



Chipmunk Solar

Exhibit Q

Ecological Assessment Report

Filing 1 of 10

Case No. 21-0960 EL BGN

ECOLOGICAL ASSESSMENT REPORT

FOR THE:
**CHIPMUNK SOLAR PROJECT
PICKAWAY COUNTY, OHIO**

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TABLE OF CONTENTS

| | PAGE |
|--|------|
| 1.0 INTRODUCTION..... | 1 |
| 1.1 Project Description..... | 1 |
| 1.2 Site Description..... | 1 |
| 2.0 REGULATORY OVERVIEW | 2 |
| 2.1 Federal Regulations | 2 |
| 2.2 State and Local Regulations..... | 3 |
| 3.0 BACKGROUND REVIEW AND DESKTOP ASSESSMENT | 5 |
| 3.1 Land Cover | 5 |
| 3.2 Geology | 6 |
| 3.3 Glacial Deposits | 7 |
| 3.4 Soils | 7 |
| 3.5 Wildlife Resources | 9 |
| 3.6 Surface Waters | 13 |
| 3.7 Floodplain..... | 14 |
| 4.0 FIELD SURVEYS..... | 15 |
| 4.1 Habitat Observations | 15 |
| 4.2 Wildlife Observations..... | 24 |
| 4.3 Surface Water Delineation Results..... | 24 |
| 4.3.1 Streams in the Project Area | 24 |
| 4.3.2 Wetlands in the Project Area..... | 25 |
| 4.3.3 Other Waters in the Project Area..... | 25 |
| 5.0 ESTIMATED ECOLOGICAL IMPACTS..... | 26 |
| 5.1 Temporary Project Construction Impacts..... | 26 |
| 5.1.1 Impacts to Land Cover | 26 |
| 5.1.2 Impacts to Wildlife | 28 |
| 5.1.3 Impacts to Surface Waters | 28 |
| 5.1.4 Proposed Mitigation | 29 |
| 5.1.5 Best Management Practices and Minimization of Impacts..... | 29 |
| 5.2 Permanent Project Impacts | 29 |
| 6.0 REFERENCES..... | 31 |

LIST OF TABLES

| | |
|---|----|
| Table 1. Federal Regulations and Compliance Summary | 2 |
| Table 2. State Regulations and Compliance Summary..... | 4 |
| Table 3. Land Cover Within the Project Area | 6 |
| Table 4. Soils Within the Project Area | 8 |
| Table 5. Rare, Threatened, and Endangered Species Habitat Within the Eco Study Area | 16 |
| Table 6. Summary of Impacts to Land Cover | 26 |
| Table 7. Summary of Impacts to Surface Waters | 29 |

LIST OF FIGURES

| | |
|-----------|---|
| Figure 1 | Project Location Map |
| Figure 2 | Project Vicinity Map |
| Figure 3 | USGS 7.5-Minute Topographic Map |
| Figure 4 | Land Cover Map |
| Figure 5 | Bedrock Geology Map |
| Figure 6 | Glacial Deposits Map |
| Figure 7 | Hydric Soils Map |
| Figure 8 | Highly Erodible Soils and Soils with Slopes >12 Percent Map |
| Figure 9 | ODNR Wildlife Resources Map |
| Figure 10 | Surface Water Delineation Map |
| Figure 11 | Watershed Boundaries Map |
| Figure 12 | 100-Year Floodplain and NHD Map |

LIST OF ATTACHMENTS

| | |
|--------------|---|
| Attachment A | Agency Correspondence |
| Attachment B | Rare, Threatened, and Endangered Species Desktop Review |
| Attachment C | Surface Water Delineation Report and Forms |
| Attachment D | Inadvertent Release of Drilling Fluid Contingency Plan |

1.0 INTRODUCTION

1.1 Project Description

Chipmunk Solar, LLC (Chipmunk Solar) is proposing to construct the Chipmunk Solar Project: a 400-megawatt (MW_{AC}), utility-scale solar facility five miles west of Circleville and immediately north of Williamsport in Pickaway County, Ohio (Figure 1). The proposed facility will consist of photovoltaic (PV) solar panels arranged into several arrays and associated infrastructure including access roads, electrical collection lines, a substation/switchyard, and an operations and maintenance building (Project). The preliminary layout and design of the Project encompasses approximately 3,684 acres of privately-owned land (Project Area; Figure 2). Hull has prepared this Ecological Assessment of the Project Area as a required component for a Certificate of Environmental Compatibility and Public Need.

1.2 Site Description

The Project Area contains a predominance of active agricultural land, some scrub-shrub/new field habitat, several deciduous woodlots, and a forested riparian corridor along Dry Run and Deer Creek (Figure 2). It has been shaped by a history of agricultural production, including artificial drainage, tilling, and soil amendments.

The terrain within the Project Area consists of relatively flat topography. The USGS Five Points, Clarksburg, Darbyville, and Williamsport Quadrangle maps indicate the northwest portion of the Project Area slopes inward towards Dry Run, the northeast slopes southeast towards Yellowbud Creek, and the southwest slopes inward towards Deer Creek (Figure 3).

2.0 REGULATORY OVERVIEW

2.1 Federal Regulations

Chippmunk Solar is seeking a Certificate of Environmental Compatibility and Public Need (Certificate) from the Ohio Power Siting Board (OPSB). The federal approval process includes review by the U.S. Fish and Wildlife Service (USFWS) and by the U.S. Army Corps of Engineers (USACE) if impacts are proposed to Waters of the U.S. (WOTUS) (Table 1).

The USFWS review of the Project is required and will consist of consultation with the USFWS regional, Ohio field office under Section 10 or Section 7 of the Endangered Species Act (ESA). Consultation under Section 7 of the ESA must be initiated by the lead federal agency associated with the Project.

The Project is located within the USACE Huntington District. The USACE has sole authority to determine whether wetlands or other water bodies are WOTUS (under federal jurisdiction) or isolated (under state jurisdiction). Determinations must be verified by the USACE after review of a delineation report and a field visit by USACE staff. Delineations are typically valid for a period of five years from the date of the USACE delineation verification letter. If the proposed design of the Project will impact WOTUS, then Chippmunk Solar will obtain the necessary Clean Water Act (CWA) permits prior to any proposed impacts to jurisdictional surface waters.

CWA permits that may be applicable to the Project include Nationwide Permit (NWP) 51 for Land-based Renewable Energy Generation Facilities and NWP 57 for Electric Utility Line and Telecommunications Activities. To comply with the requirements of these NWPs, discharge or fill activities must not cause the loss of greater than ½-acre of WOTUS. The USACE has authority to make the final determination about which NWP is applicable to the Project.

FEDERAL REGULATIONS AND COMPLIANCE SUMMARY

TABLE 1

| Lead Agency | Agency Permit or Approval | Permit Thresholds | Project Applicability |
|-------------------------|--|--|-----------------------|
| USFWS Ohio Field Office | Clearance for threatened and endangered species under either Section 7 or Section 10 of the Endangered Species Act | The Endangered Species Act of 1973 ensures that any action authorized, funded, or carried out by federal agencies does not jeopardize the continued existence of endangered or threatened species or their designated or proposed critical habitats. | Concurrence needed |

| Lead Agency | Agency Permit or Approval | Permit Thresholds | Project Applicability |
|-------------|--------------------------------|--|-----------------------|
| USACE | Clean Water Act Section 404 | Discharge of fill material into WOTUS. Section 10 of the Rivers and Harbors Act is not applicable for the Project because there are no navigable waterways in the Project Area. | Concurrence needed |

2.2 State and Local Regulations

Certificate approval also includes review by the Ohio Department of Natural Resources (ODNR), Ohio's State Historic Preservation Office (SHPO), and the Ohio Environmental Protection Agency (Ohio EPA) for National Environmental Policy Act (NEPA) and ecological concurrence and when impacts are proposed to WOTUS or to isolated surface waters of the state (Table 2).

The ODNR performs Environmental Reviews of a Project's potential effects to federal and state-listed rare, threatened, or endangered species in accordance with Section 1531.25 of the Ohio Revised Code. ODNR manages a local database of previously known locations of listed species as well as specific habitat type locations. The agency will provide comments and Project recommendations with regards to listed species habitat or known locations within the Project vicinity.

In accordance with Section 106 of the National Historic Preservation Act (NHPA), a SHPO review is required for projects which contain a federal nexus including those that seek a CWA permit. The SHPO review will determine whether the Project may affect cultural resources.

The Ohio EPA administers Water Quality Certifications (WQC) under Section 401 of the CWA for impacts to jurisdictional WOTUS and non-jurisdictional waters of the state. However, the Ohio EPA has waived WQC for NWP 51 and 57. Projects permitted under these NWPs will not require 401 WQC in the state of Ohio. The Ohio EPA also regulates impacts to waters of the state including isolated wetlands. An Isolated Wetlands Permit is required for any impacts to isolated wetlands.

STATE REGULATIONS AND COMPLIANCE SUMMARY

TABLE 2

| Lead Agency | Agency Permit or Approval | Permit Thresholds | Project Applicability |
|--------------------|--|--|-------------------------------|
| OPSB | Certificate of Environmental Compatibility and Public Need Ohio Administrative Code 4906-4 | OPSB has authority to review and approve solar electric generation and transmission facilities that generate 50 MW or more. | Concurrence needed |
| ODNR | State rare, threatened, and endangered species Environmental Review Ohio Revised Code 1531.25 | The chief of the division of wildlife, with the approval of the wildlife council, shall adopt and may modify and repeal rules, in accordance with Chapter 119 of the Revised Code, restricting the taking or possession of native wildlife, or any eggs or offspring thereof, that he or she finds to be threatened with statewide extinction. | Concurrence needed |
| ODNR | In-Water Work Exclusion Dates Waiver | Work proposed within streams or other waters during a designated in-water work exclusion period determined by the division of wildlife. | Not anticipated |
| Ohio SHPO | Section 106 Review | Section 106 of the National Historic Preservation Act requires federal agencies to account for potential effects on historic properties and cultural resources. Projects that involve demolition or earthwork must coordinate with SHPO. | Concurrence needed |
| Ohio EPA | Isolated Wetlands Permit Ohio Revised Code 6111 | Discharge of fill material into isolated wetlands. | Permit determination required |

3.0 BACKGROUND REVIEW AND DESKTOP ASSESSMENT

3.1 Land Cover

The existing land cover within the Project Area was determined by analyzing the 2019 National Land Cover Database (NLCD 2019) from the Multi-Resolution Land Characteristics Consortium (Table 3 and Figure 4). The NLCD identifies land cover types using the classification system outlined in *A Land Use and Land Cover Classification System for Use with Remote Sensor Data*. Land covers within the Project Area include:

- **Cultivated Crops** – areas where greater than 20 percent of the total vegetation includes annual crops, such as corn, soybeans, vegetables, tobacco, and cotton, and also perennial woody crops such as orchards and vineyards. This classification also includes all land being actively tilled.
- **Mixed Forest** – areas where more than one-third intermixture of either evergreen or deciduous species occurs in a specific area.
- **Hay/Pasture** – areas where greater than 20 percent of the total vegetation includes grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle.
- **Developed Open Space** – areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20 percent of total cover. These areas most commonly include large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes.
- **Open Water** – shallow water areas where aquatic vegetation is submerged.
- **Deciduous Forest** – areas where greater than 20 percent of the vegetative cover is dominated by trees greater than five meters tall. More than 75 percent of the tree species shed foliage simultaneously in response to seasonal change.
- **Developed Low Intensity** – areas with any development that contain 15 percent or less of impervious surfaces. These areas exclude single-family dwellings.
- **Developed Medium Intensity** – areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50 percent to 79 percent of the total cover. These areas most commonly include single-family housing units.
- **Herbaceous** – areas dominated by grasses and forbs.
- **Evergreen Forest** – areas dominated by trees generally greater than 5 meters tall, and greater than 20 percent of the total vegetation cover. More than 75 percent of the tree species maintain their leaves all year. Canopy is never without green foliage.

Based on the assessment of the land cover categories identified, the majority of the Project Area is cultivated cropland with sizeable mixed forest components scattered throughout (Figure 4). The specific breakdown of the land cover types is included in Table 3.

LAND COVER WITHIN THE PROJECT AREA

TABLE 3

| Type | Project Area (Acres) | Project Area (%) |
|----------------------------|----------------------|------------------|
| Cultivated Crops | 3186.998 | 86.51% |
| Mixed Forest | 246.627 | 6.69% |
| Hay/Pasture | 120.971 | 3.28% |
| Developed, Open Space | 66.029 | 1.79% |
| Open Water | 31.222 | 0.85% |
| Deciduous Forest | 20.350 | 0.55% |
| Developed Low Intensity | 10.043 | 0.27% |
| Developed Medium Intensity | 0.903 | 0.02% |
| Herbaceous | 0.445 | 0.01% |
| Evergreen Forest | 0.222 | 0.01% |
| Total | 3684 | 100% |

3.2 Geology

The Project Area lies in the Central Lowland Till Plains according to the *Physiographic Regions of Ohio* map and atop a divided bedrock: Columbus Limestone, Ohio Shale, and Salina Group (Figure 5). These bedrocks are described by the U.S. Geologic Survey (USGS) as consisting of limestone, shale, and a shale with mixed brecciated zones, respectively. Topographic elevations in the Project Area range from 750 to 800 feet above sea level.

