWS, Information for Planning and Consultation (IPaC) online reports;
- Kentucky Department of Fish and Wildlife Resources (KDFWR), Natural Heritage Database.

There are two figures and three attachments associated with this report. Figures include: •
Figure 1 - Site Location Map

- Figure 2 - Site Features Map

Attachments include:

- Attachment 1 – Photo log
- Attachment 2 - USFWS IPaC Report and State-listed Species for the Henderson Quadrangle
- Attachment 3 – Potential Bat Roost Tree Data Forms.

2. Literature Review

The USFWS IPaC report (USFWS 2020), accessed December 21, 2020, and the KDFWR Natural Heritage website ([KDFWR 2020](#)), accessed December 21, 2020, as well as topographic mapping, aerial survey, soils, geology, and other information were reviewed to determine the potential presence of endangered species. The potential for certain birds protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act to utilize habitat at the site also was considered. Following review of the available literature, a field survey and habitat characterization were performed in accordance with standard habitat inspection and wildlife survey methods as well as Indiana Bat Survey Guidelines (FWS 2019).

The survey included visual observation of the site and characterization of the vegetation, land use, crops, water bodies, and other features to determine if habitat for endangered species or other protected species identified by the FWS or state databases was on site. The NRCS website was utilized to determine the soil types present on the site as a potential indicator of hydric soils and wetlands.

Following review of these data, a field survey was conducted of the site on December 14, 2020. The field team was led by Mr. Niels Hiedner, with support from Mr. Jim Orr.

2.1 Site Setting

The site additional properties consist of three tracts with the north tract abutting Highway 60 on the south, the middle tract abutting Route 425 to the north and the south tract located to the south of Wilson Creek all near Henderson, Kentucky.

The sites are bordered by agricultural land to the east, west, and south, with more developed residential and commercial property to the north, particularly along State Highway 60. The north tract, located north and east of the middle tract is bordered by the riparian area of Canoe Creek to the south and commercial/residential property on all other sides.

The middle tract is a long narrow parcel of land located north of state route 425 (Henderson Bypass) and partially abuts a railway into and out of Henderson. The tract is roughly 4,600 feet long and 200 – 250 wide. Most of this tract is in agricultural field.

The south tract abuts Wilson Creek to the north and a tributary to Wilson Creek to the south. The south tract does not connect directly to any named roadways. The property is primarily agricultural fields with forested areas along the borders between the property line and adjacent to both streams.

The topography of all tracts is primarily flat with some rolling hills with elevations from 440 feet above sea level (ASL) to about 360 feet ASL in the Wilson Creek bottom. There are few undisturbed areas on the sites as they are primarily farmed land. Most of the sites were planted in corn, soybeans or left fallow, with some open grassland. Wilson Creek runs north of the south, with all of the runoff from the sites flowing to Wilson Creek and eventually to Canoe Creek and the Ohio River or directly to Canoe Creek. Neither Wilson nor Canoe Creek are classified in Kentucky as an Exceptional Water.

The sites are located in Ecoregion 72 in Kentucky (Shawnee Hills), which is made up of nearly level lowlands that are dominated by agriculture and forested hills. It is characteristically underlain

by carboniferous sedimentary rock and is lithologically distinct from the limestones, calcareous shales, and dolomites of the Interior Plateau (71) and the unconsolidated coastal plain sediments of the Mississippi Valley Loess Plains (74). Broad, low gradient valleys occur and are filled with alluvium, loess, and lacustrine deposits, including the Green River. Drainage conditions and terrain strongly affect land use. Wetlands are common on lowlands and bottomlands. Bottomland deciduous forests and swamp forests were once extensive on poorly drained, nearly level, lowland sites but most have been replaced by cropland and pastureland. Hilly uplands remain mostly forested. Ecoregion 72 includes Kentucky's Western Coal Fields. Extensive surface and underground coal mines occur and have significantly degraded downstream habitat and water quality. Silt and sand dominate lowland channels, while upland streams are rockier. Streams typically have lower nutrient, alkalinity, and hardness levels than Ecoregion 71. Fish assemblages are lowland in character and are rather similar to those found in Ecoregion 74, http://ecologicalregions.info/data/ky/ky_front.pdf.

3. Methods

Data were collected to characterize areas of the site in terms of habitat, including geology, hydrology, dominant plant species, and vegetation type. Specific site features are depicted in **Figure 2** for the three tracts. Photographs were taken of the bat trees, habitats and surrounding areas is provided in **Attachment 1**.

Endangered species were reviewed from the US Fish and Wildlife Service IPaC database and the State of Kentucky listing of Rare Species for the Henderson Quadrangle http://environment-online.state.il.us:8080/pls/enf_reports/, accessed December, 2020, **Attachment 2**. These species as well as their preferred habitat are summarized in Table 1. The need for a clearance survey of specific species is also summarized in **Table 1**. Coordination with the USFWS would be required prior to site development and additional clearance surveys may be required. In the field, habitats common to the listed species were surveyed for potential presence or absence. Specifically, endangered bat species utilize trees with exfoliated bark, cracks and crevices. Where potential bat roost trees were located, a Phase I bat survey form was completed and photos taken, **Attachment 3**.

4. Field Survey

4.1 Site Habitats

The additional sites include three tracts. The south tract is the only tract bordered by water. Wilson Creek is located on the northeast corner of the south tract and has a narrow forested riparian area. These woods were dominated by oak timber but also exhibit hickory, hackberry, maple, sweetgum, boxelder, and sycamore trees. Wilson Creek features many vertical soil embankments between 5 and 20 feet in height. The north tract has a drainage on the southwest corner that drains to Canoe Creek.

