

JIM KELLY FIELD AIRPORT // KLXN

LEXINGTON, NEBRASKA

DRAFT ENVIRONMENTAL ASSESSMENT

FOR

Release of 7.1 acres of Aeronautical Land for a Non-aeronautical Use as a
solar photovoltaic electricity generating facility

and other work as described within the EA.

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Lexington, Nebraska

This environmental assessment becomes a Federal document when evaluated, signed,
and dated by the Responsible Federal Aviation Administration (FAA) Official.

Responsible FAA Official

Date

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ACRONYMS

ALP	Airport Layout Plan
APE	Area of Potential Effect
CEQ	Council on Environmental Quality
DOT	US Department of Transportation
EA	Environmental Assessment
EIS	Environmental Impact Statement
EJ	Environmental Justice
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
GA	General Aviation
LAA	Lexington Airport Authority
LXN	Jim Kelly Field Airport (Code)
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NPL	National Priority List
NPPD	Nebraska Public Power District
NWI	National Wetlands Inventory
PPA	Power Purchase Agreement
PV	Photovoltaic
RNAV	Area Navigation

SGHAT	Solar Glare Hazard Analysis Tool
SHPO	State Historic Preservation Office
SWPPP	Stormwater Pollution Prevention Plan
USFWS	US Fish and Wildlife Service
VOR	Very High Frequency Omni-Directional Radar

1.0 Proposed Action

1.1 Introduction

The Lexington Airport Authority (LAA) is proposing the release of approximately 7.1 acres of airport property at Jim Kelly Field Airport (KLXN), in the form of a long-term lease, with Sol CES Projects, LLC (1101 Connecticut Ave NW, Suite 200; Washington, D.C. 20036), for the purpose of constructing and operating the Lexington II Community Solar Project (the solar project). The project location is shown in **Figures 1**.



Figure 1. Proposed Solar Project Site at Jim Jelly Field Airport, Lexington, Nebraska

Because the land is designated for aeronautical uses and the lease for solar would change the use to non-aeronautical, the release of airport land requires approval from the Federal Aviation Administration, which is a Federal Action as defined by the National Environmental Policy Act

(NEPA). This Environmental Assessment (EA) has been prepared to support the FAA's evaluation of the proposed release of the Jim Kelly Field Airport property and to meet its obligations under NEPA.

The impacted airport property was purchased using federal funds (see ALP Property Map, Parcel 2, Date: 1951, Project: 9-25-024-103) and, based on FAA Order 5050.4B, requires FAA approval prior to redesignation of the airport property to non-aeronautical purposes. The Proposed Project would affect approximately 7 acres of airport property and, in accordance with FAA Order 1050.1F, is not eligible for a categorical exclusion as the solar project will occupy more than 3 acres of airport property, requiring the preparation of the EA (FAA 2015). The EA is prepared by the sponsor with support from project partners and is used by the FAA to provide sufficient environmental documentation to determine the need for an Environmental Impact Statement (EIS) or that a Finding of No Significant Impact (FONSI) is appropriate.

1.2 Proposed Action

The Proposed Action is the release of airport property currently designated for aeronautical uses to a non-aeronautical use as a solar power generation facility, referred to as the Lexington II Community Solar Project.

The land to be leased for the proposed solar facility is 7.1 acres of land to the east of the runway at LXN. Of the lease area, the solar PV facility will occupy about 6.5 acres. It will be comprised of 3,200 solar photovoltaic modules (or panels) which convert sunlight to electricity. The panels will be attached to a racking system raised above the ground and secured by driven piles. The racking system will support a single axis tracking system whereby the solar panels move and track the path of the sun during the day to keep the surface of the solar panels perpendicular to the sun and maximize electricity generation efficiency. When extended at its steepest angle (at the beginning and end of the day), the panels rise to a maximum of 8 feet above ground level. The facility will include 8 inverters which convert the DC power generated by the panels to AC providing power that is compatible with transmission on the electric grid.

The project site will be surrounded by a 7-foot tall chain link fence for public safety and security. The power will be transmitted through a new underground power cable buried along North Airport Road to a utility junction box about 750 feet north of the facility where the power will interconnect to the regional electric grid. The City of Lexington will be purchasing solar generated electric energy from the solar panel system from the project owner through a power purchase agreement (PPA) to provide residents with a clean energy alternative.