The bedrock geology within the Project Area is summarized by ODNR in its Environmental Review for the Project (Attachment A):

"The uppermost bedrock unit in the project area is the Ohio and Olentangy Shales Undivided. This unit is Devonian-age and consists of greenish gray to gray shale. The unit is clayey and often contains disseminated pyrite. Locally this unit may contain lenses or nodules of limestone as well as thin beds of brownish-black shale in the upper portion. The Ohio and Olentangy Shales Undivided are found in the southern and eastern most portion of project area. Underlying the Ohio and Olentangy Shales Undivided is the Devonian-age Columbus Limestone. This unit is characterized by bluish gray to brown fossiliferous limestone. The unit may be dolomitic in places and frequently contains solution features. The

Columbus Limestone can be found in southern and eastern portions of project area. Underlying the Columbus Limestone is the Silurian-age Salina Undifferentiated. This unit is characterized by a gray to brown dolomite which contains argillaceous partings, brecciated intervals, algal laminations and anhydrite/gypsum zones. It should be noted that bedrock is not exposed at the surface within the boundaries of the project area due to significant glacial drift (Slucher et al, 2006)."

3.3 Glacial Deposits

The Project Area contains five distinct categories of glacial deposits: G2, ground moraine; M2, end moraine; O2, intermediate-level outwash terraces; O3, low-level valley-train outwash; and a, alluvium and alluvial terraces; (Figure 6). Glacial deposits within the Project Area are further described by the ODNR in the Environmental Review for the Project (Attachment A):

"The project area lies within the glaciated margin of the state and includes several Wisconsinan-age glacial features. The project area is covered by the silty loam till of flat to gently undulating ground moraine, outwash terraces and modern alluvium (Pavey et al, 1999). Glacial drift throughout most of the study area is between 20 and 218 feet thick. Drift is thinnest in the southwest and thickest in the northeastern portion of the project area (Powers and Swinford, 2004)."

3.4 Soils

The U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), Web Soil Survey (WSS) of Pickaway County, Ohio was used to identify the soil types and hydric ratings of soils located within the Project Area (Table 4 and Figure 7). The soil survey identifies soil mapping units and their associated hydric soil rating, based on percent hydric components. Mapped non-hydric soils may contain inclusions of hydric components in terraces, in depressions, on floodplains, and in drainage ways. The hydric soils identified within the Project Area are Patton silty clay loam with 0 to 2 percent slopes (Pa), Westland silty clay loam – Southern Ohio Till Plain with 0 to 2 percent slopes (Ws), and Kokomo silty clay loam with 0 to 2 percent slopes (Ko). Together, these soils comprise 798.759 acres or 21.68% of the Project Area.

The most prevalent soil types are Crosby silt loam – Southern Ohio Till Plain with 0 to 2 percent slopes (CrA), Kokomo silty clay loam with 0 to 2 percent slopes (Ko), and Miami-Lewisburg silt loam with 2 to 6 percent slopes (MIB). Slopes of 12 percent or greater are scarce throughout the Project Area and concentrated along the riparian corridors of Deer Creek and Dry Run (Figure 8). Most of the soil types within the Project Area have been determined to be Non-Highly Erodible Land (NHEL) and Potentially Highly Erodible Land (PHEL) by the USDA NRCS (Figure 8). The specific breakdown of the soil types is included in Table 4.

SOILS WITHIN THE PROJECT AREA

TABLE 4

| Type | Map Unit Description | Hydric Rating | Project Area (Acres) | Project Area (%) |
|------|---|---------------|----------------------|------------------|
| CrA | Crosby silt loam, Southern Ohio Till Plain, 0 to 2 percent slopes | 5 | 808.478 | 21.95% |
| Ko | Kokomo silty clay loam, 0 to 2 percent slopes | 90 | 754.538 | 20.48% |
| MIB | Miamian-Lewisburg silt loams, 2 to 6 percent slopes | 5 | 588.260 | 15.97% |
| Rs | Ross loam, 0 to 2 percent slopes, occasionally flooded | 5 | 209.829 | 5.70% |
| MkB | Miamian-Kendallville silt loams, 2 to 6 percent slopes | 5 | 209.160 | 5.60% |
| Gn | Genesee silt loam, 0 to 2 percent slopes, occasionally flooded | 6 | 165.851 | 4.50% |
| MIA | Miamian-Lewisburg silt loams, 0 to 2 percent slopes | 5 | 144.094 | 3.91% |
| CoB | Corwin silt loam, 2 to 6 percent slopes | 5 | 129.675 | 3.52% |
| EIB | Eldean loam, 2 to 6 percent slopes | 1 | 92.435 | 2.51% |
| CoA | Corwin silt loam, 0 to 2 percent slopes | 5 | 55.932 | 1.52% |
| W | Water | | 45.873 | 1.25% |
| CaB | Cana Variant silt loam, 2 to 6 percent slopes | | 39.657 | 1.08% |
| Ws | Westland silty clay loam, Southern Ohio Till Plain, 0 to 2 percent slopes | 90 | 38.620 | 1.05% |
| MfC2 | Miamian silt loam, 6 to 12 percent slopes, eroded | 0 | 34.307 | 0.93% |
| EIA | Eldean loam, 0 to 2 percent slopes | 0 | 33.240 | 0.90% |
| MkC2 | Miamian-Kendallville silt loams, 6 to 12 percent slopes, eroded | 7 | 30.133 | 0.82% |
| Ag | Algiers silt loam | 15 | 29.956 | 0.81% |
| EpB | Eldean-Kendallville loams, 2 to 6 percent slopes | 0 | 29.154 | 0.79% |
| WeA | Wea silt loam, 0 to 2 percent slopes | 2 | 28.937 | 0.79% |
| St | Stonelick sandy loam | 0 | 27.997 | 0.76% |
| CaD | Cana Variant silt loam, 6 to 18 percent slopes | 0 | 24.797 | 0.67% |
| HeE | Hennepin-Miamian silt loams, 18 to 25 percent slopes | 0 | 23.807 | 0.65% |
| HeF | Hennepin-Miamian silt loams, 25 to 50 percent slopes | 0 | 22.652 | 0.61% |
| WbA | Warsaw loam, 0 to 2 percent slopes | 0 | 20.771 | 0.56% |

| | | | | |
|-------|---|----|--------|-------|
| MhC3 | Miamian clay loam, shallow to dense till substratum, 6 to 12 percent slopes, severely eroded | 10 | 16.492 | 0.45% |
| TpA | Tippecanoe silt loam, 0 to 2 percent slopes | 5 | 12.057 | 0.33% |
| EnB2 | Eldean gravelly loam, 2 to 6 percent slopes, eroded | 5 | 11.843 | 0.32% |
| CgC | Casco gravelly loam, 6 to 12 percent slopes | 0 | 10.653 | 0.29% |
| MfD2 | Miamian silt loam, 12 to 18 percent slopes, eroded | 0 | 8.025 | 0.22% |
| RoC | Rodman gravelly sandy loam, 4 to 12 percent slopes | 5 | 6.926 | 0.19% |
| WeB | Wea silt loam, 2 to 6 percent slopes | 0 | 6.886 | 0.19% |
| MhD3 | Miamian clay loam, shallow to dense till substratum, 12 to 18 percent slopes, severely eroded | 2 | 5.969 | 0.16% |
| Pa | Patton silty clay loam, 0 to 2 percent slopes | 90 | 5.600 | 0.15% |
| WbB | Warsaw loam, 2 to 6 percent slopes | 0 | 4.000 | 0.11% |
| ThA | Thackery silt loam, 0 to 2 percent slopes | 5 | 3.292 | 0.09% |
| EpC2 | Eldean-Kendallville loams, 6 to 12 percent slopes, eroded | 0 | 2.420 | 0.07% |
| MkA | Miamian-Kendallville silt loams, 0 to 2 percent slopes | 5 | 2.124 | 0.06% |
| OcA | Ockley silt loam, Southern Ohio Till Plain, 0 to 2 percent slopes | 0 | 1.836 | 0.05% |
| MmB | Merrimac fine sandy loam, 3 to 8 percent slopes | 0 | 0.603 | 0.02% |
| Total | | | 3684 | 100% |

3.5 Wildlife Resources

3.5.1 Existing Habitat

The vegetative communities visible from a desktop analysis show a predominance of row crop agriculture likely consisting of corn (*Zea mays*) and/or soybeans (*Glycine max*) and some large forest woodlots – mostly concentrated along Deer Creek within the Project Area. Two ODNR wildlife areas are mapped within a ½-mile buffer of the Project Area: Charles O. Trump Wildlife Area and Pickaway County Wildlife Area 1 (Figure 9).

In general, agricultural settings provide marginal habitat for native species compared to unmaintained natural settings. Agricultural land is typically not suited to sensitive rare, threatened, or endangered species due to the frequent use of machinery; lack of diverse vegetation; nutrient enrichment; pesticide use; sedimentation; and modification of surface water sources via channelization, tiling, filling and grading.

Approximately 214 acres of woodland with potential wetland components are visible in the Project Area. Wooded areas have the potential to provide ample species habitat since they are often sheltered from human disturbance. Woodlots within the Project Area appear to range from approximately 5 – 30+ acres in size.

3.5.2 Birds and Bats

As of March 2021, 443 species of birds were included on the official Ohio Ornithological Society (OOS) Ohio Bird Checklist. Two to four species on the list are extinct and two are extirpated. Approximately 180 birds breed in Ohio every year.

The eBird website (www.ebird.org, Cornell Lab of Ornithology) was used to identify “Hot Spots” important for bird populations. These areas are known locations for breeding, wintering, and migration stop-over for birds in central Ohio. Seven eBird “Hot Spots” were identified within five miles of the Project Area:

- **Metzgar Preserve and Ballard Park** is located approximately 0.8 miles south of the Project Area. At least 48 bird species have been observed at this location.
- **Deer Creek SP – Beach Picnic Area** is located approximately 4.5 miles west of the Project Area. At least 97 bird species have been observed at this location.
- **Deer Creek SP – Beach** is located approximately 4.5 miles west of the Project Area. At least 185 bird species have been observed at this location.
- **Deer Creek SP – Dam** is located approximately 4.0 miles west of the Project Area. At least 137 bird species have been observed at this location.
- **Deer Creek SP – Boat Ramp and Harding Cabin** is located approximately 4.8 miles west of the Project Area. At least 58 bird species have been observed at this location.
- **Canal Park – Canal Road** is located approximately 4.60 miles east of the Project Area. At least 68 bird species have been observed at this location.
- **Calamus Swamp** is located approximately 4.25 miles east of the Project Area. At least 147 bird species have been observed at this location.

The bald eagle is no longer a state-threatened species in Ohio although it remains protected under the Bald and Golden Eagle Protection Act originally passed in 1940. Bald eagle sightings were noted at several of the eBird, “hot spot” locations listed above. In addition, the USFWS has indicated that records of a bald eagle nest exist within the Project Area less than one mile south of the intersection of Yankeetown Pike and Phearson Pike roads. Update this writing if additional nest coordination occurs.

According to the ODNR, there are 10 common species of bats in Ohio. Potential bat roosting habitat may exist within the forested portions of the Project Area. Bats typically roost in trees with desirable characteristics

during the daytime in the summer months. Based on the size of the existing woodlots within the Project Area, it is possible that potential roost trees (PRTs) are present. Caves, abandoned mines, and large rock outcroppings which support winter bat hibernaculum for non-migratory species are likely not present within the Project Area based on review of the ODNR mines of Ohio database.

3.5.3 Mammals

Ohio is home to 53 species of mammals, two of which are non-native. Mammals found to be most common in agricultural landscapes with nearby forests include white-tailed deer (*Odocoileus virginianus*), eastern chipmunk (*Tamias striatus*), white-footed deermouse (*Peromyscus leucopus*), eastern gray squirrel (*Sciurus carolinensis*), and coyote (*Canis latrans*). Sizeable forests and riparian corridors such as some of those present within the Project Area, may provide suitable habitat for some common mammals including Virginia opossum (*Didelphis virginiana*), eastern chipmunk (*Tamias striatus*), eastern gray squirrel (*Sciurus carolinensis*), raccoon (*Procyon lotor*), eastern cottontail (*Sylvilagus floridanus*), striped skunk (*Mephitis mephitis*), and white-tailed deer (*Odocoileus virginianus*),

3.5.4 Reptiles, Amphibians, and Aquatic Species

Ohio is home to 42 native species of reptiles and 39 native species of amphibians. Common species which may exist within forested or wet portions of the Project Area include common mudpuppy (*Necturus maculosus*), spotted salamander (*Ambystoma maculatum*), eastern red-back salamander (*Plethodon cinereus*), southern two-lined salamander (*Eurycea bislineata*), northern dusky salamander (*Desmognathus fuscus*), American toad (*Anaxyrus americanus*), spring peeper (*Pseudacris crucifer*), northern green frog (*Lithobates clamitans melanota*), American bullfrog (*Lithobates catesbeianus*), and Cope's gray tree frog (*Hyla chrysoscelis*).

Aquatic species such as fish, crayfish, mussels, and aquatic insects may exist within perennial streams and waterbodies within the Project Area. Larger or sensitive species may exist within perennial streams with a drainage area greater than five square miles. According to the April 2020 Ohio Mussel Survey Protocol (OMSP), Dry Run and Deer Creek are listed as Group 1 streams within the Project Area. The OMSP listing indicates these streams may provide suitable mussel habitat but are not expected to contain federally listed mussel species.

3.5.5 Rare, Threatened, and Endangered Species

An Official Species List for the Project Area was obtained from the Ohio Ecological Services Field Office using the Information for Planning and Consultation (IPaC) tool (Attachment B). The IPaC search found four listed species, the Indiana bat (*Myotis sodalis*, endangered), northern long-eared bat (*Myotis septentrionalis*, threatened), Scioto madtom (*Noturus trautmani*, endangered), and monarch butterfly (*Danaus plexippus*, candidate species) to have potential habitat within the Project Area. Note that the Scioto madtom is currently

proposed for de-listing as rare, threatened, or endangered due to extinction.