The middle tract is a long narrow piece of land bordering the railroad. Most of the land is crop or pasture land with a narrow strip of hardwoods bordering the railway.

4.2 Vegetation

The additional sites include primarily by crop fields, wooded areas, retention ponds, and some wetlands. The dominant tree species on the properties is hackberry (*Celtis occidentalis*), which is found on all field borders. Also present are American sycamore (*Plantanus occidentalis*), cottonwood (*Populus deltoides*), boxelder (*Acer negundo*), hickory species (*Carya* sp.), oak species (*Quercus* sp.), American elm (*Ulmus americana*) and sugar maple (*Acer saccharum*). A variety of herbaceous plants and shrubs are located in the open areas, including Johnson grass (*Sorghum halepense*), golden rod (*Solidago* sp.), fescue grass (*Festuca* sp.) and numerous annual weeds.

There are no state-protected plant species listed for the Henderson Quadrangle, and no federally-protected plant species are potentially located near the site according to the FWS IPaC report.

4.3 Wildlife

Wildlife common to the Shawnee Hills Ecoregion include: whitetail deer (*Odocoileus virginianus*), wild turkey (*Meleagris gallopavo*), cottontail rabbit (*Sylvilagus floridanus*), gray and fox squirrels (*Sciurus* spp.), raccoon (*Procyon lotor*), skunk (*Mephitis mephitis*), opossum (*Didelphis virginiana*), coyote (*Canis latrans*), and numerous reptiles, amphibians, small mammals, songbirds, raptors, and waterfowl. The site has marginal wildlife value due to the lack of natural areas and dominance of agricultural land. The Wilson and Canoe Creek riparian areas do provide a wildlife corridor and habitat for a number of animal species. Whitetail deer and a variety of birds were observed during the site survey. Protected wildlife species are discussed in the Section 5 – Results.

5. Results

5.1 Federally-Listed Threatened and Endangered Wildlife Species

The USFWS IPaC report for the subject site identifies 15 federally listed endangered or threatened wildlife species with a potential to occur in the project vicinity (**Table 1**). These include three bats (gray bat, Indiana bat, and northern long-eared bat [NLEB]), one bird (least tern), and 11 species of mussels.

The gray bat is a cave dweller year-round, but the property does not appear to have any caves present; therefore, neither roosting nor wintering habitat for this species is located on site.

According to the USFWS IPaC report, designated critical habitat for the Indiana bat is located outside of the project location, and there is no critical habitat designated for the NLEB. However, suitable spring/summer roosting and maternity habitat for the Indiana bat and NLEB potentially could occur on the site. Therefore, the AECOM field team conducted a survey for suitable bat summer roosting habitat. This habitat includes exfoliated bark, cracks, crevices, and hollows in living and dead trees that are at least 10 feet off the ground as well as flaking bark on standing dead trees.

The survey of bat habitat found 2 suitable potential roost trees one of the north tract and one on the south tract. Both trees were standing dead, one American elm and one red oak. Much of the middle and south tracts included fields bordered by forest, which is typical feeding habitat for Indiana bat and NLEB.

In addition to the bat species that might potentially be impacted by site construction, one bird – least tern, and 11 mussel species were listed in the IPaC report for the project area. Least tern is a shore bird which nests along large river banks, such as the Ohio River. The sites do not contain suitable habitat for this species. With the exception of two mussel species, clubshell and little spectaclecase, the habitat for mussels species is limited to large rivers or specific river locations indicated in **Table 1**. In the event impacts to Wilson or Canoe Creeks are planned, consultation with the USFWS is recommended.

Table 1. Federal and State Listed Threatened and Endangered Species with the Potential to Occur at or near the Additional Sites in Henderson County, Kentucky.

Common Name Scientific Name	Status Fed, State	Habitat	Clearance Survey Recommended if impacts to habitat expected**
Mammals			
Gray bat <i>Myotis grisescens</i>	FE, SE	Cave obligate, frequents forested areas	No
Indiana bat <i>M. sodalis</i>	FE, SE	Hibernates in caves, spring/summer maternity roosts normally under bark of standing trees	Yes
Northern long-eared bat <i>M. septentrionalis</i>	FT, NL	Hibernates in caves or mines, summer roosting under bark or in cavities of trees, rarely roosts in barns or sheds	Yes
Birds			
Least Tern, <i>Sterna antillarum</i>	FE, SE	Sand and gravel pits, agricultural fields	No
American Coot <i>Fulica americana</i>	NL, SE	Ponds, lakes and marshes, Requires shallow marshes for breeding	No
Bald Eagle <i>Haliaeetus leucocephalus</i>	NL, ST	Coastlines, rivers, and large lakes	No
Bank Swallow <i>Riparia riparia</i>	NL, SS	Nests on vertical banks of dirt or sand along rivers or ponds	No
Blue-Winged Teal <i>Spatula discors</i>	NL, ST	Shallow freshwater or brackish marshes	No
Brown Creeper <i>Certhia americana</i>	NL, SE	Woodlands, needs mature forest for breeding	No
Dark-Eyed Junco <i>Junco hyemalis</i>	NL, SS	Edges of woodlands by open fields	No
Double-Crested Cormorant <i>Phalacrocorax auritus</i>	NL, ST	Coasts, bays, lakes, rivers	No

