Avian Protection Plan

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Cornerstone Solar, LLC

Cornerstone Solar Project

Jefferson Township,
Washington County, Pennsylvania

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ATTACHMENTS

ACRONYM LIST

APLIC	Avian Power Line Interaction Committee
APP	Avian Protection Plan
BGEPA	Bald and Golden Eagle Protection Act
BMP	Best Management Practice
NCE	North Corners Energy, LLC
ESA	Endangered Species Act
GPS	Global Positioning System
IPaC	Information for Planning and Consultation
MBTA	Migratory Bird Treaty Act
MW	Megawatt
NEPA	National Environmental Policy Act
O&M	Operations and Maintenance
PA	Pennsylvania
PGC	Pennsylvania Game Commission
PNDI	Pennsylvania Natural Diversity Inventory
Project	Cornerstone Solar Project
USFWS	United States Fish and Wildlife Service
WV	West Virginia

1.0 Introduction

1.1 Purpose

The purpose of this Avian Protection Plan (APP) is to minimize and manage potential risks to avian species associated with the construction and operation of the Cornerstone Solar Project (Project). This APP outlines avoidance, minimization, and monitoring measures to support compliance with state and federal law.

The APP also supports the Project's broader environmental compliance commitments and demonstrates a proactive approach consistent with the United States Fish and Wildlife Service (USFWS) Avian Protection Plan Guidelines (APLIC 2005) and relevant renewable energy best practices.

1.2 Commitment to Avian Protection

Cornerstone Solar, LLC is committed to its responsibility to be a good steward of the environment and to adhere to federal, state, and local laws and ordinances. A pre-construction risk assessment will be completed to determine the need for avoidance, minimization, and monitoring measures to support compliance with state and federal law. The mitigation measures presented in this APP are based on general APLIC guidelines and final design will incorporate mitigation measures, as needed, based on the pre-construction risk assessment.

The development and application of this APP provides a framework to ensure that:

- Project-related actions comply with applicable federal and state regulations;
- Project-related actions comply with applicable permit conditions;
- Project-specific species concerns are included in the APP, including avoidance and minimization measures.

The procedures described in this APP are as follows;

- Cornerstone Solar, LLC staff and relevant subcontractors will receive the appropriate training pursuant to wildlife monitoring and reporting protocols; and,
- The documentation of bird injuries and fatalities may provide the basis for future modifications to the APP.

1.3 Project Description

Cornerstone Solar, LLC proposes to develop the Cornerstone Solar Project within Jefferson Township, Washington County, in southwestern Pennsylvania (PA). The Project has a total area of approximately 730 acres with center coordinates of 40.315731, -80.509238. The 200-megawatt (MW) Project will include the installation of photovoltaic solar modules and any associated accessories such as electrical infrastructure, access roads, and operation facilities. The Project abuts the PA/West Virginia (WV) state border line on its western extent and is bisected by both Bethel Ridge Road and Miller Road.

1.4 Legal and Regulatory Framework

The protection of avian species in PA is governed by a combination of federal and state statutes administered primarily by the USFWS. The following federal laws are relevant to the Project and helped to inform the development of this APP.

1.4.1 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (BGEPA), originally enacted in 1940 and amended in 1962 to include golden eagles, prohibits take and possession of bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) without a permit issued by the USFWS (USFWS 1962).

Under the BGEPA, "take" is defined broadly to include actions that interfere with eagles' typical breeding, feedings, or sheltering behavior, causing injury, death, or nest abandonment. Projects that may incidentally take eagles or disturb nesting or foraging behavior are required to obtain authorization through the Eagle Incidental Take Permit process (USFWS 2024).

Compliance with BGEPA requires:

- Conducting risk assessments for eagle presence and habitat use within the Project area and surrounding landscape;
- Implementing avoidance and minimization measures to reduce potential for eagle disturbance or collision; and
- Coordinating with USFWS for potential permitting needs if risk cannot be fully avoided.

1.4.2 Endangered Species Act

The Endangered Species Act (ESA) provides protection for species listed as threatened or endangered and their designated critical habitats. Under Section 9 of the ESA, it is unlawful to take any listed species without authorization. The term "take" is defined by the ESA as activities including harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, collecting, or any such conduct. For non-federal projects, Section 10 of the ESA provides a mechanism for incidental take authorization through the Habitat Conservation Plan (HCP) process (USFWS 1973).

Compliance with the ESA requires:

- Reviewing the USFWS Information for Planning and Consultation (IPaC) system to identify any federally listed species as appropriate (USFWS 2025); and
- Implementing avoidance, minimization, or mitigation measures to prevent unauthorized take.