On August 13, 2021, a request for rare, threatened, and endangered species data was sent to the USFWS. A response was received from the USFWS on September 27, 2021 (Attachment A). The USFWS indicated that the project is within the vicinity of multiple known location records for the Indiana bat (*Myotis sodalis*, endangered) and northern long-eared bat (*Myotis septentrionalis*, threatened). However, the USFWS was unable to determine whether impacts may occur to these species since the extent of tree-clearing associated with the Project was not known at the time of submittal. In addition, the USFWS noted that the project is within the known range of the recently de-listed running buffalo clover (*Trifolium stoloniferum*, species of concern) and recommends that a survey for this species be conducted by a trained botanist if habitat exists within the Project Area. The response from the USFWS indicated that due to the project, type, size, and location, they do not anticipate adverse effects to any other federally endangered, threatened, proposed, or candidate species.

A request for ecological information was also sent to the Ohio Department of Natural Resources (ODNR) on August 13, 2021. A response was received from the ODNR on September 10, 2021 (Attachment A). Nineteen records of state-listed rare, threatened, or endangered species were found within a one-mile radius of the Project Area; Leiberg's panic grass (*Dichanthelium leibergii*, state endangered), inland rush (*Juncus interior*, state potentially threatened), elktoe (*Alasmidonta marginata*, state species of concern), purple wartyback (*Cyclonaias tuberculata*, state species of concern), elephant-ear (*Elliptio crassidens*, state endangered), northern riffleshell (*Epioblasma rangiana*, state and federally endangered), snuffbox (*Epioblasma triquetra*, state and federally endangered), wavy-rayed lampmussel (*Lampsilis fasciola*, state species of concern), round pigtoe (*Pleurobema sintoxia*, state species of concern), kidneyshell (*Ptychobranhus fasciolaris*, state species of concern), rabbitsfoot (*Theliderma cylindrica*, state endangered and federally threatened), fawnsfoot (*Truncilla donaciformis*, state threatened), deerto (*Truncilla truncate*, state species of concern), rayed bean (*Villosa fabalis*, state and federally endangered), western creek chubsucker (*Erimyzon claviformis*, state species of concern), spotted darter (*Etheostoma maculatum*, state endangered), Tippecanoe darter (*Etheostoma tippecanoe*, state threatened), northern madtom (*Noturus stigmosus*, state endangered), and Indiana bat (*Myotis sodalis*, state and federally endangered). In addition, the ODNR states that two ecological sites are located within a one-mile radius of the Project Area: Big Darby Creek State Scenic River and Trump Wildlife Preserve – an ODNR Division of Wildlife (DOW) property.

The ODNR DOW indicated the Project Area is located within the ranges of the clubshell (*Pleurobema clava*), fanshell (*Cyprogenia stegaria*), northern riffleshell (*Epioblasma torulosa rangiana*), purple cat's paw (*Epioblasma o. obliquata*), rayed bean (*Villosa fabalis*), snuffbox (*Epioblasma triquetra*), rabbitsfoot (*Quadrula cylindrica cylindrica*), butterfly (*Ellipsaria lineolata*), ebonyshell (*Fusconaia ebenus*), elephant-ear (*Elliptio*

crassidens), long-solid (*Fusconaia maculata maculata*), Ohio pigtoe (*Pleurobema cordatum*), pyramid pigtoe (*Pleurobema rubrum*), sharp-ridged pocketbook (*Lampsilis ovata*), washboard (*Megaloniais nervosa*), black sandshell (*Ligumia recta*), fawnsfoot (*Truncilla donaciformis*), pondhorn (*Unio merus tetralasmus*), and threehorn wartyback (*Obliquaria reflexa*) state-listed mussel species, but that due to the location, and that there is no in-water work proposed in a perennial stream of sufficient size, the project is not likely to impact these species. The DOW also indicated the Project Area is located within the ranges of several state-listed fish species including the Scioto madtom (*Noturus trautmani*), bigeye shiner (*Notropis boops*), goldeye (*Hiodon alosoides*), northern brook lamprey (*Ichthyomyzon fossor*), northern madtom (*Noturus stigmosus*), shortnose gar (*Lepisosteus platostomus*), spotted darter (*Etheostoma maculatum*), shovelnose sturgeon (*Scaphirhynchus platyrhynchus*), blue sucker (*Cycleptus elongatus*), lake chubsucker (*Erimyzon sucetta*), paddlefish (*Polyodon spathula*), and Tippecanoe darter (*Etheostoma tippecanoe*). The DOW recommends that no in-water work occur in perennial streams from March 15 through June 30 to reduce impacts to these species. Finally, the DOW indicated the Project Area is located within the ranges of the lark sparrow (*Chondestes grammacus*), least bittern (*Ixobrychus exilis*), northern harrier (*Circus hudsonis*), sandhill crane (*Grus canadensis*), and upland sandpiper (*Bartramia longicauda*). The DOW recommends that no vegetation-clearing or ground disturbance occur within these species' habitats, including grasslands and emergent wetlands, during their various nesting periods.

3.6 Surface Waters

3.6.1 Streams

Based on a desktop analysis of topographic mapping, aerial imagery, National Wetlands Inventory (NWI), and the National Hydrography Dataset (NHD), Hull identified 15 potential streams, including Deer Creek and Dry Run within the Project Area (Figure 10). Relatively permanent streams, with perennial or intermittent flow regimes, are more likely to be apparent from a desktop analysis than ephemeral streams. Streams within the Project Area would be located within the Upper Scioto River Watershed (HUC 05060001) or the Lower Scioto River Watershed (HUC 05060002) (Figure 11).

3.6.2 Wetlands

Based on a desktop analysis of topographic mapping, aerial imagery, and the NWI, Hull identified five potential wetlands including one mapped as palustrine forested (PFO) habitat within the Project Area (Figure 10). Wetlands within the Project Area would be located within the Upper Scioto River Watershed (HUC 05060001) or the Lower Scioto River Watershed (HUC 05060002) (Figure 11).

3.6.3 Other Waters

Based on a desktop analysis of topographic mapping, aerial imagery, and the NWI, Hull identified two ditches with potentially permanent flow regime and no potential ponds within the Project Area (Figure 10).

3.7 Floodplain

A review of Federal Emergency Management Agency (FEMA) floodplain maps was completed to determine the presence of floodplains in the Project Area (Figure 12). There are two mapped 100-year floodplains within the Project Area surrounding Deer Creek and Dry Run.

4.0 FIELD SURVEYS

Ecological field surveys were conducted within a 3146-acre area (Ecological Study Area) from August 26 to September 7, 2021, from September 28 to September 29, 2021, on November 15 and 23, 2021, and on January 14, 2022. The Ecological Study Area included a 100-foot buffer from the proposed Project fence line in locations where land access could be obtained (Figure 10). The results of the surface water delineation field survey are summarized below and discussed in detail in the *Surface Water Delineation Report* in Attachment C.

4.1 Habitat Observations

Most of the Ecological Study Area was dominated by active crop production of corn (*Zea mays*) and soybeans (*Glycine max*). These areas appeared to provide limited habitat for native species since they contained loose soils, were dominated by a single plant variety (monocrop), frequently exposed to farming activities, and were located within close proximity to residential properties compared to more typical rural settings. In addition, crop fields were fragmented by maintained farm roads.

Forested woodlots within the Ecological Study Area were often found to be wet and contain common tree species such as silver maple (*Acer saccharinum*), black walnut (*Juglans nigra*), and black locust (*Robinia pseudoacacia*). These areas appeared to provide a diverse range of native species habitat including interspersed vegetative communities, microtopographic features, headwater streams, and evidence of relatively low-to-no human activity within. In addition, potential bat roosting habitat was observed within the forested communities in the form of standing dead trees. Some living trees, including shagbark hickory (*Carya ovata*) that could provide roosting habitat, were observed in upland portions of the forests. Subsurface openings that could provide winter hibernaculum for bats were not observed within the Project Area.

Coordination with the USFWS and ODNR identified a known occurrence of a bald eagle nest within the Ecological Study Area (Attachment A). However, additional field surveys and coordination with both agencies have failed to determine the precise location of the nest. Once identified, the Project will implement an infrastructure set-back limit from the nest in accordance with the USFWS avoidance recommendations. Consultation with the USFWS and ODNR will continue until the nest location is discovered or appropriate avoidance measures are determined on another basis. A tabulated summary of specific rare, threatened, and endangered species habitat observations is included in Table 5.

RARE, THREATENED, AND ENDANGERED SPECIES HABITAT WITHIN THE ECOLOGICAL STUDY AREA

TABLE 5

| Common Name | Scientific Name | Listing Status | | Habitat | Habitat Present | Likelihood of Occurrence | Agency Recommendation |
|-------------------------|---------------------------------|----------------|-------|---|-----------------|--|---|
| | | Federal | State | | | | |
| Mammals | | | | | | | |
| Northern long-eared bat | <i>Myotis septentrionalis</i> | T | E | Hibernates in caves and abandoned mines; Maternity and foraging habitat includes stream corridors with well-developed upland forests | Yes | Potential to occur. A moderate amount of suitable wooded habitat occurs within the Project Area, which is within the vicinity of multiple USFWS records. | Minimize tree clearing; avoid woodlots. Restrict tree clearing to Oct 1-Mar 31. Coordinate with USFWS on the extent and location of tree clearing proposed. |
| Indiana bat | <i>Myotis sodalis</i> | E | E | Hibernates in caves and abandoned mines; Maternity and foraging habitat includes stream corridors with well-developed riparian woods and upland forests | Yes | Potential to occur. A moderate amount of suitable wooded habitat occurs within the Project Area. | Minimize tree clearing; avoid woodlots. Restrict tree clearing to Oct 1-Mar 31. Coordinate with USFWS on the extent and location of tree clearing proposed. |
| Little brown bat | <i>Myotis lucifugus</i> | N/A | E | Hibernates in caves and abandoned mines; Maternity and foraging habitat includes stream corridors with well-developed upland forests | Yes | Potential to occur. A moderate amount of suitable wooded habitat occurs within the Project Area. | Restrict tree clearing to Oct 1-Mar 31, conserving trees with suitable roosting characteristics, (if possible). |
| Tricolored bat | <i>Perimyotis subflavus</i> | N/A | E | Hibernates in caves and abandoned mines; Maternity and foraging habitat includes stream corridors with well-developed riparian woods and upland forests | Yes | Potential to occur. A moderate amount of suitable wooded habitat occurs within the Project Area. | Restrict tree clearing to Oct 1-Mar 31, conserving trees with suitable roosting characteristics, (if possible). |
| Birds | | | | | | | |
| Bald Eagle | <i>Haliaeetus leucocephalus</i> | Protect-ed | N/A | Preferred habitat includes mature forests adjacent to open water for nesting and foraging | Yes | Confirmed record by ODNR indicate that a bald eagle nest is located within the Project Area. | No tree clearing occurs within 660' of the nest or within the supporting woodlot and that work be avoided within 660' feet of the nest Jan15-Jul 31. |
| Lark Sparrow | <i>Chondestes grammacus</i> | N/A | E | Grassland habitats with scattered shrub layers, disturbed open areas, as well as patches of bare soil (in the Oak Openings, grass and | No | Potential to occur. Grasslands with scattered shrub layers present within the Project Area. | Impacts to grasslands with scattered shrub layers within the Project Area should be avoided May 1 through July 31. |

| Common Name | Scientific Name | Listing Status | | Habitat | Habitat Present | Likelihood of Occurrence | Agency Recommendation |
|------------------|-----------------------------|----------------|-------|---|-----------------|--|--|
| | | Federal | State | | | | |
| | | | | shrubby fields along sandy beach ridges) | | | |
| Least Bittern | <i>Ixobrychus exilis</i> | N/A | T | Emergent wetlands with thick stands of cattails, sedges, sawgrass or other semiaquatic vegetation interspersed with woody vegetation and open water. | No | Unlikely to occur. Suitable habitat is not present within the Project Area. | N/A. |
| Northern Harrier | <i>Circus hudsonius</i> | N/A | E | The northern harrier is an occupant of grasslands and is found both in upland or wetland habitat types in Ohio such as wet prairies, damp meadows, the grassy margins of large wetlands, pastures, hayfields, some cultivated fields and reclaimed strip mines. Hunting over grasslands and marshes, this species prefers undisturbed grasslands for nesting. | Yes | Potential to occur. Grasslands and wetlands present within the Project Area. | Impacts to grasslands and wetlands within the Project Area should be avoided between April 15-July 31. |
| Sandhill Crane | <i>Grus canadensis</i> | N/A | T | Large marshes and wetland complexes; migrants often rest on shores and mudflats of lakes and in agricultural fields. | Yes | Potential to occur. Agricultural fields present within the Project Area. | Impacts to grasslands and wetlands within the Project Area should be avoided between April 1-August 31. |
| Upland Sandpiper | <i>Bartramia longicauda</i> | N/A | E | Nesting upland sandpipers utilize dry grasslands including native grasslands, seeded grasslands, grazed and ungrazed pasture and hayfields. | Yes | Potential to occur. Grasslands present within the Project Area. | Impacts to grasslands within the Project Area should be avoided between April 15-July 31. |
| Mussels | | | | | | | |
| Clubshell | <i>Pleurobema clava</i> | E | E | Prefers clean, loose sand and gravel in medium to small rivers and streams. | Yes | Unlikely to occur. Streams within the Project Area are classified as Group 1, where federally listed species are not expected. | Due to the location, and that there is no in-water work proposed in a perennial stream of sufficient size, this project is not likely to impact these species. |
| Fanshell | <i>Cyprogenia stegaria</i> | E | E | Medium to large rivers. It buries itself in sand or gravel in deep water of moderate current. | Yes | Unlikely to occur. Streams within the Project Area are classified as Group 1, where federally listed species are not expected. | Due to the location, and that there is no in-water work proposed in a perennial stream of sufficient size, this project is not likely to impact these species. |