Common Name Scientific Name	Status Fed, State	Habitat	Clearance Survey Recommended if impacts to habitat expected**
Henslow's Sparrow <i>Centronyx henslowii</i>	NL, SS	Weedy fields and meadows with sparse shrubs	No
Hooded Merganser <i>Lophodytes cucullatus</i>	NL, ST	Wooded lakes, ponds, and rivers	No
Northern Harrier <i>Circus hudsonius</i>	NL, ST	Marshes, fields, or prairies	No
Northern Shoveler <i>Spatula clypeata</i>	NL, SE	Marshes and ponds	No
Pied-billed Grebe <i>Podilymbus podiceps</i>	NL, SE	Breeds in dense marshes with little open water	No
Red-breasted Nuthatch <i>Sitta canadensis</i>	NL, SE	Conifer trees including spruce, fir and hemlock	No
Red-headed Woodpecker <i>Melanerpes erythrocephalus</i>	NL, SS	Forest edges or open woods	No
Sharp-shinned Hawk <i>Accipiter striatus</i>	NL, SS	Dense forest avoids open country	No
Short-eared Owl <i>Asio flammeus</i>	NL, SE	Prairies, marshes, dunes and tundra	No
Mussels			
Clubshell, <i>Pleurobema clava</i>	FE, ST	Small to medium upland rivers with bedrock or gravel substrate and boulders	Potential
Fanshell, <i>Cyprogenia stegaria</i>	FE, NL	Medium to large rivers, deep sand/gravel bottoms	No
Fat Pocketbook <i>Potamilus capax</i>	FE	Mixed substrate of silt, mud, and sand in large rivers	No
Northern Riffleshell <i>Epioblasma torulosa rangiana</i>	FE	Short reaches of the Green River	No
Orangefoot Pimpleback <i>Plethobasus cooperainus</i>	FE	Lower Ohio River	No
Purple Cat's Paw <i>Epioblasma obliquata obliquata</i>	FE	Killbuck Creek, OH	No
Rabbitsfoot <i>Quadrula cylindrica cylindrica</i>	FT	Ohio River, KY	No
Ring Pink <i>Obovaria retusa</i>	FE	Green River, KY	No
Rough Pigtoe <i>Pleurobema plenum</i>	FE	Green River and Barren River, KY	No
Sheepnose Mussel <i>Plethobasus cyphus</i>	FE, SE	Shallow portions of large rivers in coarse sand and gravel	No
Spectaclecase <i>Cumberlandia monodonta</i>	FE	Sheltered areas of firm mud in large rivers	No
Pocketbook <i>Lampsilis ovata</i>	NL, SE	Large rivers in coarse sand and gravel	No
Little Spectaclecase <i>Villosa lienosa</i>	NL, SS	Silty, clay substrates in tributary streams	Potential
Fish			
Spottail shiner, <i>Notropis hudsonius</i>	NL, SS	Spawn in sandy shoals, tributary streams and lakes, avoids strong currents	No
*F=federal, S=state, E=endangered, T=threatened, NL=Not Listed, S=Special Concern **Clearance survey is recommended if respective habitat is to be disturbed by construction			

5.2 State-Listed Threatened and Endangered Species

Twenty state-protected species were identified by KDFWR for Henderson County (Table 1). These consist of one bat, 15 birds, one fish, and three mussel species. Based on the mature hardwoods in the riparian area of the two streams of the site, the presence of habitat for the bat species is possible. If any of the habitats for bat species would be disturbed during construction, clearance surveys are recommended for these species, as summarized in Table 1. Habitat for all of the other state-listed species does not appear to be present, or is not present in sufficient quantity, to support the species on or adjacent to the site where it could be affected. However, if impacts to Wilson or Canoe Creeks are planned consultation with the Kentucky Department of Fish and Wildlife Resources is recommended.

5.3 Migratory Birds

A migratory bird of conservation concern (BCC) identified in the IPaC report as potentially occurring in or near the site is the red-headed woodpecker (*Melanerpes erythrocephalus*) (see **Attachment 2**). The breeding period for the red-headed woodpecker is May 10 to September 10 (USFWS 2020). This species was not observed during the May or December 2020 site visits. The IPaC report also noted that the bald eagle (*Haliaeetus leucocephalus*), while not a BCC, warrants attention based on the Bald and Golden Eagle Protection Act.

The migratory bird nesting period in Kentucky is from April 15 to July 31. This time period is critical for migratory bird reproduction. None of these species listed in Table 1 were observed during the May or December 2020 site visits.

6. Regulatory Requirements

Federal Regulations

Federal permits pertaining to endangered and threatened species may be necessary in the event that these sensitive resources cannot be avoided during the design and construction phase of the project. Consultation with the USFWS should be undertaken to ensure lack of, or minimal impact to, federally listed species. If threatened and endangered species cannot be avoided, a Section 10 incidental take permit may be required. Removal of summer roost trees for the Indiana bat and NLEB is dependent on location related to hibernacula buffers. If the site is within a hibernacula buffer, then the tree clearing dates are from November 15th to March 31st. If the site is not within a buffer, then the window is from October 15th to March 31st. If tree clearing is required, mitigation multipliers are based on habitat type and season (FWS 2016). Based on the maps of known ranges of the Indiana bat and NLEB in Kentucky, the site is potentially located in NLEB known summer roost habitat (FWS 2020) https://www.fws.gov/frankfort/indiana_bat_procedures.html.

