Silver Queen Wind Farm Project

Draft Environmental Assessment

Crawford and Carroll Counties, Iowa

Western Area Power Administration

DOE/EA-2211

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WAPA has determined that this Draft Environmental Assessment meets the policies of the National Environmental Policy Act of 1969 (As Amended Through P.L. 118-5, Enacted June 3, 2023), the Council on Environmental Quality's National Environmental Policy Act Implementing Regulations (40 C.F.R. Part 1500), and the Department of Energy's National Environmental Policy Act Implementing Procedures (10 C.F.R. Part 1021).

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List of Abbreviations

Acronym or Abbreviation	Definition
°	degree
2015 PEIS	2015 *Upper Great Plains Wind Energy Programmatic Environmental Impact Statement*
ACEP	Agricultural Conservation Easement Program
ADLS	aircraft detection lighting system
APE	Area of Potential Effect
AWWI	American Wind Wildlife Institute
BBCS	Bird and Bat Conservation Strategy
BCA	Bird Conservation Areas
BCC	Birds of Conservation Concern
BCI	Bat Conservation International
Bear Creek	Bear Creek Archaeology, Inc.
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BMP	best management practice
BO	Biological Opinion
CAA	Clean Air Act of 1970
CAP	criteria air pollutant
CEJST	Climate & Economic Justice Screening Tool
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	Conference Opinion
CO_2	carbon dioxide
CO_{2e}	carbon dioxide equivalents
conservation measures	mitigation measures and best management practices, together
Corn Belt	Corn Belt Power Cooperative
CWA	Clean Water Act
dBA	A-weighted decibels
DOT	Department of Transportation
EA	Environmental Assessment
EMF	electric and magnetic fields
EMI	electromagnetic interference
ESA	Endangered Species Act

Acronym or Abbreviation	Definition
F	Fahrenheit
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FSA	Farm Service Agency
G	Gauss
GE	General Electric
gen-tie line	generation-tie line
GHG	greenhouse gas
GIA	Generator Interconnection Agreement
GNA	good neighbor agreement
HAP	hazardous air pollutant
HF	high frequency
HSI	Habitat Suitability Index
HUC	Hydrologic Unit Code
Hz	hertz
IAC	Iowa Administrative Code
IC	Iowa Code
ICNIRP	International Commission on Non-ionizing Radiation Protection
IDALS	Iowa Department of Agriculture and Land Stewardship
IDNR	Iowa Department of Natural Resources
IEC	Iowa Environmental Council
IEEE	Institute of Electrical and Electronics Engineers
IPaC	Information for Planning and Consultation
kV	kilovolt
LBBA	little brown bat
LF	low frequency
MBTA	Migratory Bird Treaty Act
MET	meteorological
mG	milligauss
mph	miles per hour
MW	megawatt
NAAQS	National Ambient Air Quality Standards
NATA	National Air Toxics Assessment
NCA	National Climate Assessment

Acronym or Abbreviation	Definition
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NHD	National Hydrography Dataset
NIEHS	National Institute of Environmental Health Sciences
NIPCO	Northwest Iowa Power Cooperative
NLEB	Northern long-eared bat
No Action Alternative	The alternative where the Proposed Action Alternative would not be constructed
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
NWP	Nationwide Permit
O&M	operations and maintenance
OSHA	Occupational Safety and Health Administration
PBA	Programmatic Biological Assessment
PM_{10}	particulate matter, 10 microns or less in diameter
$PM_{2.5}$	particulate matter, 2.5 microns or less in diameter
POI	point of interconnection
PPA	Proposed Project Area; the area being analyzed, which varies depending on the type of survey performed
Project	Silver Queen Wind Farm and Proposed Federal Action, together
Proposed Action	The alternative where WAPA grants two interconnection requests and enters a GIA for the Project, which is constructed and operated
Proposed Project Area	42,734-acre boundary area of land where Silver Queen has found willing landowners to participate in the Project
Proposed Wind Farm	Silver Queen Wind Farm
Wind Farm Boundary	Proposed Wind Farm Boundary
ReGenerate	ReGenerate Renewable Energy Consulting
SCADA	supervisory control and data acquisition
SGCN	Species of Greatest Conservation Need
SHPO	State Historic Preservation Office
Silver Queen	Silver Queen Wind Farm, LLC

Acronym or Abbreviation	Definition
SIP	State Implementation Plan
SO_2	sulfur dioxide
SPCC Plan	Spill Prevention, Control and Countermeasure Plan
SPP	Southwest Power Pool
SWPPP	Storm Water Pollution Prevention Plan
Tariff	Open Access Transmission Service Tariff
TMDL	total maximum daily load
TRBA	tricolored bat
UGP Region	Upper Great Plains Region
UI	University of Iowa
U.S.	United States
USACE	U.S. Army Corps of Engineers
U.S.C.	U.S. Code
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	volatile organic compound
WAPA	Western Area Power Administration
WEG	USFWS *Land-Based Wind Energy Guidelines*
WEST	Western EcoSystems Technology, Inc.
WHEG	Iowa Wildlife Working Lands Habitat Evaluation Guide
WNS	white-nose syndrome
WOTUS	Waters of the United States
WQC	water quality certification
ZVI	zone of visual impact

1.0 Introduction

Western Area Power Administration (WAPA) is one of four power-marketing administrations within the U.S. Department of Energy. WAPA's mission is to "safely provide reliable, cost-based hydropower and transmission to our customers and the communities we serve." WAPA's customers include federal and state agencies, cities and towns, rural electric cooperatives, public utility districts, irrigation districts, and Native American tribes. WAPA's customers, in turn, provide retail electric service to millions of consumers in the west. Transmission capacity above the amount WAPA requires for the delivery of long-term firm capacity and energy to current contractual electrical service customers of the federal government is offered in accordance with its Open Access Transmission Service Tariff (Tariff). Since October 2015, WAPA's Upper Great Plains (UGP) Region has been a transmission owner member of the Southwest Power Pool (SPP), and its qualifying facilities are under the functional control of SPP. Excess transmission capacity on and interconnection to WAPA-UGP Region's facilities must be done in accordance with the SPP Tariff.

Silver Queen Wind Farm, LLC (Silver Queen) has submitted two interconnection applications to SPP to interconnect their proposed Silver Queen Wind Farm (Proposed Wind Farm) with WAPA's transmission system to deliver power generated by the facility to end users.[1] The interconnection point would be at WAPA's existing Denison Substation, located approximately 13 miles southeast of Denison, Iowa. The Proposed Wind Farm would be an approximately 252-megawatt (MW) wind farm and transmission line (the generation-tie line [gen-tie line]) constructed within an approximately 42,734-acre area (Proposed Project Area [PPA]) on land leased from participating landowners in Crawford and Carroll counties, Iowa (Figure 1.0-1).

Components of the Proposed Wind Farm would include:

- up to 77 wind turbines
- a new substation and upgrade/expansion of WAPA's Denison Substation
- an operations and maintenance (O&M) facility
- up to three permanent meteorological (MET) towers
- an Aircraft Detection Lighting System (ADLS)
- new permanent access roads to each aboveground facility
- underground power collection system and communication system (collocated)
- a new approximately 18-mile long, 230-kilovolt (kV) gen-tie line with a 150-foot-wide right-of-way (easement) centered on the line
- temporary construction areas, including crane paths, access roads, pulling-tensioning sites, a laydown yard, and a concrete batch plant (in the laydown yard or off site)

[1] Silver Queen submitted two interconnection applications to SPP for the Proposed Wind Farm based on an early change in the facility design that would increase the power that could be produced: one on November 30, 2017 for 180 MW, and one on October 31, 2018 for 78 MW. The two applications are being analyzed together as a single Project.

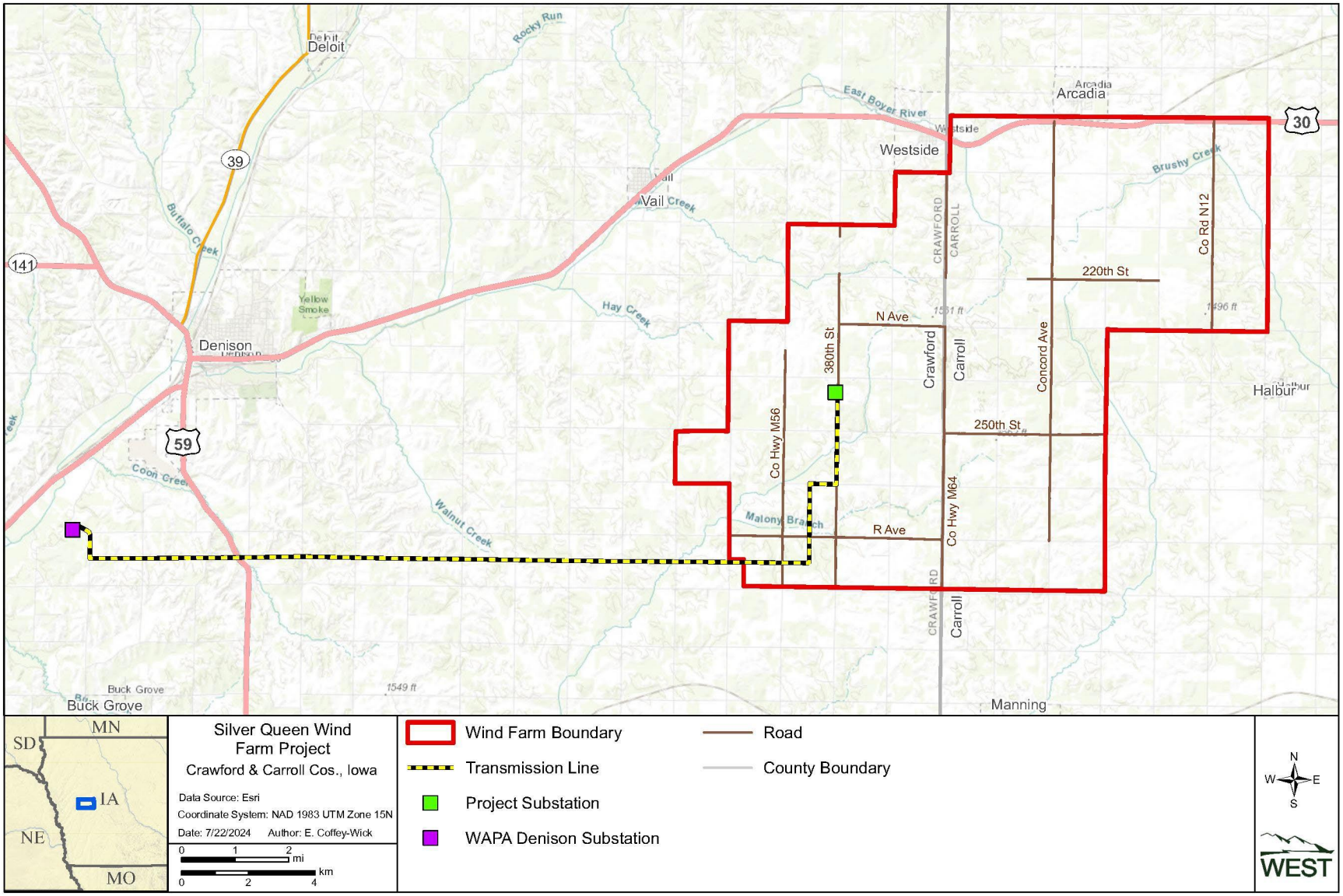

Figure 1.0-1. Location of the proposed Silver Queen Wind Farm Project.

Silver Queen would rebuild the existing, privately owned Northwest Iowa Power Cooperative (NIPCO) and Corn Belt Power Cooperative (Corn Belt) 69-kV gen-tie lines to add the proposed gen-tie line. WAPA would upgrade/expand the Denison Substation within its currently owned property to accommodate the interconnection.

Deciding whether to enter into an interconnection agreement with Silver Queen is a discretionary federal action by WAPA and is, thus, subject to the National Environmental Policy Act (NEPA), which requires federal agencies to take into account the potential effects of its Proposed Action Alternative (Proposed Action) and any alternatives on the human environment, and to take action to protect, restore, and enhance the environment during and after construction.

This Environmental Assessment (EA) analyzes and discloses potential impacts of WAPA's decision regarding the interconnection request and tiers off the analysis conducted in the 2015 *Upper Great Plains Wind Energy Programmatic Environmental Impact Statement* (2015 PEIS),[2] a document prepared jointly by WAPA and the U.S. Fish and Wildlife Service (USFWS; WAPA and USFWS 2015). The 2015 PEIS analyzed the common environmental impacts that may occur when wind energy facilities are constructed, operated, maintained, and decommissioned. This tiered EA incorporates the common environmental impacts by reference and provides a focused review of project-specific resources (e.g., soil type, watershed characteristics, wildlife habitat, vegetation, viewshed, public concerns, threatened and endangered species, and cultural resources) and project-specific design. The 2015 PEIS common environmental impacts were reviewed and remain valid for this Project. Where necessary, additional analysis of other potentially affected resources were completed to determine significance. By tiering off the PEIS, the Proposed Wind Farm would be planned, constructed, operated, and decommissioned consistent with the findings and mitigation measures and best management practices (BMPs; together, conservation measures) of this EA and the 2015 PEIS.

1.1 Purpose and Need for Federal Action

WAPA's purpose and need is to consider and respond to Silver Queen's interconnection requests in accordance with the SPP Tariff and the Federal Power Act, as described in Section 1.1.1 of the 2015 PEIS. In addition, WAPA must consider upgrading/expanding the Denison Substation to accommodate the interconnection.

1.2 Silver Queen's Goals and Objectives

Silver Queen's goals and objectives for the Proposed Wind Farm are to provide an economically sustainable, reliable, and cost-effective source of renewable energy to energy users. To accomplish these goals and objectives, the Proposed Wind Farm must be technically,

[2] Available online: https://www.energy.gov/nepa/listings/eis-0408-documents-available-download

environmentally, and economically feasible. To that end, Silver Queen needs the following factors to be present:

- a reliable wind resource,
- landowners willing to participate in the Project,
- ecological conditions that allow the Project to comply with applicable environmental regulations at a reasonable cost,
- Generator Interconnection Agreements (GIAs) with WAPA and SPP to interconnect with WAPA's transmission system, and
- a customer to purchase the power that is generated by the Proposed Wind Farm.

2.0 Description of Proposed Action and No Action Alternatives

This EA analyzes two alternatives: the Proposed Action and the No Action Alternatives. Descriptions of the two alternatives are provided below.

2.1 Alternatives Considered but Dismissed from Detailed Analysis

Within the boundaries of the PPA, the proposed layout of the Proposed Wind Farm was developed through an iterative process. Various turbine models were eliminated due to availability. Layout options were evaluated and eliminated based on the wind resource, the selected turbine model, and avoidance areas and setbacks identified by corporate best practices; county, state, and federal requirements; and to accommodate landowner needs.

Avoidance areas included wetlands, waterbodies, and areas within the Federal Emergency Management Agency (FEMA) 100-year floodplain to the extent feasible. Setbacks of varying distances from manufactured and natural features were also applied. Manufactured features include residences, structures, property lines, roads and highways, railroads, dam and ditches, towers, electric transmission and communication infrastructure, and aviation and military constraints. Natural features include streams, other waterbodies, wetlands, and potential bat habitat. The layout for the Proposed Wind Farm focused on previously disturbed lands (cultivated cropland and pasture) to the greatest extent practicable. Silver Queen reconfigured the layout multiple times to ensure noise and visual impacts to occupied residences were minimized and kept to county-specified levels.

2.2 Proposed Action Alternative

The Proposed Action Alternative is for WAPA to:

1. Grant the Proposed Wind Farm's transmission system interconnection requests, and
2. Upgrade and expand the Denison Substation to accommodate the interconnection.

Under this alternative, Silver Queen would construct and operate the Proposed Wind Farm, as described below. WAPA has determined that the Proposed Wind Farm is a connected action to the proposed federal action. As such, this EA evaluates both WAPA's proposed federal action and the connected action, collectively referred to hereafter as the Project.

2.2.1 Project Description

The PPA includes the Proposed Wind Farm, the gen-tie line, and an expansion area for upgrades to WAPA's Denison Substation. The Project footprint encompasses the areas of ground disturbance associated with the construction and operation of Project facilities, as shown in a preliminary layout in Figure 2.2-1. The Proposed Wind Farm Boundary (Wind Farm Boundary) encompasses the wind turbines, Project substation, O&M facility, MET towers, ADLS, a portion of the gen-tie line, new permanent access roads to each aboveground facility, underground power collection system and communication system, and temporary construction areas; however, not all properties within the Wind Farm Boundary are participating in the Project. As of the date of this document, approximately 350 landowners have signed wind leases, transmission easements, or good neighbor agreements (GNAs) with Silver Queen.

Silver Queen sited Project facilities to maximize energy production while avoiding or minimizing impacts to the human environment to the greatest extent possible. The Project was designed to be in compliance with conservation measures derived from a county development agreement (Appendix A),[3] government regulations, and landowner agreements. Minor turbine shifts and infrastructure moves could occur based on tribal, agency, and public comments on this Draft EA, negotiations with landowners, geotechnical evaluations, and field surveys; the Final EA will account for those minor changes. If additional shifts should become necessary following publication of the Final EA, Silver Queen would notify WAPA to determine whether additional analysis is necessary. Table 2.2-1 summarizes the temporary and permanent footprint of each Project component.

Sections 3.2 through 3.5 of the 2015 PEIS describe the typical activities that would occur during each of the major phases of a wind energy project's life cycle: site testing and monitoring, construction, operation, maintenance, and decommissioning. Project construction would be expected to begin as early as April 2025 weather permitting. Construction activities would last about 12 months with a winter demobilization and remobilization. Commercial operation of the Project is targeted for October 2026, with an expected operational life of 35 years. O&M activities would occur annually when weather conditions allow. A permanent staff of approximately 8 to 10 on-site personnel would provide O&M support activities to the Project. General construction and O&M activities would be consistent with those described in Section 3.4 of the 2015 PEIS and are incorporated herein by reference. Construction and O&M activities specific to the Project are described below.

[3] Silver Queen entered into a development agreement stipulating various conservation measures with Crawford County. They would apply the same conservation measures throughout the Project, including in Carroll County.

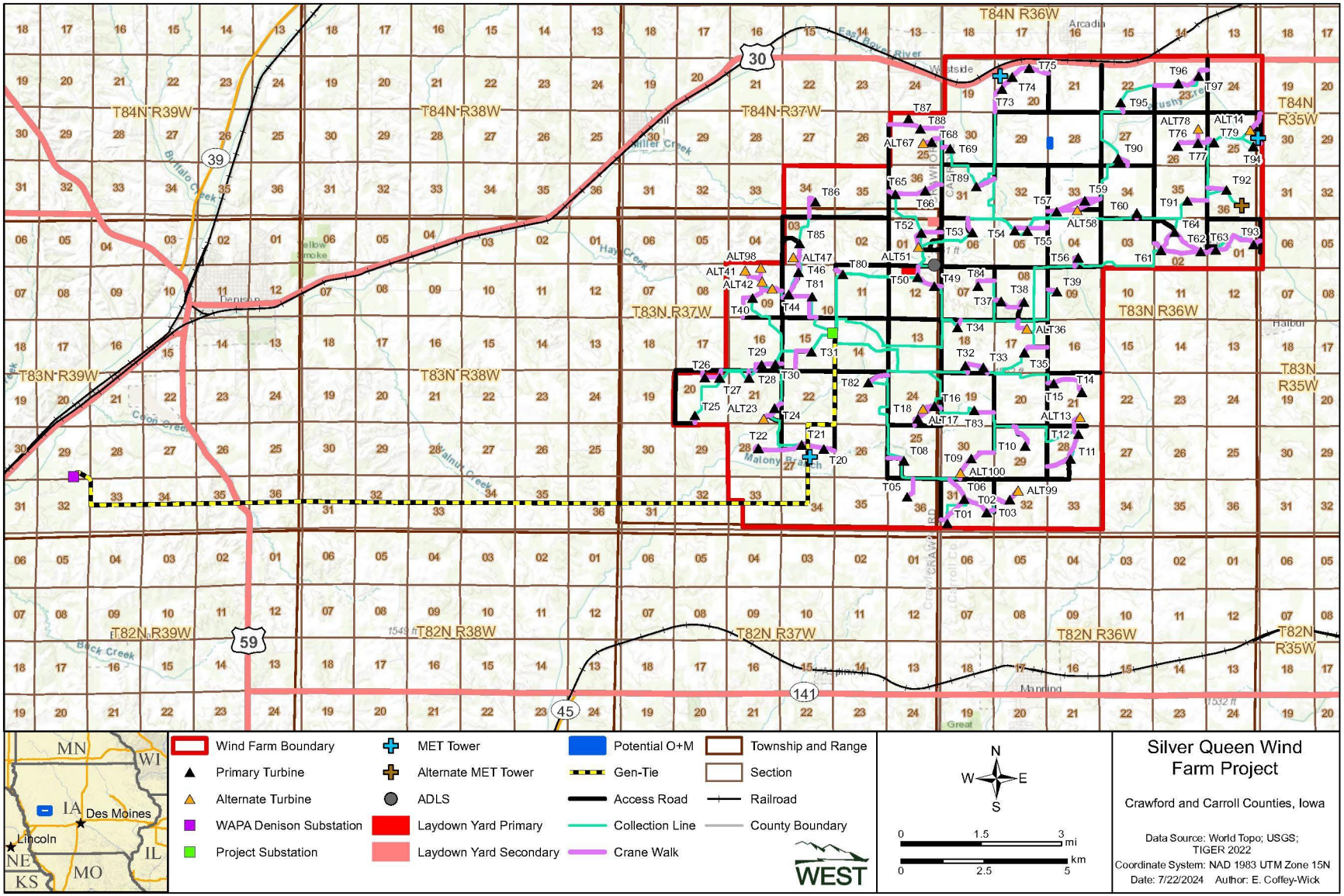

Figure 2.2-1. Proposed Project layout.

Table 2.2-1. Estimated Project footprint for the Project.

Project Component	Construction and Decommissioning (Temporary Footprint)		Operations (Permanent Footprint)	
	Dimensions/Acreage	Total Area (acres) [a]	Dimensions/Acreage	Total Area (rounded; acres) [a]
Permanent Project Footprint				
Turbines (77)	2.9 acres × 77	223.4	0.04 acres × 77	3.1
Project Substation	4.98 acres	5.0	4.98 acres	5.0
O&M facility	4.94 acres	4.9	4.94 acres	4.9
MET towers (3)	0.5 acre × 3	1.5	0.02 acre × 3	< 0.1
ADLS	25-foot × 25-foot	< 0.1	25-foot × 25-foot	< 0.1
New access roads	75-foot width × 30.1 miles	273.9	16-foot width × 29.0 miles	56.2
Point of Interconnection (Denison Substation upgrade/expansion)	6.0 acres	6.0	6.0 acres	6.0
Aboveground junction boxes (for collection lines) (17)	25 feet^2 × 17	< 0.1	25 feet^2 × 17	< 0.1
Gen-tie line structures (130)	Within gen-tie right-of-way	—	130 × 15-inch radius	< 0.1
Subtotal [a]		*514.7*		*75.4*
Temporary Project Footprint and Rights-of-Way				
Laydown yard	20.0 acres	20.4	—	—
Crane walk paths	150-foot width × 38.0 miles	691.7	—	—
Underground collection lines and communication system	50-foot width × 92.6 miles	561.4	—	—
Gen-tie line right-of-way	500 feet × 18.0 miles	1,082.4	150 feet × 18.0 miles	324.3
Subtotal [a]		*2,355.9*		*324.3*
Project Subtotal (with overlapping components for construction) [a]	—	*2,870.6*	—	*402.8*
Project Total (adjusted for overlapping components)	**—**	**2,358.7**	**—**	**399.6**

[a] Totals may not equal the sum of the addends due to rounding.

2.2.1.1 Wind Turbines

The Project would install up to 77 wind turbines on private land. This EA is evaluating 93 turbine locations: 77 primary and 16 alternate locations. The proposed turbine model is the General Electric (GE) 3.4/140 turbine, with a hub height of 266, 322, or 383 feet. Table 2.2-2 lists the turbine model specifications, and an illustration of this turbine model is included in Appendix B. Ongoing engineering and economic studies may result in other turbine models being considered for the Project. In the event a different turbine model is selected, Silver Queen would notify WAPA of the change to determine whether additional analysis is necessary.

Table 2.2-2. Specifications of proposed turbines.

Model Name	Nameplate Capacity (MW)	Hub Height (feet)	Rotor Diameter (feet)	Tip Height (feet)	Rotor-Swept Area (feet^2)
GE 3.4/140	3.40	266	460	495	165,700
		322		551	
		383		615	

Turbine towers would be painted with a non-glare white paint and lit with synchronized red lights in accordance with the Federal Aviation Administration's (FAA) Advisory Circular 70/7460-1 M, Obstruction Marking and Lighting, Chapters 4, 13, and 15 (FAA 2020), based on the FAA's Determination of No Hazard to Air Navigation for a preliminary Project design dated April 17, 2023. Determinations of No Hazard would be obtained for the finalized layout, and the Project would comply with applicable FAA requirements for marking and lighting structures.

Wind turbine foundations are typically made of concrete and steel. The foundations are buried down to an approximate depth of 10 to 12 feet, except for approximately 12 inches that would remain aboveground to allow the tower to be bolted to the foundation. A "step-up transformer" would be installed at the base of each wind turbine to increase the output voltage of the wind turbine to match the voltage of the power collection system (34.5-kV). During construction, a 200-foot radius area would be cleared to lay down the rotors and maneuver cranes during turbine assembly. After construction, a 25-foot radius area around each turbine would be maintained and graveled to prevent potential damage to the underground foundations and cabling.

The turbine locations (primary and alternate) were selected to avoid sensitive resources wherever possible and to comply with the turbine manufacturer's general setback considerations, state recommendations, and county setback requirements based on the Project's development agreement with Crawford County (Table 2.2-3 and Appendix A).

Table 2.2-3. Project siting requirements and recommendations.

Agency	Requirement/Recommendation
Setbacks	
Iowa Environmental Council Recommendation	Counties should ensure that setbacks balance multiple interests and support cost-effective wind development. Recommended setbacks from residential dwellings are between 1,000 feet and 1,250 feet at the most. Setbacks for property lines and other rights-of-way should be approximately 1.1 times the turbine height, or about 600 feet. Counties can consider longer setbacks for a small number of other areas, such as natural resource areas. Counties should provide waivers for voluntary reductions in setbacks.
Carroll County Ordinance Requirements	Notwithstanding any other consideration including calculated sound levels, no commercial wind turbine shall be located at a distance less than 1,000 feet from the nearest occupied dwelling. Wind generator towers may be setback less than 1000 feet from a dwelling if the property owner signs a waiver agreeing to the reduced setback distance. However, the wind generator tower shall not be located closer than the distance equal to the height of the tower.
	Any wind turbine within a wind farm shall be located not less than the rotor radius from the nearest non-dwelling principal or secondary structure.
	Any wind turbine within a wind farm shall be located not less than the total height from a road right-of-way line.
	Any wind turbine within a wind farm may be located straddling the property lines separating two participating properties.
	Any wind turbine within a wind farm shall be located not less than the rotor radius from property lines abutting non-participating properties.
Crawford County Development Agreement Requirements	Wind turbines shall be set back at least 1,320 feet from currently occupied residences, unless waived in writing by the owner of the occupied residence. (This is greater than the general county requirements of 1,000 feet from a residential dwelling).
	Wind turbines shall be set back from maintained county roadway, by 1.1 times the wind turbine tip height, unless waived in writing by the infrastructure owner.
	Wind turbines shall be set back from maintained township roadway, by 1.1 times the wind turbine tip height, unless waived in writing by the infrastructure owner.
	Wind turbines shall be set back from existing overhead distribution and gen-tie lines, by 1.1 times the wind turbine tip height, unless waived in writing by the infrastructure owner.
Crawford County Construction Compliance Certificate Requirements	<u>Front Yard</u> 1.0 × turbine tip height (maximum height of turbine measured from top of foundation to tip of blade) = 495/551 feet. <u>Side Yard</u> 1.0 × rotor blade radius, plus 30 feet (maximum horizontal distance from center of turbine to tip of blade) without consent of adjoining property owner or easement/lease required of consenting landowner = 260 feet 0 feet with written consent of adjoining property owner <u>Rear Yard</u> 1.0 × rotor blade radius, plus 30 feet (maximum horizontal distance from center of turbine to tip of blade) without consent of adjoining property owner or easement/lease required of consenting landowner = 260 feet. 0 feet with written consent of adjoining property owner Height Limitations: Per FAA approval received by Zoning Administrator, Duane Zenk

Agency	Requirement/Recommendation
Noise	
Crawford County Development Agreement Requirement	Sound levels resulting from Project wind turbines will not exceed 45 dBA at the residences of landowners occupied as of the start of construction, unless waived in writing by the owner of the occupied residence.
Shadow Flicker	
Crawford County Development Agreements Requirement	Limit shadow flicker resulting from Project wind turbines at currently occupied residences to 30 hours per year or less, unless waived in writing by the owner of the occupied residence.

Each wind turbine would include a supervisory control and data acquisition (SCADA) communication system that allows automated independent and remote operation of the turbine. The SCADA data provides detailed operating and performance information for each turbine, allowing real-time control and continuous monitoring to ensure safe and optimal operation and identification of potential problems. A local wind technician would be on site or available on call to respond in the event of emergency notification or critical outage, which increases turbine reliability and Project oversight and performance.

Turbines would operate above the manufacturer's cut-in speed (when winds are at 6.7 miles per hour [mph]) except when time-of-year restrictions apply to protect sensitive species, at which point higher cut-in speeds would be implemented with blades feathered below cut-in speeds (i.e., rotated so as not to turn). Turbines would also be feathered when certain wind speeds are exceeded for safety reasons (as determined by the manufacturer). Any additional curtailment needed for federally protected species would be implemented based on risk and required conservation measures set forth in the 2015 PEIS, Programmatic Biological Assessment (PBA), and/or through Endangered Species Act (ESA) Section 7 consultation with the USFWS (see Section 3.7).

2.2.1.2 Access Roads and Crane Paths

Existing public roads, private roads, and field paths would be used whenever possible for access to construction areas. Existing roads may require improvements before and during construction to accommodate heavy vehicles and equipment and a wide vehicle turning radius. Improvements may include adding gravel, widening roads, or repairing potholes. County road expansions would be contained within the existing right-of-way. Expansions on county, private, and temporary access roads would be reclaimed to pre-existing contours after construction.

Along with the use of existing roads, Silver Queen would need up to 25 miles of new permanent gravel access roads. During construction, the access roads would be maintained at 75 feet wide, for a temporarily affected area of 273.9 acres. After construction, the roads would be maintained at 16 feet wide, for a permanently affected area of 56.2 acres. Project access roads on private property would be maintained by Silver Queen in accordance with landowner easements. Maintenance may include dust control, grading, or placement of additional gravel

as needed. Maintenance of county roads within the PPA would be the responsibility of the respective county; however, Silver Queen would be responsible for any road damage caused by maintenance or warranty work in accordance with its county Road Use Agreements (see Section 3.10.2).

Up to 25 miles of 150-foot-wide temporary access routes (crane paths) would be needed for construction cranes used to erect the wind turbines. Temporary waterbody crossings (i.e., bridges and culverts) for temporary access roads and crane paths may need to be installed or upgraded to accommodate heavy vehicles and equipment. Temporary crane paths would be restored and returned to preconstruction land use. Temporary bridges or culverts would be removed, and the riparian area stabilized and restored to preconstruction contours.

2.2.1.3 Temporary Laydown Yard and Batch Plant

An approximately 20-acre temporary laydown yard would be established during construction. Two potential locations for a laydown yard are shown in Figure 2.2-1. Construction tools, materials, equipment, vehicles, and fuel would be stored at the laydown yard. The laydown yard would provide parking for construction personnel and a staging area for large equipment deliveries. In addition, a concrete batch plant may be temporarily located at the laydown yard. Construction staff would conduct maintenance on equipment and vehicles. Figure 3.3 of the 2015 PEIS shows an example of a temporary laydown yard (or staging area). The laydown yard would be restored and returned to the preconstruction land use once construction is complete.

2.2.1.4 Operations and Maintenance Facility

Silver Queen would construct and maintain a permanent 4.9-acre O&M facility. The O&M facility would include a vehicle parking area and a single- or two-story building that would house operating personnel, offices, operations and communication equipment, parts and equipment storage, and a maintenance area. An outdoor storage area for larger equipment and materials would be fenced. The facility would have running water and electricity, which would be provided by a new private water well and the local electrical utility, respectively. Standard maintenance and grounds keeping at the O&M facility would include weed control, mowing, and other general landscaping. Other than emergency calls or response to off-hour outages, the O&M activities would be limited to normal business hours.

2.2.1.5 Meteorological Towers

Silver Queen proposes to construct up to three permanent MET towers, as shown in Figure 2.2-1. The permanent MET towers are expected to be free-standing with no guy wires, have a height equal to the turbine hub (between 265 and 322 feet, and use the same markings and lighting as stipulated by the FAA determination for the Project. MET tower construction would disturb up to 1.5 acres in total (0.5 acre each). Operation of the MET towers would be expected to permanently affect 0.06 acre in total (0.02 acre each). The MET towers would be regularly inspected and maintained. Maintenance and repair activities, when needed, would generally be contained within 0.02 acre around each tower.

2.2.1.6 Aircraft Detection Lighting System

An ADLS would be installed to enable the turbine and MET tower lighting to be turned off unless an aircraft is in the vicinity. ADLS uses radar to detect aircraft a specified distance away. When aircraft are detected, the ADLS sends a signal that turns on the turbine and MET tower lighting. Once the aircraft has moved out of the detection area, the ADLS sends out a signal to turn the lights back off. The ADLS would be placed on a lattice tower structure within a fenced area approximately 25 by 25 feet wide. The ADLS will go through its own approvals with the FAA and Federal Communications Commission and will be regularly inspected and maintained. Maintenance and repair activities would generally be contained within the fenced area.

2.2.1.7 Underground Collection Lines and Communication System

The power generated by the wind turbines would be transmitted through underground collection lines to the Project Substation. The collection lines would consist of a 34.5-kV underground electrical cable system installed approximately 42 inches below ground. The SCADA system at each turbine would be connected to the Project Substation via a fiber-optic cable, which would be installed in the same trench as the collection lines.