| Common Name | Scientific Name | Listing Status | | Habitat | Habitat Present | Likelihood of Occurrence | Agency Recommendation |
|----------------------|---------------------------------------|----------------|-------|---|-----------------|--|--|
| | | Federal | State | | | | |
| Northern Riffleshell | <i>Epioblasma torulosa rangiana</i> | E | E | Wide variety of streams from large-to small. It buries itself in bottoms of firmly packed sand or gravel. | Yes | Unlikely to occur. Streams within the Project Area are classified as Group 1, where federally listed species are not expected. | Due to the location, and that there is no in-water work proposed in a perennial stream of sufficient size, this project is not likely to impact these species. |
| Purple Cat's Paw | <i>Epioblasma o. obliquata</i> | E | E | Large rivers of the Ohio river basin. It prefers shallow water and requires a swift current to avoid being buried in silt. It is found on bottom substrates ranging from sand to boulders. | Yes | Unlikely to occur. Streams within the Project Area are classified as Group 1, where federally listed species are not expected. | Due to the location, and that there is no in-water work proposed in a perennial stream of sufficient size, this project is not likely to impact these species. |
| Rayed bean | <i>Villosa fabalis</i> | E | E | Smaller, headwater creeks, but it is sometimes found in large rivers and wave-washed areas of glacial lakes. It prefers gravel or sand substrates | Yes | Unlikely to occur. Streams within the Project Area are classified as Group 1, where federally listed species are not expected. | Due to the location, and that there is no in-water work proposed in a perennial stream of sufficient size, this project is not likely to impact these species. |
| Snuffbox | <i>Epioblasma triquetra</i> | E | E | Small- to medium-sized creeks, inhabiting areas with a swift current, although it is also found in Lake Erie and some larger rivers. Adults often burrow deep in sand, gravel or cobble substrates, | Yes | Unlikely to occur. Streams within the Project Area are classified as Group 1, where federally listed species are not expected. | Due to the location, and that there is no in-water work proposed in a perennial stream of sufficient size, this project is not likely to impact these species. |
| Rabbitsfoot | <i>Quadrula cylindrica cylindrica</i> | T | E | Small to medium rivers with moderate to swift currents, and in smaller streams it inhabits bars or gravel and cobble close to the fast current. Found in medium to large rivers in sand and gravel. | Yes | Unlikely to occur. Streams within the Project Area are classified as Group 1, where federally listed species are not expected. | Due to the location, and that there is no in-water work proposed in a perennial stream of sufficient size, this project is not likely to impact these species. |
| Butterfly | <i>Ellipsaria lineolata</i> | N/A | E | Large rivers in sand or gravel. | Yes | May occur. Streams within the Project Area are classified as Group 1, where state listed species may be present. | Due to the location, and that there is no in-water work proposed in a perennial stream of sufficient size, this project is not likely to impact these species. |
| Ebonysell | <i>Fusconaia ebeus</i> | N/A | E | Strong currents of large rivers, but they can be found in deeper or shallower waters with weaker currents. Ebonyshells are found in areas with rocks, gravel, or sand | Yes | Potential to occur. Streams within the Project Area are classified as Group 1, where state listed mussel species may be present. | Due to the location, and that there is no in-water work proposed in a perennial stream of sufficient size, this project is not likely to impact these species. |

| Common Name | Scientific Name | Listing Status | | Habitat | Habitat Present | Likelihood of Occurrence | Agency Recommendation |
|-------------------------|------------------------------------|----------------|-------|---|-----------------|--|--|
| | | Federal | State | | | | |
| | | | | on the bottoms of these rivers. | | | |
| Elephant-ear | <i>Elliptio crassidens</i> | N/A | E | Mud, sand, gravel and rocky substrates (commonly limestone). They inhabit waters with moderate to swift currents in large creeks, rivers, or sometimes channels. | Yes | Potential to occur. Streams within the Project Area are classified as Group 1, where state listed mussel species may be present. | Due to the location, and that there is no in-water work proposed in a perennial stream of sufficient size, this project is not likely to impact these species. |
| Long-solid | <i>Fusconaia maculata maculata</i> | N/A | E | Small to large rivers in gravel with a strong current. The preferred substrate of this species is sand and gravel, or a mixture of gravel and sand, kept free of silt by current. | Yes | Potential to occur. Streams within the Project Area are classified as Group 1, where state listed mussel species may be present. | Due to the location, and that there is no in-water work proposed in a perennial stream of sufficient size, this project is not likely to impact these species. |
| Ohio pigtoe | <i>Pleurobema cordatum</i> | N/A | E | Medium to large rivers in sand or gravel in areas with moderate flow. | Yes | Potential to occur. Streams within the Project Area are classified as Group 1, where state listed mussel species may be present. | Due to the location, and that there is no in-water work proposed in a perennial stream of sufficient size, this project is not likely to impact these species. |
| Pyramid Pigtoe | <i>Pleurobema rubrum</i> | N/A | E | Large rivers but may occur in medium-sized lotic environments. Riffles or shoals in relatively shallow water and coarse-particle substrates, along sand bars, or in deep water (>4 m) with stable mud and muddy sand bottoms. | Yes | Potential to occur. Streams within the Project Area are classified as Group 1, where state listed mussel species may be present. | Due to the location, and that there is no in-water work proposed in a perennial stream of sufficient size, this project is not likely to impact these species. |
| Sharp-ridged Pocketbook | <i>Lampsilis ovata</i> | N/A | E | Lakes, streams and rivers, in mud, sand, and gravel. | Yes | Potential to occur. Streams within the Project Area are classified as Group 1, where state listed mussel species may be present. | Due to the location, and that there is no in-water work proposed in a perennial stream of sufficient size, this project is not likely to impact these species. |
| Washboard | <i>Megaloniais nervosa</i> | N/A | E | Large slow moving rivers systems that include adjacent tributaries and drainage basins. Adapted to use a wide variety of river bottom substrates such as mud and rocks but prefers gravel or sandy river bottoms. | Yes | Potential to occur. Streams within the Project Area are classified as Group 1, where state listed mussel species may be present. | Due to the location, and that there is no in-water work proposed in a perennial stream of sufficient size, this project is not likely to impact these species. |

| Common Name | Scientific Name | Listing Status | | Habitat | Habitat Present | Likelihood of Occurrence | Agency Recommendation |
|---------------------|-------------------------------|----------------|-------|--|-----------------|--|---|
| | | Federal | State | | | | |
| Black Sandshell | <i>Ligumia recta</i> | N/A | T | Rivers with strong currents and lakes with a firm substrate of gravel or sand. | Yes | Potential to occur. Streams within the Project Area are classified as Group 1, where state listed mussel species may be present. | Due to the location, and that there is no in-water work proposed in a perennial stream of sufficient size, this project is not likely to impact these species. |
| Fawnsfoot | <i>Truncilla donaciformis</i> | N/A | T | Preferring firm gravel or sand substrates, occurs primarily in small to large rivers and lakes. | Yes | Potential to occur. Streams within the Project Area are classified as Group 1, where state listed mussel species may be present. | Due to the location, and that there is no in-water work proposed in a perennial stream of sufficient size, this project is not likely to impact these species. |
| Pondhorn | <i>Unio merus tetralasmus</i> | N/A | T | Ponds, small creeks, and the headwaters of larger streams in mud or sand. | Yes | Potential to occur. Streams within the Project Area are classified as Group 1, where state listed mussel species may be present. | Due to the location, and that there is no in-water work proposed in a perennial stream of sufficient size, this project is not likely to impact these species. |
| Threehorn Wartyback | <i>Obliquaria reflexa</i> | N/A | T | Common in medium to large rivers, the three-horned wartyback occurs in slackwater conditions to swift currents, and substrates of gravel to muddy sand. Relatively tolerant of river impoundments. | Yes | Potential to occur. Streams within the Project Area are classified as Group 1, where state listed mussel species may be present. | Due to the location, and that there is no in-water work proposed in a perennial stream of sufficient size, this project is not likely to impact these species. |
| Elktoe | <i>Alasmidonta marginata</i> | N/A | SC | Medium to large size streams but is most common in smaller streams. Greatest abundance in small shallow rivers with a moderately fast current and riffles. The preferred substrate is fine gravel mixed with sand. | Yes | Potential to occur. Streams within the Project Area are classified as Group 1, where state listed mussel species may be present. | N/A. Note: All freshwater mussels are protected in Ohio. If impacts are proposed to a perennial stream of sufficient size within the Project Area, a mussel survey may be required. |
| Purple wartyback | <i>Cyclonaias tuberculata</i> | N/A | SC | Medium to large rivers with gravel or mixed sand and gravel substrates. | Yes | Potential to occur. Streams within the Project Area are classified as Group 1, where state listed mussel species may be present. | N/A. Note: All freshwater mussels are protected in Ohio. If impacts are proposed to a perennial stream of sufficient size within the Project Area, a mussel survey may be required. |
| Elephant-ear | <i>Elliptio crassidens</i> | N/A | E | Large rivers in mud, sand, or fine gravel. | Yes | Potential to occur. Streams within the Project Area are classified as Group 1, where state listed | N/A. Note: All freshwater mussels are protected in Ohio. If impacts are proposed to a perennial stream of sufficient size within |

| Common Name | Scientific Name | Listing Status | | Habitat | Habitat Present | Likelihood of Occurrence | Agency Recommendation |
|-----------------------|-----------------------------------|----------------|-------|---|-----------------|--|---|
| | | Federal | State | | | | |
| | | | | | | mussel species may be present. | the Project Area, a mussel survey may be required. |
| Wavy-rayed lampmussel | <i>Lampsilis fasciola</i> | N/A | SC | Small-medium sized shallow streams, in and near riffles, with good current. It rarely occurs in medium rivers. The substrate preference is sand and/or gravel. | Yes | Potential to occur. Streams within the Project Area are classified as Group 1, where state listed mussel species may be present. | N/A. Note: All freshwater mussels are protected in Ohio. If impacts are proposed to a perennial stream of sufficient size within the Project Area, a mussel survey may be required. |
| Round pigtoe | <i>Pleurobema sintoxia</i> | N/A | SC | Occurs in mud, sand, or gravel substrates of medium to large rivers. | Yes | Potential to occur. Streams within the Project Area are classified as Group 1, where state listed mussel species may be present. | N/A. Note: All freshwater mussels are protected in Ohio. If impacts are proposed to a perennial stream of sufficient size within the Project Area, a mussel survey may be required. |
| Kidneyshell | <i>Ptychobranchus fasciolaris</i> | N/A | SC | Occurs in high water quality creeks, rivers and lakes with moderate to swift currents and a sand or gravel substrate. | Yes | Potential to occur. Streams within the Project Area are classified as Group 1, where state listed mussel species may be present. | N/A. Note: All freshwater mussels are protected in Ohio. If impacts are proposed to a perennial stream of sufficient size within the Project Area, a mussel survey may be required. |
| Fawnsfoot | <i>Truncilla donaciformis</i> | N/A | T | Preferring firm gravel or sand substrates, the fawnsfoot occurs primarily in small to large rivers and lakes. | Yes | Potential to occur. Streams within the Project Area are classified as Group 1, where state listed mussel species may be present. | N/A. Note: All freshwater mussels are protected in Ohio. If impacts are proposed to a perennial stream of sufficient size within the Project Area, a mussel survey may be required. |
| Deertoe | <i>Truncilla truncata</i> | N/A | SC | Prefers habitats of firm sand or gravel substrates in rivers and lakes with a moderately swift current but has been observed occasionally in smaller streams as well. | Yes | Potential to occur. Streams within the Project Area are classified as Group 1, where state listed mussel species may be present. | N/A. Note: All freshwater mussels are protected in Ohio. If impacts are proposed to a perennial stream of sufficient size within the Project Area, a mussel survey may be required. |
| Fish | | | | | | | |
| Scioto madtom | <i>Noturus trautmani</i> | E | N/A | Stream riffles of moderate current over gravel bottoms. Water must be of high quality and free of suspended sediments. | No | Unlikely to occur. Proposed for delisting due to extinction | Avoid in-water work in perennial streams from March 15 through June 30. |