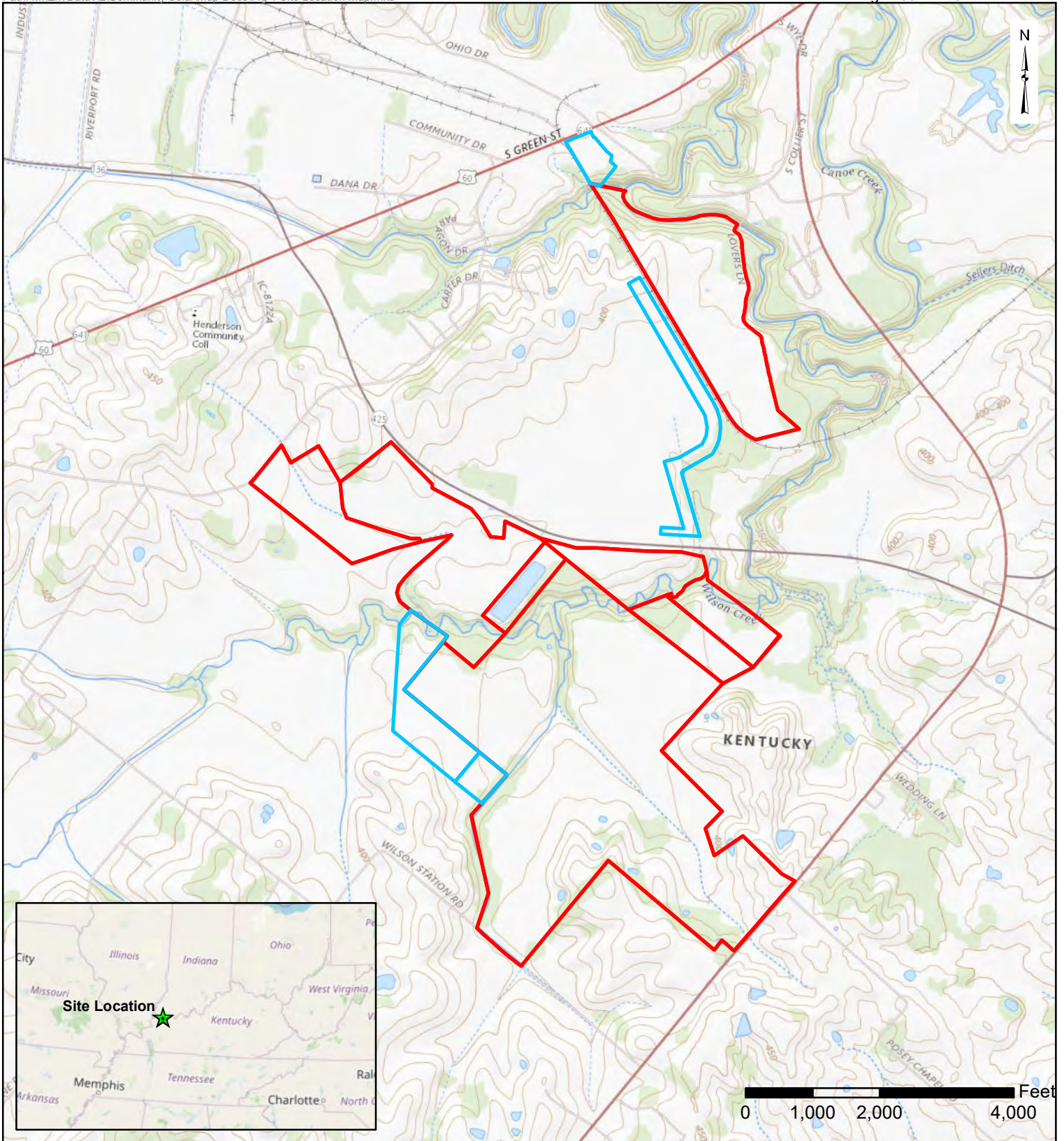
Based on the presence of potential bat roost trees on the site, and location of potential NLEB summer habitat near the project area, consultation with the USFWS is required prior to any tree clearing. Mitigation for tree clearing any time of the year may be required.

The Migratory Bird Treaty Act (MTBA) prohibits taking, attempting to take, capturing, killing, selling/purchasing, possessing, transporting, and importing migratory birds, their eggs, parts, and nests, except when specifically authorized by the USFWS. Nesting periods in Kentucky for migratory birds are from April 15 to July 31. Nest habitat, particularly for the species identified on the IPaC report, was very limited within the project area.



7. References

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Path: M:\EnvData\viz\Community Solar\Map Docs\Fig 1 Site Location Map.mxd