1.4.3 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) implements treaties between the United States and several other countries (Canada, Mexico, Japan, and Russia) for the protection of migratory birds. The MBTA prohibits take, possession, import, export, transport, sale, purchase, or barter of migratory birds, their parts, nests, or eggs, except as authorized under a valid permit (USFWS 2021).

The term “take” under the MBTA includes both direct actions, such as shooting and trapping, and incidental occurrences, such as incidental take from industrial activities. The USFWS recognizes that renewable energy facilities have potential to incidentally take migratory birds through events such as collision, entrapment, or disturbance. While there is no incidental take permit under the MBTA, the USFWS encourages the development and implementation of APPs and Best Management Practices (BMPs) to minimize impacts and demonstrate due diligence.

Compliance with the MBTA requires:

- Avoiding disturbance to active nests and implementing seasonal buffers;
- Minimizing features that may attract nests or trap birds;
- Conducting mortality monitoring and adaptive management; and
- Coordinating with USFWS regarding any avian incidents.

1.4.4 Pennsylvania Threatened and Endangered Species

In PA, protection of state-listed bird species is administered by the Pennsylvania Game Commission (PGC). Pennsylvania maintains a list of state threatened and endangered bird species, as well as species of special concern, which receive protection from direct harm and habitat disturbance.

A Pennsylvania Natural Diversity Inventory (PNDI) review was completed for the Project to evaluate the potential presence of state or federally listed species (PNDI 2024). The PNDI review resulted in one recommended avoidance measure from the USFWS. Cornerstone Solar, LLC was directed to conduct any tree cutting, disturbance, inundation, and prescribed burning from October 1 to March 31. These measures will help to minimize the risk of take or disturbance to state protected bird species potentially occurring within the Project area.

2.0 Project Baseline Conditions

The portion of the Project covered under this APP includes 1.2 miles of overhead collection.

2.1 Line Description

The overhead collector line is designed as a three-phase monopole configuration with at least 60 inches horizontal AND at least 40 inches of vertical separation between non-insulated conductors. Each phase conductor is insulated near potential perch locations, while the shield

(ground) wire remains uninsulated. Design data from the Cornerstone 34.5 kV Gen-Tie Plan & Profile (Attachment A) indicate the following

- Span lengths of 198 to 340 feet between structures.
- Conductor sag profiles 1743 – 1746 lbs everyday creep tension; 3029 – 5066 lbs MOT creep tension.
- Vertical scale of 40 ft; horizontal scale of 200 ft.

These parameters ensure sufficient electrical clearances and minimize avian electrocution potential. The uniform span geometry also reduces abrupt elevation transitions that could increase collision risk.

2.2 Landscape and Habitat Context

The Project lies within the Appalachian Plateau physiographic province, characterized by rolling terrain, dissected ridgelines, and mixed agricultural and forest land. Elevations range from approximately 1,050 to 1,380 feet above mean sea level. The area includes:

- Vegetation types: hayfields, pasture, regenerating shrubland, and mixed deciduous forest dominated by oak (Quercus spp.), maple (Acer spp.), and hickory (Carya spp.).
- Topography: gently rolling to hilly terrain with distinct ridgelines; the overhead line follows terrain contours to minimize grading.
- Wetlands and water bodies: small forested wetlands, ephemeral drainage features, and ponded areas near Bethel Ridge Road and Miller Road provide seasonal habitat for amphibians and waterbirds.
- Hydrology and flyways: the project lies within the Raccoon Creek watershed, approximately 10 miles east of the Ohio River Valley, part of the Mississippi Flyway used by migratory birds.
- Ridges and corridors: localized ridgelines along the PA/WV border may create thermals utilized by raptors and soaring species.

2.3 Nearby Nesting, Roosting, and Sensitive Areas

Desktop review and regional breeding bird data (USGS BBS and PA Game Commission WAP) indicate the potential presence of multiple habitat features that may support avian breeding and roosting activity including:

- Raptors: Red-tailed Hawks (*Buteo jamaicensis*) and Great Horned Owls (B*ubo virginianus*) nest within wooded patches and ridge forests. Open fields and grasslands support American Kestrels (*Falco sparverius*).
- Waterbirds: Small wetlands and ponds may support foraging Great Blue Herons (*Ardea herodias*) and occasional migrating ducks or shorebirds.
- Passerines: Edge and shrubland habitats support breeding populations of Eastern Kingbird (*Tyrannus tyrannus*), Field Sparrow (*Spizella pusilla*), and Song Sparrow (*Melospiza melodia*).

- Roosting/staging areas: Agricultural fields and tree lines provide roost habitat for blackbirds (*Icteridae*) and migrating songbirds in spring and fall.
- Sensitive species: No active Bald Eagle (*Haliaeetus leucocephalus*) nests are known within 1 mile of the alignment; however, occasional foraging activity along riparian corridors is possible.