| Common Name | Scientific Name | Listing Status | | Habitat | Habitat Present | Likelihood of Occurrence | Agency Recommendation |
|------------------------|--------------------------------|----------------|-------|--|-----------------|---|---|
| | | Federal | State | | | | |
| Bigeye Shiner | <i>Notropis boops</i> | N/A | E | Pools of small very clear streams with sand or gravel substrate. They are very intolerant of turbid (murky) waters and have become a very rare species in Ohio. | No | Unlikely to occur. Suitable habitat is not present within the Project Area. | Avoid in-water work in perennial streams from March 15 through June 30. |
| Goldeye | <i>Hiodon alosoides</i> | N/A | E | Large rivers and are rather tolerant of turbid (murky) waters from clay silts. They do not however tolerate industrial chemical pollutants. They are often found in areas with swift currents, often below dams | No | Unlikely to occur. Suitable habitat is not present within the Project Area. | Avoid in-water work in perennial streams from March 15 through June 30. |
| Northern Brook Lamprey | <i>Ichthyomyzon fossor</i> | N/A | E | Adults - areas of rapidly flowing water above a very coarse bed, Larvae - calmer waters of brook, stream and river side channels where there is fine sediment or organic debris in which to burrow. | Yes | Potential to occur. | Avoid in-water work in perennial streams from March 15 through June 30. |
| Northern Madtom | <i>Noturus stigmosus</i> | N/A | E | Deep swift riffles of large rivers. They usually are found in and around cobbles and boulders. | No | Unlikely to occur. Suitable habitat is not present within the Project Area. | Avoid in-water work in perennial streams from March 15 through June 30. |
| Shortnose Gar | <i>Lepisosteus platostomus</i> | N/A | E | Large rivers and associated overflow ponds and backwaters. More tolerant of turbid (murky) waters than most gar species, young are rather dependent on stagnant backwaters making them sensitive to destruction of these habitats. | Yes | Potential to occur. | Avoid in-water work in perennial streams from March 15 through June 30. |
| Spotted Darter | <i>Etheostoma maculatum</i> | N/A | E | Medium sized rivers and streams. They are typically found in areas of swift current at the top or bottom end of a riffle where there are many very large boulders or flat slabs of rock. | Yes | Potential to occur. | Avoid in-water work in perennial streams from March 15 through June 30. |

| Common Name | Scientific Name | Listing Status | | Habitat | Habitat Present | Likelihood of Occurrence | Agency Recommendation |
|--|-------------------------------------|----------------|-------|--|-----------------|---|---|
| | | Federal | State | | | | |
| Shovelnose Sturgeon | <i>Scaphirhynchus platyrhynchus</i> | N/A | E | Large river species that prefers sand and gravel substrates with rather fast current. | No | Unlikely to occur. Suitable habitat is not present within the Project Area. | Avoid in-water work in perennial streams from March 15 through June 30. |
| Blue Sucker | <i>Cycleptus elongatus</i> | N/A | T | Deep swiftly flowing chutes or channels of large rivers. | No | Unlikely to occur. Suitable habitat is not present within the Project Area. | Avoid in-water work in perennial streams from March 15 through June 30. |
| Lake Chubsucker | <i>Erimyzon sucetta</i> | N/A | T | Natural lakes and very sluggish streams or marshes with dense aquatic vegetation and clear waters. | No | Unlikely to occur. Suitable habitat is not present within the Project Area. | Avoid in-water work in perennial streams from March 15 through June 30. |
| Paddlefish | <i>Polyodon spathula</i> | N/A | T | The Ohio River and up to the first dam on its larger tributaries. They prefer the sluggish pools and backwater areas of these rivers and streams. | No | Unlikely to occur. Suitable habitat is not present within the Project Area. | Avoid in-water work in perennial streams from March 15 through June 30. |
| Tippecanoe Darter | <i>Etheostoma tippecanoe</i> | N/A | T | Medium to large streams and rivers in the Ohio River drainage in Ohio. They are found in riffles of moderate current with a substrate of gravel and small cobble sized rocks. | Yes | Unlikely to occur. Suitable habitat is not present within the Project Area. | Avoid in-water work in perennial streams from March 15 through June 30. |
| Western creek chubsucker | <i>Erimyzon claviformis</i> | N/A | SC | Small clear prairie streams of moderate and high gradients. The largest populations occur in streams with sand and gravel. Runoff from agricultural fields containing clayey silt can result in mortality to this species. | No | Unlikely to occur. Suitable habitat is not present within the Project Area. | N/A |
| Plants | | | | | | | |
| Leiberg's panic grass | <i>Dichanthelium leibergii</i> | N/A | E | Dry to wet-mesic prairies, savannahs, and openings in oak forest. | Yes | Potential to occur. | Agency did not provide avoidance recommendations. |
| Inland rush | <i>Juncus interior</i> | N/A | P | Broad range of habitat; conifer forests, prairie swales, upland prairie, rock outcrops. | Yes | Potential to occur. | Agency did not provide avoidance recommendations. |
| Note: The running buffalo clover (<i>Trifolium stoloniferum</i>) was recently removed from the federal list of endangered species due to recovery. This species habitat includes partially shaded woods, mowed areas, and along streams and trails. Potential habitat for this does exist within the Ecological Study Area; the species has the potential to occur. The USFWS has recommended that a species-specific survey occur if potential habitat is found to be present in accordance with a post-delisting monitoring plan. | | | | | | | |

4.2 Wildlife Observations

The most commonly observed wildlife in the agricultural portions of the Ecological Study Area were prevalent bird species, including red-tailed hawk (*Buteo jamaicensis*), common grackle (*Quiscalus quiscula*), European starling (*Sturnus vulgaris*), mourning dove (*Zenaida macroura*), pigeon (*Columba livia*), and American crow (*Corvus brachyrhynchos*). In addition, two bald eagles (*Haliaeetus leucocephalus*) were observed within the agricultural portions of the Ecological Study Area.

Most of the native species' observations made during the field survey occurred within non-maintained edge habitat and forested areas. Species observed within non-maintained edge habitat included white-tailed deer (*Odocoileus virginianus*), eastern coyote (*Canis latrans*), groundhog (*Marmota monax*), great blue heron (*Ardea herodias*), Canadian geese (*Branta canadensis*), and house sparrow (*Passer domesticus*).

Species observed within the forested portions of the Ecological Study Area included fox squirrel (*Sciurus niger*), white-tailed deer (*Odocoileus virginianus*), eastern gray squirrel (*Sciurus carolinensis*), eastern chipmunk (*Tamias striatus*), evidence of coyote (*Canis latrans*), evidence of raccoon (*Procyon lotor*), green heron (*Butorides virescens*), American goldfinch (*Spinus tristis*), northern cardinal (*Cardinalis cardinalis*), wood duck (*Aix sponsa*), mallard duck (*Anas platyrhynchos*), unidentified turtle species, monarch butterfly (*Danaus plexippus*), spice bush butterfly (*Papilio troilus*), tiger swallow-tail butterfly (*Papilio glaucus*), bumble bee species (*Bombus impatiens*, *B. griseocollis*, *B. bimaculatus*, and *B. fervidus*), marbled orb weaver (*Araneus marmoreus*), daddy long legs (*Opiliones* sp.), and mosquitoes (*Culicinae* sp.).

Species observed within Deer Creek and Dry Run include smallmouth bass (*Micropterus dolomieu*), largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), river chub (*Nocomis micropogon*), and unidentified mussel species.

Coordination with the USFWS and ODNR identified multiple known occurrences of listed rare, threatened, or endangered species in the vicinity of the Ecological Study Area (Attachment A). Specific species surveys were not conducted; however, no rare or protected plant species were identified during the field survey. Bats were not observed or collected during the field survey.

4.3 Surface Water Delineation Results

4.3.1 Streams in the Ecological Study Area

A total of 19 streams were delineated including Deer Creek, Dry Run, Yellowbud Creek, and 16 unnamed tributaries, comprising 39,412 linear feet within the Ecological Study Area (Surface Water Delineation Report; Attachment C). Fifteen of these streams were determined to be relatively permanent waters with intermittent or perennial flow regimes. Four of these streams were determined to be a non-relatively

permanent waters with ephemeral flow regimes. All streams were evaluated using either the HHEI or QHEI assessment methods.

4.3.2 Wetlands in the Ecological Study Area

A total of 59 wetlands were delineated, comprising a total of 32.170 acres within the Ecological Study Area (Surface Water Delineation Report; Attachment C). Forty-two of these wetlands were determined to be either abutting or adjacent to relatively permanent surface waters, likely making them jurisdictional under current federal guidelines (US EPA and USACE 2008). Seventeen wetlands were determined to be non-abutting and not adjacent to relatively permanent waters, likely making them non-jurisdictional under current federal guidelines (US EPA and USACE 2008). Because isolated wetlands are regulated in Ohio, these wetlands would likely fall under the jurisdiction of the state of Ohio (3745-1-02 OAC and 3745-1-50 OAC). Wetland quality was evaluated in the field using the ORAM; sixteen were evaluated as Category 1, forty-three as Category 2; and zero as Category 3. Scoring is subject to Ohio EPA verification.

4.3.3 Other Waters in the Ecological Study Area

A total of five potentially jurisdictional ditches were delineated, comprising 9,271 linear feet within the Ecological Study Area (Surface Water Delineation Report; Attachment C). In Ohio, the USACE has the sole authority to determine whether resources are subject to federal jurisdiction.

5.0 ESTIMATED ECOLOGICAL IMPACTS

5.1 Temporary Project Construction Impacts

5.1.1 Impacts to Land Cover

The project proposes to convert 1,741.48 acres of active agricultural land, 6.84 acres of hay field, and 4.646 acres of forested land for renewable energy production (Table 6). The resulting ecological impacts of agricultural conversion are considered negligible due to the existing habitat disturbance caused by farming activities. The proposed solar infrastructure will incorporate native pollinator habitat and significantly less vegetation maintenance than crop production, likely making it a more beneficial land use to native species than agriculture. Similarly, the resulting ecological impacts of hay field conversion are considered minimal due to the regular maintenance of this land use and the proposed creation of pollinator habitat beneath and between solar arrays. The resulting ecological impacts of forested land conversion are considered minimal-to-moderate as this land use provides habitat for a diverse range of species compared to managed uses; however, the Project has been designed to convert only a minor area of forest and to avoid unique and high-quality forest habitat.

During the construction period, temporary access roads, laydown yard, and workspace will occupy a greater footprint than the final project layout. However, temporary facilities will utilize existing farm roads and areas of proposed permanent infrastructure as much as possible to reduce the effects of the temporary footprint.

SUMMARY OF IMPACTS TO LAND COVER

TABLE 6

| Impact Type | Temporary Impact Area ¹ (acres) | Permanent Impact Area (acres) | Total Impact Area (acres) |
|--|---|----------------------------------|---------------------------|
| Cultivated Crops² | | | |
| Underground Collection Line ³ | 78.615 | 0.000 | 78.615 |
| Access Roads ⁴ | 19.919 | 39.838 | 59.757 |
| Electrical Substation | 0.000 | 17.208 | 17.208 |
| Array Piles and Panels | 0.000 | 1,683.661 | 1,683.661 |
| Gen-Tie Line | 0.274 | 0.000 | 0.274 |
| Inverter Pads | 0.000 | 0.771 | 0.771 |
| Total | 98.808 | 1,741.478 | 1,840.286 |

| Hay/Pasture ² | | | |
|--|--------------|--------------|--------------|
| Underground Collection Line ³ | 2.594 | 0.000 | 2.594 |
| Access Roads ⁴ | 0.266 | 0.517 | 0.783 |
| Array Piles and Panels | 0.000 | 6.321 | 6.321 |
| Total: | 2.860 | 6.838 | 9.698 |
| Mixed Forest ² | | | |
| Underground Collection Line ³ | 2.404 | 0.000 | 2.404 |
| Access Roads ⁴ | 0.293 | 0.590 | 0.883 |
| Array Piles and Panels | 0.000 | 3.838 | 3.838 |
| Total: | 2.697 | 4.428 | 7.125 |
| Developed, Open Space ² | | | |
| Underground Collection Line ³ | 1.363 | 0.000 | 1.363 |
| Access Roads ⁴ | 0.500 | 0.958 | 1.458 |
| Equipment Laydown Yard | 0.264 | 0.000 | 0.264 |
| Electrical Substation | 0.000 | 0.012 | 0.012 |
| Array Piles and Panels | 0.000 | 2.008 | 2.008 |
| Total: | 1.863 | 2.978 | 4.841 |
| Deciduous Forest ² | | | |
| Underground Collection Line ³ | 0.543 | 0.000 | 0.543 |
| Access Roads ⁴ | 0.115 | 0.218 | 0.333 |
| Total: | 0.658 | 0.218 | 0.876 |
| Developed, Low Intensity ² | | | |
| Underground Collection Line ³ | 0.242 | 0.000 | 0.242 |
| Access Roads ⁴ | 0.051 | 0.094 | 0.145 |
| Equipment Laydown Yard | 0.164 | 0.000 | 0.164 |
| Array Piles and Panels | 0.000 | 0.194 | 0.194 |
| Total: | 0.293 | 0.288 | 0.581 |

| Open Water² | | | |
|--|--------------|--------------|--------------|
| Underground Collection Line ³ | 0.099 | 0.000 | 0.099 |
| Array Piles and Panels | 0.000 | 0.002 | 0.002 |
| Total: | 0.099 | 0.002 | 0.101 |

1. Temporary impact areas represent only the additional impact area during construction and do not include the permanent impact area.
2. Land cover types are based on the 2019 National Land Cover Database (Figure 4).
3. A temporary, 30-foot-wide area will be required for underground collection line installation.
4. Access roads will have a temporary width of 30 feet, and a permanent width of 20 feet.

5.1.2 Impacts to Wildlife

Construction of the project may temporarily disturb wildlife activity within the Project Area. Mobile species will likely avoid areas of frequent and intensive human activity and concentrate in areas not under active construction. Few studies are available that explore the direct impacts of utility scale solar facilities and wildlife deaths; however, infrastructure is not anticipated to pose a threat to species mobility or habitat. Fencing proposed to surround the property may inhibit some species from traveling freely between tracts of land, however, most will climb over, jump over, or burrow beneath it.

As a result of avoidance and minimization planning, the Project layout has been diverted around forested stream and wetland habitat, thus reducing the likelihood of the Project or construction to effect or harm wildlife. Wildlife that currently inhabit Dry Run, Deer Creek, their riparian corridors, and forested streams and wetlands within the Project Area are expected to continue to do so during construction and operation of the solar facility.