LEGEND

-  Original Study Areas
-  Additional Study Areas

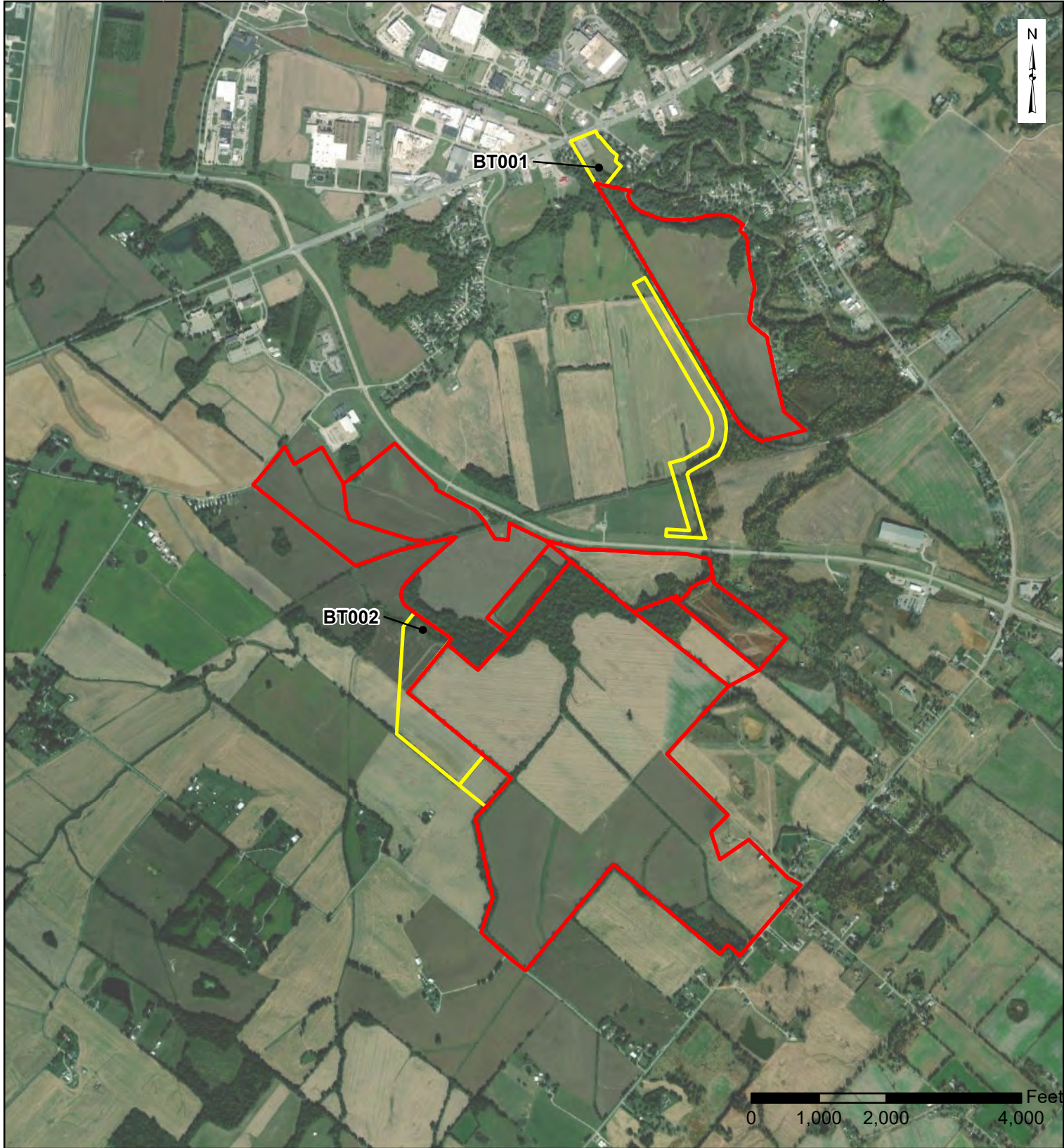
SOURCE: USGS TOPOGRAPHIC BASEMAP SERVICE

Community Solar
Henderson County Proposed Solar Site
3001 Wilson Station Road and 620 Lovers Lane
Henderson, KY 42420

SITE LOCATION MAP

AECOM
Figure: 1

Project No.: 60632959 Date: 1/5/2021



LEGEND

- Original Study Areas
- Additional Study Areas

SOURCE: USGS TOPOGRAPHIC BASEMAP SERVICE

Community Solar
Henderson County Proposed Solar Site
 3001 Wilson Station Road and 620 Lovers Lane
 Henderson, KY 42420

SITE FEATURES MAP



Project No.: 60632959 Date: 1/5/2021

Attachment 1 – Photo Log



PHOTOGRAPH LOG

Client Name: Henderson County Solar LLC	Site Location: Henderson Co, KY	Project No. 60631607.2f
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Photo No. 1	Date: 12/14/20
Direction Photo Taken: NE	
Description: Location of BT-001	

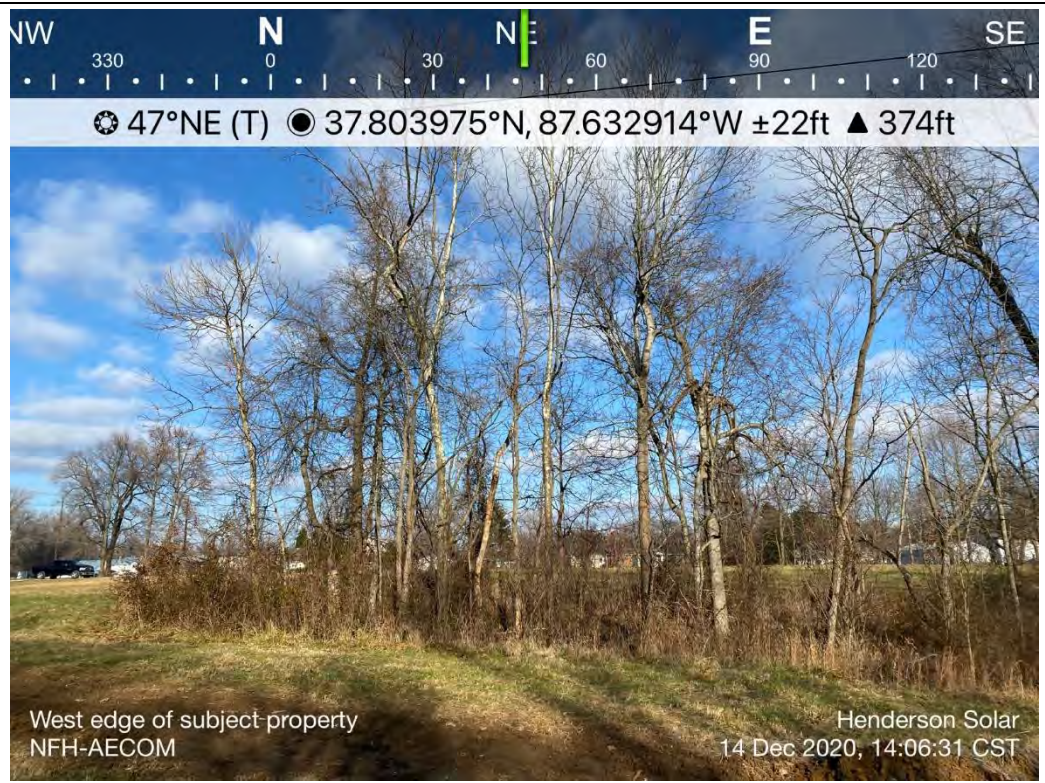


Photo No. 2	Date: 05/13/20
Direction Photo Taken: South	
Description: From north side of north parcel facing south with forested area to the south side with BT-001 in tree line to the left	