Construction of the collection lines and fiber-optic cable would temporarily disturb a 50-foot-wide path for approximately 92.6 miles, or 561.4 acres (assuming construction of all 77 turbine location options). Some of the construction disturbance for the underground collection system would be shared with construction disturbance for other Project facilities where these facilities overlap. The ground surface above the lines would be returned to preconstruction land use, which would primarily be cultivated crops. Silver Queen would register the appropriate underground facilities with the Iowa One-Call system. An estimated 17 aboveground junction boxes would be installed approximately every 8,000 feet, as required for electrical connections or splices. The junction boxes would occupy up to 25 feet^2, for a total of up to 0.009 acre. O&M activities would be consistent with those described in the 2015 PEIS and are incorporated herein by reference (see Sections 3.4, 5.6.1.1 through 5.6.1.4 of the 2015 PEIS). If repairs are needed for the underground collection system or fiber optic communication system, disturbance would occur within the confined areas of previous construction disturbance for the Project (a 50-foot-wide right-of-way).

2.2.1.8 Project Substation

The Project would involve the construction of a new substation. Construction of the Project Substation would result in 4.98 acres of permanent land disturbance. Once operational, the Project Substation would consist of up to two substation transformers, circuit breakers, switching devices, auxiliary equipment, a control enclosure (containing equipment for proper control, protection, monitoring, and communications), and other miscellaneous equipment. Electrical voltage would be stepped up at the substation from 34.5-kV from the underground collection lines to 230-kV for the Project gen-tie line. The entire substation would be fenced for safety and security.

O&M activities would include remote monitoring, in-person inspections, online testing, and vegetation removal within the fenced substation site. Silver Queen may occasionally power-off the substation to complete testing, maintenance, and cleaning, which would otherwise be too dangerous to do when the substation is energized. Equipment replacement would occur on an as-needed basis (e.g., due to damage or failure). All repair work would occur within the fenced 4.98-acre area.

2.2.1.9 Gen-Tie Line

Up to 18 miles of 230-kV overhead gen-tie line would be constructed in the existing NIPCO and Corn Belt gen-tie line corridors to connect the new Project Substation to WAPA's existing Denison Substation. In cooperation with NIPCO and Corn Belt, Silver Queen would replace the existing 238 wooden structures spaced approximately 400 feet apart with approximately 130 steel monopole structures spaced approximately 800 feet apart, resulting in a smaller structural footprint after the rebuild. The monopole structures would be approximately 145 feet tall. The north-south portion of the new transmission system would support the NIPCO 69-kV transmission line, while the east-west portion would support the Corn Belt 69-kV transmission line.

Silver Queen has obtained a 500-foot-wide temporary construction easement centered on the gen-tie line corridor, totaling 1,082.4 acres. The construction easement would contain vehicles and equipment to remove and replace existing structures. Installation of each new structure would disturb an approximately 150- by 150-foot area. In addition, approximately 10 pulling and tensioning sites would be needed to string the conductor (approximately every 2 to 3 miles) and at turning structures). The pulling and tensioning sites would be contained within the construction easement and require cleared areas of an approximately 150- by 400-foot area.

A permanent 150-foot-wide easement centered on the gen-tie line would be maintained free of tall shrubs and trees for the life of the Project, expanded from the current approximately 80-foot-wide easement maintained by NIPCO and Corn Belt. Areas temporarily disturbed during construction would be restored to preconstruction land use.

O&M activities would include regular visual inspections of the conductor and structures and replacing these components when necessary. Inspections would occur within the existing easement; due to the short distance from roads, inspections would likely occur by ground crews. Repairs and replacements would be accomplished within the easement using standard equipment such as bucket trucks. Inspections of gen-tie lines generally occur annually, depending on the need (see Section 3.6.5 of the 2015 PEIS). Vegetation maintenance within the easement would include periodic tree and bush trimming and/or herbicide applications as needed to maintain the safety and integrity of the line. NIPCO and Corn Belt would be responsible for the care and maintenance of their respective lines.

2.2.1.10 Point of Interconnection

WAPA would upgrade the existing Denison Substation to accommodate the interconnection request. The point of interconnection (POI) would occupy an additional 0.9 acre within the existing WAPA-owned property. Based on the topography at the Denison Substation, approximately 5.1 additional acres could be permanently altered through excavation and fill, for a total affected area of 6.0 acres. New equipment would include breakers, relays, communications and control equipment, and aboveground bus structures. The POI would be constructed in accordance with the GIA between WAPA and Silver Queen. WAPA may construct a temporary tap at the Denison Substation within the proposed Project footprint to enable the Project to interconnect while the substation is being upgraded. The temporary tap would be constructed in accordance with a Temporary Tap Agreement between WAPA and Silver Queen. WAPA would retain ownership and management of the Denison Substation. Silver Queen would coordinate with WAPA on operation and maintenance of the gen-tie line on WAPA property.

2.2.2 Repowering/Decommissioning

The projected operating life of the Project turbines is 35 years, with the potential to repower and/or retrofit the turbines and power system with upgrades based on new technology. Silver Queen has applied for a 40-year GIA; therefore, if the Project life is extended beyond 35 years, Silver Queen would confer with WAPA to determine the nature of any extension that may require a supplemental NEPA analysis. For decommissioning, Project components would be recycled to the extent practicable and disposed of in accordance with technologies and regulations applicable at the time of decommissioning. Infrastructure removal and restoration would be conducted in accordance with landowner leases and or easements. Decommissioning would be expected to last about six months. Currently, there are no state regulations for decommissioning wind facilities in Iowa (Iowa Department of Natural Resources [IDNR] 2018). Future decommissioning activities would be completed consistent with the general requirements described in Sections 3.5, 3.6.4, and 3.6.6 of the 2015 PEIS.

2.3 No Action Alternative

Under the No Action Alternative, WAPA would deny Silver Queen's interconnection requests. WAPA would not upgrade/expand the Denison Substation to accommodate an interconnection with the Project. For the purposes of impact analysis and comparison, it is assumed that the Project would not be constructed.

3.0 Affected Environment and Environmental Consequences

Chapter 5 of the 2015 PEIS discusses the potential direct and indirect environmental impacts of wind energy development across the UGP Region and identified conservation measures to avoid or minimize impacts. This section will focus on site-specific information relevant to the Project. It will describe the existing conditions of various resources within the PPA or otherwise specified analysis area and analyze the potential impacts of each alternative along with relevant

conservation measures. For most resources, the analysis area is the PPA, unless otherwise specified.

The significance of Project impacts is evaluated in terms of context and intensity, such as an impact's duration (temporary, short-term, long-term, and permanent), frequency of occurrence, geographic extent, and severity. For this assessment, temporary impacts occur during construction (about one to two years) and decommissioning (about six months); short-term impacts occur after site restoration for up to three years; long-term impacts last for three to 10 years after construction, and permanent impacts last for the 35-year life of the Project.

The frequency of occurrence varies between construction (generally one event) and operation, which would include regular maintenance activities repeated throughout the life of the Project. The geographic extent of impacts for each alternative is quantified by the PPA, which encompasses both the operational (permanent use) areas and construction (temporary use) areas; however, only a portion of the PPA would be altered or directly impacted by construction or operation.

The levels of severity of the impacts are designated as: negligible (resources would be essentially unchanged or unaltered by the Project); minor (the Project would cause a slight change or alteration to specific resources, but as a whole, resources would continue to function as they did prior to the Project); and moderate (the Project would have a detectable and/or measurable impact on resources causing decreased functionality, but resources would continue to function in a diminished capacity). Any potentially site-specific significant impacts that have already been addressed in the 2015 PEIS would be minimized through the implementation of the applicable conservation measures identified in the 2015 PEIS. One of the roles of this EA is to identify whether there are significant impacts that are not addressed in the 2015 PEIS.

3.1 Soil, Geological, and Paleontological Resources

This section analyzes potential impacts from the Project to soils, geology, and paleontology. The general analysis of these resources in Sections 4.2, 5.2, 4.8, and 5.8 of the 2015 PEIS are incorporated herein by reference. The Project-specific affected environment and impacts are analyzed below.

3.1.1 Affected Environment

3.1.1.1 Soil Resources

The PPA is sited in the Western Corn Belt Plains Region Level III Ecoregion (Chapman et al. 2002). Within this broader Level III ecoregion, the Project is within the Steeply Rolling Loess Prairies Level IV Ecoregion. This ecoregion is generally comprised of rolling hills with thick loess deposits and underlying glacial till. The elevation in the PPA ranges from about 368 to 477 feet (U.S. Geological Survey [USGS] 2020), or an elevation difference of no more than 109 feet across the Project. In the PPA, soil is primarily used to support agriculture.

Project facilities would be located on 41 different soil map units (Figure 3.1-1; Natural Resources Conservation Service [NRCS] 2023b). The soils within the PPA primarily consist of silty clay loams, particularly the Marshall silty clay loam, 2 to 5% slopes (11.9%) and Marshall silty clay loam, 2 to 5% slopes, eroded (8.9%). Of the 41 different map units, 52% are classified as Farmland of Statewide Importance, 25% are classified as Prime Farmland, and 24% are classified as Prime Farmland if Drained (Table 3.1-1). Approximately 99.8% of the PPA is in the upper 50th percentile for water erodibility, while approximately 100% of soils within the PPA are below the 30th percentile of wind erodibility.

Table 3.1-1. Prime Farmland and Farmland of Statewide Importance in the PPA.

Soil Map Unit [a]	Area (Acres)	Percent of PPA
Prime Farmland	10,242	25.0
Prime Farmland if Drained	10,748	24.0
Farmland of Statewide Importance	21,685	52.0
Not Prime Farmland	58	<0.1
Total [b]	**42,734**	**100**

[a] NRCS 2023b

[b] Totals may not equal the sum of the addends due to rounding.

3.1.1.2 Geologic and Paleontological Resources

Section 4.2.2.2 of the 2015 PEIS notes that geological resources in western Iowa include sand, gravel, and crushed stone, and that seismic activity and related hazards pose a low risk to wind energy development. The risk of seismic activity near the PPA is low, and there are no faults within the PPA (USGS 2018, 2023b).

Sections 4.8 and 5.8 of the 2015 PEIS state that the UGP Region has the potential to contain notable fossils, although fossils are rare. Geology within the PPA is in the Cherokee Group and the Dakota and Windrow Formations, within middle Cretaceous and lower-middle Pennsylvanian bedrock, respectively. Both subgroups were formed during a time when Iowa was a marine and coastal environment, with bedrock at a depth of 164 to 1,818 feet (Hershey 1969, Witzke et al. 2010). The primary major and minor lithologic constituents of these subgroups are sedimentary, and sedimentary deposits cover extensive portions of Iowa (University of Iowa [UI] 2024, Witzke et al. 2010). Therefore, fossils could occur in the PPA since fossils are found in sedimentary rock formations. However, the PPA is unlikely to support important vertebrate fossils discussed in the 2015 PEIS. Paleontological resources in the PPA are primarily associated with marine organisms (UI 2024).

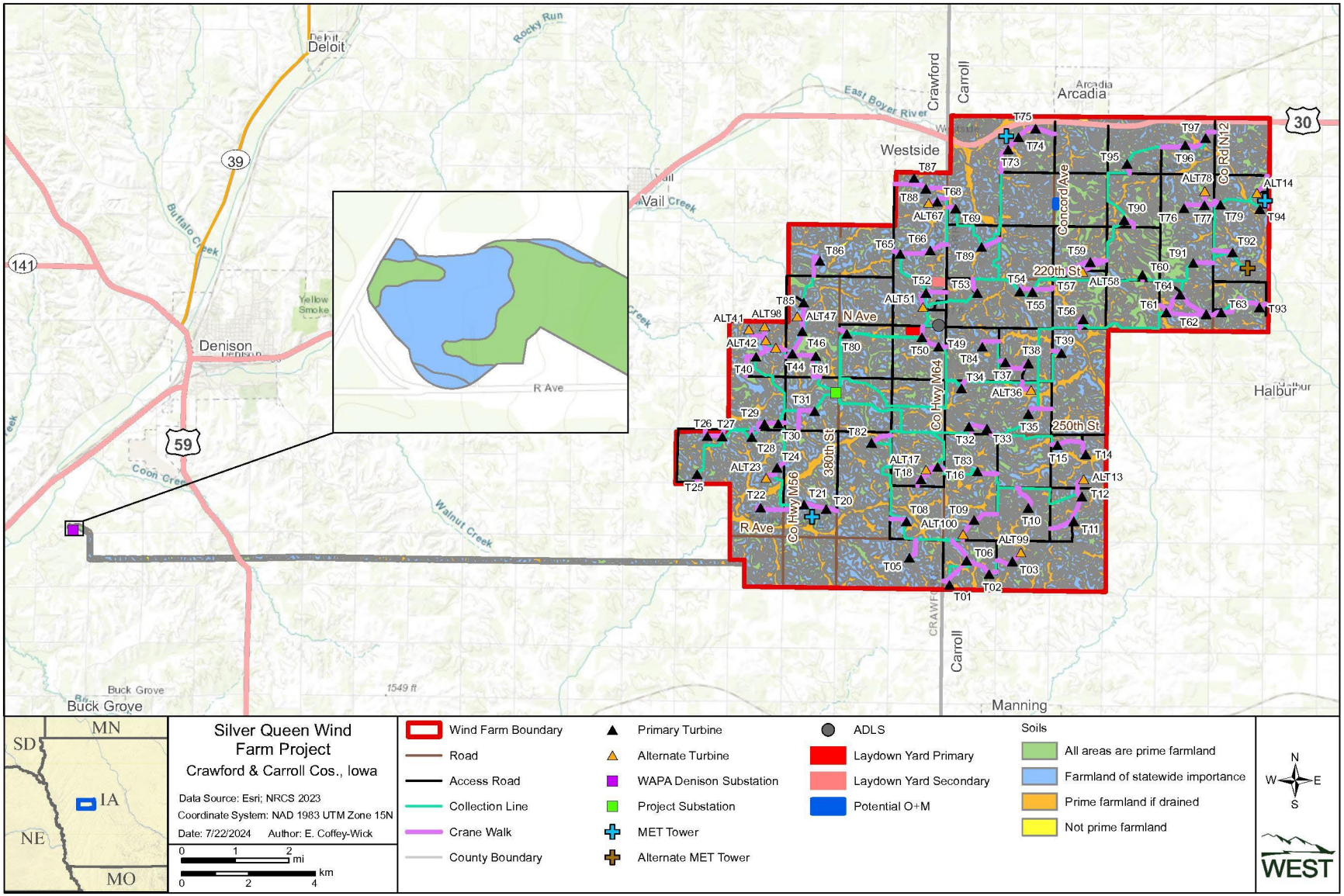

Figure 3.1-1. Soil map units in the PPA.

Important vertebrate fossils, such as those of dinosaurs and woolly mammoths, have rarely been encountered in Iowa (Iowa Geological Survey 2024, UI 2024). Furthermore, few documented paleontological resources have been discovered in Carroll and Crawford counties, with common invertebrate fossils such as mollusks, gastropods, and bivalves noted in riparian areas within limited portions of Crawford County (Fossil Spot 2008, UI 2024). Soils within the PPA are being farmed; therefore, earthmoving activities have likely already affected paleontological resources, if present.

The PPA is not within an identified Karst region (IDNR 2022a , Iowa Geospatial Data Clearinghouse 2023) and has no reclaimed or active mines. Carbonate karst bedrock is located 2.9 miles south-southwest of the PPA (USGS 2020). Common mining within the state of Iowa is surface mining for limestone, sand, gravel, gypsum, and clay (Iowa Department of Agriculture and Land Stewardship [IDALS] 2023). The closest active or abandoned gravel pit is 3.7 miles from the Wind Farm Boundary (IDALS 2023). Therefore, there is a low potential for geological hazards within the PPA.

3.1.2 Environmental Consequences: Proposed Action

Direct and indirect impacts to soils expected to occur during wind energy facility project construction, O&M, and decommissioning are discussed in Section 5.2.1 of the PEIS. Project construction would temporarily impact up to 2,358.7 acres of soils. This includes up to 631.7 acres of Prime Farmland, 352.5 acres of Prime Farmland if Drained, 1,348.9 acres of Farmland of Statewide Importance, and 25.6 acres of not Prime Farmland. Much of the affected area involves overlapping infrastructure (e.g., access roads and collection lines); overlapping acreages have been subtracted from these totals. Silver Queen collocated linear features where possible to minimize the affected area. Alternate facilities would be located in the same farmland types as the corresponding primary facilities and affecting the same approximate acreages. Cranes used for construction of wind turbines would be moved through overland travel; no grading or substrate placement would be required to create the crane paths, and soil impacts would therefore be limited primarily to soil compaction. Grading and excavation would be carried out for construction of other Project components, exposing soils, and increasing the risk of erosion, bringing subsoils to the surface, and compacting soils. Topsoil would be segregated in temporary construction areas to avoid mixing topsoil and subsoil. Following construction, subsoil would be decompacted where needed and salvaged topsoil would be replaced. Soils would be returned to preconstruction land uses, which primarily involves crop cultivation. Non-cultivated areas would be stabilized with erosion controls, where needed, and revegetated. Soils would revegetate within the first season after construction; therefore, construction impacts to soil would be minor and temporary.

Should any marine fossils occur in the PPA, they could be broken, crushed, or displaced, primarily during excavation for turbine footings, transmission line structures, and cut and fill associated with the Denison Substation upgrade/expansion. Indirectly, increased erosion caused by Project construction may result in uncovering or movement of paleontological resources, although this is unlikely with proposed erosion control measures (see below). Decommissioning impacts would be similar to those from Project construction. Cultivation and

other farming activities have likely already damaged or displaced more shallow marine fossils most likely to occur in the PPA. Because the PPA is not known for being a rich resource for important marine or vertebrate fossils, any construction impacts would be permanent but minor.

No important geologic resources occur in the PPA; therefore, impacts would be negligible. Similarly, seismic, landslide, or other geological risks to or caused by Project development and operation are unlikely to occur.

The Farmland Protection Policy Act of 1981 directs federal agencies to identify the quantity of farmland that would be converted by federal programs; identify and consider the adverse effects from farmland conversion; consider alternative actions, as appropriate; and ensure that the federal program is compatible with state, county, and private programs and policies to protect farmland. Permanent aboveground facilities (new access roads, turbines, the O&M Facility, the ADLS, the MET towers, the Project Substation, and the Denison Substation upgrade/expansion) would permanently displace or cover up to approximately 75.4 acres of soils during operations, including 31.4 acres of Prime Farmland, 7.0 acres of Prime Farmland if Drained, 37.0 acres of Farmland of Statewide Importance. In addition, 327.3 acres of soils would occur in the gen-tie line permanent right-of-way, including 59.6 acres of Prime Farmland, 45.0 acres of Prime Farmland if Drained, 216.3 acres of Farmland of Statewide Importance, and 6.4 acres of not Prime Farmland. Most of this acreage would generally be undisturbed except for occasional vegetation and structure maintenance, while a small portion of the acreage would be displaced by structures. As with construction impacts, overlapping acreages were subtracted where facilities were collocated.

The other location options for the MET towers and laydown yard locations would affect similar acreages of the three farmland types. The amount of Prime Farmland converted to industrial use would be less than 1% of the total Prime Farmland in the PPA (see Table 3.1-1); thus, impacts would be permanent but minor and consistent with farmland conservation programs and policies, including county zoning ordinances (Carroll County 2024, Crawford County 2024) for agricultural land (see Section 3.10).

During decommissioning, impacts to soils would be similar to construction.

3.1.2.1 Conservation Measures

Silver Queen is committed to implementing the conservation measures for soil resources derived from Section 5.2.3 of the 2015 PEIS, which would help avoid or minimize soil impacts associated with the Proposed Action. These measures address potential risks associated with wind and water erosion, compaction, topsoil mixing, drainage, and revegetation. The list of conservation measures can be found in Appendix C.

3.1.3 Environmental Consequences: No Action Alternative

The No Action Alternative would have no Project-related direct or indirect impacts on soils, geology, or paleontological resources. Impacts related to existing land uses, particularly agriculture, would continue to affect soils in the PPA, such as through tilling and soil amendments, as well as soil disturbance and compaction from farm machinery and cattle.

3.2 Water Resources

This section analyzes potential impacts from the Project to surface waters, floodplains, and groundwater. The general analysis of these resources in Sections 4.3 and 5.3 of the 2015 PEIS is incorporated herein by reference. The Project-specific affected environment and impacts for water resources are analyzed below.

3.2.1 Affected Environment

The USGS Hydrologic Unit Code [HUC]-8 watersheds in the PPA are part of the Missouri and Mississippi river basins and include the South Raccoon, Boyer, and West Nishnabotna watersheds. Within these larger watersheds, the PPA covers seven HUC-12 subwatersheds: the Headwaters Middle Raccoon River, City of Carroll-Middle Raccoon River, Upper Brushy Creek, Upper East Boyer River, Middle East Boyer River, Headwaters West Nishnabotna River, and Upper West Fork West Nishnabotna River.

Surface waters in the PPA that qualify as Waters of the United States (WOTUS) are federally regulated under the Clean Water Act (CWA) (33 U.S. Code [U.S.C.] 1251). Section 404 of the CWA requires a permit from the U.S. Amry Corps of Engineers (USACE) for discharges of dredged or fill material into WOTUS (33 Code of Federal Regulations [CFR] 320 to 332). Typically, dredge or fill permanently affecting from 0.1 to less than 0.5 acre can obtain authorization using a Nationwide Permit (NWP), while 0.5 acre and more requires an Individual Permit.

In addition, under Section 401 of the CWA (40 CFR 121), any project in Iowa that requires a Section 404 permit must obtain a 401 water quality certification (WQC) from the IDNR (567 Iowa Administrative Code [IAC] 61). Section 402 of the CWA (40 CFR 122) requires any project involving greater than 1.0 acre of ground disturbance to obtain a storm water permit under the U.S. Environmental Protection Agency's (USEPA's) National Pollutant Discharge Elimination System (NPDES) Program. In Iowa, construction activities are permitted by the IDNR under the Iowa General Permit No. 2 (IDNR 2022b) with the implementation of associated conditions, including the development of a Storm Water Pollution Prevention Plan (SWPPP) that includes measures to minimize erosion and stormwater runoff from construction areas into wetlands and waterbodies (567 IAC 64; IDNR 2022b). Similarly, Section 311 of the CWA requires facilities that may store over 1,320 gallons of oil, or that "have a reasonable expectation of an oil discharge to water" to develop a Spill Prevention, Control and Countermeasure (SPCC) Plan (40 CFR 112). Section 404 permitting, a 401 WQC, an Iowa General (storm water) Permit #2 and SWPPP, and a SPCC Plan would all be applicable to the Project.

3.2.1.1 Surface Waters (Rivers/Streams, Wetlands)

Wetlands and waterbodies were identified for this Draft EA based on a desktop assessment using data from the USFWS National Wetlands Inventory (NWI; USFWS 2023g, 2024d) and USGS National Hydrography Dataset (NHD; USGS 2023a, 2024), along with soils data, topographic information, climate data, and multiple years of aerial imagery to identify areas that are likely to exhibit wetland characteristics. No Wild and Scenic Rivers are located within the PPA (National Park Service 2021). The Study Area for the desktop assessment and field surveys was defined as follows:

- 300-foot radius surrounding each turbine
- 200-foot buffer around each facility footprint (i.e., the substations, O&M Facility, laydown yards, MET towers, and ADLS)
- 500-foot-wide corridor centered on the gen-tie line
- 150-foot-wide buffer centered on collection lines, access roads, and crane walks

Wetland and waterbody delineations began in the fall of 2023 to identify waters protected by Section 404 of the CWA (33 U.S.C. 1251–1387) in accordance with the 1987 *Corps of Engineers Wetlands Delineation Manual* (USACE 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region* (Version 2.0; USACE 2010). The delineations focused on permanent Project infrastructure based on the Project's proposed layout as of November 6, 2023. Surveys on remaining Project infrastructure will be completed in the spring of 2024, with results presented in the Final EA. The delineations will provide information sufficient to determine if and what Section 404 permitting might be needed.

According to the USGS (2023a, 2024), waterbodies in the PPA (Figures 3.2-1 and 3.2-2) include:

- Brushy Creek: within the Wind Farm Boundary (perennial tributary to the South Raccoon River)
- Coon Creek: crosses the gen-tie line corridor (perennial tributary to the Boyer River)
- The East Boyer River: within the Wind Farm Boundary (perennial/intermittent tributary to the Boyer River)
- Halburn Creek: within the Wind Farm Boundary (intermittent tributary to Brushy Creek)
- Malony Branch: within the Wind Farm Boundary (intermittent tributary to the West Fork West Nishnabotna River)
- Miller Creek: within the Wind Farm Boundary (perennial tributary to the Boyer River)
- West Fork West Nishnabotna River: within the Wind Farm Boundary and crosses the gen-tie line corridor (perennial tributary to the West Nishnabotna River)
- West Nishnabotna River: within the Wind Farm Boundary (perennial/intermittent tributary to the Nishnabotna River)

- Unnamed tributaries [UNT] totaling 115.9 miles (primarily intermittent): within the Wind Farm Boundary and gen-tie line corridor

The USEPA coordinates with states to identify impaired waters under Section 303(d) of the CWA. The IDNR establishes total maximum daily loads (TMDLs) specific to the pollutants causing impairment within a waterbody (567 IAC 61). Two Section 303(d) statewide priority listed impaired waters were identified in the PPA: Brushy and Halburn creeks (IDNR 2022c). Impairments for these streams include fish kills caused by a one-time fertilizer spill originating in Halburn Creek with downstream effects on Brushy Creek, and by animal waste runoff originating in Brushy Creek.

Since the mid-1800s, drainage systems composed of tiles and ditches have been installed in Iowa to drain wetlands for cropland (Iowa Geological Survey 2006). These systems have drained nearly 95% of all wetlands in the state (IDNR 2024b). Public drainage system infrastructure is mapped in eastern Carroll County outside of the PPA (IDNR 2020). These features are not publicly available for Crawford County. In addition, they do not include private drainage systems, which have been used throughout the state (Iowa Geological Survey 2006) and are likely present in the PPA.

According to the USFWS (2024d), there are approximately 195.1 acres of wetlands mapped within the PPA that could be affected by the Project. The scattered wetlands primarily consist of riverine wetlands, most of which are overlapped by USGS-mapped perennial and intermittent streams and freshwater emergent wetlands (see Table 3.2-1 and Appendix D). Neither Section 10 Traditional Navigable Waters regulated under the Rivers and Harbors Act (33 U.S.C. 401 et seq.) nor scenic rivers regulated under the Wild and Scenic Rivers Act (16 U.S.C. 28) were identified within the PPA (IDNR 2024a, USACE 2024). No NRCS or USFWS wetland easements were identified within the PPA (USGS 2022, U.S. Department of Agriculture [USDA] NRCS 2023c, National Conservation Easement Database 2024, USFWS 2023g, 2024d).

Table 3.2-1. USFWS NWI wetlands identified in the PPA.

Wetland Type [a]	Area (Acres)	Percent of PPA
Freshwater emergent	167.8	0.4%
Freshwater pond	26.6	0.1%
Freshwater forested/shrub	1.1	<0.1%
Totals [b]	**195.5**	**0.5%**

[a] USFWS 2023g, 2024d

[b] Totals may not equal the sum of the addends due to rounding.

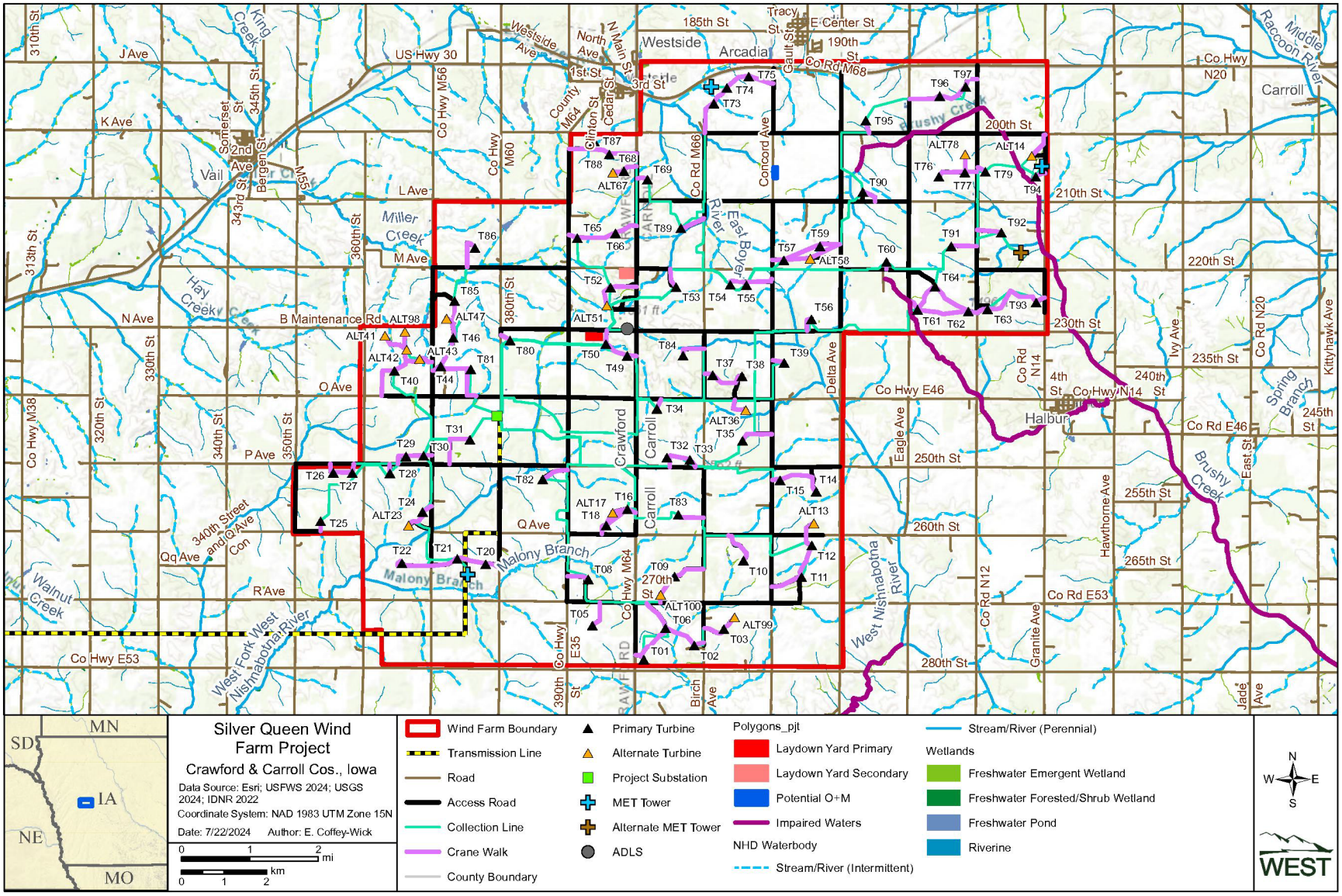

Figure 3.2-1. Water resources at the Proposed Wind Farm.

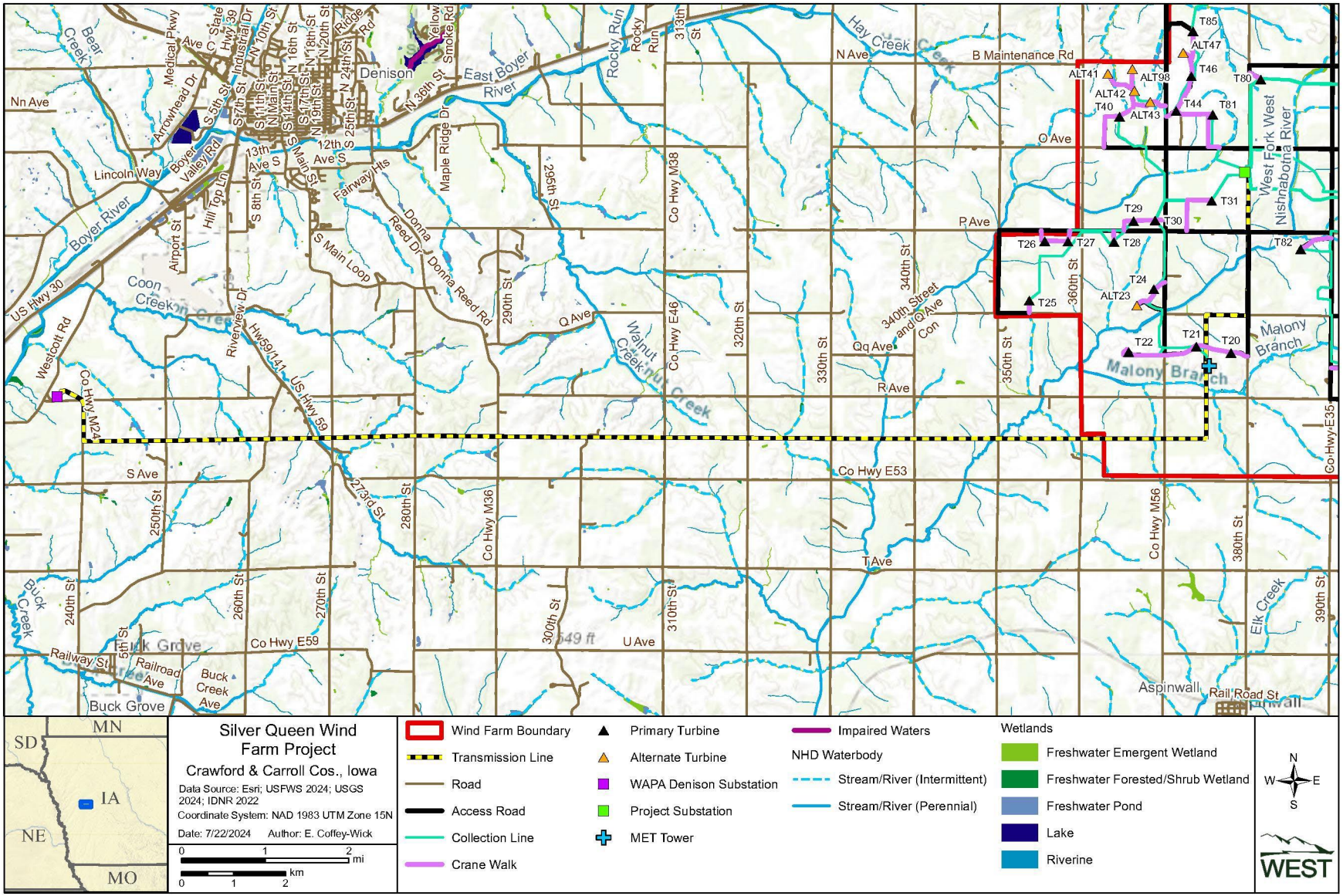

Figure 3.2-2. Water resources along the proposed gen-tie line.

A total of four wetlands and six streams were identified during the November 2023 survey. Non-wetland "no points" were recorded when wetland indicators were absent at NWI-mapped wetlands and NHD-mapped waterbodies. This data, along with data from the 2024 delineation, will be used to update impacted acreages in the Final EA and inform CWA Section 404.