5.1.3 Impacts to Surface Waters

As proposed, the project will result in impacts to one wetland (Wetland HD) for the placement of solar array piles (Table 7). Wetland HD is determined to be an emergent, Category 1, potentially isolated wetland based on surface water delineation criteria (Attachment C). All other surface water resources will be avoided by the Project. Construction boring methodologies will be used to avoid impacts to streams, wetlands, and potentially jurisdictional ditches for collection line installation.

SUMMARY OF IMPACTS TO SURFACE WATERS

TABLE 7

| Impact Type | Temporary Impact Area ¹ (acres) | Permanent Impact Area (acres) | Total Impact Area (acres) |
|-------------------------------|---|----------------------------------|---------------------------|
| Wetland HD² | | | |
| Array Piles and Panels | 0.000 | 0.250 | 0.250 |
| Total | 0.000 | 0.250 | 0.250 |

1. Temporary impact areas represent only the additional impact area during construction and do not include the permanent impact area. Land cover types are based on the 2019 National Land Cover Database (Figure 4).
2. Surface water delineation criteria and data for Wetland HD is included in Attachment C.

5.1.4 Proposed Mitigation

Compensatory mitigation for impacts to one wetland will be determined during the permitting phase of the Project. If required, mitigation is anticipated to be calculated at a 1.5:1 ratio for impacts to a Category 1 wetland based on the guidance outlined in Chapter 3745-1 of the Ohio Administrative Code.

5.1.5 Best Management Practices and Minimization of Impacts

Construction may result in a temporary increase in sedimentation downstream, however, best management practices (BMPs) will be utilized throughout construction of the Project to reduce soil erosion and sediment runoff from the site. A stormwater pollution prevention plan (SWPPP) will be prepared prior to construction to detail erosion and sediment controls that are appropriate based on disturbance type and topography. Stormwater runoff monitoring will be performed regularly during construction in accordance with an approved SWPPP. BMPs will help minimize any adverse effects to the surrounding environment.

5.2 Permanent Project Impacts

Throughout the Project design process, proposed infrastructure has been reduced and modified to avoid development within unique and high-quality habitat to the maximum extent practicable including forested streams and wetlands, Dry Run and its riparian corridor, and Deer Creek and its riparian corridor. Proposed impacts to surface waters include one, low-quality wetland which is currently subject to grading from farming activities. Therefore, the overall ecological impacts associated with the Project are considered minimal as the majority of the proposed infrastructure lies within a heavily managed agricultural setting.

It should also be noted that the ecological benefits of renewable energy will offset the ecological impacts of non-renewable in some capacity through reduced green-house gas emissions, industrial by-products,

landscape disturbance, impacts to forests and natural habitats, and pollution runoff. Solar energy is a highly efficient and sustainable alternative to fossil fuel, coal, petroleum, natural gas, and nuclear energy. Overall, the broad-scale benefits of solar energy outweigh the immediate ecological impacts associated with the Project.

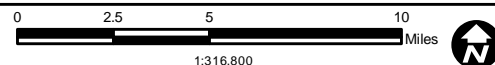
6.0 REFERENCES

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FIGURES



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Chipmunk Solar Project
Chipmunk Solar, LLC

Site Location Map

Deer Creek, Monroe, and Jackson Townships
Pickaway County, Ohio

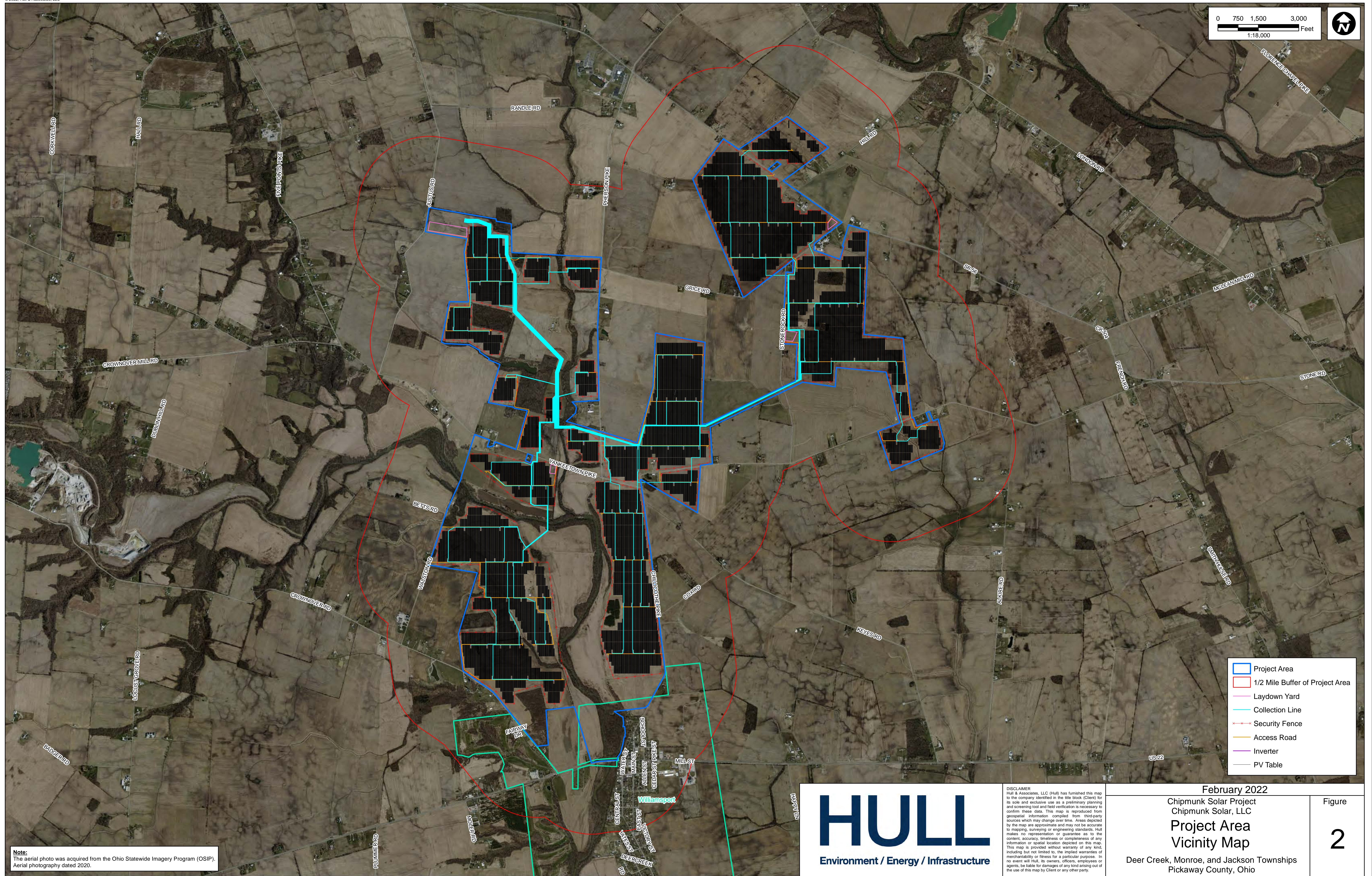
Date:

February 2022

File Name:
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Edited: 2/17/2022 By: rkaip

Figure

1



Note:
The aerial photo was acquired from the Ohio Statewide Imagery Program (OSIP).
Aerial photography dated 2020.

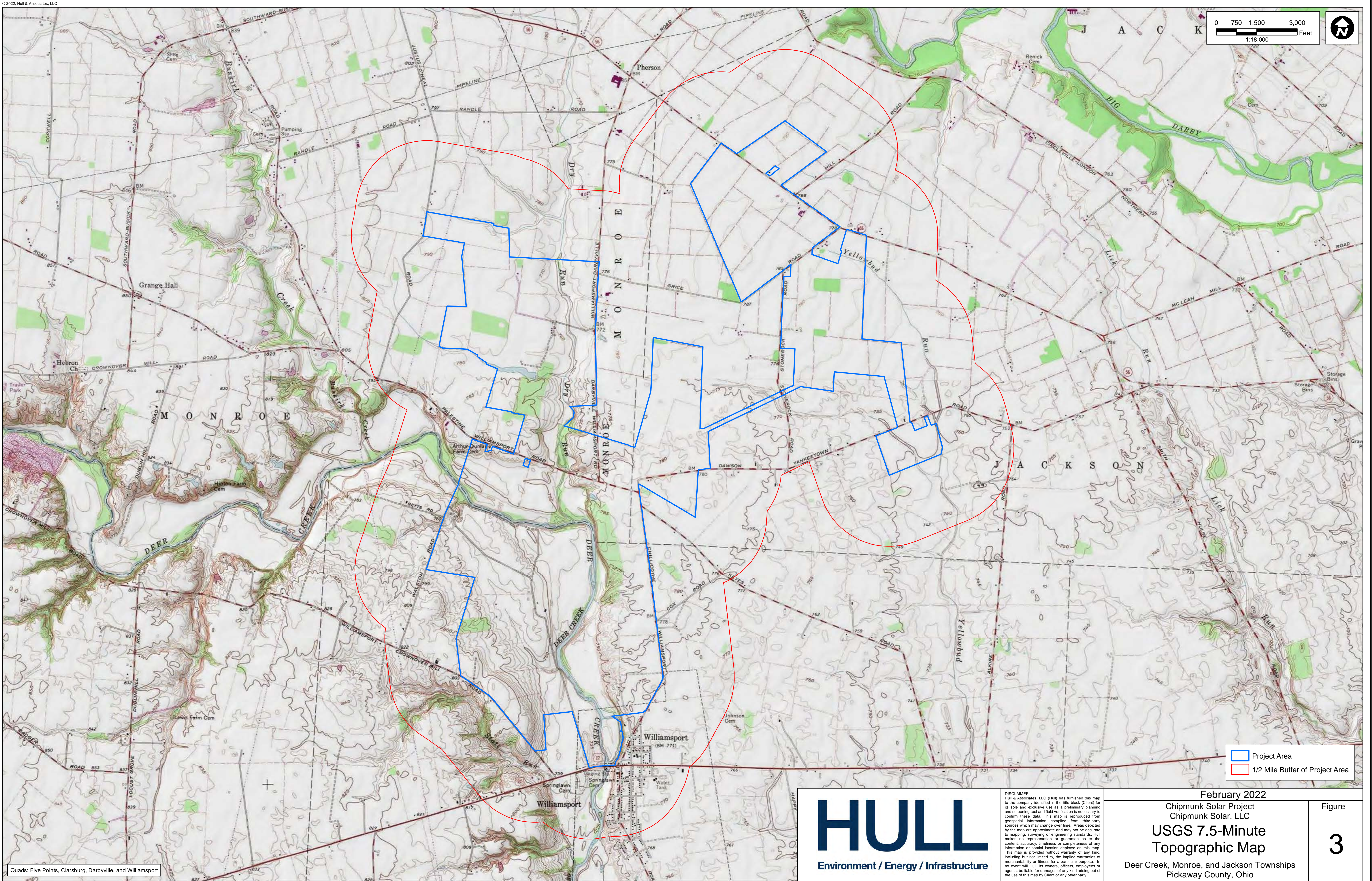
Produced Using Esri's ArcGIS Software

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February 2022
Chipmunk Solar Project
Chipmunk Solar, LLC
Project Area
Vicinity Map
ek, Monroe, and Jackson Town
Pickaway County, Ohio

Figure
2



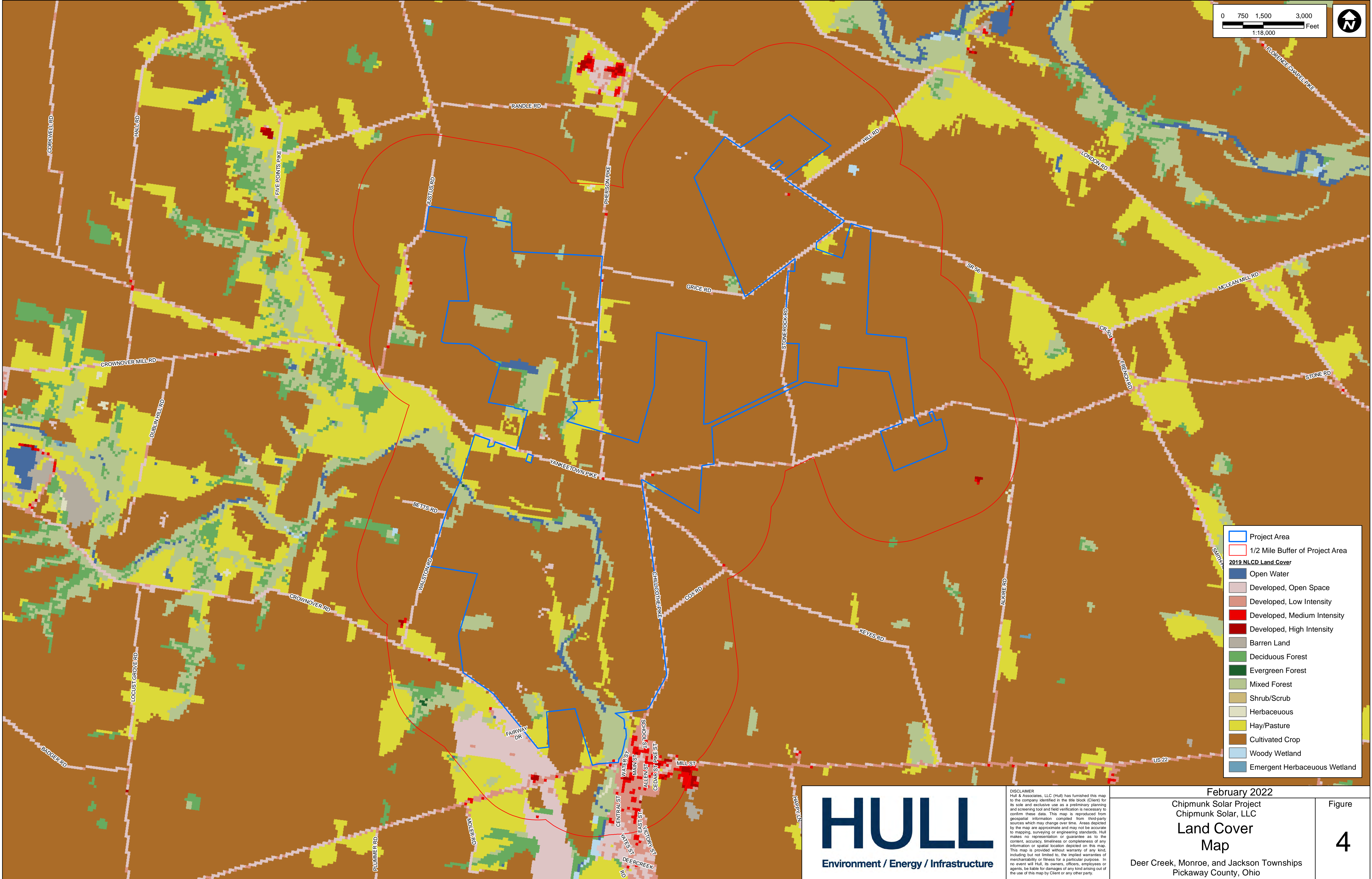
Quads: Five Points, Clarsburg, Darbyville, and Williamsport