PHOTOGRAPH LOG

Client Name: Henderson County Solar LLC	Site Location: Henderson Co, KY	Project No. 60631607.2f
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Photo No. 3	Date: 12/14/20
Direction Photo Taken: SE	
Description: BT-002	



Photo No. 4	Date: 12/15/20
Direction Photo Taken: Northeast	
Description: Southeast corner of south parcel where BT-002 is located	



**Attachment 2 - USFWS IPaC Report
and
State Listed Species for the Henderson County**

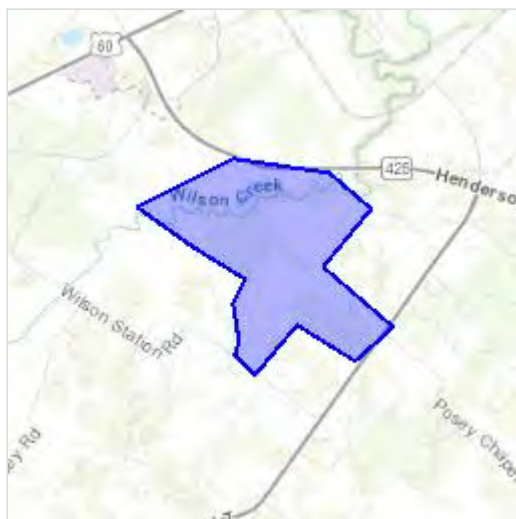
IPaC resource list

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


Henderson County, Kentucky



Local office

Kentucky Ecological Services Field Office

 (502) 695-0468

 (502) 695-1024

J C Watts Federal Building, Room 265
330 West Broadway
Frankfort, KY 40601-8670

<http://www.fws.gov/frankfort/>

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 species¹ 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 Fisheries²).

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.
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
<p>Gray Bat <i>Myotis grisescens</i></p> <p>This species only needs to be considered if the following condition applies:</p> <ul style="list-style-type: none"> • The project area includes potential gray bat habitat. <p>No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6329</p>	Endangered
<p>Indiana Bat <i>Myotis sodalis</i></p> <p>This species only needs to be considered if the following condition applies:</p> <ul style="list-style-type: none"> • The project area includes 'potential' habitat. All activities in this location should consider possible effects to this species. <p>There is final critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/5949</p>	Endangered
<p>Northern Long-eared Bat <i>Myotis septentrionalis</i></p> <p>This species only needs to be considered if the following condition applies:</p> <ul style="list-style-type: none"> • The specified area includes areas in which incidental take would not be prohibited under the 4(d) rule. For reporting purposes, please use the "streamlined consultation form," linked to in the "general project design guidelines" for the species. <p>No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045</p>	Threatened

Birds

NAME

STATUS

Least Tern *Sterna antillarum*

Endangered

This species only needs to be considered if the following condition applies:

- This species should be addressed if the action area includes bare open areas with sparse to no vegetation (e.g., sand and gravel pits, agricultural fields) and the action would occur during the nesting season (April - August).

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/8505>

Clams

NAME

STATUS

Clubshell *Pleurobema clava*

Endangered

This species only needs to be considered if the following condition applies:

- The species may be affected by projects that significantly impact, directly or indirectly, the following rivers: Barren, Green, Licking, or Ohio.

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/3789>

Fanshell *Cyprogenia stegaria*

Endangered

This species only needs to be considered if the following condition applies:

- The species may be affected by projects that significantly impact, directly or indirectly, the following rivers: Barren, Green, Licking, Ohio, Rolling Fork Salt, or Tennessee.

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/4822>

Fat Pocketbook *Potamilus capax*

Endangered

This species only needs to be considered if the following condition applies:

- The species may be affected by projects that significantly impact, directly or indirectly, the following rivers: Clarks, Cumberland, Green, Mississippi, Ohio, Tradewater, or Tennessee.

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/2780>

Northern Riffleshell *Epioblasma torulosa rangiana*

Endangered

This species only needs to be considered if the following condition applies:

- The species may be affected by projects that significantly impact, directly or indirectly, the following rivers: Green, Licking, or Ohio.

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/527>

Orangefoot Pimpleback (pearlymussel) *Plethobasus cooperianus*

Endangered

This species only needs to be considered if the following condition applies:

- The species may be affected by projects that significantly impact, directly or indirectly, the following rivers: Green, Ohio, Salt, or Tennessee.

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/1132>

Purple Cat's Paw (=purple Cat's Paw Pearlymussel) *Epioblasma obliquata obliquata*

Endangered

This species only needs to be considered if the following condition applies:

- The species may be affected by projects that significantly impact, directly or indirectly, the following rivers: Green, Licking, or Ohio.