3.2.1.2 Floodplains

According to the FEMA National Flood Hazard Layer Viewer (FEMA 2021), flood maps were published for Carroll County in 2017 and Crawford County in 2021. Within the PPA, approximately 1,643 acres are mapped in Zone A (the 100-year floodplain, or areas with a 1% annual chance of flooding; FEMA 2023; Figure 3.2-3).

3.2.1.3 Groundwater

According to Iowa Geological Survey interactive maps, the Mississippian and Lower Cretaceous aquifers are the main aquifers in use within the PPA (UI 2023a). These aquifers are important supplies of water for agricultural, industrial, domestic, and public uses in north-central and western Iowa (IDNR 2009b, Gannon and McKay 2013). Wells drilled within these aquifers are typically between 100 to 600 feet deep (Prior et al. 2003). Available well data from the UI's Iowa Well Forecasting System shows well depths within the PPA vary from 387 to 884 feet (UI 2023b). No source water protection areas are mapped in the PPA (IDNR 2023h).

3.2.2 Environmental Consequences: Proposed Action

A preliminary assessment of impacts based on a combination of field survey and NWI and NHD data are presented in the following section. A final assessment based on completion of the wetland and waterbody delineation in the spring of 2024 will be provided in the Final EA.

3.2.2.1 Surface Waters (Rivers/Streams, Wetlands)

Project construction of linear facilities could have indirect effects by temporarily decreasing water quality through increased turbidity, sedimentation, and contamination through spills of hazardous materials and stormwater runoff from soil disturbance, including to the Section 303(d) impaired waters, Halburn and Brushy creeks. Accidental spills or leaks from vehicles and equipment during construction, and transformers and other liquid-filled devices at substations and the O&M Facility during operation, could have indirect effects on water resources by degrading the quality of nearby surface waters. Herbicides, if used to control noxious weeds and vegetation growth around construction workspaces and Project infrastructure, could also have indirect effects on water resources by degrading water quality in nearby surface water bodies through surface runoff and/or groundwater. Conservation measures described below would minimize potential impacts, including implementation of a Project SWPPP, a SPCC Plan, and BMPs for herbicide use.

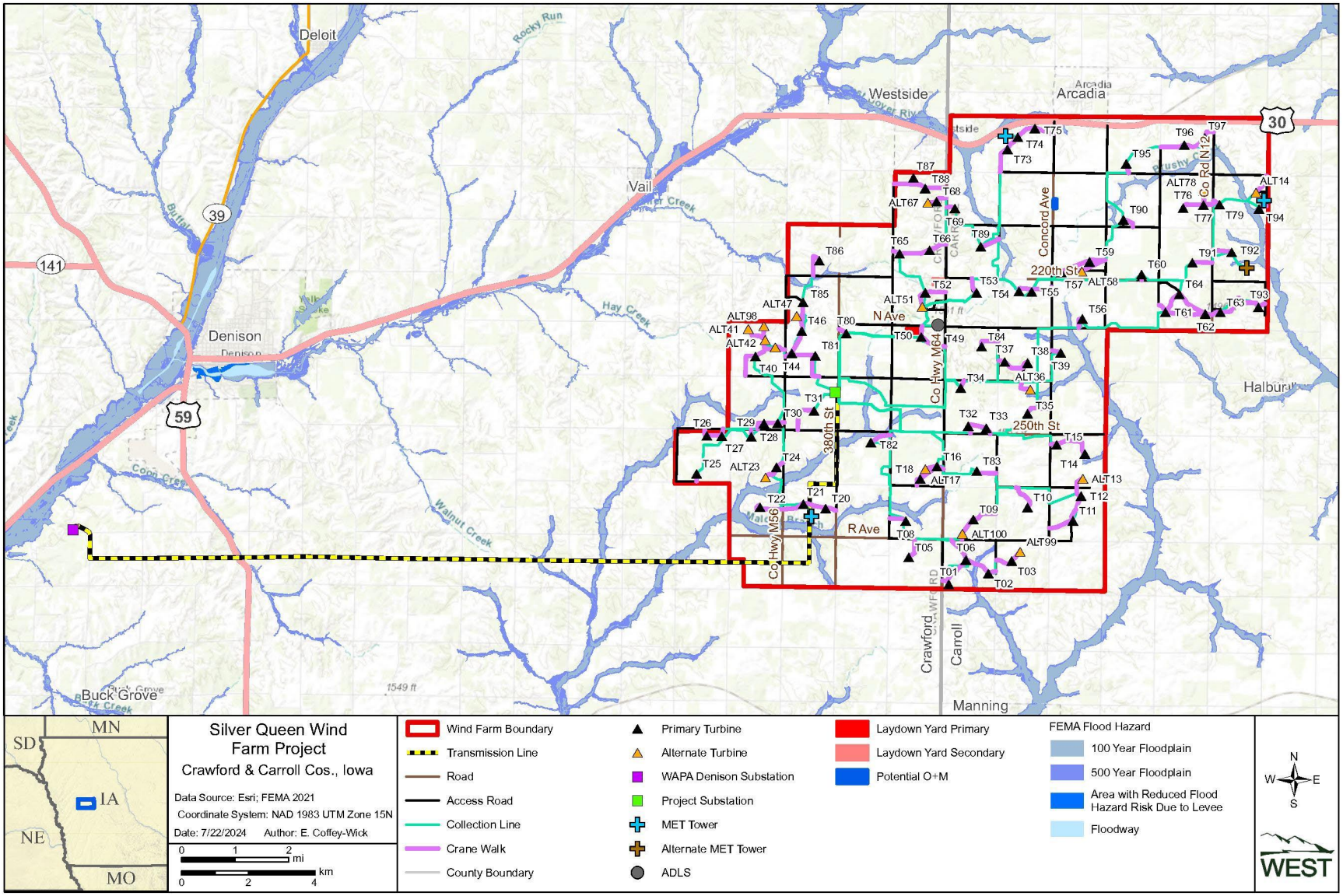

Figure 3.2-3. Floodplains in the PPA.

Project infrastructure has been cited to avoid wetlands and waterbodies. All turbines, the Project Substation, the O&M facility, the laydown yard, the ADLS, and the MET towers have been sited outside of NWI- and NHD-mapped wetlands and waterbodies and would, therefore, have no direct impacts.

Based on NWI and NHD data, temporary trenching and equipment operation in the gen-tie and collector line construction corridors could have temporary direct impacts on 8.0 acres of NWI wetlands and 16,807.7 feet of waterbodies during construction through increased turbidity and soil compaction (Tables 3.2-2 and 3.2-3). The siting of crane paths and access roads across 0.6 acre of NWI wetlands and 3,827.2 feet of NHD waterbodies could have temporary direct impacts on water resources through increased turbidity, soil compaction, and/or construction/ improvements of bridges and culverts, which could also alter stream hydrology.

Table 3.2-2. Preliminary NWI wetlands (acres) in the Project construction (C) and operational (O) footprint. [a,b]

	Freshwater Emergent Wetland (PEM)		Freshwater Pond		Totals	
Project Component [c]	**C**	**O**	**C**	**O**	**C**	**O**
Linear Transportation						
Access Roads [d, e]	0.1	<0.1	0	0	0.1	<0.1
Crane Paths	0.3	0	0.2	0	0.5	0
Subtotal	*0.4*	*<0.1*	*0.2*	*0*	*0.6*	*<0.1*
Electric Utility Lines / Telecommunication						
Gen-Tie Line Right-of- Way [d, f]	0.9	0.1	2.7	0.2	3.6	0.3
Collector Lines	1.3	0	0.1	0	1.4	0
Subtotal	*2.2*	*0.1*	*2.8*	*0.2*	*5.0*	*0.3*
Totals [e]	**2.6**	**0.2**	**3.0**	**0.2**	**5.6**	**0.4**
Number of Crossings	***48***	***6***	***11***	***3***	***59***	***9***
Average Size (acres)	***<0.1***	***<0.1***	***0.3***	***0.1***	***0.1***	***<0.1***

Source: USFWS 2023g, 2024d

Note: Project infrastructure is sited outside of wetland areas and therefore not listed in this table.

[a] Acreages will be updated in the Final EA based on the final wetland and waterbody delineation.

[b] Construction footprint outlines the area that could experience temporary affects during construction, and operation footprint outlines the area that could experience permanent affects during operation.

[c] Project components would be designed to avoid wetland impacts.

[d] Totals may not equal the sum of the addends due to rounding.

[e] Silver Queen plans to avoid impacts to wetlands.

[f] The gen-tie line would span wetlands and waterbodies.

Table 3.2-3. Preliminary [a] lengths of NHD waterbodies (feet) in the Project construction (C) and operational (O) footprint. [b]

Project Component [c]	Intermittent		Perennial		Artificial Path		Totals	
	C	O	C	O	C	O	C	O
Linear Transportation								
Access Roads	323.0	175.7	0	0	0	0	**323.0**	**175.7**
Crane Paths	3,304.4	0	151.1	0	48.7	0	**3,504.3**	**0**
Subtotal	3627.4	175.7	151.1	0	48.7	0	**3,827.3**	**175.7**
Electric Utility Lines/Telecommunication								
Collector Lines	3,249.9	0	1,139.7	0	0	0	**4,389.6**	**0**
Gen-Tie Line Right-of-Way [d]	5,662.6	1,241.7	1,853.9	523.4	237.4	0	**7,753.9**	**1,765.1**
Subtotal	8,912.5	1,241.7	2,993.6	523.4	237.4	0	**12,143.5**	**1,765.1**
Totals [e]	**12,539.8**	**1,417.4**	**3,144.7**	**523.4**	**286.1**	**0**	**15,970.7**	**1,940.8**
Number of Crossings	***78***	***24***	***23***	***5***	***5***	***0***	***106***	***29***
Average Length (feet)	***160.8***	***59.1***	***136.7***	***104.7***	***57.2***	***0***	***150.7***	***66.9***

Source: USGS 2023a, 2024

[a] Waterbody values will be updated in the Final EA based on the final wetland and waterbody delineation.

[b] Construction footprint outlines the area that could experience temporary affects during construction, and operation footprint outlines the area that could experience permanent affects during operation.

[c] Project infrastructure is sited outside of waterbody areas and therefore not listed in this table.

[d] The gen-tie line would span wetlands to avoid direct operational impacts.

[e] Totals may not equal the sum of the addends due to rounding.

Based on NWI and NHD, preliminary estimates of temporary construction impacts would be distributed across up to 59 wetland, 23 perennial stream, 78 intermittent stream, and 5 artificial path crossings (Appendix E), for an average of 0.1 acre of wetland impacts across the two wetland classes and between 4.0 to 714.0 feet of waterbodies at each crossing. Perennial waterbody crossings would involve all named streams listed in Section 3.2.1 and numerous unnamed tributaries. During operations, perennial segments of the West Fork West Nishnabotna River would cross the permanent gen-tie line corridor in three locations, as well as a perennial segment of Coon Creek and an unnamed tributary in one location each.

In addition, 14 intermittent stream segments would intersect the gen-tie line corridor, including an intermittent segment of Malony Branch, along with a freshwater pond and five NWI freshwater emergent wetlands. The permanent gen-tie line would avoid impacts by spanning wetlands and waterbodies and avoiding in-water work. New access roads would include 10 permanent crossings of intermittent streams, including an intermittent segment of the West Fork West Nishnabotna River. Although an analysis of NWI wetlands indicate there would be two permanent access road crossings of 0.1 acre of freshwater wetlands, Silver Queen is planning to design access road modifications and construction to avoid impacts to wetlands.

Silver Queen has minimized the extent of impacts by collocating linear features as much as possible to reduce the affected area. As noted, impacts would be further minimized throughout avoidance measures based on completion of the wetland and waterbody delineation in the spring of 2024,

with final results provided in the Final EA. Silver Queen would install and maintain stream conveyances (culverts and bridges) to retain the existing stream flows and accommodate the necessary flows during projected flood events, including potential increased flooding that could be caused by climate change (see Section 3.1.1).

Following construction, temporary structures would be removed, and the original grade and drainage pattern would be re-established to the extent feasible in accordance with USACE, IDNR, landowner, and county conditions. Non-cropland construction areas would be revegetated with native and naturalized species free from noxious and invasive weeds to avoid erosion to surface water resources during Project operation (see Section 3.5.2). Permanent gravel access roads would be maintained to minimize stormwater runoff. The maintenance of permanent culverts and bridges could involve minor impacts to water quality through increased turbidity, which would be temporary and infrequent. By minimizing the affected area and through proper design and maintenance, linear Project components would have minor, temporary to permanent impacts. Decommissioning impacts on surface waters would be similar to those occurring during construction.

Silver Queen would manage all potential impacts to water resources in compliance with the CWA. Based on the current preliminary assessment, planned avoidance measures, and a review of NWP General, permit-specific, and Iowa Regional Conditions (USACE 2021, 2022), Project impacts to WOTUS would likely be authorized through self-certification under USACE NWPs 14 (linear transportation projects) and 57 (electric utility lines and telecommunication activities). Silver Queen will continue to assess potential impacts to WOTUS through the NEPA process and development of a final design to confirm the appropriate level of Section 404 permitting needed and will coordinate with the USACE to ensure compliance with Section 404 as needed. An Iowa General (storm water) Permit #2 and 401 WQC would also be needed for the Project; general 401 WQCs have been granted by the IDNR for these NWPs (IDNR 2024c, USACE 2022).

As stated above, Project construction could result in direct and indirect effects to Section 303(d) impaired waters, which include Brushy and Halburn creeks. Brushy and Halburn creeks would be crossed by collection lines, and Halburn Creek would also be crossed by a crane path. Therefore, these effects would be temporary since Brushy and Halburn creeks are not located within the footprint of any permanent facilities. Neither Brushy Creek nor Halburn Creek have TMDLs available for their respective affected segments (IDNR 2022c). Implementation of the conservation measures described below, including a Project SWPPP and SPCC Plan developed in compliance with the CWA, would minimize impacts.

Based on this preliminary analysis, Project construction could involve minor and short-term impacts to waterbodies, while Project operation would not have any permanent impact on perennial streams. By avoiding road impacts, Project construction could involve minor and short-term impacts to 5.5 acres of wetlands, while Project operation would not have any permanent wetland impacts since the gen-tie line would span wetlands and collector lines would be buried.

3.2.2.2 Floodplains

The Project's construction and operational footprints respectively overlap with 51.3 and 5.3 acres of a 100-year floodplain, as designated by FEMA (2021). Direct impacts to floodplains during construction and decommissioning of the Project could include temporary ground disturbance. Long-term, direct impacts from operations could involve the alteration of floodplain function from the placement of structures; however, Silver Queen plans to site infrastructure outside of the 100-year floodplain to avoid direct impacts. Impacts would be avoided by spanning the extent of floodplains present within the Project Footprint, where feasible.

If a floodplain could not be avoided, a state floodplain permit from the IDNR may be required for waterbody crossings of a waterbody draining more than 100 square miles, or for road embankments or construction of structures that would occupy more than 15% of a floodplain of a river or stream draining more than 10 square miles (567 IAC 71.1 and 71.12). In Crawford County, a floodplain development permit is required for construction of any structure within a floodway or floodplain fringe (Crawford County [2021] Ordinance No. 1.17B). In Carroll County, a floodplain development permit would be required for any floodplain development (Carroll County [2017] Floodplain Management Ordinance No. 5). Floodplain development in both counties is permitted with conditions. Silver Queen would coordinate with the IDNR and Crawford and Carroll counties to obtain floodplain development permits prior to construction where necessary and adhere to the conditions of the permits to avoid, minimize, or mitigate floodplain impacts, as applicable. Based on avoidance measures and adherence to permitting conditions should a permit be required, the Project would have no to low long-term impacts on floodplains.

3.2.2.3 Groundwater

Project construction could result in direct impacts to groundwater by disturbing soils and vegetation from grading, clearing, trenching, or compacting, which could alter existing drainage systems and groundwater recharge. As described for surface waters, Silver Queen would install erosion control and stabilization measures as outlined in the Project's SWPPP, and temporary construction areas would be restored to pre-construction contours. As with surface waters, shallow aquifers could be indirectly impacted due to accidental spills and leaks from transformers and other liquid-filled devices at substations and the O&M Facility or herbicides used for noxious weed control; these impacts would be avoided by following the applicable conservation measures, BMPs, and the SPCC plan.

Direct impacts to groundwater could include increased water use should groundwater be used for fugitive dust management and the concrete batch plant, although measurable reductions in water supply in the PPA is not anticipated. Water use during operations would be minimal and intermittent, primarily involving periodic cleaning of wind turbine rotor blades to eliminate dust and insect buildup, and water at the O&M facility. No substantial impacts on aquifers are expected from the construction, operation, and decommissioning of the Project. Therefore, the

Project would have minor temporary impacts and negligible permanent impacts to groundwater.

3.2.2.4 Conservation Measures

Silver Queen is committed to implementing the applicable conservation measures for water resources derived from Section 5.3 of the 2015 PEIS, along with those required under the USACE 2021 NWP General Conditions (USACE 2022), the Iowa Regional Conditions (USACE 2021), the IDNR conditions for a CWA Section 401 WQC for NWPs (IDNR 2021), and conditions of the IDNR CWA Section 402 NPDES General Permit No. 2. The conservation measures address potential risks associated with stormwater runoff (i.e., turbidity and sedimentation), contaminants, changes to hydrology and stream flow, and wetland degradation. The list of conservation measures can be found in Appendix C.

3.2.3 Environmental Consequences: No Action Alternative

The No Action Alternative would have no Project-related direct or indirect impacts on water resources. Existing land uses, particularly agriculture, would likely continue. Agricultural activities can affect water resources by removing or altering vegetation, which can increase erosion and sedimentation, as well as introducing pollutants from agricultural operations (e.g., fertilizer, hormones, pesticides, and animal waste) into surface waters.

3.3 Air Quality and Climate

This section analyzes potential impacts from the Project to air quality and climate change. The general analysis of these topics in Sections 4.4 and 5.4 of the 2015 PEIS is incorporated herein by reference. Executive Order 13990 and proposed updates to the Council on Environmental Quality's (CEQ) NEPA implementing regulations (CEQ 2023d) guide federal agencies in analyzing greenhouse gas (GHG) and climate change effects from their proposed actions. The Project-specific affected environment and impacts are analyzed below. This Draft EA includes an analysis of how the Project would affect climate change, as discussed in this section, as well as how climate change could affect the Project (see Sections 3.1, 3.2, and 3.13), and how climate change could contribute cumulatively to Project impacts (see Section 4.0).

3.3.1 Affected Environment

3.3.1.1 Air Quality

As described in Section 4.4 of the 2015 PEIS, air quality is regulated in the United States (U.S.) by the federal Clean Air Act of 1970 (CAA) under the jurisdiction of the USEPA (40 CFR 50). The USEPA has set health-based standards for air quality referred to as National Ambient Air Quality Standards (NAAQS). The NAAQS sets attainment levels for six criteria air pollutants (CAPs): sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide, ozone, particulate matter ($PM_{2.5}$ and PM_{10}), and lead. The USEPA's Prevention of Significant Deterioration standard restricts increases in ambient levels of NO_2, SO_2, $PM_{2.5}$, and PM_{10} to established baseline levels. An area where the concentration of these pollutants exceeds the NAAQS levels is called a

nonattainment area, while areas that have improved air quality to meet the NAAQS are called maintenance areas. Iowa does not have separate state AAQS.

The USEPA also regulates volatile organic compounds (VOCs) and hazardous air pollutants (HAPs) under the CAA. While VOCs are not regulated, they participate in photochemical reactions called off-gassing that forms ozone (USEPA 2023d). VOCs can be released during operation of gasoline- or diesel-powered construction equipment. HAPs are pollutants, such as benzene, methylene chloride, and asbestos, that are known or suspected to cause cancer and other serious health issues (USEPA 2023f). HAPS are used or found in industrial facility construction, maintenance, and operations. The USEPA National Air Toxics Assessment (NATA) quantifies HAP emissions by county. In the Project vicinity, NATA shows the largest HAP risks are from formaldehyde, carbon tetrachloride, and acetaldehyde (USEPA 2024a), which are likely a result of agricultural practices.

States develop and submit state implementation plans (SIPs) to the USEPA that identify how the state will implement, maintain, and enforce the NAAQS and other requirements of the CAA. Iowa's SIPs are administered by the IDNR (2024c). Federal agencies are prohibited from taking actions in nonattainment and maintenance areas unless they can demonstrate that their actions conform to the SIP regarding the CAPs. There are no nonattainment, maintenance, or Class I areas in Carroll and Crawford counties (USEPA 2023g).

The nearest ambient air quality monitoring site is located in Pisgah, Iowa, approximately 52 miles west-southwest of the PPA (USEPA 2023e). This monitoring site is maintained by the UI and only monitors ozone levels. Based on the location of the PPA in a rural area with low nearby population centers (see Section 3.11), air pollutants are expected to be relatively low. The USEPA's National Emissions Inventory estimated CAPs and HAPs for Carroll and Crawford counties were below the Iowa county averages for these compounds (Table 3.3-1; USEPA 2020). The USEPA's AirNow (2024) tool ranks current air quality conditions in the Project vicinity as good on a scale of hazardous to good, with good being the highest ranking.

Table 3.3-1. Estimated levels of CAPs, HAPs, and GHGs in Carroll and Crawford counties.

County [a]	**CAPs (tons)**	**HAPs (tons)** [a]	**GHGs (tons)** [b]
Carroll	13,125	<0.01	186,530
Crawford	11,712	<0.01	181,316
Total Project Counties	**24,837**	**<0.10**	**367,846**
Iowa all-County Average	*15,414*	*0.01*	*261,599*

Source: USEPA 2020

[a] Includes lead compounds

[b] Includes CO_2 and methane

3.3.1.2 Climate

Climate data and modeling indicates that climate change has been increasing exponentially since the industrial revolution and is resulting in increased global temperatures and an alteration of the planet's natural systems, such as precipitation patterns, weather, ice cover, and sea levels.

As discussed in Section 4.4 of the 2015 PEIS, climate change is caused by the emission of GHGs through natural processes and human activities. GHGs include carbon dioxide (CO_2), methane, ozone, nitrous oxide, chlorofluorocarbons, and water vapor. The USEPA tracks emissions of GHGs and publishes data in accordance with the United Nations Framework Convention on Climate Change (USEPA 2023f). In the U.S., emissions are broken down by economic sector: transportation 28%, electric power 25%, industry 23%, commercial and residential 13%, and agriculture 10% (USEPA 2023f). GHGs emitted within the PPA are currently counted in the transportation, commercial and residential, and agricultural economic sectors through the burning of fossil fuels by vehicles along Highway 30 and local town and rural roads, by farm equipment, and for electricity, as well as through livestock methane emissions. As of 2022, Iowa has seen a reduction in the use of fossil fuels for generating electricity, while a combined 34.96% of the state's energy came from coal and natural gas; a majority of 62.70% from wind; and with solar, hydroelectricity, and other renewable sources at a combined 2.21% (Iowa Utilities Board 2024). At least four other wind energy facilities occur in Crawford and Carroll counties.

For the same reasons discussed for air pollutants above, along with the increasing prevalence of renewable energy consumption in Iowa, GHG emissions are expected to be relatively low compared to other parts of the country. At the state level, the USEPA's National Emissions Inventory (USEPA 2020) estimated GHGs for Carroll and Crawford counties were below the Iowa county averages for these compounds, which included CO_2 and methane (Table 3.3-1).

3.3.2 Environmental Consequences: Proposed Action

Project construction, including emissions from the concrete batch plant, would have direct temporary impacts on air quality and climate change by contributing to CAPs, VOCs, HAPs, and GHGs at the local scale due to fossil fuel emissions from large vehicles and equipment, as described in Section 5.4 of the 2015 PEIS. The generation of fugitive dust from ground disturbing activities on approximately 2,358.7 acres and travel on gravel roads would also increase local CAPs (i.e., $PM_{2.5}$ and PM_{10}). Fugitive dust would be minimized through dust control measures listed in the conservation measures below. Relatively small quantities of air pollutants and GHGs would be emitted as a result of fuel combustion from vehicles and other mobile equipment. Silver Queen anticipates that over the estimated 12 months of construction, Project CO_2 emissions from fuel combustion would total approximately 3,713.82 tons of CO_2 equivalents (CO_{2e}; USEPA 2024c). These levels would be approximately 0.1% of the GHG levels in the Project counties based on data from the National Emissions Inventory (USEPA 2020).

Based on these estimates, the temporary air quality and climate change effects caused by Project emissions during construction would be negligible to minor since they would not be

expected to result in NAAQS exceedances or cause a measurable degradation in local or regional air quality, particularly given the typically windy conditions that would quickly disperse any air pollutants and prevent their accumulation at the local level.

Emissions of air pollutants and GHGs during operations would likely result in a permanent but negligible reduction in air quality given that only approximately five to six pick-up trucks would be operated regularly. If a diesel generator is installed as a backup generator at the O&M facility, testing (operation) of the generator could occur infrequently (about two hours per month). Conversely, generating electricity through wind power instead of burning fossil fuels would have a minor, beneficial impact on air quality at the regional scale by reducing air pollutant and GHG emissions. When operating under the manufacturer's default turbine settings, the Project is designed to generate approximately 1,187 gigawatt hours per year, which is enough electricity to power the equivalent of at least 104,510 residential homes (USEPA 2023c). This offset would reduce GHG emissions by 248,605 tons of CO_2 per year by replacing fossil fuel-based electricity production (USEPA 2023c). The reduction would be equivalent to approximately 1% of the GHG emissions in Iowa (USEPA 2020). It would also more than mitigate Project construction emissions (about 682 tons of CO_{2e}), as well as the negligible amount annual operational emissions (about 4 tons of CO_{2e} per year).

While the State of Iowa has not developed any additional Renewable Portfolio Standards since the one developed in 1997 (identified in Section 6.2.4 in the 2015 PEIS), construction of the Project would support the long-term goal set by the Iowa Environmental Council (IEC) to transition Iowa from fossil fuels to 100% clean energy (IEC 2023). The Project would also contribute to related goals on a national scale. Temporary impacts on air quality and climate change from decommissioning would be similar to those for construction, while the minor beneficial impacts in reducing GHG emissions by replacing fossil fuels for energy production could be lost unless the Project should be replaced or repowered.

3.3.2.1 Conservation Measures

Silver Queen is committed to implementing the conservation measures for air quality and climate resources derived from Section 5.4.2 of the 2015 PEIS, which would help to avoid or minimize air and climate impacts associated with the Proposed Action. These measures address energy consumption and potential risks associated with air quality from dust and emissions. The list of conservation measures can be found in Appendix C.

3.3.3 Environmental Consequences: No Action Alternative

Under the No Action Alternative, there would be temporary or permanent minor to negligible increases to current levels of air pollutant and GHG emissions that come from agricultural activities, electricity generation, and vehicle traffic, which are below the state county averages for these compounds (see Section 3.3.1). Additionally, fossil fuel use would not be reduced through the construction of an alternative energy production facility; therefore, a minor reduction in GHG emissions would not occur.

3.4 Noise

This section analyzes potential noise impacts from the Project on people. For a discussion of noise effects on wildlife, see Section 3.6. In the 2015 PEIS, noise is analyzed in Sections 4.5.1, 4.5.2, and 5.5; an explanation of noise acoustics and typical noise impacts of a wind energy facility are incorporated herein by reference. The Project-specific affected environment and impacts are analyzed below.

3.4.1 Affected Environment

The PPA is located in rural Crawford and Carroll counties. It is predominantly agricultural, consisting of a mix of cultivated cropland and pasture with rural residences scattered throughout. The landscape is mostly open, with scattered trees occurring primarily in riparian areas and as landscaping or shelterbelts on farms; the three largest woodlands in the Wind Farm Boundary are approximately 5 acres in size, while most are 2 acres or less. The topography ranges from fairly flat in the eastern portion of the site, to gently rolling hills moving west across the site, with a maximum range in elevation of approximately 109 feet. Although no baseline assessment of existing sound sources was completed, farming activities, vehicular traffic, and wind are assumed to be the largest contributors to sound. The Project is in one of the windiest regions of Iowa, with an average annual wind speed of approximately 19 to 20 mph (WINDExchange 2011). Generally, rural areas under calm and high winds have baseline nighttime noise levels of approximately 30 to 50 A-weighted decibels (dBA; Appendix G).

Sensitive sound receptors generally include occupied residences and areas where people congregate, such as churches, schools, and community centers. Silver Queen identified 282 occupied residences in and adjacent to the Project that could be affected by noise and require setbacks based on their county agreement. (Appendix A) In addition, a number of communities are located near the Project. The closest of these is Westside (about 0.9 miles north of the nearest turbine, and at least 2.5 miles from all other turbines), Arcadia (about 1.0 mile northeast), and Halbur (about 1.5 miles northwest). Westside, Arcadia, and Halbur have populations of 282, 766, and 243 residents, respectively, as of the 2021 census (U.S. Census Bureau 2023). Also, the Hayes Township *Scheutzenverein*, or Five Mile House, is a community center located approximately 5.0 miles south of Westside. The remaining communities in proximity to the Project include Manning, Maple River, Roselle, Aspinwall, Carroll, and Denison, which are 3.0 miles or more from the nearest turbines.

Residents of these and other communities, including Denison and Carroll, Iowa, have had the opportunity to provide comments on the Project during WAPA's scoping process. One individual submitted comments regarding concerns about potential noise impacts to Westside (Scoping Comments 16-2 and 16-3; Appendix F). The Project has taken these concerns into account and provides information below regarding potential impacts to Westside and other sensitive sound receptors.

3.4.2 Environmental Consequences: Proposed Action

Project construction would result in temporary noise impacts for one to two years (likely about 15 months). Most construction equipment would have sound levels ranging from 76 to 89 dBA at a distance of 50 feet (Epsilon Associates, Inc.2019). Most construction activities would occur during the day when higher background sounds better mask construction-related noise. However, concrete foundation work and turbine erection work could extend into the overnight hours depending on the weather and timing of a concrete pour, which must be continuous. As noted in the 2015 PEIS, when background noise levels exceed noise emitted from a particular source by about six dBA, the source would not contribute to a perceptible increase in noise. Based on typical noise attenuation with distance, equipment noise would be expected to attenuate to near background noise levels on a windy day within roughly 328 to 1,640 feet, or about 1,000 to 2,000 feet on a calm day (Bureau of Land Management [BLM] 2011).

Based on sound and shadow flicker setback commitments under the Crawford County Development Agreement (Appendix A), Silver Queen has sited a majority of turbines at least 1,750 feet from occupied residences. In addition, the Project Substation would be over 2,100 feet from the nearest residence. As such, construction noise at turbine locations and the Project Substation would generally be expected to attenuate to near background levels at nearby residences, although construction of certain other Project facilities (e.g., O&M building, laydown yard) Nearby sensitive receptors (e.g., the O&M building is sited approximately 112 feet from a nearby business) could experience temporarily elevated noise levels from construction of other Project facilities (e.g., the O&M building and laydown yard). Turbine construction sound at any one location would only occur for a few days because as turbine assembly is completed, noise emitting activities would move elsewhere within the overall PPA. Based on the expected noise attenuation at nearby residences and potentially noise-sensitive areas (e.g., the Five Mile House), temporary construction noise impacts would be minor for turbine erection, and minor to moderate for individual residents due to construction of other Project infrastructure.

During operation, the Project's wind turbines and substation would be a long-term source of audible sound (for a discussion of turbine infrasound, or inaudible noise, see Section 3.13). Noise from a wind turbine primarily consists of aerodynamic noise, which is caused by wind passing over the turbine blades. The turbine model proposed for the Project, the GE 3.4-140 LNTE turbine, has a noise emission level of 106.8 dBA at 0 feet (ReGenerate Renewable Energy Consulting [ReGenerate] 2023b; Appendix G).

Sound modeling software (Openwind®)[4] was used to estimate operational sound from Project wind turbines at 282 total receptors (i.e., occupied residences or buildings; Appendix G). The assessment analyzed 93 potential turbine locations (77 primary plus 16 alternate locations) based on sound emissions for the GE 3.4-140 LNTE turbine, assuming a 322-foot hub height. The majority of these receptors (approximately 162) were located within the Wind Farm

[4] Openwind® complies with International Organization for Standardization (commonly, ISO) 9613-2, the international standard for propagation and attenuation of industrial sound.

Boundary, including the Hayes Township *Scheutzenverein* (Five Mile House); four were located along the southern portion of Westside, with additional receptors adjacent to the Wind Farm Boundary.

Initial results from the assessment indicated that noise levels would likely be exceeded at a majority of receptors based on the preliminary design. Silver Queen adjusted turbine layouts twice more based on subsequent noise assessments to bring noise levels down. The predicted noise levels at receptors from turbine operations based on the current design are shown in Table 3.4-1 and Figure 3.4-1 (see Appendix G for the full report).

Table 3.4-1. Sound emission results summary for the Project.

Sound Pressure Level (dBA)]	# of Receptors	Percentage of Receptors
0 to 35.0	70	25.00%
35.1 to 40.0	68	24.29%
40.1 to <45.0	142	50.71%
45.0 or more	0	0%

The maximum value of sound at any receptor is predicted to be less than 45.0 dBA, with about half of the receptors between 40.1 to less than 45.0 dBA, and the other half less than 40.0 dBA. Therefore, noise from Project wind turbines would be within the range of or below background noise levels for this area (30 to 50 dBA). Given that the area frequently experiences windy conditions, which increases background noise levels, it is expected that an increase in audible noise levels at receptors due to turbines would generally be negligible to minor for this Project. In addition, Silver Queen would be in compliance with the setback requirement for 45 dBA, which, as noted, is more conservative than the industry standard (see Table 2.2-3). Therefore, operational impacts from turbine noise would be negligible to minor.

Noise from a substation is due to operation of its transformer (a constant low-frequency humming noise) and its switchgear (infrequent, impulsive noise briefly emitted should a line overload occur). As discussed in the 2015 PEIS, noise levels from a substation would generally attenuate to less than 40 dBA at 2,000 feet, or likely within six dBA of background noise levels of a rural area under calm winds. Therefore, substation noise would be well under the 45-dBA setback requirement at the nearest residence and is not expected to contribute to a discernable increase in noise at nearby residences, particularly under windy conditions (see above discussion).