These features were not confirmed present within the Project, however, if observed, measures to reduce collision and electrocution risk may be implemented. These measures include integration of APLIC-friendly design criteria for the overhead line and associated structures, personnel training, construction monitoring, and ongoing reporting as described in subsequent sections of this APP.

2.4 Avian Species of Concern

Based on a desktop review of avian resources proximal to the Project, the following groups of species may occur within the vicinity of the Project.

Table 1. Avian resources anticipated to occur within the vicinity of the Project and potential risks.

Category	Representative Species	Key Habitat/Use	Risk Potential
Raptors	Red-tailed Hawk, Northern Harrier, American Kestrel, Bald Eagle	Open fields, wooded edges, ridgelines	Electrocution & collision at structures
Waterbirds	Great Blue Heron, Mallard, Killdeer	Wetlands, drainages, ponded areas	Collision risk at span crossings
Grassland Birds	Eastern Meadowlark, Bobolink, Savannah Sparrow	Cleared solar fields and edges	Habitat displacement during construction
Forest and Edge Passerines	Scarlet Tanager, Wood Thrush, Field Sparrow	Forest edges, shrubs, fencerows	Habitat loss or barrier effects
Migratory Flyovers	Broad-winged Hawk, warblers, swallows	Regional flyway corridors	Collision risk at overhead line crossings

This inventory will serve as the biological foundation for the avian risk assessment, mitigation design, and adaptive monitoring framework consistent with APLIC (2024) guidance and USFWS Avian Protection Plan criteria.

3.0 Risk Assessment

The purpose of the avian risk assessment is to evaluate the potential for electrocution and collision hazards associated with the 34.5 kV overhead collector line connecting the solar generation facility to the on-site substation in Jefferson Township, PA. This section applies the

methodologies recommended in the APLIC (APLIC, 2024) and the USFWS (USFWS, 2022) Eagle Risk Framework.

APLIC Guidance is used to characterize electrocution hazards by analyzing conductor spacing, perch accessibility, and energized-to-grounded component distances on each structure. The USFWS Eagle Risk Framework evaluates broader landscape-scale risk by integrating environmental variables that influence eagle use and collision potential, including topography, elevation, prey availability, and distance to water.

The two main sources of risk to avian resources at the Project include electrocution and collision. Electrocution risk at the Project inherent to the Project's design may be influenced by a conductor separation distance of <60-inches, phase-to-ground clearance distance of <60-inches, and proximity to potential perch sites and raptor foraging habitat. Collision risk may be influenced by the span alignment relative to topographical conditions that may concentrate birds (e.g., ridges), the presence of open water and wetlands, location within local flight corridors, vegetation height differentials and line visibility.

Structure specific data were compiled and evaluated to determine that most structures present low-to-moderate risk.

This preliminary risk assessment has helped to identify potential minimization and adaptive management as part of the APP, such as enhanced monitoring, installation of visual markers or deterrents and to evaluate the applicability of enhanced retrofits if ongoing monitoring identifies higher than expected fatalities or injuries to wildlife. Final determination of mitigation measures will be determined following final design and a pre-construction risk assessment.

4.0 Avian-Safe Design and Mitigation Measures

4.1 Conformance with APLIC Clearance Standards

All line components will be designed and constructed to meet or exceed APLIC (2024) recommended minimum clearances between non-insulated conductors to prevent avian electrocutions. Key parameters include:

- Phase-to-phase clearance: ≥ 60 inches.
- Phase-to-ground clearance: ≥ 60 inches.
- Conductor-to-guy wire or grounded hardware clearance: ≥ 60 inches.

Final structural designs will undergo engineering verification to confirm that vertical and horizontal clearances comply with these standards, including under maximum sag conditions derived from the Cornerstone 34.5 kV Plan & Profile.

Where clearances are reduced due to design constraints (e.g., riser poles, dead-end structures), insulation and protective covering will be applied to ensure avian safety (see Section 5.3).

4.2 Insulation and Protective Covering

Any energized components within the electrocution risk zone—defined as within a bird's wingspan (~4–5 ft for large raptors)—will be insulated or covered using APLIC-approved materials such as:

- Conductor cover-up and jumper insulation on exposed phases.
- Insulating boots or caps for bushings, terminals, or connectors.
- Insulating hoods for riser poles and transformer bushings at the substation.

All protective devices will be UV-rated, weather-resistant, and compatible with 34.5 kV systems. Installation will occur prior to energization to ensure compliance with APP commitments.

4.3 Collision Risk Mitigation: Flight Diverters and Markers

If post-construction monitoring or field observation indicates collision risk along particular spans (e.g., wetland-adjacent, or ridge-crest areas), the Project will evaluate installation of avian flight diverters or line markers on the uninsulated shield wire.