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/5602>

Rabbitsfoot *Quadrula cylindrica cylindrica*

Threatened

This species only needs to be considered if the following condition applies:

- The species may be affected by projects that significantly impact, directly or indirectly, the following rivers: Barren, Cumberland (below the falls), Green, Ohio, Rolling Fork Salt, South Fork Kentucky, or Tennessee.

There is **final** critical habitat for this species. Your location is outside the critical habitat.

<https://ecos.fws.gov/ecp/species/5165>

Ring Pink (mussel) *Obovaria retusa*

Endangered

This species only needs to be considered if the following condition applies:

- The species may be affected by projects that significantly impact, directly or indirectly, the following rivers: Barren, Cumberland (below the falls), Green, Ohio, or Tennessee.

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/4128>

Rough Pigtoe *Pleurobema plenum*

Endangered

This species only needs to be considered if the following condition applies:

- The species may be affected by projects that significantly impact, directly or indirectly, the following rivers: Barren, Green, Licking, or Ohio.

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/6894>

Sheepnose Mussel *Plethobasus cyphus*

Endangered

This species only needs to be considered if the following condition applies:

- The species may be affected by projects that significantly impact, directly or indirectly, the following rivers: Barren, Green, Kentucky, Licking, Ohio, Salt, or Tennessee.

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/6903>

Spectaclecase (mussel) *Cumberlandia monodonta*

Endangered

This species only needs to be considered if the following condition applies:

- The species may be affected by projects that significantly impact, directly or indirectly, the following rivers: Barren, Cumberland (below the falls), Green, Little South Fork of the Cumberland, Ohio, or Tennessee.

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/7867>

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.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

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 <http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Measures for avoiding and minimizing impacts to birds <http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/>

[conservation-measures.php](#)

- Nationwide conservation measures for birds

<http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf>

The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern](#) (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
------	--

Bald Eagle *Haliaeetus leucocephalus*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

<https://ecos.fws.gov/ecp/species/1626>

Breeds Sep 1 to Jul 31

Red-headed Woodpecker *Melanerpes erythrocephalus*

Breeds May 10 to Sep 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (I)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

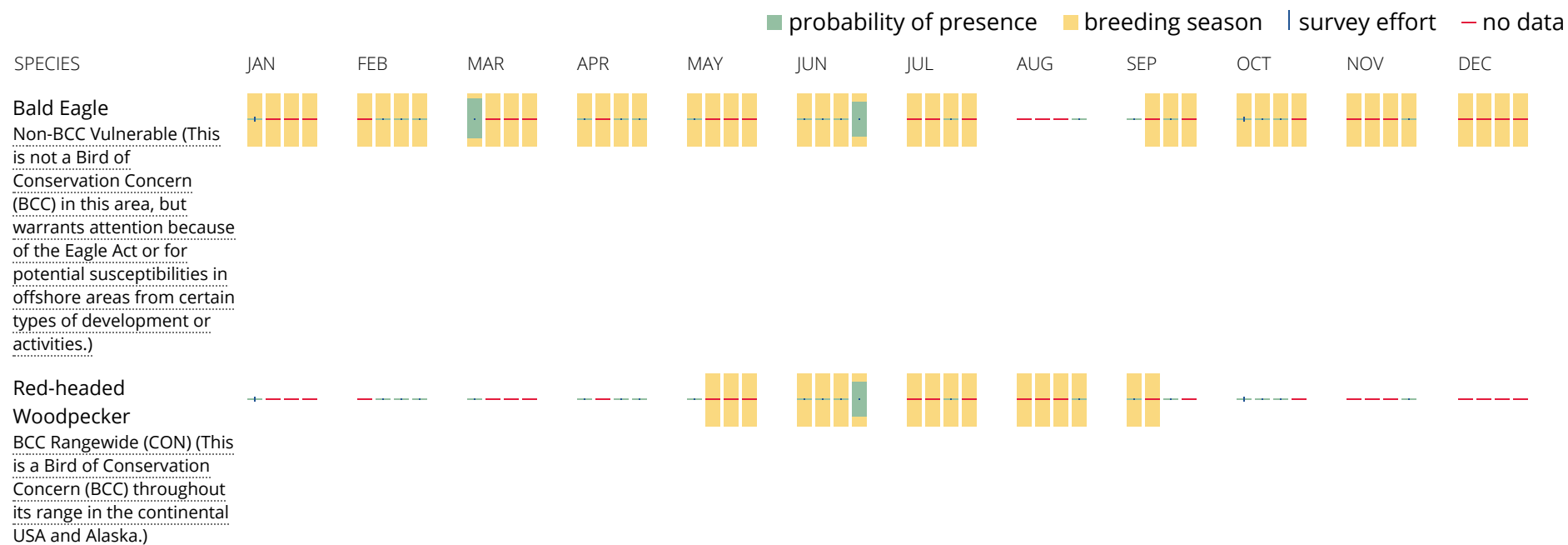
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (-)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



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](#) and/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 migratory birds potentially occurring 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 [AKN Phenology 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, migrating or present year-round in my project 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 refer to the following resources: [The Cornell Lab of Ornithology All About Birds Bird Guide](#), or (if you are unsuccessful in locating the bird of interest there), the [Cornell Lab of Ornithology Neotropical Birds guide](#). 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

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 tubercid 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.



Species Information

State Threatened, Endangered, and Special Concern Species observations for selected quads

Linked life history provided courtesy of NatureServe Explorer .

Records may include both recent and historical observations.

[US Status Definitions](#) [Kentucky Status Definitions](#)

List State Threatened, Endangered, and Special Concern Species observations in 1 selected quad.

Selected quad is: Henderson.