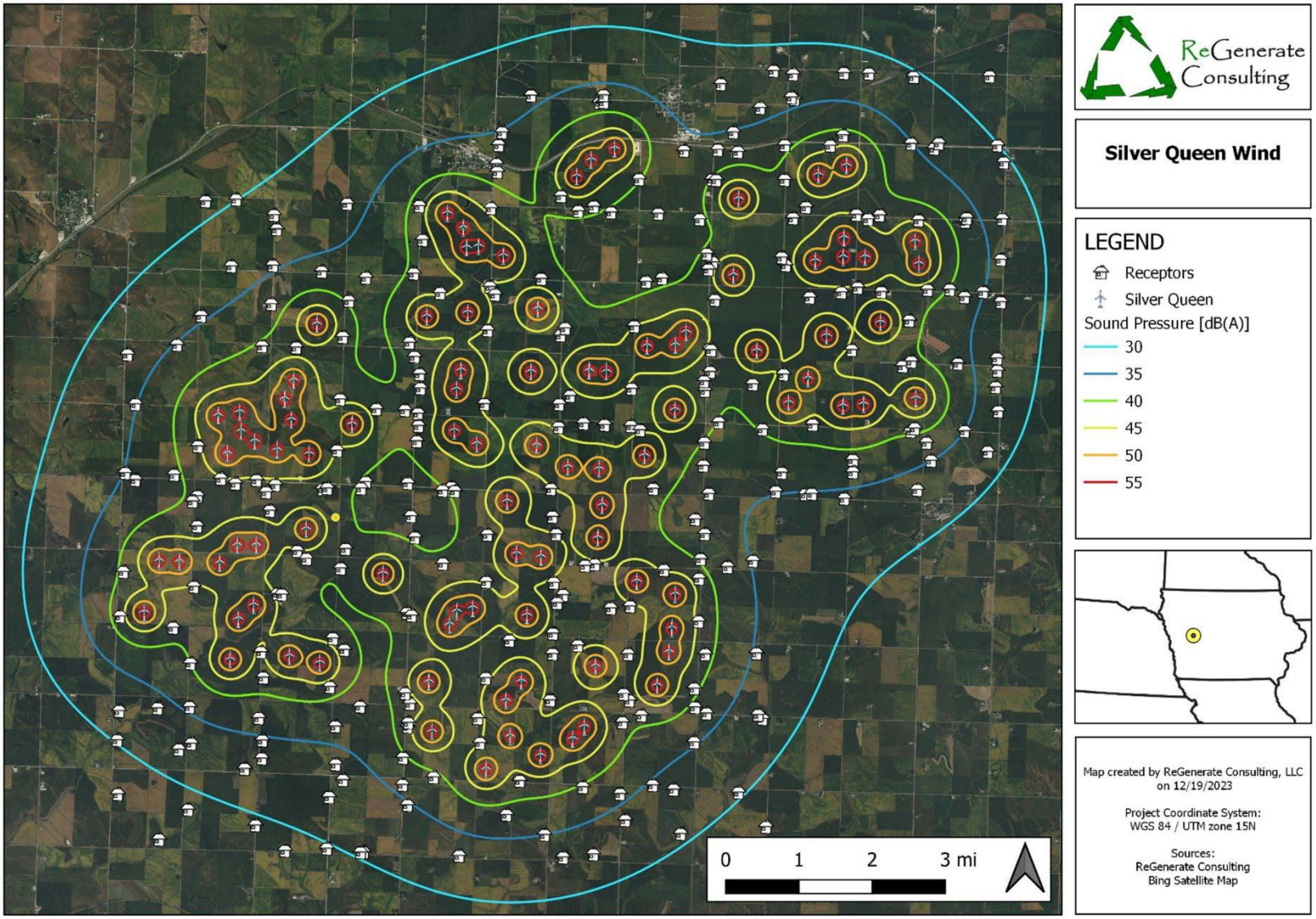

Figure 3.4-1. Sound propagation map: predicted turbine noise levels at receptors in the PPA.
(from ReGenerate Renewable Energy Consulting 2023b; Appendix G).

The proposed 230-kV gen-tie line would be a negligible source of noise since it would be typical of background sound levels in a rural environment. Based on a prior study of a 230-kV gen-tie line, gen-tie line noise would be below 39 dBA at the edge of the right-of-way, even during wet weather (Lee et al. 1996, WAPA and USFWS 2015). The collection lines would be underground and would not be a source of audible noise. Infrequent operation (about 2 hours per month) of a diesel generator for testing at the O&M facility would be another source of sound, likely between about 70 and 90 dBA. The O&M Facility is approximately 112 feet from an apparent residence or business and would not be expected to attenuate to background noise levels at the building location; therefore, the generator noise would be an intermittent, temporary, moderate noise impact on the building's occupant(s).

During decommissioning, noise level impacts would be temporary and minor, similar to those used for construction, but on a more limited scale and for a shorter duration.

3.4.2.1 Conservation Measures

Silver Queen is committed to implementing the applicable conservation measures for noise derived from Section 5.5.2 of the 2015 PEIS, which would help to avoid or minimize noise impacts associated with the PPA. In addition, as part of its development agreement with Crawford County (see Appendix A), Silver Queen has agreed to site Project wind turbines such that turbine noise levels would not exceed 45 dBA at residences occupied as of the start of construction, unless waived in writing by the landowner. This restriction would be applied to turbines in Carroll County as well and is more protective than the standard industry setback requirement of 50 dBA. The list of conservation measures can be found in Appendix C.

3.4.3 Environmental Consequences: No Action Alternative

The No Action Alternative would have no Project-related impacts on noise levels in the area. Existing activities, primarily farming and vehicular noise, would continue.

3.5 Vegetation

This section analyzes potential impacts from the Project to vegetation, including natural vegetation, cultivated crops, hayfields, and pasture. The general analysis of vegetation in Sections 4.6 and 5.6 of the 2015 PEIS is incorporated herein by reference. The Project-specific affected environment and impacts are analyzed below. Further discussion on land use related to agriculture is provided in Section 3.10.

3.5.1 Affected Environment

3.5.1.1 Land Cover

Existing land cover in Iowa is addressed in Section 4.1.1 of the 2015 PEIS and upland communities are described in Section 4.6.1.1 of the 2015 PEIS. Vegetation specific to the Project, including general vegetation types, grasslands, and noxious weeds, is described below.

The PPA in Carroll and Crawford counties experiences humid, warm, wet summers, with snowy and windy winters. Seasonal fluctuations typically vary from 13 degrees Fahrenheit (°F) to 85 °F. The area averages approximately 32 to 34 inches of rain and 30 to 32 inches of snow annually (National Oceanic and Atmospheric Administration [NOAA] 2024a).

Historically, the PPA was likely covered with tallgrass prairie with woodlands occurring along valleys and streams, habitat typical of the Steeply Rolling Loess Prairies Level IV Ecoregion; however, much of the region has been converted to cropland (Chapman et al. 2002). According to the National Land Cover Database (USGS 2021), approximately 94% of the PPA is cultivated crops (Table 3.5-1; Figure 3.5-1). The remaining land cover includes developed land; hay and pasture; herbaceous, woodland, and shrub/scrub vegetation; barren land; open water; and wetland vegetation (see Section 3.2 for a discussion of wetlands and waterbodies).

Table 3.5-1. Land cover types in the PPA.

Land Cover Type [a]	Area (Acres)	Percent of PPA
Cultivated Crops	40,067	93.8%
Developed, Open Space [b]	1,014	2.4%
Developed [c]	982	2.3%
Hay/Pasture	579	1.4%
Herbaceous [d]	53	0.1%
Barren Land	20	<0.1%
Deciduous Forest	10	<0.1%
Open Water	7	<0.1%
Mixed Forest	3	<0.1%
Evergreen Forest	<1	<0.1%
Totals [e]	**42,734**	**100%**

[a] USGS 2021

[b] Areas with constructed materials and landscaping. Impervious surfaces account for less than 20% of total cover.

[c] Areas with a mixture of constructed materials and landscaping. Impervious surfaces account for 20% to 100% of total cover.

[d] Includes NLCD-mapped emergent herbaceous wetlands; NWI wetlands are quantified in Section 3.2.

[e] Totals may not equal the sum of the addends due to rounding.

The dominant herbaceous vegetation in the PPA is characterized by common, non-native species and occurs in disturbed areas along the edges of fields, roadsides, and streams and within swales (NRCS 2017; Bird and Bat Conservation Strategy [BBCS; Appendix H]). Scattered trees and shrubs occur within the Wind Farm Boundary, primarily along riparian areas and as landscaping and shelterbelts around residences and farms; the three largest woodlands are about 5 acres in size, while most are less than 2 acres. While several larger wooded areas are intersected by the gen-tie line ranging from 0.5 to 15 acres, they occur as narrow riparian woodlands that have been previously disturbed by construction and operation of the existing transmission lines.

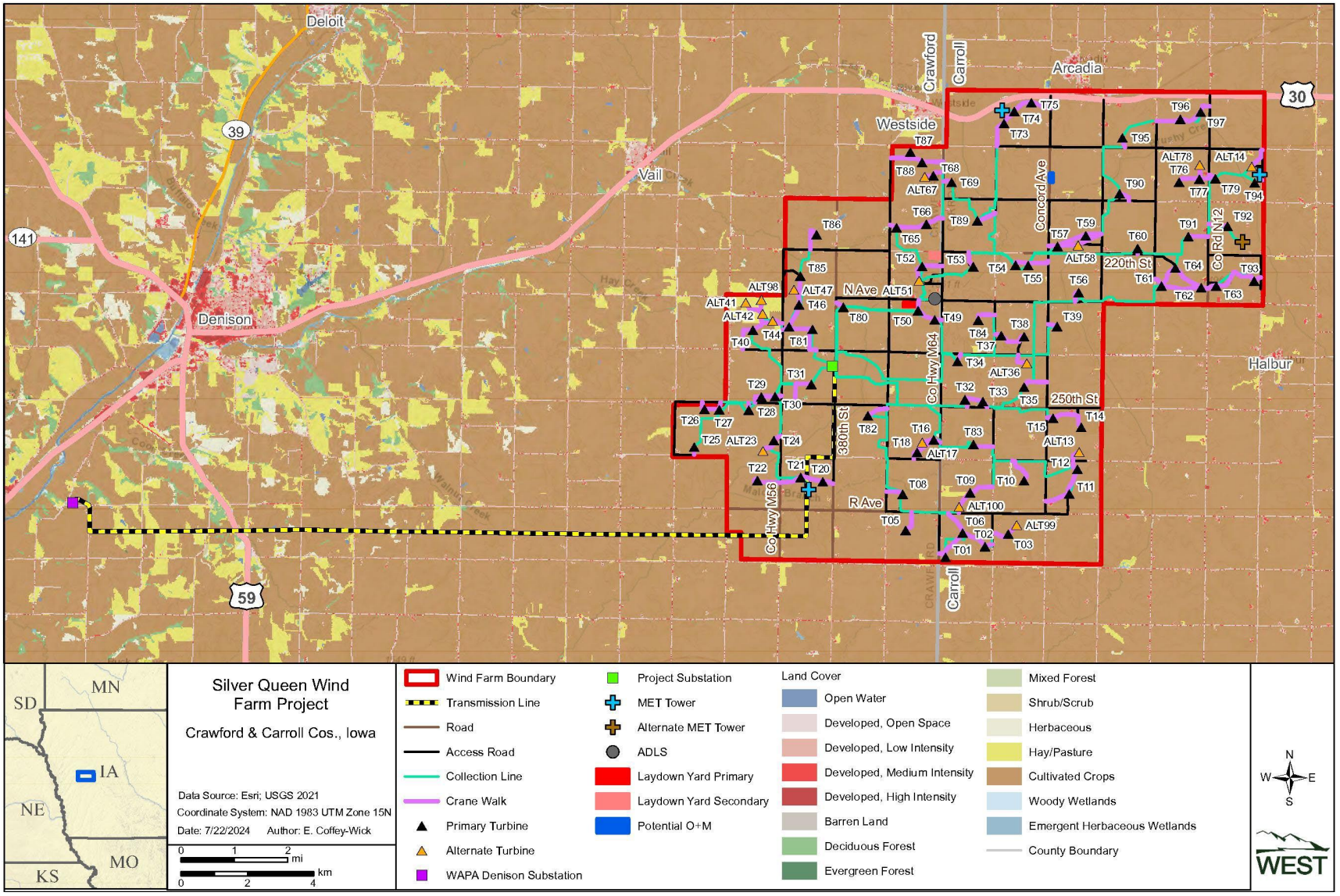

Figure 3.5-1. Land cover in the PPA.

3.5.1.2 Conservation Areas

Conservation programs protecting land from development and/or farming are common in Iowa and could occur in the PPA, including those issued by the USDA Farm Service Agency (FSA) Conservation Reserve Program and the NRCS Agricultural Conservation Easement Program (ACEP; USDA 2023a,2023b; NRCS 2023a). The ACEP administers two types of easements: wetland reserve easements and agricultural land easements (NRCS 2023a,c). Silver Queen is working with landowners to identify whether the Project could affect any conservation easements and will work with landowners and the applicable agency to comply with easement conditions, as applicable.

An environmental review of the PPA was conducted by the IDNR on October 18, 2023, and March 27, 2024, in response to a query by Silver Queen (IDNR 2023a, 2023b; Appendix I). No publicly managed conservation areas were identified within the PPA by IDNR's review. The IDNR did identify historic woodland/grassland or grassland/wetland habitats greater than 40 acres in size within or adjacent to the PPA in the southern, western, and northern portions of the Proposed Wind Farm in all or portions of Section 34, Township (T)84N/Range (R)37W and Sections 3,9,10,25, and 36 of T83N/R37W in Crawford County; and Sections 30 and 31 of T83N/R36W and Section 19 of T84N/R36W in Carroll County. If these historic habitat areas are currently suitable wildlife habitat, the IDNR would recommend buffering them from turbines by 0.5 mile to minimize the risk to birds and bats for turbine collisions.

The IDNR acknowledges that land use changes may have altered these habitats and asked that they be field verified (IDNR 2023a; Appendix I). These areas were evaluated based on a desktop assessment and field verified in May 2024. The sites are predominantly used for agriculture, and the NRCS Iowa Wildlife Working Lands Habitat Evaluation Guide (NRCS WHEG) tool was used to evaluate suitability of each complex as wildlife habitat (NRCS 2016; Appendix J). Eight of the nine areas identified by the IDNR are currently cropland with less than 40 acres of grasslands, wetlands, or woodlands and do not meet the IDNR's definition of habitat over 40 acres.

One area, Section 9 of T83N/R37W, contains about a 350-acre pasture/wetland complex, along with several unnamed tributaries to Miller Creek. The NRCS WHEG considers six criteria for wildlife habitat suitability on grassland/wetland pasture complexes: stand composition, vegetative height, stand management, field (pasture) size as a whole, livestock water use, and proximity to other cover types. It was assumed rotational grazing is used as the stand management method since the pasture is fenced into ≥ three paddocks. In addition, it was assumed adjacent cropland is not tilled in the fall, leaving crop residue available to wildlife throughout the winter. The field evaluation documented two dominant plant species in the pasture: reed canary grass (*Phalaris arundinacea*), which made up approximately 90% of the wetland vegetative cover, and smooth brome, which made up approximately 75% of the upland vegetative cover. Although vegetative height was variable, vegetation was grazed to about 4 to 6 inches in height in the upland area at the time of the evaluation, and 6 to 8 inches around the wetland. Based on the above assumptions and the field evaluation, the NRCS habitat suitability index (HSI) for the pasture is 0.48 (see Appendix J). The NRCS establishes two HSI thresholds: a

0.5 for pasture where wildlife is a secondary concern, and 0.75 where wildlife is a primary concern. With an HSI score of 0.48, the pasture complex is below the NRCS thresholds to meet the needs of wildlife.

Nine turbines, including five planned and four alternate turbines, are sited within 0.5 mile of the pasture (Figure 3.5-2). All three of the turbines sited within the pasture are alternate locations and would only be used if planned turbine locations were considered unusable. The remaining six turbines are sited in cropland. Given the pasture provides low quality grassland/wetland habitat for wildlife, if all nine turbines should be built, the Project would have minor impacts to wildlife in this area through disturbance during construction, 75 square feet (0.002 acre) of permanent grassland habitat loss from turbine foundations, and potential fatalities of birds and bats through turbine collisions. If the three alternative turbines currently sited in the pasture are not built, impacts would be further reduced since there would be no habitat loss, less construction disturbance (noise only), and a lower risk of collision mortalities.

The IDNR also recommends citing turbines 1 mile from natural areas that could provide habitat for threatened and endangered species, including wooded riparian and stream corridors, prairie remnants, and wetlands (IDNR 2023a,b; Appendix I). The only substantial wooded riparian corridors in the PPA occur more than 1 mile from the nearest turbine along the gen-tie line, and no substantial prairie remnants have been identified during desktop and field analysis. Wetlands are also small and infrequent throughout the PPA (see further discussions in Sections 3.2.1, 3.5.1.1, and 3.7.1). No other public conservation areas where natural or native plant communities might be protected are present in the PPA (USGS 2022). USFWS grassland and wetland easements (USFWS 2023g, NRCS 2023c), which are often associated with native grasslands and wetlands, are also absent (see Section 3.2). The nearest conservation areas are the West Botna and Halbur Ridge Wildlife Areas approximately 1 mile east of the Wind Farm Boundary (see Figure 3.5-3).

3.5.1.3 Noxious Weeds

Noxious weeds are defined as any species of non-native plants designated by federal, state, or county regulation as injurious to public health and safety, agriculture, recreation, wildlife, or properties (BLM 2023). These species, along with other invasive plant species, can pose serious threats to agricultural productivity. In Iowa, noxious weeds are regulated under the Iowa Weeds Law at Iowa Code (IC) Chapter 317 under the jurisdiction of the IDALS, which established a list of declared primary and secondary statewide noxious weeds regulated under both the Iowa Weeds Law and the Agricultural Seeds Law (IC Chapter 199; Table 3.5-2). The Agricultural Seeds Law defines primary (prohibited) noxious weeds as the most highly destructive and difficult to control, and secondary (restricted) noxious weeds as those that are more easily controlled (199 IC 199.1). In addition, the Iowa Weeds Law gives the IDALS the authority to implement regulations that prioritize noxious weeds for control and eradication (317.1C IC; 58 IAC). The Iowa Weeds Law requires landowners and land managers to destroy primary and secondary noxious weeds that occur on their property, or any weeds that make roadways unsafe for travel (371.10 IC). Failure to destroy these weeds could result in a fine, as determined by the county weed commissioner (IDALS 2021).

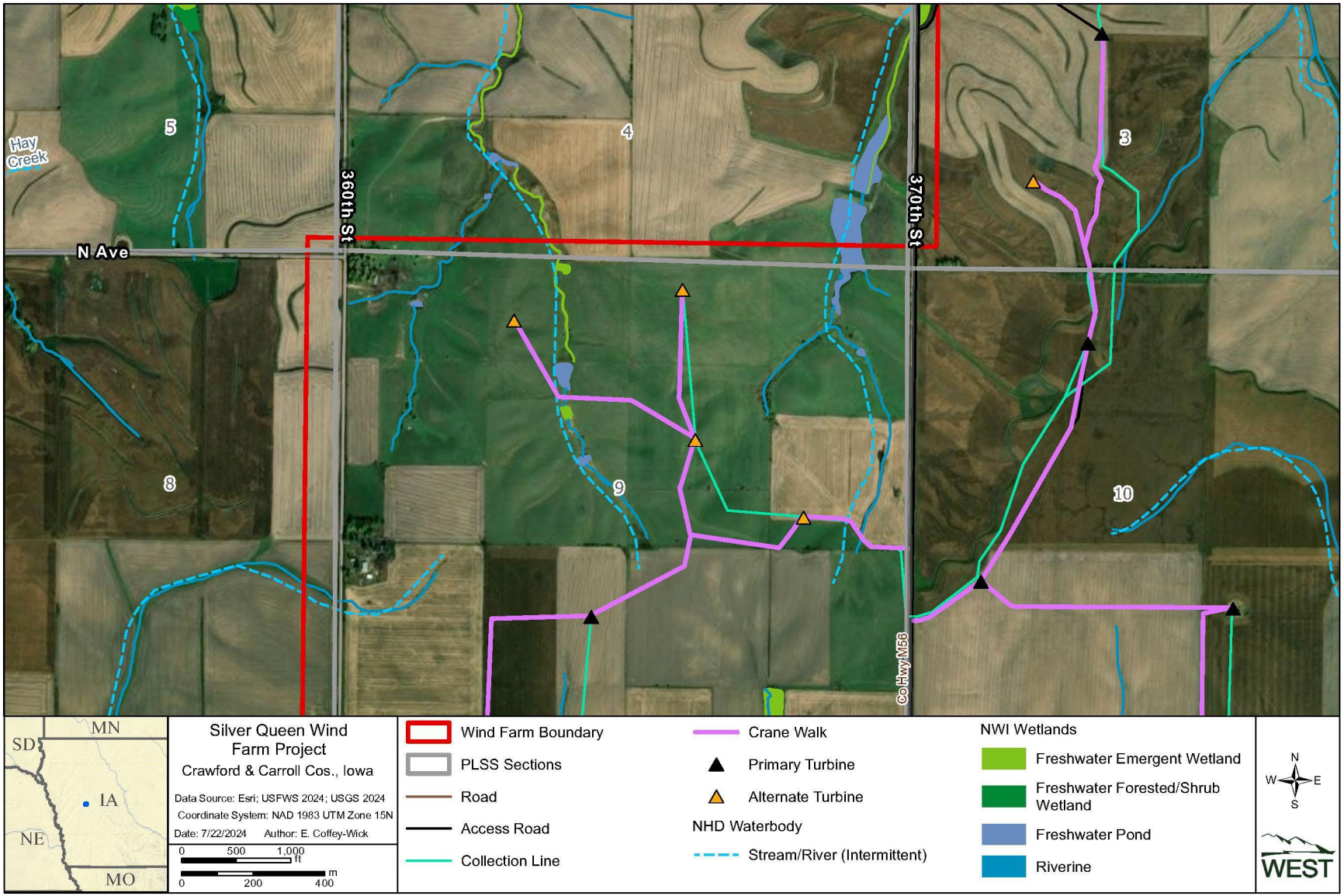

Figure 3.5-2. Turbines located in and adjacent to pasture in the PPA.

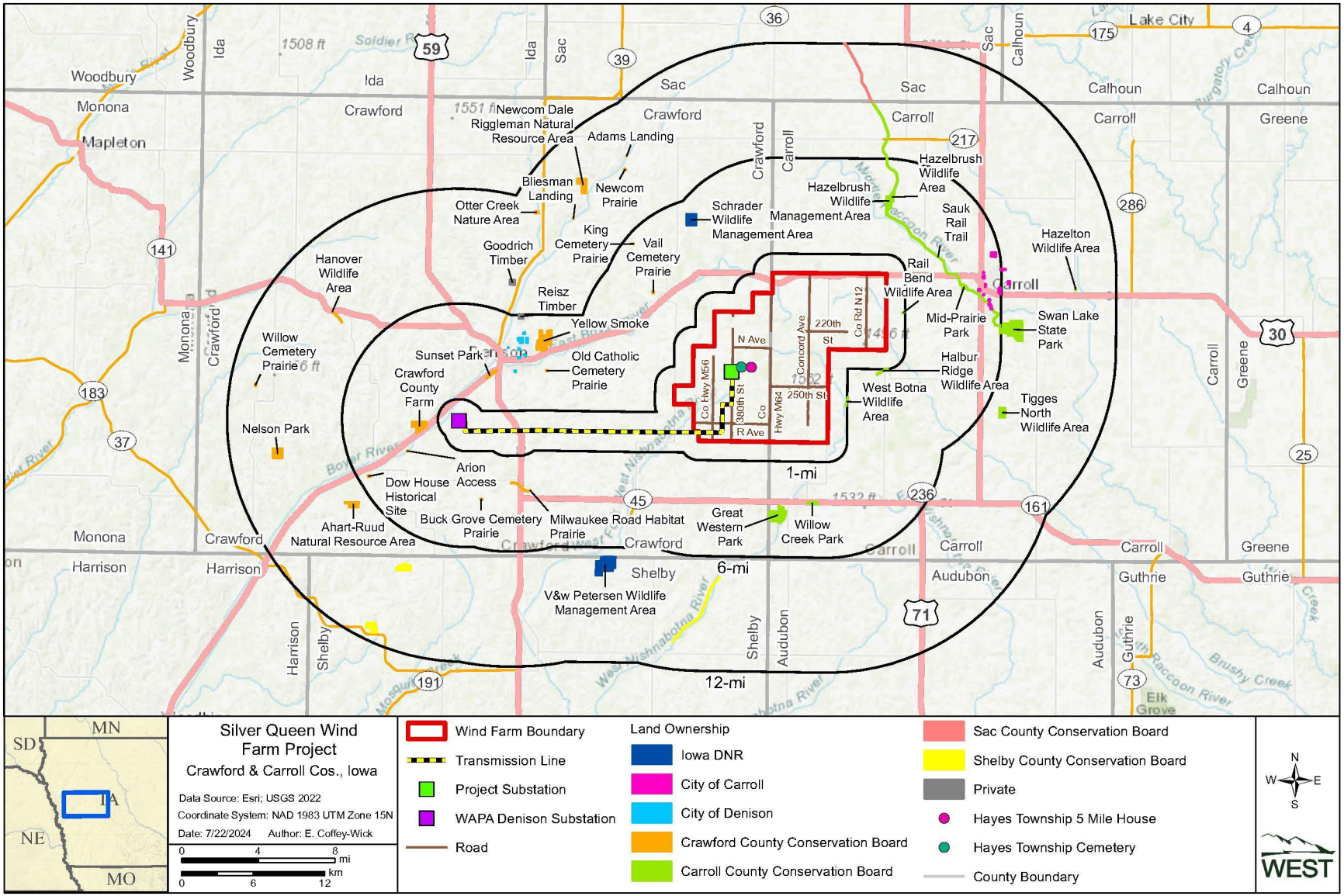

Figure 3.5-3. Public lands near the PPA.

Table 3.5-2. State-designated noxious weeds of Iowa.

Primary Noxious Weeds	Secondary Noxious Weeds
buckthorn (*Rhamnus* spp., exception *R. frangula*)	buckhorn (*Plantago lanceolata*)
bull thistle (*Cirsium vulgare*) [a]	butterprint (*Abutilon theophrasti*)
Canada thistle (*Cirsium arvense*) [a]	cocklebur (*Xanthium strumarium*)
field bindweed (*Convolvulus arvensis*) [a]	giant foxtail (*Setaria faberii*)
horse nettle (*Solanum carolinense*)	multiflora rose (*Rosa multiflora*) [a,c]
leafy spurge (*Euphorbia esula*) [a]	poison hemlock (*Conium maculatum*)
Palmer amaranth (*Amaranthus palmeri*) [b,d]	puncture vine (*Tribulus terrestris*)
perennial pepper-grass (*Cardaria draba*)	shattercane (*Sorghum bicolor*) [g]
perennial sow thistle (*Sonchus arvensis*)	sheep sorrel (*Rumex acetosella*)
quackgrass (*Elymus repens*)	smooth dock (*Rumex latissimus*)
Russian knapweed (*Centaurea repens*)	sour dock (*Rumex crispus*)
All other thistles in the genus *Carduus* [a]	teasel (*Dipsacus* spp.) [a,e]
All other thistles in the genera *Cirsium*	wild carrot (*Daucus carota*)
	wild mustard (*Brassica juncea*, *B. nigra*, *Sinapis arvensis*)
	wild sunflower (*Helianthus annuus*)

Source: CVIII 317 IC

[a] Class B noxious weed prioritized for control (58 IAC).

[b] Class A noxious weed prioritized for eradication (58 IAC).

[c] This species is allowed to be grown in gardens.

[d] This species may be permissible on conservation reserve program land depending on county requirements.

3.5.2 Environmental Consequences: Proposed Action

Project construction in temporary workspaces would result in direct, temporary impacts on vegetation, including removal through clearing, excavation, grading, and/or placement of gravel within the laydown yard and a 75-foot-wide construction corridor for new access roads. Vegetation would also be temporarily displaced by trenching for the collection lines and crushed or mowed for crane paths. These activities would temporarily disturb approximately 2,300.5 acres of vegetation, including 2,060.5 acres of cultivated crop land, 114.9 acres of hay and pasture, 15.8 acres of herbaceous (natural) upland vegetation not planted for agricultural production, and 5.2 acres of woodland. Developed areas were not included in vegetation impacts, and totals therefore do not equal the entire Project footprint estimated in Table 2.2-1.

All of the affected woodland would be in the 500-foot-wide gen-tie line construction corridor, although impacts would be dispersed and minimal in any one area since the existing (narrower) transmission line corridor was already cleared previously. The remaining vegetation in the gen-tie line right-of-way could be temporarily disturbed during construction, including 908.1 acres of cultivated crops, 37.4 acres of developed open space, 93.3 acres of hay/pasture, and 13.1 acres of herbaceous vegetation. Alternate facilities would be located in the same land cover as the corresponding primary facilities, affecting the same approximate acreages.

Silver Queen has minimized vegetation impacts by collocating Project components where feasible. Following construction, temporary construction areas would be returned to pre-construction land uses, primarily agriculture; non-cultivated areas would be reseeded to herbaceous vegetation. Crops would be temporarily affected, but they would be reestablished by the next growing season; other herbaceous plant communities would likely experience short-term impacts, with recovery within two to three years. Approximately 0.8 acre of trees would be permanently removed from the 150-foot-wide gen-tie line easement, while 4.4 acres of trees would be allowed to reestablish outside of the permanent easement naturally. They would be expected to take more than 10 years to recover, a long-term impact. Since most direct vegetation impacts would be temporary, dispersed across the larger PPA, and primarily affect cultivated crops and disturbed herbaceous vegetation around crop fields, impacts would be minor.

Additionally, construction activities could result in temporary, indirect impacts to vegetation through temporary and localized damage to plants from fugitive dust generation and/or exposure to contaminants in the event of a spill. These impacts would be avoided or minimized with the implementation of dust control measures (see Section 3.3), and the Project SWPPP and SPCC Plan (see Section 3.2). With these conservation measures, impacts would be negligible to minor.

Indirect, short-term to permanent degradation to plant communities and crops could occur due to noxious and invasive weeds that could spread through ground disturbance and the transport of weed propagules on construction equipment and vehicles. Silver Queen would control noxious weeds for up to three years after construction, as needed, in accordance with the terms of the Project's landowner and county agreements, as well as with stipulations for revegetation in the Project SWPPP. Other conservation measures described below and in Sections 3.1, 3.2, 3.3, and this section, including revegetation measures following construction and the planting of cover crops on soil stockpiles, would further minimize weed invasions. With the implementation of these conservation measures and given that most areas around crop fields have been previously disturbed, impacts from weeds would be minor.

During operation, the conversion of land to Project infrastructure for the Proposed Wind Farm would result in the permanent loss of 74.6 acres of vegetation (0.2% of the vegetation in the PPA), including 66.4 acres of cultivated crops (0.2% of cultivated crops in the PPA), 4.5 acres of herbaceous vegetation in hayfields and pasture (<0.8% of hayfields and pasture in the PPA), and 2.4 acres of herbaceous vegetation along field edges and riparian areas (4.5% of herbaceous vegetation in the PPA) (Table 3.5-1). The gen-tie line easement would contain all vegetation types.

As noted, approximately 0.8 acre of deciduous trees would be prevented from growing within the gen-tie line easement for the life of the Project. The remaining vegetation types would generally be allowed to reestablish, with localized, intermittent disturbance from Project O&M. Turbines and 16-foot-wide corridors for new access roads would all be located in cultivated crops, hayfields, and pasture; while the Project Substation, O&M Facility, ADLS, and MET towers

would all be located in cultivated crops. The Denison Substation upgrade/expansion would permanently displace cultivated crops, hayfields, pasture, and natural herbaceous vegetation. Since permanent vegetation loss would be dispersed across the larger PPA and primarily affect cultivated crops and disturbed herbaceous vegetation around crop fields, impacts on plant communities would be minor.

Affected acreages during decommissioning would be temporary to long-term, and minor to moderate, similar to those affected during construction. Aboveground and belowground facilities would be removed to an agreed upon depth, and the sites restored in accordance with landowner and county lease agreements, along with permitting requirements, as applicable.

3.5.2.1 Conservation Measures

Silver Queen is committed to implementing the applicable conservation measures derived from Section 5.6.2 of the 2015 PEIS to avoid or minimize impacts to vegetation. In addition, many conservation measures listed in Sections 3.1 and 3.2 would reduce impacts to vegetation. Measures address potential risks to the vegetative community from damaged vegetation, lost vegetation cover, degraded or eroded soils, and weed infestation. The list of conservation measures can be found in Appendix C.

3.5.3 Environmental Consequences: No Action Alternative

The No Action Alternative would retain existing impacts on vegetation based on existing land use, which is primarily agriculture (see Section 3.5.1). No additional direct or indirect impacts to vegetation would occur as a result of the No Action Alternative.

3.6 Wildlife

This section analyzes potential impacts from the Project to terrestrial and aquatic wildlife in the PPA, including both common and rare wildlife, or state Species of Greatest Conservation Need (SGCN). The section is broken up by general wildlife, species of special concern, avian species, and bat species. The general wildlife analysis in Sections 4.6 and 5.6 of the 2015 PEIS are incorporated herein by reference. Wildlife issues specific to the Project are addressed in this section. State- and federally listed wildlife species are discussed in Section 3.7.

3.6.1 Environmental Consequences: Proposed Action

3.6.1.1 General Wildlife

During construction, direct impacts on wildlife would be from potential injury and mortality from construction equipment in areas with suitable habitat, which primarily includes small amounts of pasture, wooded sites, and riparian areas in the PPA, including up to 5.2 acres of tree clearing along the gen-tie line corridor. Direct impacts from injury and mortality would most likely affect the young and less mobile species, such as denning mammals and amphibians and reptiles. Indirect impacts would involve the temporary disturbance of wildlife in adjacent areas from noise and human activity. Indirect impacts would likely be greatest during the

breeding season, when disturbance could lead to abandoned young or reduced fecundity due to alterations in behavior, reduction in foraging habitat, and increased stress (see Section 3.4 for more information on noise levels anticipated at the Project). Direct and indirect impacts are expected to be temporary and negligible to minor to fish and wildlife species during construction based on the general scarcity of habitat in the Project footprint, and since impacts would predominantly occur to common species that are adapted to disturbance in cultivated cropland, pasture, and edge habitat.

During operation, non-volant wildlife would experience direct impacts through the loss of small, isolated areas of herbaceous habitat due to the permanent placement of Project infrastructure in pasture and field edges, as well as up to 0.8 acre of trees where the gen-tie line crosses through wooded riparian areas. Because of the small amount of habitat affected in any one area and the availability of habitat in adjacent areas, these permanent impacts would be negligible to minor.

The temporary direct and indirect impacts during decommissioning would be similar to those described for the construction phase.