Recommended devices include:

- Swan Flight Diverters or FireFly-style markers, spaced 15–20 m apart.
- Dual-color spirals or swing plates to enhance visibility under varying light conditions.
- Night-visibility options (UV-reflective or illuminated markers) if nocturnal flight activity is confirmed though surveys or other monitoring methods such as site radar, fatality monitoring, direct observations, etc.

Marker selection and spacing will follow APLIC (2012, 2024) and EPRI/USFWS guidance to balance efficacy and mechanical reliability.

4.4 Perch Management and Anti-Perching Devices

Should bird use near energized components increase over time—particularly by raptors, corvids, or other large species—targeted perch management measures may be implemented. These may include:

- Anti-perching devices (e.g., perch discouragers, angled brackets, or insulated cones) on crossarms, insulators, or pole tops where electrocution risk is elevated.
- Creation of alternate perches (safe posts or platforms) located away from energized hardware to maintain behavioral options for birds while reducing risk.
- Regular inspection and maintenance to ensure perch deterrents remain intact and effective
- Devices will be evaluated to avoid unintended harm (e.g., entanglement) and will comply with USFWS-approved avian deterrent design standards.

5.0 Construction, Installation, & Quality Assurance

5.1 Construction Personnel Training

Construction of the Project will be conducted in a manner that avoids and minimizes potential impacts on avian species. All appropriate construction personnel will receive pre-construction training on the APP requirements and applicable procedures. Training will include identification of sensitive species, nest buffer requirements, and reporting protocols for injured or dead birds.

5.2 Pre-construction Inspection

If significant risk to avian species is identified as part of the pre-construction risk assessment, and mitigation measures have been implemented, then qualified personnel, such as a biologist or an individual trained for the task, will complete a pre-construction inspection to verify that bird-safe design elements have been incorporated. This includes ensuring appropriate spacing of energized components in accordance with the Avian Power Line Interaction Committee (APLIC) standards and verifying that deterrents or insulation are properly installed where necessary (APLIC 2005, APLIC 2024).

5.3 Installation

During construction, supervised installation of insulation, diverters, and deterrent devices will occur under oversight of qualified personnel. Active nests will be avoided during breeding season and any potential disturbance will be reported immediately.Quality Assurance

Upon completion, as-built documentation, including GPS coordinates, photographs, and diagrams of bird-safe features, will be prepared and maintained on file with Cornerstone Solar, LLC and made available to agency personnel upon request.

6.0 Post-construction Monitoring & Maintenance

Following commencement of operations, Cornerstone Solar, LLC will monitor the ongoing effectiveness of avian protection measures.

As part of standard operations and maintenance of the Project, all avian incidents, including injured, dead, or nesting birds, will be documented and reported. Documentation will include species identification, approximate location, date and time of the observation, and probable cause of injury or death if applicable.

If monitoring identifies recurring issues, such as collisions with a specific structure, the Project will implement or modify mitigation measures to reduce risks. Modified measures might include adding diverters, adjusting lighting, or retrofitting infrastructure. Regular maintenance and repair of diverters, insulation covers, and deterrents will be included in standard operations and maintenance inspections to ensure continued functionality.

7.0 Nest Management & Protection

The Project recognizes the potential for birds to construct nests on poles, crossarms, or equipment, particularly by raptors, corvids, and starlings. If necessary, Cornerstone Solar, LLC will implement proactive nest management practices to prevent nesting on or near energized or hazardous structures. If nests are identified in areas that could pose a risk to birds or facility safety, qualified personnel will evaluate options for nest removal or relocation in coordination with the USFWS and Pennsylvania Game Commission (PGC), and in compliance with the MBTA and BGEPA as applicable.

USFWS and PGC guidance will be followed to balance avian protection and infrastructure reliability. Additionally, all nest removals and relocations will be documented and contain information such as species, GPS location, date and time of the action, and follow-up observations. Coordination with USFWS and PGC will ensure seasonal timing compliance and appropriate protection for sensitive species.

8.0 Stakeholder Coordination & Permitting

This APP has been developed following federal, state, and local wildlife agency guidance. Cornerstone Solar, LLC will obtain and maintain all necessary permits and authorizations required under the MBTA, BGEPA, and ESA, as well as applicable state and local regulations.

This APP and associated mitigation design will undergo internal review and approval as part of the Project's environmental compliance process. Coordination will occur as needed with relevant agencies and stakeholders.

9.0 References

Avian Power Line Interaction Committee (APLIC). 2005. Avian Protection Plan (APP) Guidelines. Available online at: https://www.aplic.org/uploads/files/2634/APPguidelines_final-draft_Aprl2005.pdf

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