Scientific Name and Life History	Common Name and Pictures	Class	Quad	US Status	KY Status	WAP	Reference
<i>Fulica americana</i>	American Coot	Aves	Henderson	N	E		Reference
<i>Haliaeetus leucocephalus</i>	Bald Eagle	Aves	Henderson	N	T	Yes	Reference
<i>Riparia riparia</i>	Bank Swallow	Aves	Henderson	N	S	Yes	Reference
<i>Spatula discors</i>	Blue-winged Teal	Aves	Henderson	N	T		Reference
<i>Certhia americana</i>	Brown Creeper	Aves	Henderson	N	E	Yes	Reference
<i>Junco hyemalis</i>	Dark-eyed Junco	Aves	Henderson	N	S		Reference
<i>Phalacrocorax auritus</i>	Double-crested Cormorant	Aves	Henderson	N	T		Reference
<i>Centronyx henslowii</i>	Henslow's Sparrow	Aves	Henderson	N	S	Yes	Reference
<i>Lophodytes cucullatus</i>	Hooded Merganser	Aves	Henderson	N	T	Yes	Reference
<i>Villosa lienosa</i>	Little Spectaclecase	Bivalvia	Henderson	N	S	Yes	Reference
<i>Circus hudsonius</i>	Northern Harrier	Aves	Henderson	N	T	Yes	Reference

<i>Myotis septentrionalis</i>	Northern Myotis	Mammalia	Henderson	T	E		Reference
<i>Spatula clypeata</i>	Northern Shoveler	Aves	Henderson	N	E		Reference
<i>Podilymbus podiceps</i>	Pied-billed Grebe	Aves	Henderson	N	E	Yes	Reference
<i>Lampsilis ovata</i>	Pocketbook	Bivalvia	Henderson	N	E	Yes	Reference
<i>Sitta canadensis</i>	Red-breasted Nuthatch	Aves	Henderson	N	E	Yes	Reference
<i>Accipiter striatus</i>	Sharp-shinned Hawk	Aves	Henderson	N	S	Yes	Reference
<i>Plethobasus cyphus</i>	Sheepnose	Bivalvia	Henderson	E	E	Yes	Reference
<i>Asio flammeus</i>	Short-eared Owl	Aves	Henderson	N	E	Yes	Reference
<i>Notropis hudsonius</i>	Spottail Shiner	Actinopterygii	Henderson	N	S		Reference

20 species are listed.

Attachment 3 - Potential Bat Roost Tree Data Forms

Bat Habitat Preliminary Assessment

Project Name Henderson Solar Date 2020-12-15
 Location South Parcel / BT-NFH-002 County Henderson State KV
 Transmission line # (if applicable) Associated Structures (if applicable)
 Latitude / Longitude 37.78448, -87.63986 Surveyor NFH

Pictures documenting project site (pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area including the tree

Documentation for specific trees

Snag Class: Live Declining Dead

Description of level of decay if tree is a snag (use following table to make determination)

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	Few-no branches	Limb stubs to none	none
Bark Tightness	80-100% remaining	30-80% remaining	If snag has most of height and ≤ 30% bark, or if snag has <50% of height and ≥ 80% bark	<80% bark
Height	Full-broken top	Broken top	Broken top to 50% height	<50 % of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Percent solar exposure 50 %

Roost Tree Quality: Low Medium High

DBH (inches) 30 Tree species (if known) Oak

Percent usable bark: 0-25% 26-50% 51-75% 76-100%

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site
 Area of the project site to be cleared
 Percent of the project site forested %
 Dominant canopy tree species in project area
 Dominant midstory tree species in project area

North Southeast Corner of Property

Bat Habitat Preliminary Assessment

Project Name Henderson Solar Date 2020-12-14
 Location Northern Parcel, BT-NFH-001 County Henderson State KY
 Transmission line # (if applicable) Associated Structures (if applicable)
 Latitude / Longitude 37.80432, -87.63279 Surveyor NFH

Pictures documenting project site (pictures in this section only needed once for each project site)

- General picture(s) of the potential habitat (a picture of the forest) and the project site
- Picture(s) of adjacent areas to project site

Pictures for documenting suitability of specific trees

- A picture of the trunk of the tree at eye level
- A picture taken at the base of the tree looking up into the canopy
- A picture taken capturing the whole tree while standing back at a distance
- A picture of the surrounding area including the tree

Documentation for specific trees

Snag Class: Live Declining Dead

Description of level of decay if tree is a snag (use following table to make determination)

	Overall Decay Status			
	1	2	3	4
Branches	80-100%	Few-no branches	Limb stubs to none	<input checked="" type="checkbox"/> none
Bark Tightness	80-100% remaining	30-80% remaining <input checked="" type="checkbox"/>	If snag has most of height and ≤ 30% bark, or if snag has <50% of height and ≥ 80% bark	<80% bark
Height	Full-broken top	Broken top	Broken top to 50% height <input checked="" type="checkbox"/>	<50 % of height

- Tree has **exfoliating bark** 10 ft high or higher off the ground that allows for bats to roost
- Tree has **crevices, cracks, or hollows** 10 ft high or higher off the ground that allow for bats to roost
- The tree is exposed to the sun at some point during the day
- Potential roost tree is within 1000 feet of forested area

Percent solar exposure 40 %

Roost Tree Quality: Low Medium High

DBH (inches) 42 Tree species (if known) Elm

Percent usable bark: 0-25% 26-50% 51-75% 76-100%

Summary of project site (Section only needs to be filled out once for each project site)

Number of potential roost trees within the project site
 Area of the project site to be cleared
 Percent of the project site forested %
 Dominant canopy tree species in project area
 Dominant midstory tree species in project area