3.6.1.2 Avian

Vegetation clearing and tree removal during Project construction could cause injury or mortality of birds, particularly nesting birds and their young. Silver Queen would limit tree clearing during the primary nesting season in Iowa (May 15 – August 1; USDA 2018), which would minimize harm to nesting birds (see Appendix H). If clearing is necessary within this period, a bio-monitor would survey planned cleared areas for nesting birds prior to clearing. Ground-nesting birds, such as the killdeer (*Charadrius vociferus*), which is common in Iowa, could still experience harm during vegetation clearing and grading activities. Since impacts would be temporary (one nesting season) and limited to localized areas distributed in the construction footprint across the larger PPA, impacts would be negligible to minor on local bird populations.

Operation of the Project may result in displacement of local birds in the PPA. Data indicate that avoidance impacts to birds generally extends from 246 to 2,624 feet from a turbine, depending on the environment and the bird species affected (Strickland 2004). However, displacement impacts are unlikely to be realized at the population level, as displaced birds are not precluded from breeding elsewhere. In addition, given that the turbines would primarily be placed in existing cropland, bird habitat is already limited in the PPA. Therefore, the long-term, indirect impacts of displacement from operation are expected to be negligible.

Direct impacts during operation would primarily include fatalities from collisions with wind turbines. Reviews of other wind projects in the region estimate bird fatalities ranging from 0.4–12.4 fatalities/turbine/year (Bay and McDonald 2018). The overall magnitude of these population impacts is expected to be low, especially since most birds (70 to 72%) observed during the pre-construction surveys, and those most likely to be impacted at the Project, were passerines. While passerines are the most often documented fatalities among bird types in

North America (approximately 62%), individual species experiencing direct impacts from collisions with wind turbines within the group is low (less than 0.05%; Erickson et al. 2014). Therefore, the collision fatalities for passerines would have a minor, permanent impact on passerine populations.

The Project could affect migratory BCC species, particularly bobolink, chimney swift, grasshopper sparrow, red-headed woodpecker, and short-eared owl (*Asio flammeus*). However, the conservation measures identified in the 2015 PEIS would be implemented to avoid take to the extent feasible, and minimize impacts, as noted above. Given the limited amount of undisturbed grassland and/or forested habitats in the PPA, the Project's permanent direct and indirect impacts to migratory BCCs, raptors, and other species of special concern identified above would have a minor impact on overall population levels.

3.6.1.3 Eagles and Other Raptors

Construction activities could affect nesting and foraging raptors. Tree clearing would be limited to winter months and areas where actively nesting raptors are not present, which would minimize the risk of harm.

Wind turbine operation could also result in raptor injury or mortality. Across 36 studies in the Midwest, the average raptor fatality rate from turbine collision during wind farm operation was estimated to be 0.09 fatalities/turbine/year (Sichmeller and Parrott 2023). Another review, comparing 14 studies, reported that diurnal raptors and vultures accounted for 6% of all bird fatalities and had a combined raptor fatality rate of 0.03 fatalities/turbine/year (National Research Council 2007). However, raptor fatality rates as high as 1.15 raptor fatalities/turbine/year have also been estimated in the Midwest (range: 0.0–1.15, mean: 0.18, median: 0.14 fatality/turbine/year; Johnson and Stephens 2011).

The operation of the Proposed Wind Farm could potentially impact bald and golden eagles, based on the bald eagle's presence documented in the PPA and/or suitable habitat for either species. However, based on the low occurrence of bald eagles in the PPA, the distance to the nearest bald eagle nest (3.4 miles), and no recorded golden eagle occurrences in the PPA, Silver Queen does not anticipate bald or golden eagle take as a result of Project operation at this time. An IDNR biologist recommended a 5-mile setback of turbines from bald eagle nests (IDNR, pers. comm., October 18, 2023, and March 27, 2024). A bald eagle nest has been documented within 5 miles of a proposed turbine, approximately 3.4 miles northwest of the nearest proposed turbine. USFWS guidance recommends a 660-foot setback of turbines from bald eagle nests (Appendix H; USFWS 2007). Silver Queen has adhered to USFWS guidance. Along with bald and golden eagles, other raptor species could be affected by the operation of the Proposed Wind Farm, though impacts are expected to be minor due to the low presence of raptor species in the PPA. Based on the proportionately low presence of raptors in the PPA, including bald eagles and golden eagles, collision fatalities would have a minor, permanent, direct impact on raptor populations.

3.6.1.4 Bats

Construction and operation of the Project could include both direct and indirect impacts to non-listed bats, as mentioned above. Tree removal during Project construction could cause injury or mortality of migrating or breeding bats, particularly pups not yet able to fly. As noted, Silver Queen would limit tree clearing for construction during the bat active season (April 1 – September 30) to minimize direct impacts to bat species (see Appendix H). If tree clearing is necessary within this period, a bio-monitor will survey planned cleared areas for roosting bats prior to tree clearing. This minimization measure would also protect non-listed bat species that use forested habitat.

Public data of fatality rates at wind energy facilities in Iowa was reviewed from WEST's Renew database (WEST 2023). Public data was available for 36 Iowa wind energy facilities. The all-bat fatality rate for the projects ranged from less than one to two fatalities/turbine/year, rounded (less than one to four fatalities/turbine/year). These ranges fall within the low end of the estimated fatality range for other USFWS Region 3 wind energy facility fatalities, comparing across 70 studies (0.4 to 73 fatalities/turbine/year; American Wind Wildlife Institute [AWWI] 2020).

Potential direct impacts during operation via turbine collision could result in fatalities of bats such as eastern red bats, hoary bats, and silver-haired bats, which are among the most common bat fatalities at many wind projects. This is consistent with publicly available data from the two wind farms closest to the Project, Carroll and Victory Wind Projects, which documented fatalities of big brown bats, eastern red bats, evening bats hoary bats, and silver-haired bats (WEST 2024). Impacts would be minimized in accordance with the BMPs outlined in the BBCS, consistent with the 2015 PEIS conservation measures, along with additional conservation measures that would be implemented to avoid adverse impacts to federally listed bat species (see below). Given that low populations of bats are expected in the PPA during the active season based on habitat scarcity, collision fatalities would have minor to moderate permanent, direct impacts on non-listed bat species populations.

The Project also could result in indirect permanent impacts such as habitat alteration and/or loss and the disturbance or displacement of bat species. However, these impacts are expected to be minor because the PPA includes sparse bat habitat, with 94.4% of the PPA composed of cultivated croplands; and tree habitat, which constitutes less than 0.1% of the PPA, is fragmented and dispersed.

Postconstruction monitoring studies would be completed for this Project, and the results of the studies would be evaluated to see if impacts are as expected, or if adaptive management measures may be warranted according to the BBCS.

Direct and indirect impacts during decommissioning would be similar to those temporary impacts described for the construction phase. Therefore, the temporary impacts during the decommissioning of the Project are expected to be minor.

3.6.1.5 Conservation Measures

Silver Queen is committed to implementing the applicable conservation measures for wildlife resources derived from Section 5.6.2 of the 2015 PEIS, which would help to avoid or minimize wildlife impacts associated with the Proposed Action. In addition, many conservation measures listed in Sections 3.1, 3.2, and 3.5 would reduce impacts to wildlife. Measures address potential risks to wildlife associated with injury and mortality from construction equipment, wind turbines, transmission lines, and guy wires; noise disturbance, and degraded habitat. The list of conservation measures can be found in Appendix C.

3.6.2 Affected Environment

Silver Queen carried out wildlife surveys in accordance with the recommendations in the USFWS *Land-Based Wind Energy Guidelines* (WEG; 2012). The WEG is intended to provide wind developers with best practices for analyzing and reducing impacts to wildlife. There are five progressive tiers of analysis under the WEG; the Project has undergone studies related to Tier 3: *Field Studies to Document Site Wildlife and Habitat and Predict Project Impacts* (USFWS 2012). These studies are listed in Table 3.6-1 and included in the appendix of the BBCS (Appendix H). Due to changes in the proposed layout during Project siting, some species-specific surveys were conducted in study areas that are not an exact match to the current PPA. However, these survey results provide context for wildlife conditions in the PPA and, thus, are discussed in the subsections below. Refer to Appendix H for descriptions and maps of the specific study areas and methodologies.

Table 3.6-1. Project wildlife studies.

Study	Dates
General Bird Studies [a]	
Fixed-point visual assessments of bird species within the PPA (baseline avian use studies including all species; e.g., passerines, eagles and other raptors, waterfowl, and waterbirds)	May 2017 to April 2018 May 2018 to October 2019 November 2018 to October 2020 [a]
Eagle and Raptor Studies	
Spring aerial raptor nest survey	April 2017 April 2024
Bat Studies	
Three-season bat acoustic monitoring survey (bat activity survey)	April to October 2018
Summer bat acoustic presence / probable absence surveys for northern long-eared bat	August 2017 July 2021

Sources: USFWS 2014, 2017, 2020b; Sichmeller et al. 2017; WEST 2017, unpublished data 2024; Bay and McDonald 2018, Bay et al. 2019a, 2019b; McDonald and Bay 2021; McDonald and Sirajuddin 2021.

3.6.2.1 General Wildlife

As previously discussed in Section 3.5, the Project is in the Steeply Rolling Loess Prairies Level IV Ecoregion (Chapman et al. 2002). Common non-volant (non-flying) species within this ecoregion that are likely to occur in the PPA include white-tailed deer (*Odocoileus virginianus*), coyote (*Canis latrans*), raccoon (*Procyon lotor*), and other small mammals common to disturbed and

open agricultural areas. Amphibians include numerous species of frogs, such as the gray treefrog (*Hyla versicolor*) and northern leopard frog (*Lithobates pipiens*); snakes, such as the prairie ringneck snake (*Diadophis punctatus amyi*) and western fox snake (*Pantherophis vulpinus*); and turtles, including the ornate box turtle (*Terrapene ornata*) and spiny softshell turtle (*Apalone spinifera*; IowaHerps 2024). Invertebrates include insects primarily associated with prairie and aquatic habitat, as well as freshwater fish and mussels in streams and wetlands. Wildlife may use cultivated cropland, hayfields, and pasture for foraging and shelter, along with herbaceous vegetation in field edges and swales, shelterbelts or woody habitat, riparian areas, and wetland and waterbody habitat. A discussion of these habitats can be found in Sections 3.2 and 3.5.

3.6.2.2 Avian

Birds in the PPA primarily include species associated with open, disturbed agricultural habitat. Many of the bird species reported within the PPA during avian use surveys are seasonal migrants, including waterfowl, waterbirds, shorebirds, and neotropical songbirds. The Project is located at the western extent of the Mississippi Flyway, which encapsulates the routes of migrating birds through the region (USFWS 2023f). No Important Bird Areas overlap the PPA, and none are located in Crawford or Carroll counties (National Audubon Society 2023c). A query of the Bird Conservation Areas (BCA) of Iowa identified no BCAs overlapping the PPA (IDNR 2023c). The Project is in Bird Conservation Region 22: Eastern Tallgrass Prairie (North American Bird Conservation Initiation Committee 2024).

Across all avian use surveys, a total of 7,118 bird observations were made during avian use surveys (see Appendix H), consisting of 80 unique bird species. The three most frequently observed groups of species included passerines (71.6%), doves/pigeons (7.6%), and diurnal raptors (5.1%; Bay and McDonald 2018, Bay et al. 2019a; McDonald and Bay 2021). Across all avian use surveys, a total of 49 unique small bird species were observed. The three small bird species most often observed included the horned lark (*Eremophila alpestris*), Lapland longspur (*Calcarius lapponicus*), and European starling (*Sturnus vulgaris*; Bay and McDonald 2018, Bay et al. 2019a, McDonald and Bay 2021).

The Migratory Bird Treaty Act (MBTA) prohibits the take of migratory bird species. Within the UGP Region, most of the reported bird species are classified as migratory birds under the MBTA. The USFWS further identifies migratory Birds of Conservation Concern (BCC) species that are at an elevated risk of becoming listed as threatened or endangered under the ESA, and therefore represent a high conservation priority (USFWS 2021a). Five species listed on the BCC for the Eastern Tallgrass Prairie Region were observed during avian use surveys, including the bobolink (*Dolichonyx oryzivorus*), chimney swift (*Chaetura pelagica*), grasshopper sparrow (*Ammodramus savannarum*), red-headed woodpecker (*Melanerpes erythrocephalus*), and upland sandpiper (*Bartramia longicauda*) (Table 3.6-2; Bay and McDonald 2018, Bay et al. 2019a, McDonald and Bay 2021). The chimney swift, grasshopper sparrow, red-headed woodpecker, and upland sandpiper were also identified as potentially occurring as breeding populations in the July 3, 2024 USFWS Information for Planning and Consultation (IPaC) report for the Project (USFWS 2024c; Appendix K).

Table 3.6-2. Bird species of special concern observed during Project avian use surveys.

Bird Species	Average Number of Observations per Year Across All Survey Years [a]	Conservation/Regulatory Status [b]
American kestrel (*Falco sparverius*)	8.25	SGCN
American tree sparrow (*Spizella arborea*)	3.75	SGCN
American white pelican (*Pelecanus erythrorhynchos*)	4.25	SGCN
bald eagle (*Haliaeetus leucocephalus*)	2.5	BGEPA
Baltimore oriole (*Icterus galbula*)	1.75	SGCN
bank swallow (*Riparia riparia*)	3.25	SGCN
bobolink (*Dolichonyx oryzivorus*)	0.25	BCC; SGCN
brown thrasher (*Toxostoma rufum*)	1.25	SGCN
chimney swift (*Chaetura pelagica*)	0.25	BCC; SGCN
common yellowthroat (*Geothlypis trichas*)	1.25	SGCN
dickcissel (*Spiza americana*)	30	SGCN
eastern kingbird (*Tyrannus tyrannus*)	15.5	SGCN
eastern meadowlark (*Sturnella magna*)	3.5	SGCN
field sparrow (*Spizella pusilla*)	1.25	SGCN
grasshopper sparrow (*Ammodramus savannarum*)	0.5	BCC; SGCN
horned lark (*Eremophila alpestris*)	294	SGCN
Le Conte's sparrow (*Ammodramus leconteii*)	0.25	SGCN
northern bobwhite (*Colinus virginianus*)	1	SGCN
northern flicker (*Colaptes auratus*)	3.75	SGCN
northern harrier (*Circus hudsonius*)	8.75	State Endangered
red-headed woodpecker (*Melanerpes erythrocephalus*)	2.25	BCC; SGCN
Swainson's hawk (*Buteo swainsoni*)	8	SGCN
trumpeter swan (*Cygnus buccinator*)	1.25	SGCN
upland sandpiper (*Bartramia longicauda*)	3	BCC; SGCN
western meadowlark (*Sturnella neglecta*)	14	SGCN

Sources: Bay and McDonald 2018; Bay et al. 2019a; McDonald and Bay 2021; IDNR 2015; USFWS 2021b; McDonald and Bay 2021

[a] See the Bird and Bat Conservation Strategy in Appendix H for survey methods.

[b] All birds, except the northern bobwhite, are listed under the MBTA (CFR 50-Part 10.13; updated 12/11/2023).

Within Iowa, state-listed threatened and endangered species receive protection by the Iowa Threatened and Endangered Species law (571 IAC). In accordance with Chapters 481A and 481B of the Code of Iowa (IC), take of any plant or animal species on the state list is prohibited (IDNR 2023d). The IDNR has identified SGCN within the Iowa Wildlife Action Plan (IDNR 2015). The SGCN are species that have low and declining populations within the state of Iowa but are not protected by regulation (IDNR 2015). During three of the 4 years pre-construction avian use surveys, 35 observations of northern harriers (state endangered) were made within the PPA (Bay and McDonald 2018; Bay et al. 2019a; McDonald and Bay 2021), with no northern harrier observation during the second year of avian use surveys in the expansion area (McDonald and

Bay 2021). See Section 3.7 for additional discussion of the northern harrier. No other state-listed species were observed. In addition, five migratory BCCs and 23 SGCN were observed. As recommended by the WEG, Silver Queen has developed a Project-specific BBCS (Appendix H). The BBCS identifies birds and bats that could be at risk from mortality resulting from turbine collisions and establishes BMPs that would be implemented by the Project to avoid or minimize impacts to bird and bat species.

3.6.2.3 Eagles and Other Raptors

The Bald and Golden Eagle Protection Act provides federal protection to bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*), prohibiting the taking or otherwise harming of eagles, nests, or eggs. The IPaC (July 3, 2024) report flagged bald and golden eagles as having the potential to occur in the PPA (USFWS 2024c; Appendix K). No golden eagles were observed during pre-construction avian use surveys (Appendix H). A total of 10 bald eagle observations were made across four years of surveys, along with six incidental observations, with no bald eagles observed during the last year of observation (2019–2020). The maximum amount of eagle use in the PPA was 10 eagle risk minutes during 2018–2019 surveys. An aerial raptor nest survey was completed in spring of 2017 to locate raptor nests within the vicinity of the Project (see survey details in Appendix H). During the 2017 survey, one active bald eagle nest was observed along the Boyer River approximately 3.4 miles northwest of the nearest proposed turbine location during the aerial raptor nest survey (WEST 2017).

Additional ground surveys were conducted in 2024, during which one active bald eagle nest was observed approximately 1,312 feet from the western end of the gen-tie line (approximately 18 miles west of the Wind Farm Boundary; Western EcoSystems Technology, Inc. [WEST] unpublished data 2024). Eagle data from an IDNR environmental review of the Project correlated with the location of the bald eagle nest observed in 2017 (IDNR, pers. comm., October 18, 2023, and March 27, 2024). An IDNR environmental review of the Project gen-tie line identified a different documented eagle nest within 1.0 mile of the gen-tie line (IDNR, pers. comm., March 27, 2024). This nest site was included in the 2024 survey, but the nest was not found.

In addition, there were 31 other occupied and active nests observed in 2017, including 24 red-tailed hawk (*Buteo jamaicensis*), six great horned owls (*Bubo virginianus*), and one great blue heron (*Ardea herodias*) nest (WEST 2017). During the 2024 survey, 12 additional nests were found within 1.0 mile of the Proposed Wind Farm, and 0.5 mile of the gen-tie line (WEST unpublished data 2024). Of these nests, there were three occupied and active nests, including two red-tailed hawk nests and one great horned owl nest. The other seven nests were of unknown status due to inactivity at the time of surveys.

3.6.2.4 Bats

Eight bat species are potential residents and/or migrants in the study area, including the big brown bat (*Eptesicus fuscus*), eastern red bat (*Lasiurus borealis*), hoary bat (*L. cinereus*), silver-haired bat (*Lasionycteris noctivagans*), little brown bat (LBBA; *Myotis lucifugus*), northern

long-eared bat (NLEB; *M. septentrionalis*), tricolored bat (TRBA; *Perimyotis subflavus*), and evening bat (*Nycticeius humeralis*). The only federally listed bat species with the potential to occur at the Project is the NLEB, and a study designed specifically to determine if this species was present at the Project is described in Section 3.7. Additionally, the TRBA is proposed for listing as a federally endangered species (USFWS 2024b).

The PPA is not expected to support large numbers of bats during the summer season given the limited woodland roosting habitat available, which primarily occurs along the gen-tie line, although farm buildings and other structures are abundant and may provide suitable roosting for certain bat species more tolerant of disturbance. A general bat activity acoustic survey was conducted from April 16 – October 16, 2018, at seven monitoring stations located in the PPA (see Appendix H for survey details). Bat calls (passes) recorded during the general acoustic surveys were not identified to species, except for the TRBA, which is discussed further in Section 3.7. Instead, calls were identified to frequency groups, high frequency (HF) and low frequency (LF). The HF calls could include species such as the eastern red bat, western small-footed bat (*Myotis ciliolabrum*), LBBA, NLEB, and TRBA; the LF calls could include species such as the big brown bat, silver-haired bat, and hoary bat. Averaging across the seven stations, approximately 12.3% of bat passes were classified as HF and 87.7% of bat passes were classified as LF (Bay et al. 2019b). Bat activity varied between seasons with lower activity during the spring and higher activity during the summer and fall. At the Project, the mean bat activity (± the standard error) recorded at ground representative stations during the fall migration period (12.15 ± 3.04 bat passes per detector-night) was within the range of activity rates recorded at other facilities in the Midwest and nationally, ranging from 1.9 to 35.7 bat passes per detector-night (Bay et al. 2019b).

3.6.3 Environmental Consequences: No Action Alternative

The No Action Alternative would have no direct or indirect impacts on wildlife. Existing impacts to wildlife from agricultural activities would likely continue in the area.

3.7 State- and Federally Listed Species

This section analyzes state- and federally protected species that could occur in the PPA and be affected by Project activities, including species that are listed, proposed for listing, candidates for listing, or under review for listing under the federal ESA and state threatened or endangered species protected under IC Chapter 481B – Endangered Plants and Wildlife (481B IAC), as listed in 571 IAC.

3.7.1 Affected Environment

3.7.1.1 Federally Listed Species

Section 4.6.4 of the 2015 PEIS describes animal and plant species listed as threatened or endangered under the ESA with potential to occur in the UGP Region. For threatened and endangered species, the analysis area is generally the PPA, unless otherwise described below.

According to a query of the IPaC for the PPA plus a 1-mile buffer (July 3, 2024; USFWS 2024c), two federally listed species protected under the ESA (NLEB and western prairie fringed orchid), one candidate for listing (monarch butterfly), and one proposed endangered species (TRBA) have the potential to occur in the PPA (Table 3.7-1; Appendix K). In addition, the LBBA is currently under review for listing (USFWS 2016). Although the LBBA was not flagged by IPaC due to its under-review status, it has the potential to occur in the PPA and is included in the analysis.

The 2015 PEIS and PBA provides details regarding the NLEB and western prairie fringed orchid. In addition, an analysis of the potential for the species to occur at the Project can be found in Appendix L for the two species, along with that for the TRBA and LBBA. The following discussions provide a summary of that analysis.

Table 3.7-1. Federally listed, proposed, and candidate species potentially occurring in the PPA. [a]

Species	Federal Status	Suitable Habitat	Nearby Documented Occurrences	Results of Summer P/A Survey [b]	Potential to Occur
Mammals					
Little brown bat (*Myotis lucifugus*)	UR	Yes: limited roosting and foraging habitat; no known hibernacula in or adjacent to the PPA	Yes, in HUC-12 overlapping the Wind Farm Boundary and Project gen-tie line (USFWS, pers. comm., August 25, 2023)	Negative	Potential seasonal migrant
Northern long-eared bat (*Myotis septentrionalis*)	E [c]	Yes: limited roosting and foraging habitat; no known hibernacula in or adjacent to the PPA	Yes, in HUC-12 overlapping Project gen-tie line (USFWS, pers. comm., August 25, 2023)	Negative	Potential seasonal migrant
Tricolored bat (*Perimyotis subflavus*)	PE	Yes: limited roosting and foraging habitat; no known hibernacula in or adjacent to the PPA	Yes, in HUC 12 approximately 11.2 miles northeast of the PPA (USFWS, pers. comm., August 25, 2023)	Negative[d]	Potential seasonal migrant
Insects					
Monarch butterfly (*Danaus plexippus*)	C	Yes: low- to moderate-quality summer adult and larval habitat	No	N/A	Likely to occur in summer and during spring and fall migrations
Plants					
Western prairie fringed orchid (*Platanthera praeclara*)	T	No; no minimally disturbed native, moist, tallgrass prairie or sedge meadows.	Yes, in Carroll and Crawford counties [e]	N/A	Unlikely due to a lack of suitable habitat in the PPA

Species	Federal Status	Suitable Habitat	Nearby Documented Occurrences	Results of Summer P/A Survey [b]	Potential to Occur

[a] USFWS 2024c

[b] Negative = the bat species was not detected during the summer bat presence / probable absence surveys.
Positive = the bat species was detected during the summer bat presence / probable absence surveys.

[c] At the time the 2015 PEIS was prepared, the NLEB was proposed for listing but is now federally listed as endangered.

[d] The TRBA was qualitatively confirmed to be in the PPA during the fall migration season based on data from the 2018 bat activity survey. No TRBAs were qualitatively confirmed to be in the PPA during the 2021 P/A survey.

[e] The IDNR Natural Areas Inventory reported observations of the western prairie fringed orchid in Carroll and Crawford counties (IDNR 2023f,g).

C = candidate for federal listing; E = federally endangered; N/A = not applicable; P/A = presence / probable absence; PE = proposed endangered for federal listing; T = federally threated; UR = Under Review

It should be noted that the Topeka shiner (*Notropis topeka*), an ESA-listed endangered species (USFWS 1998), is documented to occur within Crawford and Carroll counties by the IDNR (2023f, 2023g) and USFWS species profile (USFWS 2024f). However, the Topeka shiner was not listed as a species with potential to occur within the PPA by IPaC, and no critical habitat has been designated for this species within the PPA. Furthermore, the IDNR did not find any records of rare species or significant natural communities, including the Topeka shiner, in the PPA. For this reason, there will be no further discussion of the Topeka shiner. The western prairie fringed orchid was listed to occur within the Crawford and Carroll counties by the IDNR (2023f, 2023g) and within the PPA in the USFWS species profile (USFWS 2024g). However, it is not anticipated to occur within the PPA due to a lack of suitable habitat.

Northern Long-Eared Bat

The PPA is within the western portion of the estimated range for the NLEB, which extends through the Midwest (Bat Conservation International [BCI] 2023a). The species is known to occur in Iowa throughout the year, including during hibernation, spring and fall migrations from and to hibernacula, and the summer maternity season (Janke 2018). While the NLEB is present year-round, it is more active in Iowa during the summer (USFWS 2013b). Publicly available databases were queried and found that no records of NLEB presence or confirmed hibernacula documented within the PPA. Publicly available data identified observations of NLEB in HUC-12 watersheds west of the Wind Farm Boundary and north of (and overlapping) the gen-tie line. Limited woodlands were identified within the PPA, thus providing limited habitat for the NLEB. Additionally, acoustic studies conducted within the wind Farm Boundary indicate the probable summer absence of NLEBs at the wind farm, although they could pass through the Project during the spring and fall migration and be present in riparian woodlands along the gen-tie line.

Tricolored Bat

The TRBA is proposed for listing under the ESA and has the potential to occur in the PPA as it is in the western edge of its estimated range (BCI 2023b). As with the NLEB, publicly available databases contained no records of TRBA presence or confirmed hibernacula were documented within the PPA. The likelihood of TRBA presence in the PPA was analyzed by searching publicly

available karst, mining, and bedrock, all of which are features commonly used as hibernacula, within the surrounding areas. No features conducive to hibernation were identified. Publicly available data identified no observations of TRBA in HUC-12 watersheds overlapping or immediately adjacent to the PPA. Limited woodlands were identified within the PPA that could provide limited habitat for the species. However, acoustic studies conducted within the Wind Farm Boundary indicate the probable summer absence of TRBAs at the Project, although they could pass through the Project during the spring and fall migration and be present in riparian woodlands along the gen-tie line.

Little Brown Bat

The PPA is in the central portion of the estimated range for the LBBA, which extends through most of the U.S., and is known to occur in Iowa throughout the year (USFWS 2023f, Janke 2018). As with the NLEB and TRBA, there is limited woodland habitat in the PPA, although the LBBA frequently use buildings and other structures as roosting habitat. Publicly available data identified several observations of LBBA in HUC-12 watersheds that overlap with the northern portion of the PPA, west of the PPA, and north of the gen-tie line. Acoustic analyses were also used to assess the possible presence of TRBAs in the PPA, results of which indicate the probable summer absence of the species, although they could pass through the Project during the spring and fall migration and be present in riparian woodlands along the gen-tie line.

Monarch Butterfly

The monarch butterfly can be found throughout Iowa as part of the eastern migratory population wherever its host plant, milkweed (*Asclepias* spp.), or other blooming nectar resources are found (USFWS 2020b, Journey North 2019). Larvae are obligate milkweed feeders, whereas adults consume the nectar of a variety of flowers in a variety of habitats including grasslands, roadsides, open areas, wet areas, and urban gardens (Midwest Association of Fish and Wildlife Agencies 2018, Monarch Joint Venture 2023b; USFS 2021, 2023). The PPA contains approximately 799.8 acres of potentially suitable habitat within the PPA, and, therefore, there is potential for this species to occur at the Project.

Western Prairie Fringed Orchid

The western prairie fringed orchid is an open habitat species found west of the Mississippi River (USFWS 2023h). The species is associated with undisturbed native mesic to wet tallgrass prairies and sedge meadows (IDNR 2006a). While the PPA contains 220.8 acres of potentially suitable habitat, there have been no documented observations of the species, likely due to the primarily disturbed agricultural landscape within the PPA.

3.7.1.2 State-Protected Species

As mentioned in Section 3.6, IC 481A and 481B prohibits the take of any plant or animal species listed by the state as threatened or endangered. A list of state-listed endangered and threatened species with records in Carroll and Crawford counties, as documented by the IDNR

Natural Resource Inventory, is provided in Table 3.7-2 (IDNR 2023f, 2023g; Sichmeller and Parrott 2023). The IDNR did not find any records of rare species or significant natural communities in the PPA (IDNR, pers. comm., October 18, 2023, and March 27, 2024). Furthermore, most of the land within the PPA is cropland, which is not suitable habitat for most of the state's protected species.

Detailed species descriptions for those species with the potential to occur at the Project, including an analysis of the likelihood for the species to occur, can be found in Appendix L. The following discussions provides a summary of that analysis.

Table 3.7-2. State endangered and threatened species in the PPA. [a]

Species	State Status	Counties with Documented Occurrence Records [b]
Birds		
Barn owl (*Tyto alba*)	Endangered	Crawford; Carroll
Northern harrier (*Circus hudsonius*)	Endangered	None [c]
Reptiles		
Blanding's turtle (*Emydoidea blandingii*)	Threatened	Carroll
Ornate box turtle (*Terrapene ornata*)	Threatened	Crawford
Fish		
Topeka shiner (*Notropis topeka*)	Threatened	Crawford; Carroll
Freshwater Mussels		
Creeper (*Strophitus undulatus*)	Threatened	Carroll
Pistolgrip (*Tritogonia verrucosa*)	Endangered	Carroll
Insects		
Byssus skipper (*Problema byssus*)	Threatened	Crawford
Plants		
Bigroot prickly-pear (*Opuntia macrorhiza*)	Endangered	Carroll
Western prairie fringed orchid (*Platanthera praeclara*)	Threatened	Crawford

[a] IDNR 2023f,g

[b] While the species below have the potential to occur in the Project counties, IDNR did not find any records of rare species or significant natural communities in the PPA (IDNR, pers. comm., October 18, 2023, and March 27, 2024).

[c] The northern harrier was not included in the IDNR Natural Resource Inventory for Crawford or Carroll counties. However, it was observed during pre-construction avian use surveys (Bay and McDonald 2018, Bay et al.2019a, McDonald and Bay 2021).

[d] The Topeka shiner was not listed in the IPaC report as having the potential to occur within the PPA and the IDNR analysis found no records of occurrence within the PPA. Therefore, it is assumed that the Topeka shiner is unlikely to occur in the PPA, and there will be no further discussion on the Topeka shiner.

Barn Owl and Northern Harrier

The analysis presented in Appendix L has found that based on documented occurrences, species habitat requirements, and available habitat at the Project, the barn owl and northern harrier, both state endangered birds, could occur and are highly likely to occur at the Project, respectively.

Blanding's and Ornate Box Turtle

The analysis presented in Appendix L has found that based on documented occurrences, species habitat requirements, and available habitat at the Project, the Blanding's turtle and the ornate box turtle, both state-threatened species, are not likely to occur at the Project.

The analysis presented in Appendix L has found that based on documented occurrences, species habitat requirements, and available habitat at the Project, the creeper (state-threatened) could be present at the Project, while the pistolgrip (state-endangered) is not likely to occur.

Byssus Skipper

The analysis presented in Appendix L has found that based on documented occurrences, species habitat requirements, and available habitat at the Project, the Byssus skipper (state-threatened) is not likely to occur at the Project.

Bigroot Prickly-Pear

The analysis presented in Appendix L has found that based on documented occurrences, species habitat requirements, and available habitat at the Project, the bigroot prickly-pear (state-endangered) is not likely to occur at the Project.

3.7.2 Environmental Consequences: Proposed Action

Silver Queen would follow all applicable conservation measures required in the 2015 PEIS and PBA, as listed in the species consistency evaluation forms, to ensure the Project would not significantly affect federally listed species. These measures are listed individually by species below. WAPA is requesting an informal ESA Section 7 consultation with the USFWS in compliance with the ESA by submitting the Project's consistency evaluation forms along with other documentation, as relevant, to the USFWS. In addition, WAPA is pursuing a formal ESA Section 7 conference with the USFWS for the TRBA. Results, including final determinations, will be presented in the Final EA.

Conservation measures for water resources (Section 3.2), vegetation (Section 3.5) and wildlife (Section 3.6) could also benefit threatened and endangered species, including federally and state-listed species.

3.7.2.1 Federally Listed Species

Northern Long-Eared Bat

The Project could affect the NLEB from development of the gen-tie line and Proposed Wind Farm. Direct and indirect impacts to the NLEB, including injury or mortality and noise disturbance, may occur during tree clearing and trimming activities for construction and safe operation of the gen-tie line, where trees would be permanently removed within the

permanent 150-foot-wide easement (see Sections 3.5.2 and 3.6. 2 and Appendix L). However, tree clearing would be limited during the NLEB's active season, April 1 to September 30, to avoid direct impacts to NLEB during construction. If clearing is necessary within this period, a biomonitor would survey for roosting bats prior to tree clearing (see Appendix H).

Bat fatalities are known to occur at wind energy facilities, primarily through collision with turbine blades, although barotrauma may also be a minor factor (Baerwald et al. 2008, Rollins et al. 2012, Lawson et al. 2020, USFWS 2023b). Most fatalities occur during the migration period, particularly the fall migration that takes place in late summer and early fall (Arnett et al. 2008, Arnett and Baerwald 2013, Zimmerling and Francis 2016, AWWI 2020). Based on publicly available data from 2017 to 2021, there have been 4,554 documented bat fatalities at wind farms in Iowa, primarily during the fall migration, with fatality rates ranging from 0.3 to 3.7 bat fatalities/turbine/year (WEST 2024). Of these fatalities, approximately 95% of the fatalities were migratory tree bats (typically the eastern red bat, hoary bat, and silver-haired bat); 0.04% were NLEB fatalities. When the analysis was narrowed down to look at the two closest wind energy facilities with similar habitat to the Project (within 31.1 miles of the Wind Farm Boundary), there were no recorded NLEB fatalities (WEST 2024).