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February 2022
Chipmunk Solar Project
Chipmunk Solar, LLC
**USGS 7.5-Minute
Topographic Map**
Deer Creek, Monroe, and Jackson Townships
Pickaway County, Ohio

Figure
3



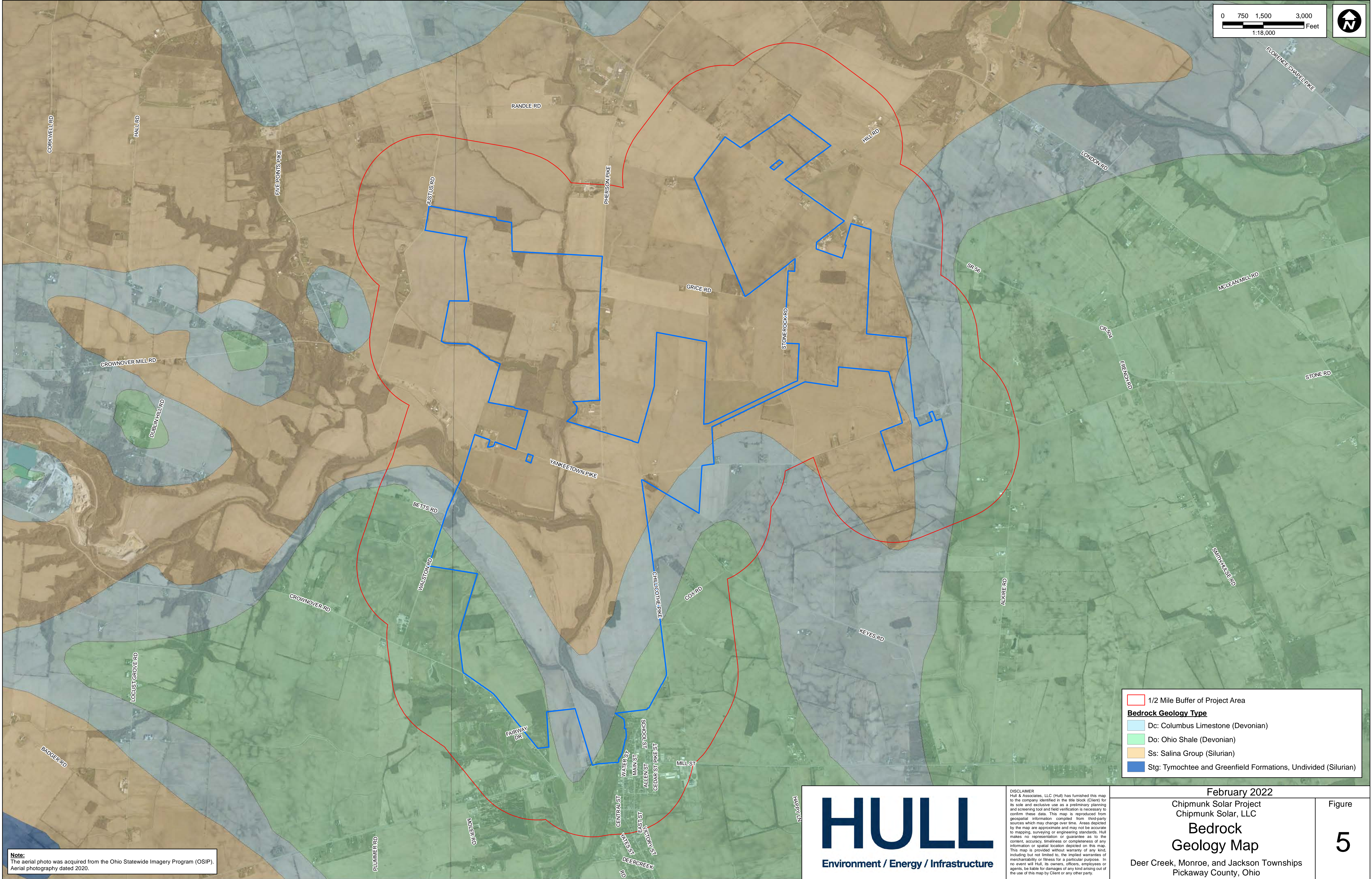
- Project Area
- 1/2 Mile Buffer of Project Area
- 2019 NLCD Land Cover
 - Open Water
 - Developed, Open Space
 - Developed, Low Intensity
 - Developed, Medium Intensity
 - Developed, High Intensity
 - Barren Land
 - Deciduous Forest
 - Evergreen Forest
 - Mixed Forest
 - Shrub/Scrub
 - Herbaceous
 - Hay/Pasture
 - Cultivated Crop
 - Woody Wetland
 - Emergent Herbaceous Wetland

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Chipmunk Solar Project
Chipmunk Solar, LLC
Land Cover Map
Deer Creek, Monroe, and Jackson Townships
Pickaway County, Ohio

Figure
4



Note:
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Aerial photography dated 2020.

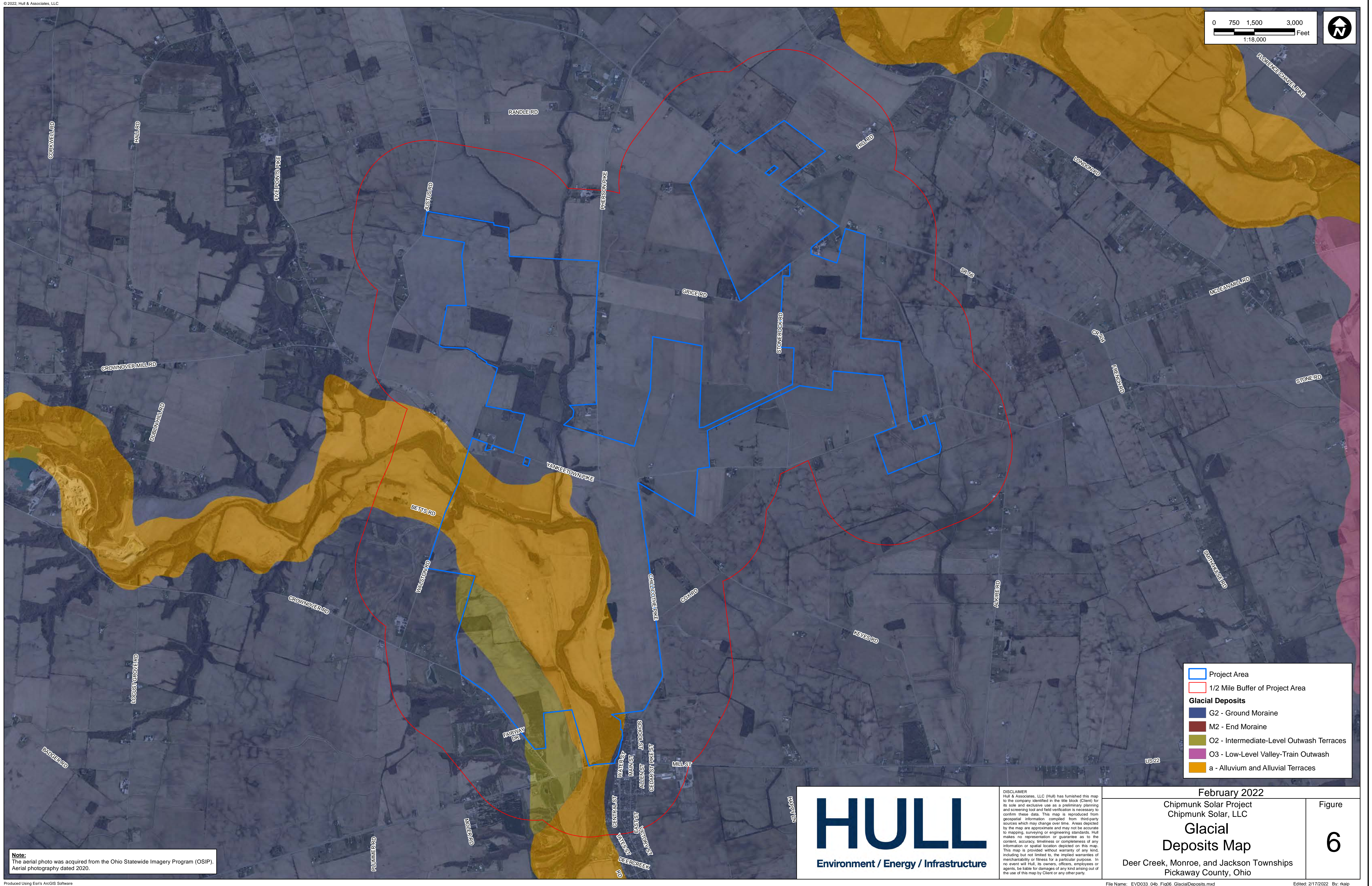
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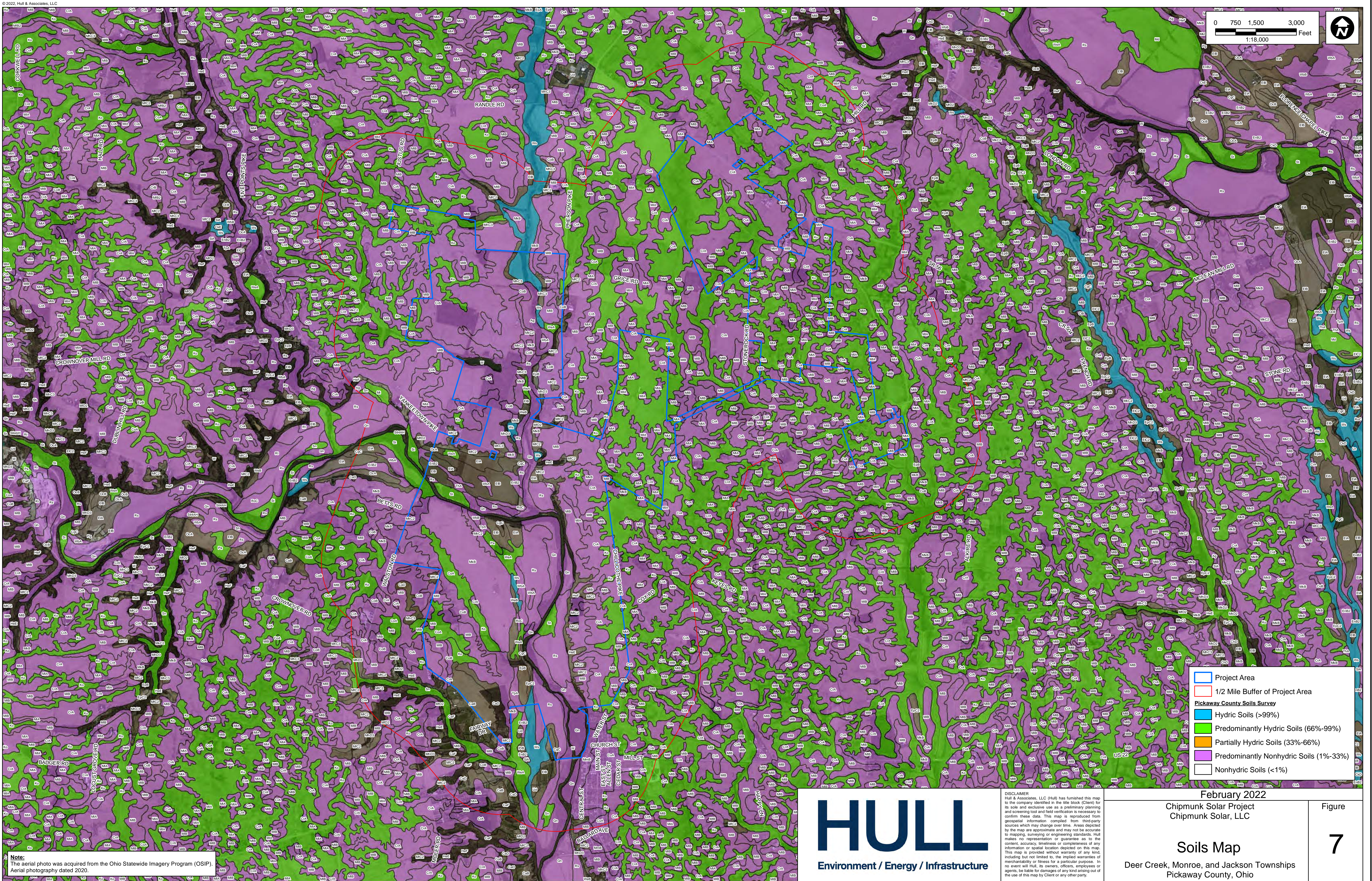
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1/2 Mile Buffer of Project Area
Bedrock Geology Type
Dc: Columbus Limestone (Devonian)
Do: Ohio Shale (Devonian)
Ss: Salina Group (Silurian)
Stg: Tymochtee and Greenfield Formations, Undivided (Silurian)