In accordance with the new *Land-based Wind Energy Voluntary Avoidance Guidance for the Northern Long-Eared Bat* (USFWS 2024a), the USFWS has extended the curtailment period for avoidance of NLEB beyond the period identified in the 2015 PEIS consistency form. If NLEB are migrating earlier and later than was previously thought based on these guidelines, the Project could cause NLEB mortality through turbine collisions if curtailment is not extended. Because Silver Queen will be retaining the previous curtailment period, as specified in the consistency form, WAPA is entering Section 7 formal consultation and preparing a Project-specific Biological Assessment for the species. The consultation will assess the anticipated level of take that would occur and identify conservation measures to ensure the Project would sufficiently offset take such that jeopardy would not occur and impacts would not be significant. The results of the Section 7 consultation, including the USFWS Biological Opinion (BO), will be provided in the Final EA. Based on Project presence/probable absence surveys, limited habitat acres, and rarity of the species, summer risk for the NLEB is not anticipated to occur, although the species could risk colliding with turbines during spring and fall migration.

To minimize the risk of take, the Project would implement the applicable measures from the NLEB 2015 PEIS consistency form, as updated in 2023 (USFWS, pers. comm., November 2023). Measures address potential risks to the species from injury and mortality due to wind turbine operation. A list of potential measures is listed in Appendix D and will be confirmed based on WAPA's ESA Section 7 consultation with the USFWS, which is ongoing as of the date of this document. The results of the ESA Section 7 consultation will be included in the Final EA.

Based on the analysis presented above and by following conservation measures identified during WAPA's Section 7 consultation with the USFWS, impacts from Project construction are anticipated to be negligible, short-term, direct and indirect impacts; while impacts from Project operation are expected to be low to moderate, long-term, direct impacts since take could

occur. Accordingly, WAPA anticipates that the Project is likely to adversely affect the NLEB but will not result in jeopardy to the species. A final determination will be made in the Final EA based on the outcome of the ESA Section 7 consultation.

Tricolored Bat

Similar to the NLEB, the Project could affect the TRBA from development of the gen-tie line and Proposed Wind Farm. Direct and indirect impacts to the TRBA could occur during Project construction where tree clearing activities would take place along the gen-tie line, including injury or mortality and noise disturbance. However, tree clearing would be restricted to outside of the bat active season, April 1 to September 30, to avoid direct impacts to protected bat species during construction.

Adverse effects are likely to occur due to wind turbines during Project operation. An analysis from WEST's Renew database of public data of TRBA fatalities across all wind energy facilities in Iowa reported 47 TRBA fatalities, representing 1% of all reported bat fatalities in Iowa (total fatalities = 4,554; WEST 2023). None of the TRBA fatalities were documented within the same ecoregion as the Project, with the majority in ecoregions to the east, including approximately 52% in the adjacent Rolling Loess Hills Prairie ecoregion and 30% in the Des Moines Lobe, along with 17% in the Loess Prairies north of the Project ecoregion. These ecoregions also exhibit higher levels of documented TRBA occurrences (see Appendix L; USFWS, pers. comm., August 25, 2023).

The closest reported TRBA fatalities were at least 40 miles away in the Rolling Loess Prairie Level IV Ecoregion (see Appendix L; WEST 2023). The fatalities occurred at wind speeds over 6.7 or 7.8 mph. While the USFWS has more recent documented TRBA fatality data for wind farms in Iowa with a wind speed at 11.2 mph (USFWS, pers. comm., January 18, 2024), the locations and dates of the latter fatalities are not publicly available. The most recent publicly available TRBA fatality data discussed above is from 2017, and it is anticipated that TRBA fatalities have declined along with the decline in the species' population due to White-nose Syndrome (WNS).

Given the relative lack of woodland habitat in the Project ecoregion, fewer bats overall are likely to migrate through the PPA, which could reasonably be assumed to correlate with lower fatality rates. This correlation is supported by data from the two closest wind projects, Carroll and Victory, that have documented bat fatalities in the same ecoregion as the Project. The two projects had 56 and 21 bat fatalities, respectively, documented over the survey year (December to November), compared to an average of 127 bat fatalities across all projects in Iowa (WEST 2023).

Given the location of the Project at the edge of the species' range in an ecoregion generally lacking in suitable roosting habitat, the distance to suitable hibernacula, the lack of documented TRBA wind fatalities, and other evidence indicating a low population of TRBA in the Project ecoregion, it is likely that low numbers of TRBA would pass through the PPA and be harmed by turbines. Because the TRBA is proposed for listing and are not addressed in the 2015 PEIS, WAPA is developing a Project biological assessment for the TRBA and requesting an

ESA Section 7 formal conference with the USFWS to assess the anticipated level of take that would occur should the species become listed. In addition, the conference will identify conservation measures to ensure the Project would sufficiently offset take such that jeopardy would not occur and impacts would not be significant. The results of the ESA Section 7 conference, including the USFWS conference opinion (CO), will be provided in the Final EA. Should a final rule listing the TRBA as endangered become effective prior to WAPA completing the NEPA process, WAPA will request that the ESA Section 7 conference be converted to a Section 7 consultation, with the CO being used as the USFWS' BO.

Based on the analysis presented above and by following conservation measures identified during WAPA's ESA Section 7 conference with the USFWS, impacts from Project construction are anticipated to be negligible, short-term, direct and indirect impacts, while impacts from Project operation are expected to be low to moderate, long-term, direct impacts. Accordingly, WAPA anticipates that the Project is *likely to adversely affect* the TRBA but will not result in jeopardy to the species. A final determination will be made in the Final EA based on the outcome of the ESA Section 7 conference.

Little Brown Bat

Similar to the NLEB and TRBA, the Project could affect the LBBA from development of the gen-tie line and Proposed Wind Farm. Direct and indirect impacts to the LBBA could occur during Project construction where tree-clearing activities would take place along the gen-tie line, including injury or mortality and noise disturbance. However, tree clearing would be restricted to outside of the bat active season, which is April 1 to September 30, to avoid direct impacts to protected bat species during construction.

Adverse effects are likely to occur due to wind turbines during Project operation. As discussed in Section 3.6, the Project operation would be most likely to affect LBBAs from potential collisions with turbines resulting in injury or fatality during the spring or fall migration periods.

Public data from WEST's Renew database of fatalities at wind energy facilities with similar habitat as the Project and within 31.1 miles of the Wind Farm Boundary recorded no LBBA fatalities (WEST 2023). Expanding the scope to all wind energy facilities in Iowa, the public data from WEST's Renew database report 177 LBBA fatalities, representing 3.9% of all reported bat fatalities in Iowa (total fatalities 4,554; WEST 2023). Furthermore, the PPA accounts for 208.4 acres (0.5%) of suitable habitat for the LBBA. Based on the data above and by following the conservation measures detailed for the NLEB and TRBA, it is expected that the Project would have minor, short-term, direct, and indirect impacts to the LBBA during construction and decommissioning, and low to moderate, long-term, direct impacts to the LBBA during operation. Conservation measures implemented for the NLEB and TRBA will also help protect the LBBA (see Appendix D).

While the LBBA is not currently protected under the ESA, should it be listed in the future, Silver Queen would reassess at that time and determine whether an incidental take permit and habitat conservation plan may be warranted under Section 10 of the ESA.

Monarch Butterfly

Based on data from the USGS (2021), USFWS (2023g, 2024d), and field surveys, the PPA contains approximately 798.6 acres of monarch butterfly suitable habitat, or 1.9% of the PPA. While the PPA is predominantly cropland, roadside ditches and vegetated swales within and along crop fields may provide limited suitable habitat for the monarch butterfly. Project construction could impact the monarch butterfly through the degradation, fragmentation, or removal of suitable habitat. The effects of construction could vary depending on the Project layout. Temporary construction activities could disturb up to 130.7 acres of suitable habitat, while operations could permanently displace up to 28.6 acres of suitable habitat. However, given the limited amount of potentially suitable habitat present within the PPA and the dispersed nature of the impacts, it is unlikely that habitat impacts would affect the monarch butterfly population based on primary and alternative infrastructure locations. Similar to the bat species described above, Project operation could result in injury or mortality of the monarch butterfly if the species should collide with turbines during migration.

Silver Queen is committed to implementing conservation measures for the monarch butterfly by implementing BMPs recommended by state and federal agencies, which would help to avoid or minimize impacts associated with the Proposed Action. Silver Queen would minimize impacts to the monarch butterfly by minimizing disturbance to natural vegetation (see Appendix D). In addition, impacts to the monarch butterfly would be mitigated through the revegetation of disturbed, non-cultivated areas using native plants like milkweed, which is an important food source for monarch butterflies and caterpillars (see Section 3.5.2; Electric Power Research Institute 2019). Based on these measures, WAPA has determined that the Project would have negligible impacts on monarch butterflies. While the monarch butterfly is not currently protected under the ESA, Silver Queen would reassess whether take could occur should it be listed in the future, and coordinate with the USFWS on whether an incidental take permit and habitat conservation plan may be warranted under Section 10 of the ESA.

Western Prairie Fringed Orchid

Impacts to the western prairie fringed orchid are not expected due to a lack of suitable habitat. If potentially suitable habitat should be found during the 2024 wetland delineation, the Project would implement the applicable measures from the NLEB 2015 PEIS consistency form for the species to avoid or minimize impacts. Measures address potential risks from damage to plants and degraded habitat. A list of conservation measures can be found in Appendix D and will be confirmed based on WAPA's ESA Section 7 consultation with the USFWS, which is ongoing as of the date of this document. The results of the ESA Section 7 consultation will be included in the Final EA.

Due to Silver Queen's commitment to uphold the conservation measures outlined in the western prairie fringed orchid species consistency evaluation form if western prairie fringed orchids or their habitats are found within the PPA, WAPA anticipates that the Project would have no to negligible impacts on the western prairie fringed orchid, and therefore *may affect, but is not likely to adversely affect* the western prairie fringed orchid or its habitat. A final

determination will be made in the Final EA based on the outcome of the Section 7 consultation with the USFWS.

3.7.2.2 State-Listed Species

Barn Owl and Northern Harrier

Potential impacts to the two bird species would be the same as for other avian species, including potential collisions with turbines, as well as collisions with or electrocution from the Project gen-tie line. Impacts from the gen-tie line would be unlikely, since transmission lines are spaced far enough apart to reduce the risk of even a large bird touching two wires at a time and being electrocuted, or colliding with lines, versus distribution lines that are spaced more closely (Avian Power Line Interaction Committee and USFWS 2005). Both species have been documented as fatalities at wind farms; though rarely in comparison to other raptors, such as the red-tailed hawk (Erickson et al. 2001).

Northern harrier fatalities have been documented at facilities in California and Wyoming, a region known for high rates of raptor fatalities, whereas the barn owl was only found at four facilities in California (Erickson et al. 2001). The flight path of barn owls is typically too low to collide with turbine blades (Barn Owl Trust 2023b). In addition, neither species had been reported as fatalities from studies at midwestern wind farms, including at a facility in Minnesota with high occurrences of northern harriers (Erickson et al. 2001; Usgaard 1997). Based on a query of WEST's Renew database, there are also no recently reported northern harrier fatalities at wind energy facilities in Iowa based on publicly available data from 2005 to 2022 (WEST 2023). Based on available data, turbine collision risk appears low for the two species, and implementation of conservation measures for raptors in Section 3.6 would further reduce the risk of take of the barn owl and northern harrier at the Project. As such, the Project would have negligible impacts on barn owls and northern harriers.

Blanding's and Ornate Box Turtle

While the Blanding's turtle has been known to occur in agricultural settings, the fragmented, low-quality wetland and upland nesting habitat make it unlikely to occur. Due to the lack of suitable habitat for the two turtle species, the direct and indirect, long-term and short-term impacts would be negligible within the PPA.

Creeper and Pistolgrip Mussels

Given potentially suitable habitat in the PPA, impacts to the creeper could include injury or mortality during in-water work to establish access roads and crane paths or install collection lines at waterbody crossings, or degraded water quality from stormwater runoff. Within the PPA, construction would cross 23 perennial streams. However, implementation of the conservation measures in Section 3.2 would minimize the risk of take of the species, should it be present. As such, the Project could have minor, direct and indirect, temporary impacts on

creepers within the PPA. The Project is not expected to affect pistolgrip since it is not likely to occur.

Byssus Skipper

Due to the lack of suitable habitat for the Byssus skipper, impacts to the species would be negligible.

Bigroot Prickly-Pear

Due to the lack of suitable habitat for the bigroot prickly-pear, impacts to the species would be negligible.

3.7.3 Environmental Consequences: No Action Alternative

With the No Action Alternative, there would be no Project effects to federally threatened or endangered species or state-listed species. Effects to threatened and endangered species would likely continue at the current rate, apart from NLEB and TRBA, which may decline at an increasing rate due to the continued spread of WNS.

3.8 Visual Resources

This section analyzes the existing landscape of the PPA, and potential Project impacts on potentially sensitive viewers or visually sensitive areas. A detailed analysis is provided in Sections 4.7 and 5.7 of the 2015 PEIS and is incorporated herein by reference.

3.8.1 Affected Environment

Cultivated cropland with nearly flat to gently rolling topography, along with farm buildings, roads, and scattered trees and woodlands, visually dominate the viewshed of the PPA (see Figure 3.5-1). Based on a site visit, topography becomes more pronounced moving from east to west into Crawford County.

Based on WAPA's analysis of the North Bend Wind Project in South Dakota, which had similar turbine heights and landscape to the Project, wind turbine visibility was deemed negligible past approximately 11.9 miles, with major impacts out to approximately 7.4 miles (WAPA 2023). Therefore, potentially sensitive viewers and visually sensitive areas (i.e., key observation points) were identified from the PPA to between 7 to 10 miles out, as discussed below.

The BLM Visual Resource Management recommends that a visual analysis be conducted for areas that represent either the typical view from sensitive viewing locations, or the range of visual impacts associated with a project (BLM 2013). Viewers of the Project would include local residents, including rural residents and those from the neighboring communities of Denison, Westside, Carroll, Aspinwall, Vail, Arcadia, Templeton, Halbur, and Mannin; farm workers; recreationists (e.g., hunters); and local or regional travelers along local highways and roads. The closest communities are between approximately 0.9 and 1.6 miles from the nearest turbines (see Section 3.4.1). Approximately 282 occupied, mostly rural residences are dispersed

throughout the PPA, along with numerous residents adjacent to the Project and potentially within viewing distance (based on a visual assessment of recent aerial photographs of the area; Figure 3.8-1). Iowa Highway 30 runs through the northernmost portion of the Wind Farm Boundary, and Iowa Highway 141 and U.S. Highway 71 are south and east of the Wind Farm Boundary, respectively. In some areas in and adjacent to the Proposed Wind Farm, wind farm turbines from other projects are visible to the north and southeast.

Other potentially visually sensitive areas include locations where community members and recreationists may congregate, and where the viewshed may hold higher value, such as the Five Mile House and Hayes Township Cemetery, located within the Wind Farm Boundary. Five state or county parks, four cemeteries, numerous city parks, and the Sauk Rail Trail also occur between 1 and 10 miles from the PPA (see Figure 3.5-3). As of the date of this document, no cultural resource areas, other than the cemeteries, have been identified in the cultural Area of Potential Effect (APE; see Section 3.9.1).

3.8.2 Environmental Consequences: Proposed Action

Common visual impacts of wind energy projects occur in response to site construction, operation, and decommissioning activities, and are further described in Section 5.7.1 of the 2015 PEIS. Project-specific impacts for each phase of the Project are described below.

The Project would result in long-term visual impacts from Project construction and operation, including landscape quality, shadow flicker effects, and light pollution. The magnitude of the visual impacts would depend on many factors, including the number of viewers within visual range of the Project, distance of the facility from viewers, weather and lighting conditions, the presence and arrangement of lights on the turbines and other structures, landscape conditions, and the degree of public or agency concern for the landscape. Viewer identified visual impacts are subjective, and reactions to visual changes may be influenced by non-visual factors such as perceptions of renewable energy and wind power, culture, and financial considerations. During Project scoping, concern was expressed regarding the visual impact of Project turbines (specifically the effects of shadow-flicker and flashing lights). These impacts were addressed as described below and in Appendix M.

3.8.2.1 Landscape Quality

Landscape impacts result from both an increase in contrast of a feature with the landscape and degradation of the landscape's visual quality. Construction activities would result in minor to moderate temporary visual impacts to the landscape from vegetation clearing and grading; road building; construction and use of staging and laydown areas; construction of facilities; vehicle, equipment, and worker presence and activity; dust; and emissions. Because of the large size of wind turbines, the transport and installation of wind turbines during construction are visually conspicuous. In general, construction visual impacts would vary in frequency, duration, and location throughout construction. Periods of intense activity would be followed by periods with less activity, and associated visual impacts would vary in accordance with construction activity levels. BMPs, including site monitoring, adherence to standard construction practices, and restoration activities, would reduce construction impacts.

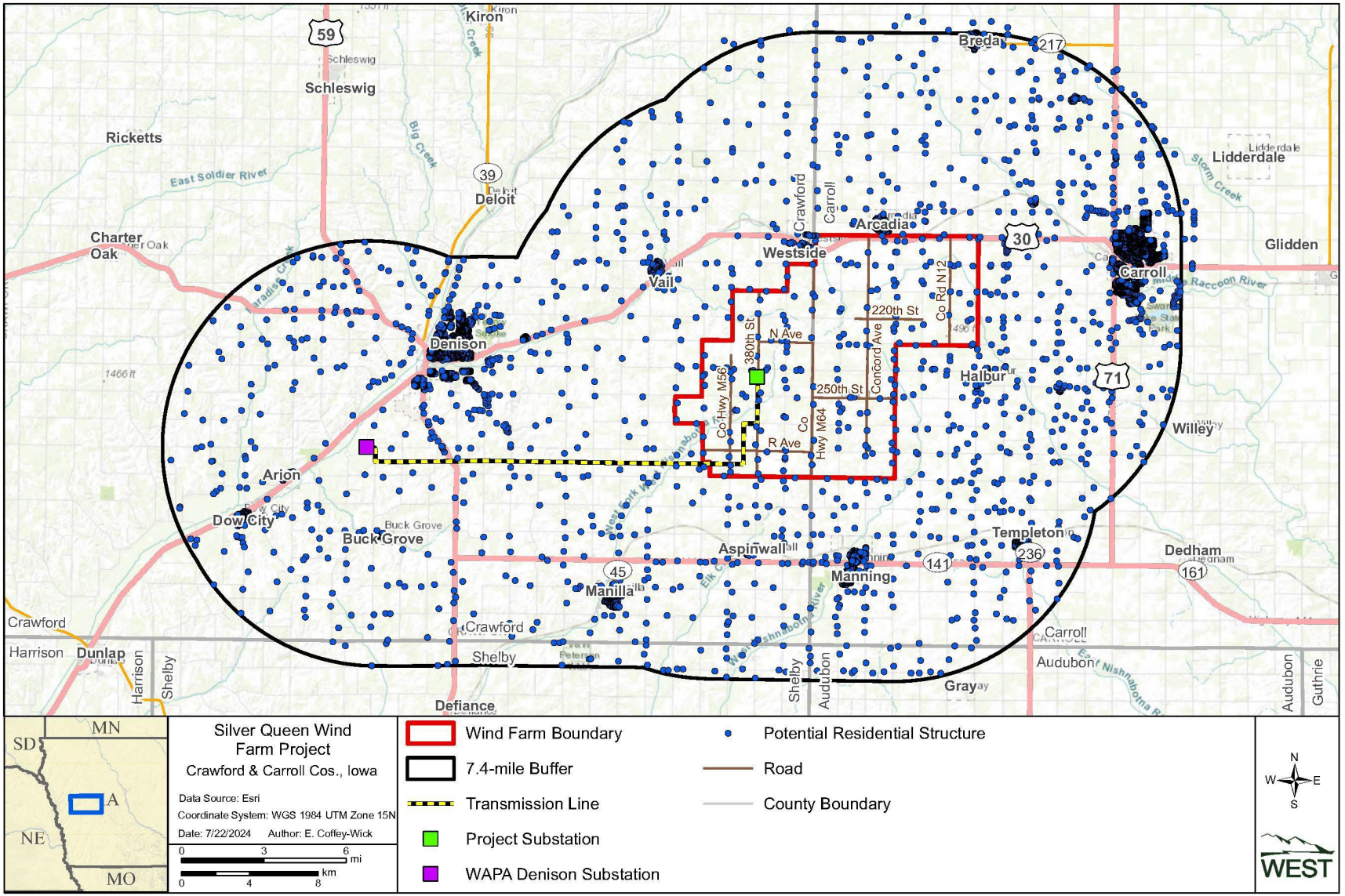

Figure 3.8-1. Potential residential structures identified from aerial imagery within 7.4 miles of the Project.

Once the Project reaches commercial operation, these construction visual impacts would cease. The primary direct, long-term visual impacts associated with operation of the Project would result from the introduction of the 77 vertical wind turbines into the generally horizontal landscape found in the PPA. Minor visual impacts would result from replacing the existing single 68-kV gen-tie line with wooden structures, to a combined 68- and 230-kV gen-tie line with fewer steel structures.

Openwind wind farm modeling and layout design software (UL Solutions, Northbrook, Illinois) was used to model the zone of visual impact (ZVI) for the Project, including both the 77 primary and 16 alternate turbine locations (Appendix M). Based on Project specifications and area topography, modeling showed that blade tips of at least 90 turbine locations could be visible at residences within the majority of the area inside the Wind Farm Boundary, and at higher elevations as much as 10 miles from the nearest turbine. This would likely include several towns, such as Carroll and Arcadia (see Figure 2 in Appendix M). However, the number of visible turbine tips does not necessarily translate to the level of visual impact, since distance, local topography, and structures and vegetation closer to a particular location can make turbines more or less dominant to the viewer. As described in Appendix M, wind turbines are generally expected to be a dominant feature of the landscape to 4 miles under optimal viewing conditions (flat ground, clear skies, and little vegetation), becoming less distinct with greater distance (Sullivan et al. 2012).

To demonstrate the level of potential visual impacts, windPRO simulation software (EDM International, Aalborg Øst, Denmark) was used to develop photo simulations of Project turbines. Simulation photos show the visibility of turbines from six potentially sensitive visual resource areas within approximately 10 miles of the Project and representative of areas north, south, east, and west of the Project (Table 3.8-1; Appendix M). Section 5.7 of the 2015 PEIS notes that simulations should view from sensitive visual resource areas, highly sensitive viewing locations, and more representative viewing locations.

Table 3.8-1. Representative visually sensitive areas in and near the Proposed Wind Farm.

Site name	Distance to Nearest Proposed Turbine (nearest mile)	Estimated Visual Impact [a]	Direction from the Proposed Wind Farm
Hayes Township Cemetery	2	Moderate	N/A
Sauk Rail Trail	6	Minor	Northeast
Great Western Park	6	Minor	South
Vail Cemetery	6	Minor	West
Swan Lake State Park	10	None	East
Yellow Smoke Campground	12	None	West

[a] ReGenerate Renewable Energy Consulting 2023c (Appendix M)

N/A = not applicable

Sites were selected for the Project based on likely increased sensitivity, including the presence of cultural or historic resources or where the landscape might be a more integral part of the

land use for a larger population (e.g., recreational areas such as campgrounds). An analysis of the simulations determined that turbines would have a moderate visual impact at Hayes Township Cemetery, where blade tips of potentially 60 to 80 turbines could be visible based on the ZVI analysis (Appendix M). However, as can be seen in the photographic simulation, even with this relatively high level of visibility at a site 2 miles from the nearest turbine, the local landscape appears dominant over the visible turbines. For the remaining analyzed sites, minor visual impacts would be likely at Sauk Rail Trail, Great Western Park, and Vail Cemetery at 6 miles from the nearest turbine, with no visual impact at Swan Lake State Park Campground and Yellow Smoke Campground, at 10 and 12 miles from the nearest turbine, respectively. Depending on viewer sensitivity, impacts would be moderate to high for all residents within the PPA since all potential residences fall within 4 miles of a turbine. Similar impacts would be experienced by adjacent residents or businesses within 4 miles of the nearest turbine. These impacts are consistent with those analyzed in the 2015 PEIS, and the applicable conservation measures from the PEIS would be applied to minimize visual impacts to the extent feasible.

3.8.2.2 Shadow Flicker

Shadow flicker occurs during operation when wind turbine blades pass in front of the sun to create recurring shadows on an object and can have a disorienting effect on a small percentage of the population. Such shadows occur only under specific conditions, including sun position, wind direction, time of day, and other similar factors. Shadow flicker becomes less noticeable with increasing distance from a wind turbine. Shadow flicker at distances greater than 10 rotor diameters (i.e., about 4,490 feet or 0.85 mile) is generally low intensity and considered imperceptible. At such distances, shadow flicker is typically only caused at sunrise or sunset, when cast shadows are sufficiently long.

Shadow flicker impacts are not currently regulated by state or federal law. However, Silver Queen has committed to minimizing the amount of shadow flicker to no more than 30 hours/year (shadow flicker threshold) on occupied residences (i.e., receptors). This threshold is based on turbine siting in accordance with the Project's Crawford County Development Agreement (Appendix A) unless the owner of an occupied residence waives this limit in writing (see Table 2.2-3).

A shadow flicker analysis was conducted for the Project to identify whether proposed turbine locations could exceed the shadow flicker threshold for the 282 receptors (ReGenerate 2023a; Appendix M). This includes residences both within and adjacent to the Project. Based on the results of the initial analysis, Silver Queen adjusted the turbine layout to meet the shadow-flicker threshold at all receptors, with a subsequent analysis concluding that the shadow flicker threshold was met and ranged from zero to 28.8 hours/year. One hundred forty-six receptors (52.14%) had a shadow flicker of zero hours/year, 101 receptors (36.07%) had a shadow flicker of 0.1–20 hours/year, and 33 receptors (11.79%) had a shadow flicker of 20.1–28.8 hours/year.

3.8.2.3 Light Pollution

Light pollution is caused by any adverse effect of human-made lighting, such as the excessive illumination of night skies by artificial light. Flashing turbine marker lights required by the FAA for aviation safety and security lighting at the Project Substation, the O&M facility, the ADLS tower, and the MET towers could be a source of light pollution. Concern was expressed over the flashing lights that mark turbines. As noted in Section 2.0, Silver Queen plans to install an ADLS at the Project that would substantially minimize the effects of turbine marker lights, since the lights would be off at night except for short periods of time when aircraft are in the vicinity (see Section 2.2).

Decommissioning impacts would be similar to the impacts described above for construction, creating minor to moderate temporary visual impacts during decommissioning activities. The landscape would be returned to preconstruction conditions and/or in accordance with landowner agreements.

3.8.2.4 Conservation Measures

Silver Queen is committed to implementing the conservation measures derived from Section 5.7.1.3 of the 2015 PEIS to minimize visual impacts from construction and operation of the Project. Measures address impacts from changes to the landscape, the amount of shadow flicker experienced by residences, and light pollution. The list of conservation measures can be found in Appendix D.

3.8.3 Environmental Consequences: No Action Alternative

No Project-related direct or indirect impacts to visual resource would occur under the No Action Alternative. The existing viewshed, dominated by farmland, would remain relatively unchanged.

3.9 Cultural Resources

3.9.1 Affected Environment

Cultural resources include archaeological, historic, and architectural sites or structures, or places that are significant in understanding the history of the U.S. or North America. Cultural resources may also include traditional cultural properties, defined as sites or places of traditional use to specified social or cultural groups, including Native American tribes. Properties of traditional religious and cultural and importance are sites specifically related to Native American tribes. Cultural resources that are listed in or meet the eligibility criteria for listing in the National Register of Historic Places are considered “historic properties” under the National Historic Preservation Act (NHPA).

To identify new or previously recorded cultural resources or historic properties, cultural resources surveys were conducted within a specified APE. The APE is defined as “the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist.” The APE is

influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking" (36 CFR 800.16(d). Cultural resources that could be physically affected were inventoried in areas that could experience ground disturbance from the Project, including the planned Project footprint plus a buffer to allow for minor design modifications (see Table 3.9-1). Cultural resources that could be visually or auditorily affected were identified within the APE, including the area extending in a 2-mile buffer from Project infrastructure.

A records search and viewshed analysis were conducted to identify potential cultural resources within the 2-mile buffer, while field surveys were also conducted within the Project area where earth disturbing activities and physical effects could occur. In addition, WAPA consulted with the Iowa State Historic Preservation Office (SHPO) along with tribes, including tribal leaders and designated Tribal Historic Preservation Officers. The SHPO was contacted via letter on July 20, 2023, introducing the Project, initiating the Section 106 consultation process, and requesting their concurrence on the APE (as defined above) per 36 CFR 800.4(a) (Appendix N). The SHPO concurred with the APE on August 18, 2023, providing additional contact information and guidance on identifying historic resources and archaeological sites within the APE. On October 16, 2023, the SHPO was also invited to participate in the environmental scoping process by providing comments through November 29, 2023. The SHPO provided comments on October 23, 2023 (see Scoping Submittal 1; Appendix F.

Table 3.9-1. Cultural Resource Inventory Areas.

Disturbance Activity	Minimum Survey Area
Turbine pads (77 primary plus 16 alternates) [a]	300-foot radius from center point
Substation and/or switchyard (including primary plus three options)	Actual size plus 200-foot buffer
O&M Facility [b]	
ADLS	
Two to three MET towers	
Laydown yards / staging areas (including primary plus one option) [c]	
Access roads (new and existing)	150-foot-wide corridor
Crane paths [d]	
Collection lines [d]	
New gen-tie line right-of-way [e]	500-foot-wide corridor
Geotechnical boring sites (all facilities plus 20 gen-tie boring sites)	Actual size or bore site plus 50-foot buffer along gen-tie

[a] Minimum established as a 250-foot radius; analyzed a 300-foot radius for potential siting adjustments.

[b] Minimum established as the actual size plus a 125-foot buffer; analyzed a 200-foot buffer for potential siting adjustments.

[c] Minimum established as the actual size; analyzed a 200-foot buffer for potential siting adjustments.

[d] Minimum established as a 100-foot-wide corridor; analyzed a 150-foot-wide corridor for potential siting adjustments.

[e] Minimum established as a 125-foot-wide corridor; analyzed a 500-foot-wide corridor for potential siting adjustments, additional construction areas, and pulling-tensioning sites.

Nine tribes were identified by WAPA that may attach religious and cultural significance to cultural resources within or adjacent to the PPA (see Section 5.3). Letters were sent to the nine tribes on July 20, 2023, introducing the Project and inviting them to participate in the NHPA Section 106 consultation process. The same tribes were contacted via letter on October 13, 2023, inviting them to participate in the environmental scoping process under NEPA by providing comments by November 29, 2023. Additionally, the tribes were contacted via email on January 22, 2024, once again inviting their participation in the Section 106 consultation process. No responses or comments from the tribes have been received by WAPA as of the date of this document.

3.9.1.1 Records Search

A review of state records identified 11 previous cultural resource surveys that overlap with the APE (Bear Creek Archaeology, Inc. [Bear Creek] 2024; Table 3.9-2). Of these surveys, one archeological site (13CF30) and one historic property (24-00143) have been identified. Site 13CF30 is the recorded location of a historic schoolhouse; however, two previous surveys concluded that the schoolhouse has been completely destroyed and no remnants exist, with no further work recommended for this site. The historic property plotted within the APE was a bridge (Bridge #127370) that was demolished and replaced in 1998. Since the bridge was destroyed, no further work will be needed for this historic property.

Table 3.9-2. Previous cultural surveys and potential cultural sites within the PPA.

Previous Cultural Survey	Survey Type	Reference
19810224130	Road Corridor	Carr and Tiffany 1981
19900624025	Road Corridor	Anderson 1990
19901024074	Road Corridor	Merry 1990
19920614089	Road Corridor Architectural Inventory	Ingalls 1992
19930724003	Bridge Replacement	Thompson and Stanley 1993
19960300043	Power Line Corridors	Chevance 1996
19970000700	Historic Context	Rogers 1997
20001224022	Wastewater Corridors	Kapler 2001
20080600105	Wind Project Areas	Finn and Morrow 2008
20090500003	Wind Project Areas	Rothaus and McFarlane 2009

Source: Bear Creek Archaeology, Inc. 2024

3.9.1.2 Field Survey

Field surveys are ongoing as of the date of this document. In November and December 2023, Bear Creek began conducting its Phase I archaeological survey of the Project APE for physical effects. They were able to complete surveys at 122 locations before snow cover prevented further survey. Survey of the remaining Project APE will continue as weather conditions allow, and results will be presented in the Final EA. WAPA will consult with the SHPO and interested tribes on the results of the Phase 1 survey to ensure compliance with the NHPA.

Locations surveyed in 2023 included all primary and alternate turbine locations, the Project Substation site, the O&M Facility, the ADLS, two potential laydown yards, and 21 points along the Project gen-tie line (including one inside the Project Substation boundary, as covered by the substation survey). Overland access routes to each location were also surveyed. No cultural resources were found during the 2023 survey.

3.9.2 Environmental Consequences: Proposed Action

Given the absence of cultural resources in the PPA based on a literature review and the results of the Phase I archeological survey to date, no impacts to cultural resources are anticipated at this time. In addition, in its scoping comment dated November 21, 2023, the Great Plains Regional Office of the Bureau of Indian Affairs (BIA) noted that the Project would not affect cultural resources on tribal or individual landholdings for which the BIA is responsible (see Scoping Comment 22-3, Appendix F).

Since no impacts are anticipated, no conservation measures for cultural resources from the 2015 PEIS are deemed necessary. Should cultural resources be found during final field surveys, WAPA will consult with the tribes and SHPO under the Section 106 process to determine whether any conservation measures are needed to ensure impacts are avoided or minimized consistent with the requirements of the 2015 PEIS.

3.9.2.1 Conservation Measures

Information on conservation measures for cultural resource can be found in Appendix D. These measures provide information on what would occur if unanticipated cultural or archeological resources are found during Project construction.

3.9.3 Environmental Consequences: No Action Alternative

The No Action Alternative would have no direct or indirect impacts on cultural resources. Existing activities, such as farming and the trend toward conversion of undeveloped land to agriculture, would likely continue and could affect any unidentified cultural resources, should resources occur.

3.10 Land Use and Public Facilities

This section analyzes potential impacts from the Project to land use and public facilities in the PPA. The general land use analysis in Sections 4.1 and 5.1 of the 2015 PEIS is incorporated herein by reference. Land use specific to the Project, including general land use, land ownership, transportation, public facilities and services, and recreational areas, are addressed in this section. Conservation easements that could occur in or near the PPA are discussed in Section 3.5.

3.10.1 Affected Environment

3.10.1.1 Land Use

The PPA is predominantly agricultural, consisting of a mix of cultivated cropland, primarily corn (*Zea mays*) and soybeans (*Glycine max*), and cattle pasture. Developed open spaces, areas with a mixture of some constructed materials with mostly vegetation in the form of lawns comprise approximately 2% of the PPA (Section 3.5; Table 3.5-1). Isolated farms and rural residences are found through the PPA; 174 occupied residences have been identified within the PPA. The PPA is located on lands zoned as A-1 Agricultural Districts in both Carroll and Crawford counties. The Project would be in adherence with all county zoning ordinances.

3.10.1.2 Land Ownership

All lands within the PPA are privately owned properties, apart from the tie-in to the Denison Substation, which is land owned by WAPA. Project development would only occur on properties where landowners have agreed to participate through signed lease agreements (see Section 2.2). Temporary construction easements with participating landowners may be required. No tribal trust or restricted fee-owned properties requiring federal oversight or lease/easement restrictions were identified during Silver Queen's land negotiations or WAPA's public scoping process (see Section 5.0). In addition, Silver Queen has signed numerous GNAs with non-participating landowners adjacent to the Project. GNAs include certain development restrictions that Silver Queen would follow to minimize impacts on the neighboring properties. Decommissioning responsibilities and requirements are based on landowner lease agreements and are described in further detail in Section 2.2.2 of this Draft EA.

3.10.1.3 Public Facilities and Services

Most public facilities and services nearest to the Project are in the towns of Westside and Arcadia, which are approximately 0.5 mile northeast and north of the Wind Farm Boundary, followed by Halbur at approximately 1.4 miles northwest. The nearest proposed turbines would be located approximately 1.2 and 2.5 miles away from Westside city limits, respectively. All remaining turbines would be over 3 miles from Westside city limits. While Westside and Arcadia are relatively small communities, with populations of 285 and 525, respectively (2020 Decennial Census), both contain cemeteries; police, fire, and ambulance services; schools, places of worship; and parks and recreational facilities. The cities of Denison and Carroll are larger towns within 10 miles of the PPA, both of which have the aforementioned resources in addition to small- to mid-sized airports. Townships within the PPA include Arcadia, Washington, Roselle, Ewoldt, Eden, Westside, Hayes, and Iowa.

The Hayes Township Cemetery lies within the PPA and is located approximately 2 miles northeast of the proposed turbine and approximately 0.6 mile from the Project Substation. The Five Mile House, a community center owned by the Hayes Township and a traditional German *Scheutzenverein*, is located within the PPA approximately 1.5 miles northeast of the nearest

proposed turbine and approximately 1.0 mile east of the Project Substation (Iowa GenWeb 2023).

Electrical service in the PPA is provided by MidAmerican Energy Company. The Iowa American Water company supplies rural water and maintains a network of distribution lines within the PPA.

3.10.1.4 Recreation

Recreation in the PPA primarily includes hunting and fishing, and other recreational activities, on private lands. There are no public recreation areas within the PPA. Recreation areas within 1 mile of the PPA include the West Botna, Rail Bend, and Halbur Ridge wildlife areas (Figure 3.5-3). These areas are relatively small and are designated for hiking and upland hunting recreation (My County Parks 2012).

Recreational areas within 5 miles of the Wind Farm Boundary include the Hazel Brush Wildlife Area, Schrader Wildlife Management Area, Mid-Prairie Park, Sauk Rail Trail, Vail Cemetery Prairie, Great Western Park, and Willow Creek Park (Figure 3.5-3). These areas are managed by the Carroll County and Crawford County conservation boards and provide a breadth of recreational opportunities including hiking, hunting, biking, winter sports, lake and stream fishing, swimming, boating, and shooting ranges (My County Parks 2012). Schrader Wildlife Management Area, which is managed by the IDNR, is also located in Crawford County, and provides hunting, hiking, and birding recreation opportunities (IDNR 2023c).

3.10.1.5 Transportation

Table 3.10-1 lists existing roads and proposed new access roads that are within the PPA. Primary access to the Project would likely be via Interstate Highway 30, which runs along the northern edge of the PPA. Additional primary access to Project sites would likely be via County Highway M64, which vertically bisects the area at approximately midway through the PPA . Secondary access to turbine locations would be via existing county and township roads. Traffic volume is moderate on the nearest major highway, Interstate Highway 30E, with total average annual daily traffic of 3,670 vehicles (Iowa Department of Transportation [DOT] 2023). The PPA is in a rural location and does not have heavy commuter traffic.

No airports, private airstrips, or private helipads are located within the PPA. The closest airports are the Arthur N. Neu Airport, approximately 10 miles east of the PPA, and the Denison Municipal Airport, approximately 10 miles west of the PPA. No private-use or unregistered airstrips were identified in proximity to the PPA (FAA 2023). Military airspace and training routes are located near the PPA, but the Project was determined to have no impact on air navigation (Capitol Airspace Group 2023). Air traffic may be present in the PPA for crop dusting of agricultural fields.

Table 3.10-1. Existing and proposed new access roads within the PPA.

Road Type	Total Miles in PPA
Local Neighborhood Road, Rural Road, City Street	
200th St.	5.3
210th St.	6.9
220th St.	1.5
230th St.	4.0
250th St.	1.2
260th St.	1.8
270th St.	0.8
380th St.	4.0
390th St.	4.5
Co Rd E53	2.0
Co Rd M66	1.0
Co Rd N12	3.6
Concord Ave.	10.5
Delta Ave.	2.0
Eagle Ave.	2.6
Granite Ave.	2.2
O Ave.	3.7
Q Ave.	4.3
Birch Ave	0.6
Co Hwy E35	5.2
Level B Road; Local Neighborhood Road, Rural Road, City Street	
Co Hwy M56	3.1
R Ave.	1.0
N Ave.	5.7
Primary Access Route; Local Neighborhood Road, Rural Road, City Street	
Co Hwy M64	4.0
Proposed new access roads	
Gravel roads, variable width depending on location and Project phase.	29.5

Ave. = Avenue. Co = County, Hwy = Highway

3.10.2 Environmental Consequences: Proposed Action

3.10.2.1 Land Use

Direct impacts to land use would occur due to Project construction and operation. Based on the proposed layout of wind turbines, access roads, underground collection lines, and associated facilities, no residences or businesses would be displaced. As noted in Section 3.5.2, agricultural activities on up to 2,175.4 acres, the majority of which involves cultivated crops, followed by

hayfields and pasture, would be temporarily disrupted during construction. Following construction, agricultural activities on approximately 70.9 acres would be permanently disrupted due to Project operations, which would be returned to pre-construction land uses after the Project is decommissioned. Agricultural activities could continue during Project operation up to the edges of access roads and turbine pads. The Project Substation would be fenced, as would the ADLS and MET tower foundations.

Access roads and turbine pads would not be fenced except for gates/cattle guards installed in coordination with landowners, such that livestock and landowners or farm workers would be able to travel through the PPA unimpeded. The underground collection system would be buried below plow depth and would not alter agricultural activities.

Use of small aircraft for crop dusting could be permanently prevented, modified, or curtailed in areas near Project infrastructure, particularly Project turbines, the MET towers, and the new gen-tie line, which would be taller than the existing transmission lines. The Project would work with landowners to minimize impacts to crop dusting where possible.

Given that the majority of existing land uses in the PPA would be able to continue during Project operation, impacts would be minor (see Section 3.11 for a discussion of economic impacts).

3.10.2.2 Land Ownership

Participating landowners would enter into lease and/or easement agreements with Silver Queen, such that land ownership would not change. These agreements would include details of any potential restrictions on land use for health and safety around Project infrastructure, commitments by Silver Queen in restoring disturbed areas, as well as roles and responsibilities of both Silver Queen and landowners in maintaining the lease/easement areas. These agreements would additionally stipulate decommissioning responsibilities and requirements, including securing and delivering Removal Bonds to landowners. Upon sale of a property, the lease/easement agreements would carry over to the new owner.

Silver Queen has additionally entered into a development agreement with Crawford County, in which multiple setbacks are required to allow for Project construction and operation and ensure current land uses would be protected (Appendix A). Given that land ownership would not change, but since lease/easement agreements would be permanent for the life of the Project, impacts on land ownership would be minor to moderate.

3.10.2.3 Public Facilities and Services

No public facilities would be displaced by the construction, O&M, or decommissioning of the Project. The public facility closest to a Project turbine would be the Five Mile House. During the public scoping process, the owners and operators of this facility expressed support for the Project and did not anticipate direct impacts to the facility.

3.10.2.4 Recreation

No public recreation areas would be displaced by the construction, O&M, or decommissioning of the Project. Recreation at nearby recreation areas would not be directly affected, although sensitive viewers in recreational areas could experience visual impacts (see Section 3.8). Recreation on private lands adjacent to construction areas, such as hunting, could experience direct and indirect temporary impacts from construction noise and activities. Similar impacts during O&M activities would occur but would be infrequent and intermittent. Since recreation areas would not be directly affected, and disruption to recreation on private land would primarily be temporary and dispersed across the PPA, impacts on recreation would be minor.

3.10.2.5 Transportation

The Project would have direct impacts on ground transportation during construction. Silver Queen would make temporary to short-term improvements to existing roads to accommodate construction vehicles. Improvements may include adding gravel, widening roadways, and repairing potholes, which would have minor beneficial impacts since this work would improve local road conditions. Conversely, traffic from large equipment and construction vehicles, including semi-trucks and work trucks, would increase during the 12- to 15-month construction period, causing temporary disruptions to local traffic. Silver Queen would have road use and maintenance agreements in place with Carroll and Crawford counties to obtain the appropriate access and use permits, and to minimize and mitigate impacts to area transportation and roadways, resulting in minor to moderate temporary impacts. The Project would not result in permanent impacts to the area's ground transportation.

Project construction and operation would have direct temporary and permanent impacts on air traffic generated by local and regional airports. The presence of tall construction cranes, turbines, and MET towers could require aircraft to route around or climb higher over the PPA. Silver Queen would follow FAA regulations for marking towers and implement the necessary safety lighting, including the use of an ADLS to safely manage lighting at night (see Section 2.2.1). The Project received a Determination of No Hazard for 170 turbine locations at 699 feet. Given that the maximum height of Project structures would be 615 feet, it is not anticipated that Project structures would have more than a minor impact on aircraft (see the Land Use section and Section 3.13 for a discussion of crop dusters aircraft safety, respectively).

3.10.2.6 Conservation Measures

Silver Queen is committed to implementing the following conservation measures for land use and public facilities derived from Section 5.1.2 of the 2015 PEIS to avoid or minimize land use, land ownership, and public facility impacts. In addition, many of the conservation measures listed in Sections 3.1, 3.2, 3.4, 3.5, and 3.8 would also help reduce these impacts. Measures address ways to minimize the area of disturbance, ensure public transportation is not substantially disrupted, and protect landowner property and livelihoods. The list of conservation measures can be found in Appendix D.

3.10.3 Environmental Consequences: No Action Alternative

The No Action Alternative would have no impact on land use and public facilities. Agriculture would likely continue to be the dominant land use in the PPA.

3.11 Socioeconomics

This section analyzes potential impacts from the Project to social and economic resources in the PPA. The general socioeconomic analysis in Sections 4.10 and 5.10 of the 2015 PEIS is incorporated herein by reference. The Project-specific affected environment and impacts are analyzed below.

3.11.1 Affected Environment

The PPA for socioeconomics includes Crawford and Carroll counties and the state of Iowa. Socioeconomics is an assessment of the social and economic conditions in a given area. Socioeconomic metrics are analyzed to determine how the Project may impact these conditions over the short- and long-term. Section 5.10.1 of the 2015 PEIS outlines 10 key measures of economic development: population, employment, unemployment, personal income, sales tax revenues, individual income tax returns, vacant rental housing, state and local government expenditures, state and local government employment, and recreation. Key measures of economic development relevant to the PPA are listed in Table 3.11-1.

Table 3.11-1. Key measures of economic development.

Economic Development Measures (Year)	Crawford County	Carroll County	Iowa
Population (2022) [a]	16,123	20,567	3,200,517
Employment (2023) [b]	7,677	10,696	1,679,879
Unemployment rate (2023) [b]	3.9%	2.6%	3.2%
Median household income (2017-2021) [a]	$55,552	$61,157	$65,429
Sales tax revenue (2023; 2022) [c, d]	DNA	$1,585,022	$4,146,354,794
Individual income tax revenue (2022) [c]	DNA	DNA	$5,159,743,866
Rental vacancy rate (2022) [a]	DNA	DNA	7.6%
State and local (county) government expenditures (2023; 2022) [c, e]	DNA	$25,234,468	$29,445,000,000
State and local (county) government employment (2023) [c, f]	DNA	145	261,000
Recreation sector income (2023; 2011) [c, g]	DNA	$149,589	$717,000,000

[a] U.S. Census Bureau 2022
[b] U.S. Bureau of Labor Statistics (BLS) 2023b
[c] Paulsen 2022
[d] Payer 2024
[e] National Association of State Budget Officers 2022
[f] BLS 2023a
[g] Otto et al. 2012
DNA = Data not available

As of 2022, an estimated 16,123 and 20,567 people resided in Crawford and Carroll counties, respectively (Table 3.11-1). This was a slight decrease (-0.9% and -2.4%) from 2020.

The largest employment sectors in the two counties by number of employees are manufacturing, health care and social assistance, and retail (Data USA 2023a, 2023b). The unemployment rate in Crawford County is higher than the statewide unemployment rate, while the unemployment rate in Carroll County is lower. Median household income in both Crawford and Carroll counties is slightly lower than the median household income statewide.

County sales tax revenue for Carroll County contributes $1,585,022 to state tax revenue. Sales tax revenue for Crawford County was unavailable. Income tax revenues and rental vacancies were unavailable for both Crawford and Carroll counties. Carroll County government expenditures total approximately $25,234,468, with 145 government employees. Both of these metrics were unavailable for Crawford County.

Income generated from recreation is $149,589 for Carroll County and was not available for Crawford County. However, income is likely generated from a number of recreational areas in the two counties, including Swan Lake State Park, Great Western Park, V&W Petersen Wildlife Management Area, and Yellow Smoke, among others.

3.11.2 Environmental Consequences: Proposed Action

Potential impacts from the Project on socioeconomics were assessed for the PPA. Section 5.10 of the 2015 PEIS outlines socioeconomic impacts of the construction and operation of wind energy facilities in the UGP Region. Details of that analysis are incorporated herein by reference; Project-specific impacts are discussed below. No conservation measures related to socioeconomics are identified in the 2015 PEIS, and none are deemed necessary here.

Project construction would create temporary direct and indirect beneficial impacts on the local economy. Direct impacts stem from Project wages and lease/easement payments to individuals, as well as procurement of Project supplies and equipment. The Project is expected to generate 300 to 400 short-term construction jobs over an estimated 1- to 2-year construction period. Project construction would require unskilled and skilled laborers such as supervisors, carpenters, iron workers, electricians, millwrights, and heavy equipment operators. The estimated number of construction jobs by classification and annual employment expenditures during construction are included in Table 3.11-2. While the salary of some of the workers is likely to be greater than the median household income in Crawford and Carroll counties, the relatively small number of workers (approximately 1 to 3% of the counties' populations, including construction and operations workers) would have a minor, temporary positive effect on overall county median household income.

Table 3.11-2. Anticipated Project construction jobs and employment expenditures.

Job Classification	Number of Jobs	Estimated Annual Salary per Person	Total Estimated Annual Salaries
Crane operators	10	$90,000	$900,000

Job Classification	Number of Jobs	Estimated Annual Salary per Person	Total Estimated Annual Salaries
Civil workers	30	$85,000	$2,550,000
Construction managers	4	$110,000	$440,000
Construction workers	100	$65,000	$6,500,000
Collection workers	25	$75,000	$1,875,000
Tower erectors	35	$75,000	$2,625,000
Transmission workers	30	$80,000	$2,400,000
Substation workers	25	$70,000	$1,750,000
Foundation workers	20	$85,000	$1,700,000
Testing and inspections	13	$140,000	$1,820,000
Design engineers	8	$110,000	$880,000
Total	**300**	**—**	**$23,440,000**

Local and state industrial businesses, such as aggregate and cement suppliers, wind turbine manufacturers, welding and industrial suppliers, hardware stores, automotive and heavy equipment repair, electrical contractors, maintenance providers, road construction contractors, and others, could also directly benefit by supporting Project construction.

Indirect impacts from Project construction and operation would occur as wages and other expenditures related to the Project subsequently circulate through the economy, creating additional employment, income, and tax revenue. Indirect, temporary beneficial impacts to the local economy would occur based on expenditures on goods and services from local and non-local workers, particularly to businesses such as restaurants, grocery stores, hotels, and gas stations in Denison and Carrol, Iowa. During construction, non-local workers would need temporary housing, which would moderately impact the area tax base and business revenue as workers stay in nearby hotels or rental properties and visit restaurants, grocery stores, and gas stations. If needed, temporary housing for workers would likely include available facilities in several towns throughout the area. These temporary direct and indirect contributions to the economy would last one to two years and would have a minor to moderate beneficial impact on the rural, agricultural community of the PPA.

Operations would permanently employ eight to 10 people over the life of the Project to carry out operation and maintenance activities of the wind farm and gen-tie line (Table 3.11-3). The Project would also likely intermittently contract with service providers for maintenance and repair activities. These permanent, beneficial impacts to the local economy based on this small workforce would be minor.

Table 3.11-3. Anticipated Project operation jobs and employment expenditures.

Job Classification	Number of Jobs	Estimated Annual Salary per Person	Total Estimated Annual Salaries
Turbine supplier site manager	1	$100,000	$100,000
Turbine technicians	6	$52,000	$312,000

Job Classification	Number of Jobs	Estimated Annual Salary per Person	Total Estimated Annual Salaries
Owner site manager	1	$115,000	$115,000
Assistant site manager	1	$85,000	$85,000
Administrative assistant	1	$31,200	$31,200
Total	**10**	**—**	**$643,200**

The operation of the Project also has the potential to create direct, permanent, moderate beneficial impacts on landowners and state and county tax bases over the anticipated 35-year life of the Project (Table 3.11-4). Private landowners participating in the Project would receive the most direct economic benefit from easement and lease payments for Project infrastructure and roads located on their properties, gaining a predictable supplementary income source over the Project lifespan. Overall, the Project is expected to pay approximately $21,000,000 in payments over the life of the Project to participating landowners. Current agricultural activities would be reduced in areas where agriculture would be displaced by Project infrastructure. A potential reduction in agricultural revenue would be minor and would be compensated as established in landowner agreements.

The Project is expected to generate approximately $1,746,548 annually in production taxes (approximately $884,400 for Crawford and Carroll counties, $35,542 for local townships [Hayes, Westside, Arcadia, and Washington], and $826,606 for local school districts). This would increase tax revenues that could subsequently benefit all residents by improving community services.

Table 3.11-4. Direct economic benefits from the Project.

Payment	Direct Beneficiary	Approximate Annual Total
Wind lease payments	Project landowners	$700,000
Operations and maintenance	8–10 employees	$617,660
Taxes	School districts, Crawford and Carroll counties, and Iowa	$1,746,548
Total		**$3,064,208**

Section 5.10 of the 2015 PEIS discusses potential impacts to property values from wind farm projects, indicating no evidence that wind turbines decrease property values. Hoen et al. (2013) concluded that there was no statistical evidence that home values near turbines were affected either after construction or after the site selection/project announcement. Another study also found “no unique impact on the rate of home sales near wind turbines.” The study did find a potential negative impact to property values near other types of infrastructure, such as major roads and electrical gen-tie lines (Hoen and Atkinson-Palombo 2016). It is anticipated that the Project would have similar implications on property values in the PPA to those described in the 2015 PEIS, although as the new gen-tie line would replace and follow an existing gen-tie line right-of-way, impacts would be negligible.

While the Project is expected to produce a net positive socioeconomic effect, there could be short-term, minor negative effects such as increased traffic during construction, resulting in transportation delays for local residents and workers, as well as an increased need for road maintenance due to the increased traffic, heavy equipment, and large vehicles. Silver Queen would have road haul agreements with both counties in place to ensure good road conditions throughout construction. Adverse effects in terms of county expenditures on transportation are therefore expected to be temporary and negligible.

Decommissioning activities at the end of the Project life would have similar short-term beneficial impacts to those described above for construction activities. Long-term impacts of decommissioning activities would include the loss of revenue from property easements, employment, and tax revenue, resulting in a moderate negative socioeconomic impact.

3.11.3 Environmental Consequences: No Action Alternative

No Project-related adverse or beneficial impacts to socioeconomics would occur under the No Action Alternative. Socioeconomic conditions in Crawford and Carroll counties would likely continue based on existing socioeconomic activities and trends.

3.12 Environmental Justice

Environmental justice has been defined as "the just treatment and meaningful involvement of all people, regardless of income, race, color, national origin, Tribal affiliation, or disability, in agency decision making and other Federal activities that affect human health and the environment so that people are fully protected from disproportionate and adverse human health and environmental effects (including risks) and hazards, including those related to climate change, the cumulative impacts of environmental and other burdens, and the legacy of racism or other structural or systematic barriers; and have equitable access to a healthy, sustainable, and resilient environment in which to live, play, work, learn, grow, worship, and engage in cultural and subsistence practices" (CEQ 2023c; 40 CFR 1508.1(g)(4) [2020]). In accordance with this definition, this section analyzes potential impacts on low-income and minority populations that may occur in the PPA to ensure they would not experience disproportionate impacts from the Project, as described further below.

3.12.1.1 Affected Environment

Executive Order 12898 and proposed updates to the CEQ's NEPA implementing regulations (CEQ 2023b, 2023d; 40 CFR 1500.2l) requires federal agencies to identify and address, as appropriate, any disproportionate and adverse human health or environmental effects of their actions, programs, or policies on minority and low-income populations. These impacts also include impacts of climate change, which can often disproportionately impact more vulnerable communities (National Climate Assessment [NCA]; Reidmiller et al. 2018).

The analysis area includes the census tract for direct and indirect impacts and the counties for indirect impacts. Census tracts within 4 miles of the PPA, where substantial visual impacts could

be expected to occur (see Section 3.8), were included in this analysis. This analysis includes census tracts 701, 705, 9601, 9602, 9604, and 9606 . For this Project, a minority population was identified by determining the percentage of minority residents for the census tract within 4 miles of the PPA. A low-income population was identified based on poverty rates for the population within these census tracts. Crawford and Carroll counties and the State of Iowa were selected as comparison areas to the census tracts. If the minority or low-income populations of the census tract exceeds 50% or exceeds the county or state levels by greater than 20% (i.e., "meaningfully greater than the general population"), the census tract is defined as a minority or low-income population (CEQ 1997).

Table 3.12-1 summarizes minority and low-income population data in census tracts 701, 705, 9601, 9602, 9604, and 9606, Crawford and Carroll counties, and Iowa, based on a 5-year estimate from 2018 to 2022. The majority populations in all census tracts were white, with no other ethnicity listed. Most of the census tracts had a lower minority and low-income percentage compared to their respective counties and the state (Table 3.12-1). In instances where the county or state had lower proportions of minority and low-income residents than the census tract, the difference was not "meaningfully greater than the general population." The largest minority group in Iowa was Hispanic (as race alone or in combination with one or more races).

As indicated in Table 3.12-1, the percentages of minority and low-income residents in census tracts do not exceed 50%, nor do the minority low-income residents exceed the respective county or state levels by greater than 20%. Therefore, according to CEQ guidance (CEQ 1997), no minority or low-income populations are in the PPA.

Table 3.12-1. Minority and low-income populations in the Environmental Justice Analysis Area (2018 – 2022).

Location	Total Population	Percent Minority [a]	Median Household Income	Percent Below Poverty
Crawford Co. Census Tract 701	1,799	22.1%	$60,648	11.8%
Crawford Co. Census Tract 705	1,897	4.6% [b]	$92,625	3.6%
Carroll Co. Census Tract 9601	3,282	6.8%[b]	$86,638	7.0%
Carroll Co. Census Tract 9602	2,991	5.8% [c]	$77,00	2.2%
Carroll Co. Census Tract 9604	4,324	9.7 %[d]	$54,628	10.9%
Carroll Co. Census Tract 9606	2,273	5.7 %[e]	$70,682	7.7%
Crawford Co.	16,450	36.8% [b]	$61,188	17.0%
Carroll Co.	20,728	6.8% [b]	$68,041	7.8%
Iowa	3,188,836	16.2 %	$70,571	11.1%

Source: U.S. Census Bureau 2022

[a] Minority is calculated by adding the populations for all non-white races and the population for white-Hispanic.

[b] Two largest minority groups were Hispanic and two or more races.

[c] Two largest minority groups were African American and two or more races.

[d] Two largest minority groups were Hispanic and African American.

[e] Two largest minority groups were two or more races and other race, not specified.

Co. = county

The Project is considered consistent with environmental justice policies by not affecting vulnerable populations within Crawford and Carroll counties that are meaningfully greater than the comparative populations). Residents would be expected to benefit from the Project through the creation of temporary and permanent jobs. Using the Climate & Economic Justice Screening Tool (CEJST), neither county's census tract was identified as being disadvantaged (CEQ 2023a). The EJ Screen tool was also used to identify communities that could face environmental justice issues based on other socioeconomic indicators, such as limited English speaking, under the age of five, and over the age of 64 (USEPA 2023b). All other socioeconomic indicators were below the 80th percentile, except for the below age five group, which was within the 80th to 90th percentile. Since no minority or low-income populations, as defined by the USEPA or CEJST, are expected to be impacted by the Project, no further analysis was conducted for climate change adaptation, and no conservation measures (e.g., installing "green" stormwater management features; USEPA 2023a) were identified for vulnerable communities. No mitigation regarding this Project is needed for environmental justice issues.

3.12.1.2 Environmental Consequences: Proposed Action

Environmental commitments for air quality, noise, visual resources, and health and safety would apply to the complete residential population in the census tracts within 4 miles of the PPA. No distinct minority or low-income populations have been identified in the analysis area; therefore, no disproportionate and adverse human health or environmental effects on these populations are expected from construction, operation, or decommissioning of the Project.

3.12.1.3 Environmental Consequences: No Action Alternative

The No Action Alternative would have no direct or indirect impacts on environmental justice. Since no distinct minority or low-income populations have been identified in the analysis area, ongoing activities would have no effect on these populations.

3.13 Health and Safety

Sections 3.8 and 3.15 of the 2015 PEIS discusses health and safety issues associated with wind energy development, including the occupational health impacts on workers and environmental health concerns for the public during the construction and operation of these facilities. Details are incorporated herein by reference, with a summary of the Project-specific issues assessed below.

3.13.1 Affected Environment

Based on the Project's layout, surrounding land uses, Project turbines, and other considerations, the Project presents a specific set of conditions related to worker and public health and safety, including Project-specific physical hazards, aviation safety, and ground transportation, as described below. In addition, a discussion of electric and magnetic fields (EMF), electromagnetic interference (EMI), infrasound, and hazardous materials are also included, given public concern about these issues in general.

3.13.1.1 Physical and Occupational Hazards

Project production, design, and surrounding land uses are typical of those described in the 2015 PEIS for a wind farm producing approximately 252 MW in an agricultural setting, therefore presenting similar health and safety risks.

As with any wind farm, the Project would present potential risks from natural disasters (e.g., earthquakes and storms), mechanical failure, human error, sabotage, or deliberate destructive acts. The Project would not present unusual intrinsic system vulnerabilities based on its design, and it is located in a rural area in the Midwest without a high potential for an earthquake or hurricane event or any particular human threat.

The Project would be located in area that can experience strong storms, including tornados, which range from approximately 40 to 318 mph , and derechos, which are widespread, long-lived windstorms with straight-line winds reaching at least 58 mph (Corfidi et al. 2024). Among the states in WAPA's UGP Region, Iowa has the highest average number of tornadoes per area (Section 4.4.1.7 of the 2015 PEIS). The windier months span from the end of September through the end of May, with average wind speeds of 10.8 mph. During calmer wind periods, the average wind speed is 8.8 mph (Weather Spark 2024). Tornadoes do not frequently occur in the PPA; since 1951, the National Centers for Environmental Information have documented that Crawford County has experienced one tornado, and Carroll County has experienced three tornadoes (NOAA 2024b). Derechos can occur in all six states of the UGP Region, but are most common in eastern South Dakota, eastern Nebraska, southern Minnesota, and Iowa, where they occur approximately once every two years (National Weather Service 2020). The PPA most recently experienced a strong derecho in August 2020, with winds that reached 100 to 140 mph across central Iowa, causing extensive damage to buildings, structures, and crops (National Weather Service 2020). Blizzards and ice storms can also occur in this region of Iowa. These storms present the risk of ice formation on turbine blades along with strong winds, which could result in ice throw from the blades that could create a hazard in adjacent areas.

Occupational hazards at the Project would include activities typical to the heavy construction and electric power industries, which includes working at heights, exposure to weather extremes, exposure to dangerous animals and plants, working around energized systems, working around lifting equipment and large moving vehicles, and working in proximity to rotating/spinning equipment. Workers are also potentially exposed to arc flashes, electric shocks, falls, and thermal burn hazards that can cause injury and death. Occupational hazards that occur at wind farms are addressed in depth in Section 3.8.1 of the 2015 PEIS.

3.13.1.2 Electric and Magnetic Fields and Electromagnetic Interference

EMF at the Project is not expected to differ from the conditions discussed in the 2015 PEIS but is discussed with regard to the Project due to public concern over the issue. Natural and manufactured sources of EMFs are commonplace in the U.S. Electric fields exist wherever an electric charge exists. A magnetic field exists when that charge is in motion (i.e., the flow of electrons to produce an electric current). EMFs are vector quantities, which means they have a

strength and a specific direction. The strength of an EMF decreases substantially with increasing distance from the source (National Institute of Environmental Health Sciences [NIEHS] 2018). The International Commission on Non-ionizing Radiation Protection (ICNIRP) and the Institute of Electrical and Electronics Engineers (IEEE) have issued guidelines for exposure to EMF (ICNIRP 1998, IEEE 2002).

At wind farms, the primary areas at which EMF exist include: 1) at the point of power injection into the high-voltage transmission or distribution grid; 2) near of the generator in each turbine's nacelle; 3) near any electrical transformer (i.e., transformers located at individual turbines and the Project Substation); or 4) near the power cables (collection lines) connecting the turbines to the Project Substation (see Section 3.8.2.2 of the 2015 PEIS). Research has shown that EMF levels at these locations (e.g., at most approximately 0.5 milligauss [mG] at the source) are well below the IEEE maximum permissible exposure levels at these EMF sources of 27.1 Gauss (G) for head and torso and 632 G for appendages (IEEE 2002, 2015 PEIS), and fade to negligible beyond 10 to 25 feet, with no detectable levels at ground level from the turbine nacelle or buried collection lines.

EMF levels at the Project are expected to produce the same low EMF as those discussed in the 2015 PEIS (see Section 3.8.2.2 of the 2015 PEIS). The Project gen-tie line would also serve as a source of EMF (see Table 3.13-1). EMF levels decrease sharply with increasing distance. As Table 3.13-1 shows, the magnetic field of a sample 230-kV gen-tie line decreases by 88% (from 57.5 to 7.1 mG) at 100 feet away from the gen-tie line and by 97% (from 57.5 to 1.8 mG) at 200 feet away from the gen-tie line. Furthermore, the EMF exposure is expected to be less than that generated by many common household appliances (see Table 3.13-2) and below the midpoint of the USEPA recommendations.

Table 3.13-1. Example EMF levels with increasing distance from a 230-kV power gen-tie line.

	Electric Field (kV)				Average Magnetic Field (mG)			
Transmission Line Voltage (kV)	At the Source	100 Feet Away	200 Feet Away	300 Feet Away	At the Source	100 Feet Away	200 Feet Away	300 Feet Away
230	2.0	0.3	0.05	0.01	57.5	7.1	1.8	0.8

Source: Lee et al. 1996

Table 3.13-2. EMF levels of common household appliances.

Appliance	Average Magnetic Field (mG)[a] Within 6 Inches	Average Magnetic Field (mG)[a] 4 Feet Away
Blender	30-100	0
Dishwasher	10-100	0-1
Microwave Oven	100-300	0-20
Electric Range	20-200	0-6
Refrigerator	0-40	0-10

Appliance	Average Magnetic Field (mG)[a] Within 6 Inches	Average Magnetic Field (mG)[a] 4 Feet Away
Vacuum Cleaner	100-700	0-10

Source: USEPA 1992

The potential for EMI at the Project has been analyzed (Appendix O) and is generally discussed in Section 3.8.2.3 of the 2015 PEIS. The potential microwave bands that may be affected by the installation of the Project operate over a wide frequency range (900– 23,000 megahertz) and provide a myriad of telecommunication services throughout the U.S. Wind turbines have the potential to impact these frequencies passively by creating a physical obstacle to the direct-line propagation of an electromagnetic wave, or it can result in destructive interference by electromagnetic emissions from the turbine. Fixed microwave links that rely on straight-line propagation and uninterrupted line-of-sight between transmitter and receiver can be impacted by the physical presence of turbines. Additionally, the areas immediately adjacent to turbines, also referred to as the Fresnel zone, can produce signal blockages.

3.13.1.3 Noise and Infrasound

The affected environment for audible noise is discussed in Section 3.4, including a description of anticipated audible noise levels from Project construction and operational activities. In addition to generally audible noise (typically, frequencies of 20 to 20,000 hertz [Hz]), infrasound (sound with frequencies in the range of one to less than 20 Hz) is commonplace in the U.S. As with EMF, infrasound at the Project is not expected to differ from the conditions discussed in the 2015 PEIS (see Section 3.8.2.5) but infrasound is discussed here due to public concern over the issue. Infrasound is created from natural sources, such as wind and any other natural motions that result in the slow oscillations of air, as well as manufactured sources, such as cars, industrial machinery, slow-moving fans, and other household appliances (Leventhall 2003, 2006). Infrasound can travel long distances with low attenuation. As presented in the 2015 PEIS, infrasound is generally not audible, including the infrasound produced by wind farms. There are currently no regulations limiting infrasound exposure levels.

3.13.1.4 Aviation Safety

The Project is not expected to pose a risk to commercial, military, or private flight safety. The FAA conducted an aeronautical study to assess the risk of the Project's proposed turbine locations, gen-tie line, and MET towers, and made a determination of no hazard to air navigation. As a condition to the determination, several FAA requirements would be implemented at the Project, including the installation of an ADLS, as covered in Section 2.1.1.

Due to the prevalence of agricultural land in the PPA, there is an increased likelihood of crop duster activity (e.g., pesticide applications from airplane or helicopter) in the vicinity of the Project. Crop dusters have been documented to strike unmarked towers and gen-tie lines, with incidents occurring in Carroll County as recently as 2022 (Hanson 2022). Risk surrounding crop dusting and wind energy facilities are primarily associated with the turn radius needed to safely maneuver, the turbulence turbine blades are purported to emit, and the potential shadow

flicker created from the rotation of the turbines (Manjooran 2013). These combined factors have led to concerns in the increased complexity of aerial applications to maintain crop productivity and pilot safety.