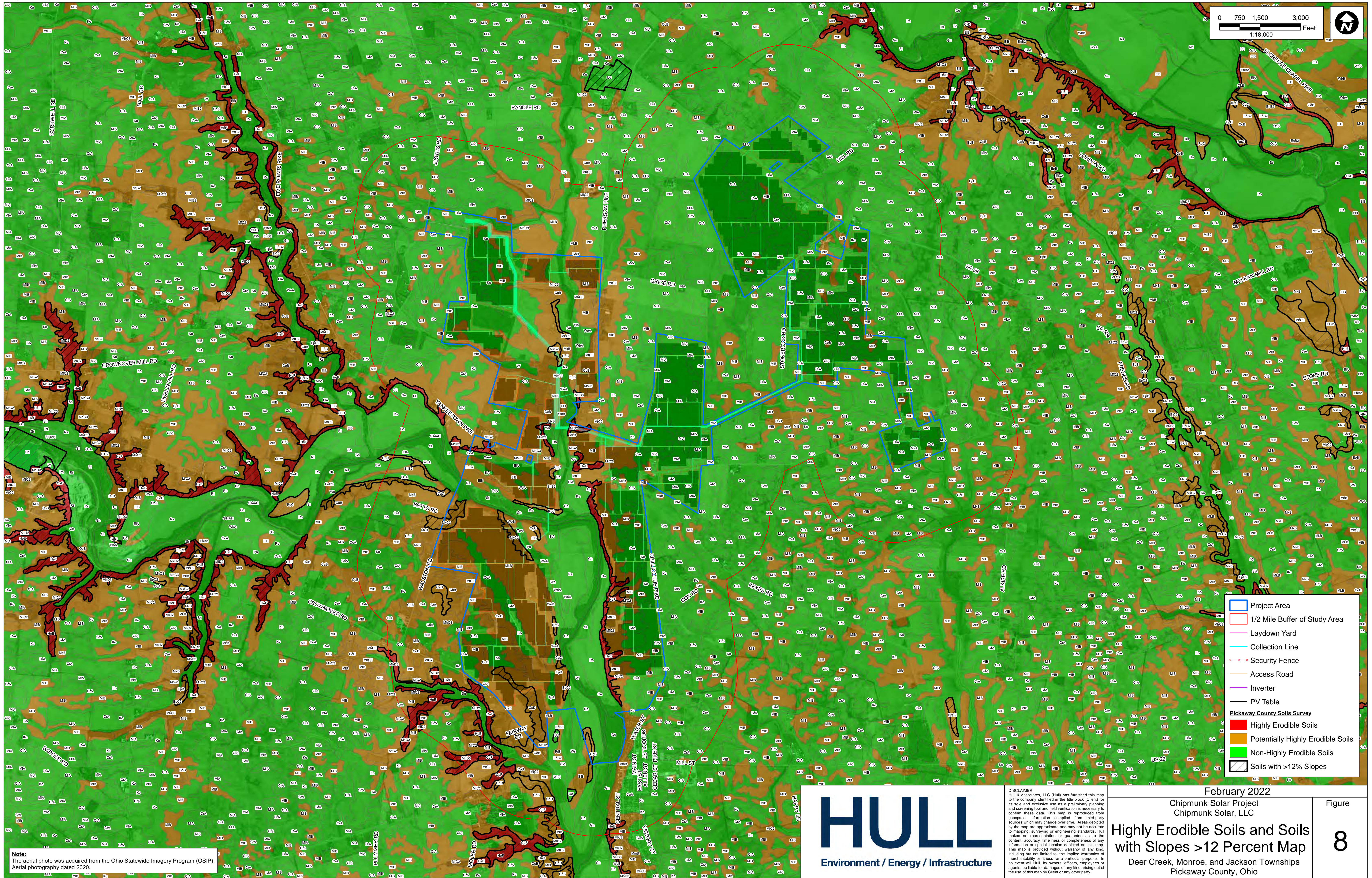
February 2022
Chipmunk Solar Project
Chipmunk Solar, LLC
**Bedrock
Geology Map**
Deer Creek, Monroe, and Jackson Townships
Pickaway County, Ohio

Figure
5





Note:
The aerial photo was acquired from the Ohio Statewide Imagery Program (OSIP).
Aerial photography dated 2020.



Project Area

1/2 Mile Buffer of Project Area

Important Bird Areas

ODNR Lands

Division of Wildlife

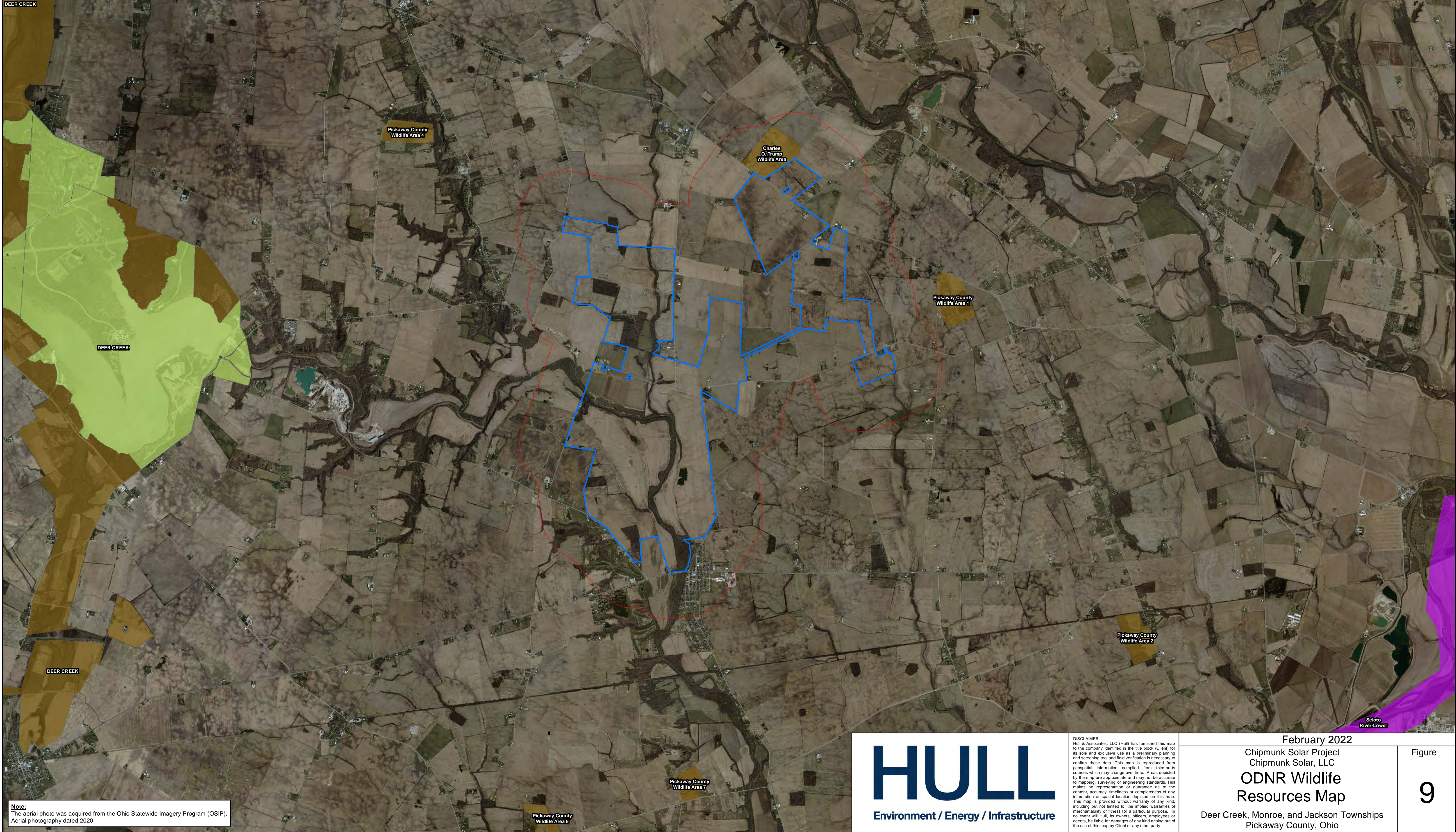
Division of Parks

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Feet

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Aerial photography dated 2020.

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Chipmunk Solar Project

Chipmunk Solar, LLC

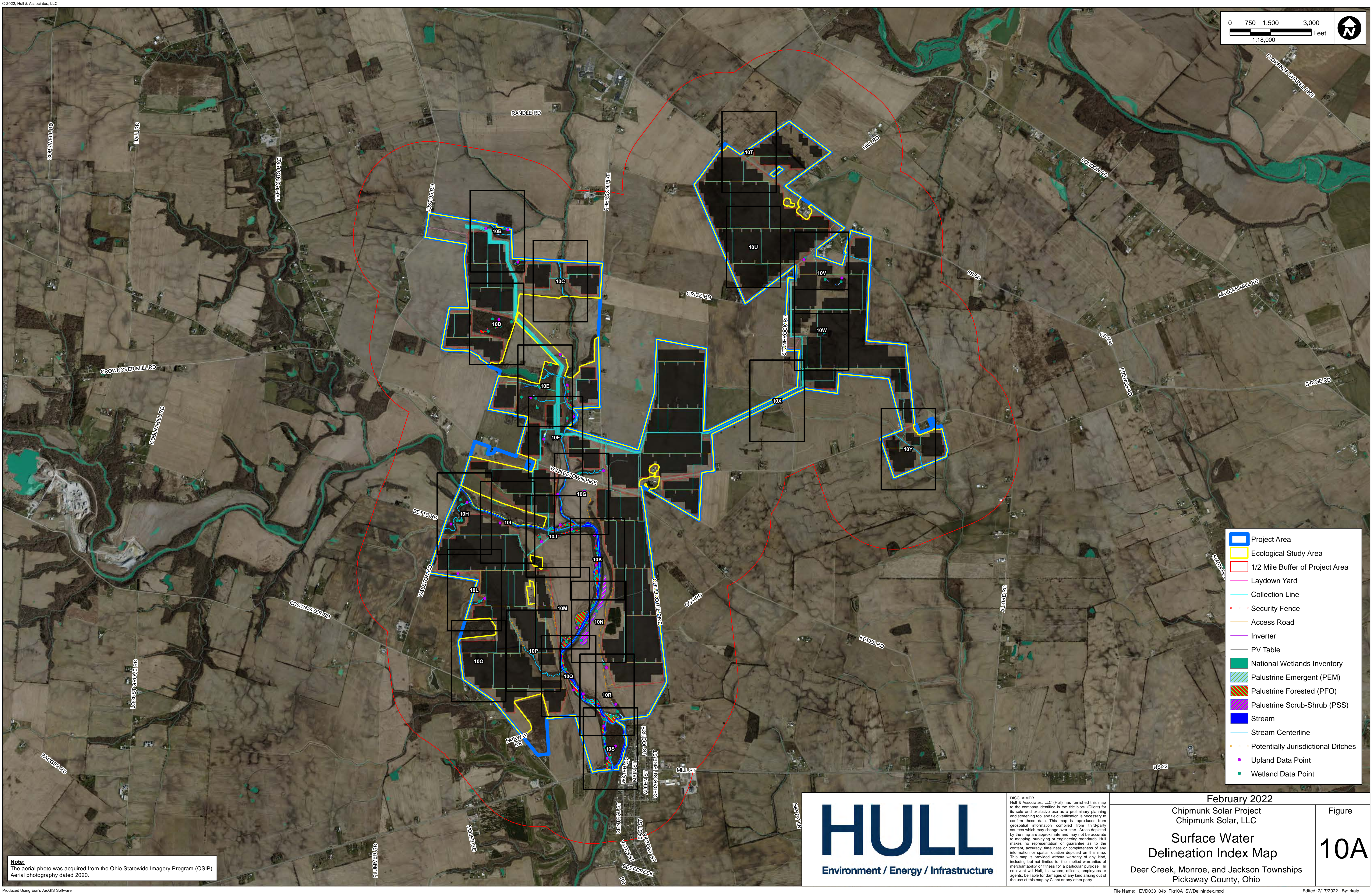
ODNR Wildlife Resources Map

Deer Creek, Monroe, and Jackson Townships

Pickaway County, Ohio

Figure

9



Note:
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in

Case No(s). 21-0960-EL-BGN

Summary: Application Exhibit Q (Ecological Assessment, 1 of 10) electronically
filed by Mr. Michael J. Settineri on behalf of Chipmunk Solar LLC