3.13.1.5 Hazardous Materials and Waste Management

Hazardous materials are defined by the USEPA and the Occupational Safety and Health Administration (OSHA) as any item or chemical which can cause harm to people's health, plant, or animals when exposed by spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment. Primary sources of hazardous materials are likely to be from the construction phase of the Project and include, but are not limited to, fluids and/or chemicals needed to perform primary maintenance on construction vehicles and equipment, compressed gas cylinders, cleaning solvents, paints, portable sanitary facilities, and pesticides. No known existing contamination is found in the PPA based on a review of USEPA's database (USEPA 2024a).

An additional potential source of hazardous materials is diesel exhaust emissions from construction activities, which is a known carcinogen that affects humans according to the National Health Institute (Silverman 2017). Details regarding air quality and environmental commitments to minimize and mitigate the effects of hazardous emissions can be found in Section 3.3. Potential waste materials generated from the construction, maintenance, and decommissioning of the Project include a range of liquid and solid materials generated from the use of industrial equipment. These materials would potentially include the aforementioned hazardous materials but could also include materials used in the packaging and transport of Project materials, such as lumber and paper. Construction-related debris such as lumber, stone, and brick are also potential sources of waste materials. Little waste is expected to be generated during the operation and maintenance phase of the Project, with the potential exception of sanitary waste from workforce support and industrial solid and liquid wastes resulting from routine cleaning and equipment maintenance and report.

3.13.1.6 Ground Transportation

Project access roads immediately within and adjacent to the Project are generally dirt and gravel roads, including a number of level B roads (Table 3.10-1).

3.13.2 Environmental Consequences: Proposed Action

Potential Project-specific impacts are discussed below, including those associated with physical hazards, EMF and electromagnetic interference, noise and infrasound, avian safety, and ground transportation. The remaining health and safety impacts applicable from the 2015 PEIS are incorporated herein by reference (see Section 5.13 of the PEIS).

3.13.2.1 Physical and Occupational Hazards

Hazards from damaged wind turbines resulting from thrown parts or collapsed towers, or ice throw from ice buildup on blades, are a consideration in this part of Iowa given the risk of

tornados, derechos, blizzards, and ice storms. However, few records of damage to wind turbines from derechos or tornadoes were found to be reported. Project turbines are designed to withstand up to 116 mph winds. In addition, turbines have built in mechanisms that lock and feather the blades when wind speeds exceed specified wind speeds to keep the blades from spinning at dangerous speeds (U.S Department of Energy 2018). For the Project model, turbines are shut down when wind speeds are greater than or equal to (GE Renewable Energy 2022):

- 58 mph (> 600-second duration)
- 69 mph (> 30-second duration)
- 78 mph (>3-second duration)
- 81 mph (instantaneous, sampled every 1 second) (GE Renewable Energy 2022)

The relative infrequency of these storms, the localized area that is generally affected, turbine design and safety measures, and lack of evidence of past damage indicate potential hazards from damaged or broken turbines due to high winds is low. However, the Fourth NCA (Reidmiller et al. 2018) predicted that Iowa and the rest of the Midwest are likely to increasingly experience extreme heat, drought, severe weather, heavy downpours, and flooding, with acute storm events occurring with increasing frequency and intensity (Scoping Comment 3-6, Appendix F). While potential impacts are currently not possible to accurately predict, it is anticipated that permanent impacts to Project infrastructure would occur, which could present health and safety hazards similar to those described below.

As discussed in Section 3.8.2.1 of the 2015 PEIS, both blade throw and ice throw rarely occur, based both on quality control standards for utility-scale wind turbine manufacture, and the turbine control software that triggers a turbine to stop rotating if ice buildup occurs. Setback standards help further minimize these potential safety hazards. Carroll and Crawford County set-back requirements (see Tables 2.2-2 and 2.2-3) are consistent with the recommended formula for a safe setback distance from residences (e.g., for ice-throw from turbine blades) in the 2015 PEIS, which is a distance 1.5 times the sum of the hub height and rotor diameter (Section 3.8.2.1 of the 2015 PEIS; Wahl and Giguere 2006). However, as noted in Section 3.4.2, Silver Queen has sited a majority of turbines at least 1,750 feet from occupied residences, well over the recommended distance. These setback requirements would minimize the risk of physical damage from falling parts or ice throw to nearby residences. The county setback requirements for roadways and gen-tie lines are at 1.0 (Carroll County) and 1.1 times (Crawford County) the total height, which would be up to 615 feet, consistent with industry standards. These setback distances help minimize the risk that should a tower collapse, it would not fall on residences, roads, or gen-tie lines. Occupational hazards would be addressed by Project adherence to the safe work practices and worker training requirements of OSHA's Electric Power Generation, Transmission and Distribution standard, 29 CFR 1910.269 (OSHA 2015).

3.13.2.2 Electric and Magnetic Fields and Electromagnetic Interference

Potential health effects from EMF have been extensively studied; however, results show no evidence of a link between EMF exposure and health, including cancer (NIEHS 2018). In addition, given that EMF levels within the wind farm and along the Project gen-tie line would be

well below the IEEE occupational and general public maximum permissible exposure levels (IEEE 2002), lower than many common household appliances (USEPA 1992), and below the midpoint of the USEPA's recommendations, no health impacts from the Project are anticipated.

While the effects of EMI are not recognized as a direct risk to human health, interference of telecommunication frequencies could potentially impact communications to and from emergency services, and thus could be categorized as a safety hazard. In a microwave study conducted on Project infrastructure locations, a total of seven microwave paths were located within the PPA. Of those seven paths analyzed, one path's Fresnel Zone intersected with one Project turbine. The proposed turbine location was shifted a short distance to eliminate potential impacts to the interference of this microwave path. Additional studies were conducted to assess impacts to Global Positioning Systems, AM and FM radio, television and wireless internet, and registered frequencies used by local emergency services. These analyses identified no impacts to any of these resources from Project infrastructure (see Appendix O).

3.13.2.3 Noise and Infrasound

Potential impacts associated with noise are discussed in Section 3.4. Potential effects from infrasound are discussed below.

There have been concerns and studies into whether a "wind turbine syndrome" exists, in which low-frequency noise, such as from the "swish" of turbine blades, or infrasound from turbine blade rotation, could cause a variety of symptoms, such as sleep problems, headaches, dizziness, and anxiety (Pierpoint 2006). However, recent studies have found no causal link between these or other illnesses and the proximity of a resident to a wind farm (Colby et al. 2009, Ellenbogen et al. 2012, Roberts 2018). The infrasound levels from contemporary wind turbines are lower than those that have been shown to cause harm, such as the high-intensity infrasound aircraft maintenance workers encounter (Roberts 2018). Instead, studies have linked the experience of adverse human health effects to individual perceptions and attitudes about wind farms (Ellenbogen et al. 2012).

3.13.2.4 Aviation Safety

While it has been determined that the Project would have no important impact on commercial, private, or military flight safety, the continued applicability of aerial crop dusting in the PPA would likely be of concern to surrounding land and business owners. Aerial crop dusting ideally occurs during low wind conditions to reduce both the effects of spray drift and turbulence. These are the conditions in which wind turbines are typically non-operational and pose little threat to maneuverability for pilots. While the turbine may be non-operational during ideal application conditions, it still poses a potential safety threat as an obstacle for a pilot. The new gen-tie line would also be taller and larger than the existing gen-tie line and could pose a hazard to pilots based on proximity to treated fields. Pilots regularly plan for obstacles commonly encountered in their flight path including, but not limited to, power lines, agricultural infrastructure, trees, and occupied residences. To ensure that pilots can properly prepare for these obstructions in their flight path, Silver Queen has committed to all applicable FAA

regulations and would install ADLS to aid in visibility of turbines. Silver Queen would coordinate with landowners should crop dusting be needed. In addition, unmanned drones are being more frequently used for crop dusting, removing risk to pilots.

3.13.2.5 Hazardous Materials and Waste Management

Hazardous materials and waste generated from Project activities are not expected to differ from those discussed in Section 3.9 of the 2015 PEIS. Construction, operation, and decommissioning activities at the Project would require the use of some hazardous materials; however, minimal amounts would be present during Project operation. Hazardous and waste materials acquisition, transport, storage, use, and disposal would follow all applicable federal and state regulations. A Phase I Environmental Site Assessment was conducted to ensure the Project would not affect any areas of potential contamination of hazardous substances that could pose a risk to human health and the environment.

3.13.2.6 Ground Transportation

The width and substrates of many of the Project access roads would unlikely support the large vehicles that would be used to transport equipment and parts, such as cranes and turbine blades. Therefore, as discussed in Sections 2.1.1 and 3.10, Silver Queen would upgrade these roads to ensure safe and reliable transportation for workers and the general public. Silver Queen has executed road haul agreements with the counties to minimize and mitigate impacts to area transportation.

3.13.2.7 Conservation Measures

Silver Queen is committed to implementing the conservation measures for health and safety derived from Section 5.13.4 of the 2015 PEIS, which would help avoid or minimize health and safety impacts associated with the Project. Measures address potential risks from physical harm from construction equipment and vehicles, turbines, transmission lines; as well as the potential for contamination from fuels and other hazardous materials. In addition, many conservation measures listed for soils and water would help reduce health and safety impacts.

3.13.3 Environmental Consequences: No Action Alternative

The No Action Alternative would have no direct or indirect impacts on health and safety. Existing activities, such as farming and crop-dusting activities near existing gen-tie lines, would likely continue. These types of activities have inherent occupational health and safety hazards. Health and safety risks resulting from climate change would not be expected to increase.

4.0 Cumulative Impacts

This section analyzes the potential cumulative impacts to resources of past, present, and reasonably foreseeable federal and non-federal actions when added to the effects from the Proposed Action or No Action Alternatives. Of note, this EA addresses climate change as an environmental trend contributing to cumulative effects on resources. Effects of climate change

on the Project under the Proposed Action are discussed in Sections 3.1, 3.2, and 3.13; while the Project effects on climate change are discussed in Section 3.3.

The general cumulative impacts of past, present, and future actions on resources within the UGP Region are analyzed in Section 6 of the 2015 PEIS (see Table 6.3-2 of the 2015 PEIS) and are incorporated herein by reference. The contribution of cumulative impacts associated with the Proposed Action falls within the scope of the cumulative impacts analysis in the 2015 PEIS. Impacts would be avoided, minimized, and mitigated during the construction and operation of the Project through the implementation of conservation measures.

The Cumulative Analysis Area for the purpose of this analysis is Crawford and Carroll counties, which includes existing industrial wind farms in the vicinity (within 10 miles) of the Project (Figure 4.0-1). No operating or proposed renewable energy facilities are within or directly adjacent to the Project. The closest operating wind farms include the Victory Wind Project, consisting of 66, 1.5-MW turbines approximately 4.4 miles north; the Carroll Wind Project, consisting of 100, 1.5-MW turbines approximately 5.3 miles north; and the Carroll Area Wind Project, consisting of nine 2.3-MW turbines approximately 6.9 miles. Other wind projects occur further away but are not assessed here since wind turbines are no longer a dominant feature of the landscape past approximately 4 miles, and other resources would not likely be substantially affected past the Project counties (see Section 3.8.2). One other potential large-scale development near the Project, the proposed Summit Carbon Solutions CO_2 Pipeline, could bisect the Project gen-tie line near the Denison Substation (Summit Carbon Solutions 2023). Other past and current actions that would contribute to cumulative effects primarily include agricultural land use, including cultivated crops and cattle pasture. As of 2017, approximately 95% and 97% of land in Carroll and Crawford counties, respectively, was used for agriculture, primarily for cultivated crops (USDA National Agricultural Statistics Service 2017).

The Fourth NCA describes the Midwest region as expecting extreme heat, drought, severe weather, heavy downpours, and flooding from future climate change (Reidmiller et al 2018). These events could affect health and safety, air, water quality, and other resources as evaluated in this EA (Table 4.0-1). Climate change impacts on each resource covered in this EA continue to occur over time and are complex, particularly in regard to vegetation and wildlife. Thus, these effects are not reasonably foreseeable at this time. Other potential impacts, particularly to soil and water, may be more easily assessed, as summarized in Table 4.0-1, along with other potential cumulative effects on resources for the Proposed Action and No Action Alternatives.

While the Proposed Action Alternative would avoid impacts to the greatest extent possible during construction, operation, and decommissioning, if the No Action Alternative were to be implemented, impacts resulting from the other past, present, and reasonably foreseeable actions in the vicinity of the Project could continue. With the implementation of conservation measures for each resource, the cumulative impacts from the Proposed Action Alternative on the evaluated resources would be minor, with the exception of visual resources. However, visual impacts are within the scope of the 2015 PEIS, and the applicable conservation measures from the PEIS would be implemented to minimize impacts.

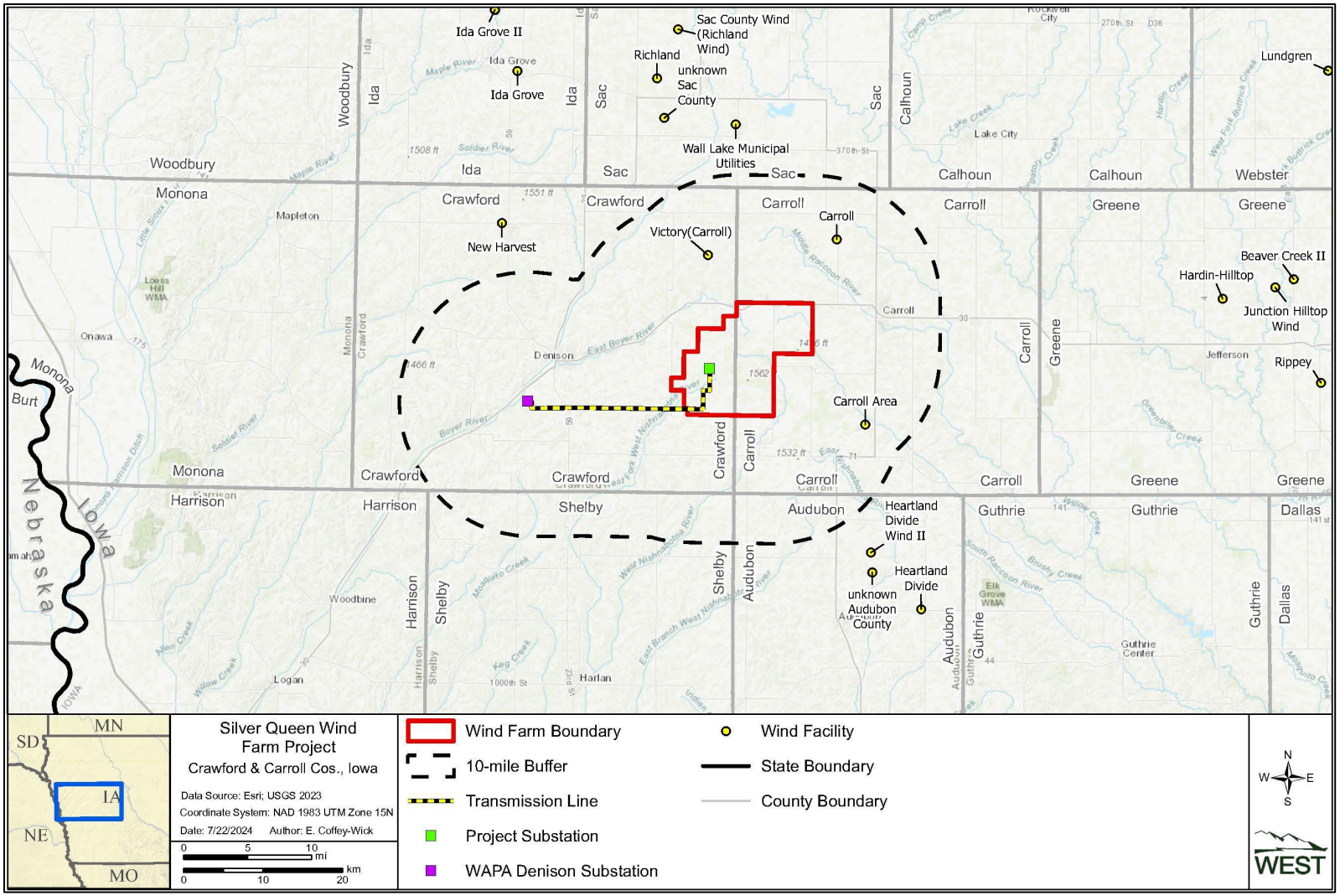

Figure 4.0-1. Existing wind farms in the Cumulative Analysis Area.

Table 4.0-1. Discussion of cumulative impacts of the Project.

Resource	Cumulative Impacts of the Proposed Action	Effect from Past, Present, and Reasonably Foreseeable Actions of the No Action Alternative
Geology – Soils and Paleontology	Project construction could contribute incrementally to potential wind and water soil erosion, compaction, and soil contamination along with ongoing farming activities and the proposed Summit Carbon Solutions Carbon Dioxide (CO_2) Pipeline (Summit CO_2 Pipeline). The contribution to cumulative impacts would be temporary and minor with the implementation of proposed conservation measures. In addition, Project operation could contribute to increased soil erosion at waterbody crossings of new permanent access roads should installed bridges and culverts be sized inadequately for the anticipated increase in flood frequency and intensity due to climate change. Silver Queen's coordination with the IDNR and counties regarding floodplain permitting would minimize potential impacts.	The No Action Alternative would result in continued, long-term potential wind and water soil erosion, compaction, and soil contamination from ongoing farming activities, along with construction of the proposed Summit CO_2 Pipeline.
Water Resources	Project construction could contribute incrementally to increased water use and decreased water quality due to stormwater runoff from construction areas, along with ongoing farming activities and the proposed Summit CO_2 Pipeline. The contribution to cumulative impacts would be temporary and minor with the implementation of proposed conservation measures. In addition, Project operations could contribute incrementally to altered stream flows and floodplain function at waterbody crossings of permanent new access roads along with the anticipated increase in flood frequency and intensity due to climate change. As noted for soils, cumulative impacts would be minimized through Silver Queen's coordination with the IDNR and counties for floodplain permitting.	The No Action Alternative would result in continued, long-term water use and potential decreased water quality due to ongoing farming activities, along with construction of the proposed Summit CO_2 Pipeline.
Air Quality and Climate	Project construction would have a minor contribution to decreased air quality from construction emissions of GHGs and other air pollutants, along with ongoing farming activities; however, the contribution would be negligible. The contribution to cumulative impacts would be temporary and negligible with the implementation of proposed conservation measures. Project operation would contribute incrementally to beneficial impacts by reducing GHG emissions and subsequent climate change through the production of renewable energy that would reduce the use of fossil fuels, along with the three other operating wind farms, and with the sequestration of CO_2 resulting from the operation of the proposed Summit CO_2 Pipeline.	The No Action Alternative would result in the continuation of existing emissions of GHG and other air pollutants resulting from ongoing farming activities. The contribution to the reduction in GHG emissions and climate change would be smaller based on the continued operation of the three operating wind farms, along with CO_2 sequestration resulting from operation of the proposed Summit CO_2 Pipeline.

Resource	Cumulative Impacts of the Proposed Action	Effect from Past, Present, and Reasonably Foreseeable Actions of the No Action Alternative
Noise	Construction and operation of the Project would contribute incrementally to increased noise at sensitive noise receptors, particularly occupied residences, along with ongoing farming activities, traffic, wind, and the potential construction of the Summit CO_2 Pipeline. The contribution to cumulative impacts would be minor with the implementation of proposed conservation measures.	The No Action Alternative would result in the continuation of increased noise at sensitive noise receptors due to ongoing farming activities, traffic, wind, and construction of the Summit CO_2 Pipeline.
Vegetation	Project construction could contribute incrementally to the spread of invasive and noxious weeds and a temporary loss of vegetative cover, along with ongoing farming activities and the proposed Summit CO_2 Pipeline. The contribution to cumulative impacts would be temporary and minor with the implementation of proposed conservation measures. In addition, operation of the Project would contribute incrementally to the long-term conversion of disturbed grassland (pasture and field edges) to a developed (industrial) use, along with the three other operating wind farms. Cumulative impacts would be minor given the relatively small areas affected.	The No Action Alternative would result in the continued potential spread of invasive and noxious weeds through ongoing farming activities and construction of the proposed Summit CO_2 Pipeline.
Wildlife	Project construction would contribute incrementally to the disturbance, displacement, and potential mortality of common wildlife and fish, primarily in pasture, field edges, and riparian and aquatic habitats, along with ongoing farming activities and construction of the proposed Summit CO_2 Pipeline. The contribution to cumulative impacts would be temporary and minor with the implementation of proposed conservation measures. Operation of the Project would contribute incrementally to the long-term disturbance, displacement, and mortality of wildlife, primarily birds and bats through turbine collisions, along with the three operating wind farms. In addition, habitat offsets for federally listed bat species would benefit general wildlife. Given the low-quality habitat for birds and bats in the PPA, including the lack of woodland habitat, and since the Project and other operating wind farms do not occur in a major avian migratory flyway, cumulative impacts would be minor.	The No Action Alternative would result in continued disturbance, displacement, and potential mortality of common wildlife and fish from ongoing farming activities, construction of the proposed Summit CO_2 Pipeline, and three operating wind farms in the Cumulative PPA.
Threatened and Endangered Species	Project operation would contribute incrementally to potential mortality or injury of NLEBs and TRBAs from turbine collisions during the migration seasons, along with the three other operating wind farms. Given the low-quality bat habitat in this part of Iowa, including the lack of woodland habitat, and with the implementation of proposed conservation measures and habitat offsets, cumulative adverse impacts to NLEBs and TRBAs would not be significant. Similarly, the Project and three other operating wind farms could disturb potential habitat of the western prairie fringed orchid, although the species is not expected to occur at the Project based on the lack of undisturbed habitat. With implementation of the 2015 PEIS consistency form for the species, the Project would contribute discountable cumulative impacts on the western prairie fringed orchid.	The No Action Alternative would result in continued potential mortality or injury of NLEBs and TRBAs from turbine collisions at the three operating wind farms, although assuming the wind farms are operating in compliance with the ESA, impacts are likely avoided or minimized.

Resource	Cumulative Impacts of the Proposed Action	Effect from Past, Present, and Reasonably Foreseeable Actions of the No Action Alternative
Visual Resources	Project construction would contribute incrementally to visual impacts in the rural setting of the Project, including from construction of the Project gen-tie line in conjunction with construction of the proposed Summit CO_2 Pipeline. The contribution to these cumulative impacts would be minor given that impacts would be localized and temporary. Turbine operation would contribute to visual impacts from existing wind farms, particularly those with turbines within 4 miles of the Project. The contribution to cumulative impacts would be minimized through use of an ADLS at the Project, which would substantially reduce visual impacts from turbine lighting at night. Cumulative daytime impacts would likely be minor to moderate on occupied residences where more than one of the wind farms are visible; 35 turbines from the adjacent Carroll and Victory wind farms fall within 4 miles of the Wind Farm Boundary (Figure 4.0-2). These impacts are within the scope of the 2015 PEIS analysis and would follow the applicable conservation measures.	The No Action alternative would result in the continuation of existing visual impacts from the three operating wind farms, particularly for occupied residences where more than one wind farm is visible.
Cultural Resources	The Proposed Action is not expected to contribute to cumulative impacts on cultural resources given that none have been found in the PPA based on the cultural analysis to date. Should cultural resources be found during construction, Silver Queen would follow the conservation measures outlined in Section 3.9.2 to minimize potential impacts. With the implementation of conservation measures, even if unanticipated cultural resources were encountered, cumulative impacts would be minor.	The No Action Alternative is not expected to result in cumulative impacts on cultural resources since no cultural resources occur in the PPA based on the cultural analysis to date, and the three operating wind farms have completed construction and are not likely to have any new impacts on cultural resources.
Land Use and Public Facilities	Operation of the Project, along with the three operating wind farms, would contribute to cumulative land use impacts through the long-term conversion of agricultural land, including prime farmland, to a developed (industrial) use. The contribution to cumulative impacts would be minimized since agricultural practices could continue on land surrounding the wind farm infrastructure.	The No Action Alternative would result in the continuation of existing agricultural uses within the PPA; however, long-term loss of agricultural land to a developed (industrial) use would continue outside the PPA through operation of the three other wind farms.
Socio-economics	Project construction would contribute to short-term beneficial impacts to the local economy through increased employment, income, and expenditures at local businesses in Crawford and Carroll counties, along with existing agricultural operations and construction of the proposed Summit CO_2 Pipeline. Project operation would contribute to long-term beneficial cumulative impacts from employment of Project operational staff, procurement of supplies and services for maintenance activities, compensation to landowners from lease and easement agreements, and increased tax bases, along with similar contributions from the three operating wind farms.	The No Action Alternative would result in long-term contributions to the local economies in Crawford and Carroll counties from ongoing agricultural operations and the three operating wind farms.

Resource	Cumulative Impacts of the Proposed Action	Effect from Past, Present, and Reasonably Foreseeable Actions of the No Action Alternative
Environmental Justice	The Project would not contribute to cumulative environmental justice impacts since there are no minority or low-income populations in the PPA.	The No Action Alternative would not have cumulative impacts on minority or low-income populations.
Health and Safety	Project construction would contribute to short-term cumulative impacts from health and safety risks to workers and residents in the two counties from construction equipment, activities, and vehicles traveling on local roads, along with ongoing farming activities and construction of the proposed Summit CO_2 Pipeline. The contribution to cumulative impacts would be minimized or avoided with proposed conservation measures. Operation of the Project, along with the three operating wind farms, would contribute to long-term cumulative impacts from safety risks to employees and county residents, primarily due to potential physical and/or electrical hazards from electrical gen-tie lines, the substation, and wind turbines. The implementation of proposed conservation measures, along with industry safety standards, would minimize and avoid potential impacts.	The No Action Alternative would result in continued long-term health and safety risks to workers and residents in the two counties from ongoing farming activities, construction of the proposed Summit CO_2 Pipeline, and operation of the three other wind farms.

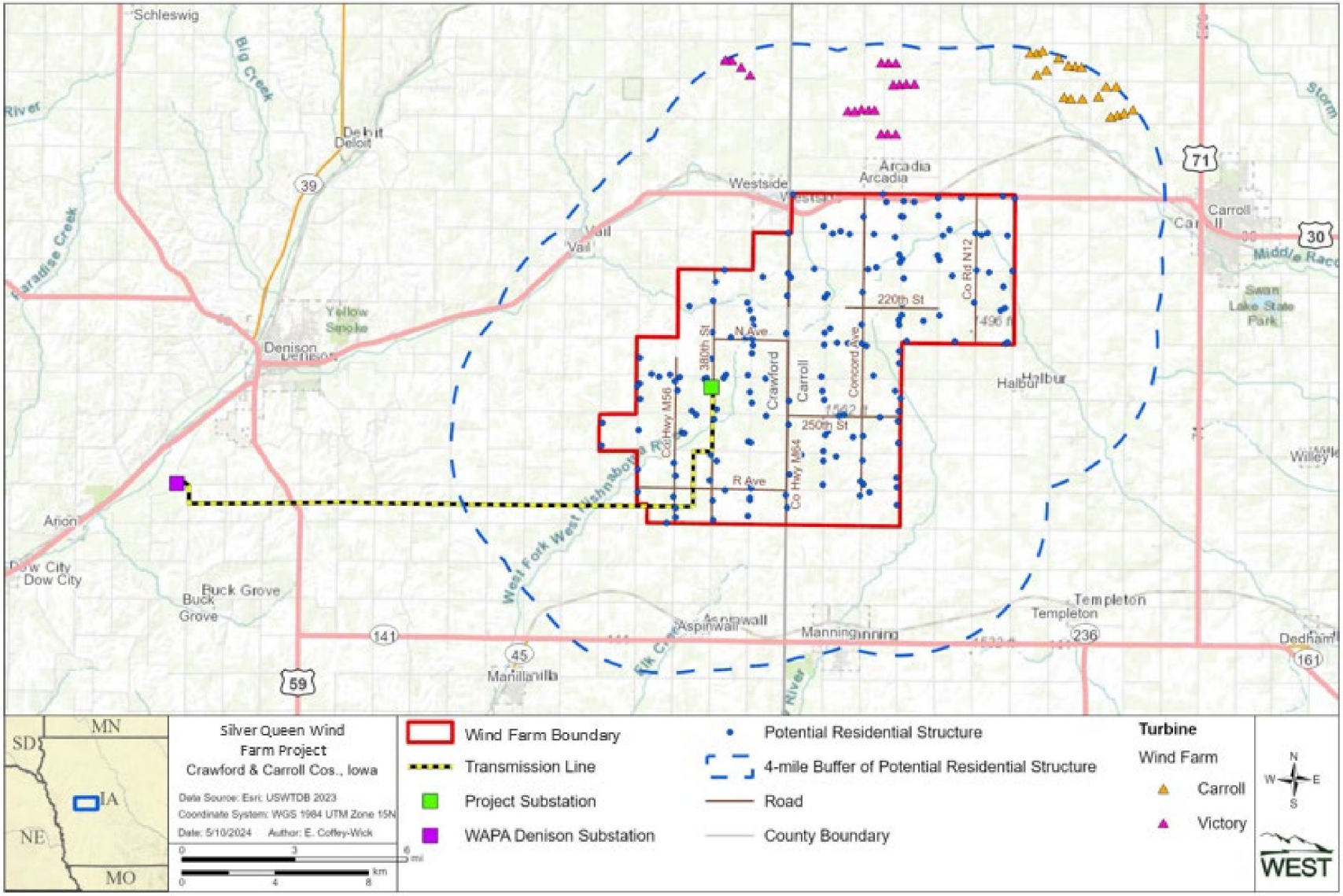

Figure 4.0-2. Turbines from neighboring wind projects within 4 miles of proposed Project turbines.

5.0 Consultation and Coordination

WAPA held a public scoping comment period from November 1 – 29, 2023, to provide the general public, government agencies, tribal governments, and others to identify issues and alternatives that would help WAPA define the scope of the EA. An agency scoping meeting was held online via a Zoom Webinar on October 30, 2023, and a public scoping meeting was held in person on November 1, 2023, in Denison, Iowa. Agency staff were also invited to attend the in-person public scoping meeting. Federal, state, local agencies, and tribal governments were invited to the meeting via letter to provide comments regarding the Project. Landowners within and adjacent to the PPA were invited via letter to attend and/or provide comments, as was the general public through announcements in the Bulletin-Review, the newspaper of record for Crawford County, and the Carroll Times Herald, the newspaper of record for Carroll County.

Fourteen agency staff attended the agency scoping meeting, and 46 individuals attended the public scoping meeting. Twenty-three submittals (comment forms and e-mails) were received by WAPA from county, state, and federal agencies, as well as landowners in and near the PPA. The submittals contained 61 individual comments relating to different aspects of the Project. The public scoping meeting documentation is included in Appendix P. Scoping comments and WAPA's responses are included in Appendix F. Information from scoping comments was reviewed and incorporated into the Draft EA, as applicable.

Following completion of the Draft EA, agencies, the public, and other interested parties will be invited to review and comment on the document during a 30-day public review period.

5.1 Federal Agencies

The federal agencies that were contacted for the purpose of the EA scoping process include the following:

- BIA, Great Plains Regional Office
- FAA Central Region
- Federal Energy Regulatory Commission, Office of Energy Projects
- FSA, Carroll Service Center
- FSA, Denison Service Center
- Midwest Reliability Organization
- NRCS, Carroll Service Center
- NRCS, Denison Service Center
- State FSA
- USACE Rock Island Regulatory District
- USDA Upper Midwest Region
- USDA, Rural Utilities Service, Water and Environmental Program
- USEPA, Region 7
- U.S. Federal Highway Administration, Iowa Division
- USFWS, Illinois-Iowa Ecological Services Field Office

- USFWS, Midwest Region Headquarters
- USGS, Midcontinent Region
- U.S. House of Representatives
- U.S. Senate

The USEPA and BIA have submitted scoping comments (Appendix F).

5.2 State and Local Agencies

The state and local agencies that were contacted for the purpose of the EA scoping process include the following:

- Environmental Protection Commission
- Iowa Department of Agriculture
- IDNR
- IDNR Field Services and Compliance Bureau
- Bald Eagle Nest Reporting
- Iowa DOT, Region 3
- Iowa Governor's Office
- Iowa House of Representatives, District 11
- Iowa House of Representatives, District 12
- Iowa Secretary of State
- Iowa Senate, District 6
- Iowa SHPO
- Iowa Utilities Board
- Soil and Water Conservation District Region 5
- Crawford County Auditor & Commissioner of Elections
- Carroll County Auditor
- Crawford County Conservation Board
- Carroll County Conservation Board
- Ar-We-Va Community School District
- Boyer Valley Community School District
- Charter Oak-Ute Community School District
- Denison Community School District
- Schleswig Community School District
- East Sac School District
- IKM Manning School District
- Maple Valley-Anthon-Oto School District
- OABCIG School District
- Carroll Community School District
- Corn Belt
- NIPCO
- Carroll County Historical Society

- Crawford County Historical Society
- Carroll Soil and Water Conservation District
- Crawford Soil and Water Conservation District
- Crawford County Historic Preservation Commission

The SHPO has submitted scoping comments (Appendix F).

5.3 Native American Tribes and Associated Bodies

Pursuant to Section 106 of the NHPA, WAPA initiated tribal consultations with the following tribes by letter on July 20, 2023:

- Apache Tribe of Oklahoma
- Iowa Tribe of Oklahoma
- Otoe-Missouria Tribe of Indians, Oklahoma
- Iowa Tribe of Kansas and Nebraska
- Omaha Tribe of Nebraska
- Sac & Fox Nation of Missouri in Kansas and Nebraska
- Menominee Indian Tribe of Wisconsin
- Sac & Fox Tribe of the Mississippi in Iowa
- Sac & Fox Nation, Oklahoma

No responses have been received from the tribes as of the date of this document.

5.4 Non-Governmental Organizations

The non-governmental organizations that were contacted for the purpose of the EA scoping process include the following:

- Midwest Reliability Organization
- Sierra Club
- The Nature Conservancy
- Ducks Unlimited
- Iowa Audubon
- Iowa Natural Heritage Foundation

6.0 List of Preparers

Table 6.0-1 identifies the personnel responsible for the preparation of this EA.

Table 6.0-1. List of EA preparers.

Agency/Firm and Staff Name	Title
WAPA	
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WEST	
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Julie Dickey	Deputy Project Manager, Consulting Ecologist and NEPA Analyst
Kirsten Frahm	NEPA Analyst, Wildlife Biologist, Botanist, and Wetland Delineator
Arin Thacker	NEPA Analyst, Wildlife Biologist
Moira Snuffer	NEPA Analyst, Soil Specialist and Wetland Biologist
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Davey Young	NEPA Analyst
Elyse Coffey-Wick	GIS Specialist
Andrea Palochak	Technical Editor

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