The land will be leased for a 25-year period after which it could be returned to an aeronautical use if warranted. The LAA is not using the subject land for aeronautical uses and does not plan to use the land for aeronautical uses during the term of the proposed lease. The LAA will receive a regularly scheduled lease payment as compensation for the land lease which will provide it with a certain alternative revenue stream for the land to support the aviation operations at LXN. In its oversight role in grant assurances, the FAA will review the lease arrangements to ensure that the proposed land use is the highest and best non-aeronautical use and meets the fair market value test. In addition, the FAA will also conduct an aeronautical study to ensure that it complies with airspace safety and the FAA's Interim Solar Policy.

In addition to the FAA approvals, the project will require a state electrical permit, a building permit from the city, and an interconnection agreement with the municipal utility system subject to review by the Nebraska Public Power District.

2.0 Purpose and Need

2.1 Introduction

This EA has been prepared in compliance with requirements set forth in the National Environmental Policy Act (NEPA) of 1969, as amended, the regulations of the President's Council on Environmental Quality (CEQ) for NEPA compliance, and the Federal Aviation Administration (FAA) Orders of 1050.1F (Environmental Impacts: Policies and Procedures) and 5050.4B (National Environmental Policy Act Implementing Instructions for Airport Actions). NEPA review is triggered when federal agencies are required to take action, such as issuing permits, approving plans, providing financial assistance, or modifying regulations. An EA is

used to provide sufficient environmental documentation to determine whether the project complies with NEPA and the FAA can proceed with the Federal Action.

2.2 Purpose and Need

The purpose of the project is to

- (1) enable the airport to maximize revenue generation for a portion of airport property that is not needed to support aeronautical uses; and
- (2) support the community's interest in generating cost-effective renewable energy to local electricity customers.

The complementing need for the project is that:

- (1) the airport is in a rural area with relatively low economic activity requiring creative management measures to finance its aviation missions, and
- (2) the community seeks diverse and cleaner energy options to support public policy goals related to energy independence and the environment.

2.2.1 *LXN Aviation Activity*

LXN is a public use airport located about 2 miles northwest of the City of Lexington. It has two intersecting runways: 14/32, a concrete runway in good condition, and 01/19, a turf runway in fair condition. It is classified by the FAA as General Aviation (GA) service and it does not have an air traffic control tower. LXN has RNAV (Area Navigation) instrument approaches to Runways 14 and 32, and a VOR (Very High Frequency Omni-Directional Radar) approach to Runway 14.

Statistics reported to the FAA through August 2018 indicate the number of based aircraft in **Table 1** and the number of operations in **Table 2**. As reported in the 2011 Master Plan, the number of aircraft has varied from 20 to 31 over the last 30 years and the number reported in 2018 remained within the historic range.

Table 1. Based Aircraft at LXX

Aircraft Type	#
Single Engine	24
Multi Engine	1
Jet	0
Total (Based Aircraft)	25
Helicopters	1
Gliders	1
Military	0
Ultra-Light	2

Table 2. Aircraft Operations (September 2017 – August 2018)

Operation Type	#
Air Carrier	0
Air Taxi	400
GA Local	8100
GA Itinerant	2100
Military	40
TOTAL	10,640

Operations at LXX as reported to the Nebraska Department of Aeronautics (NDA) 5010 Inspectors and included in the 2011 Master Plan has varied from 6,210 annual operations in 1996 to 18,600 in 1976. The latest annual operations statistics fall within about the median of the historic highs and lows.

Services at the airport include aircraft maintenance, aircraft rentals, flight instruction, fuel (100LL and Jet A), tiedowns, and transient hangar storage. Emergency air ambulance services

use the airport, as well as aerial sprayers on a seasonal basis.

The airport has also received a number of grants from the FAA through its Airport Improvement Program. A list of grants including projects funded and amounts are included in

Table 3. FAA AIP Grants Awarded to LXN (FFY 2010-2019)

Federal Fiscal Year	Project	Grant \$
2016	Rehabilitate Runway Lighting - 14/32, Rehabilitate Taxiway Lighting	\$421,155
2013	Construct Snow Removal Equipment Building	\$409,500
2012	Construct Fuel Farm (Phase II)	\$150,000
2011	Construct Fuel Farm	\$300,000

Information about LXN shows that it serves an important function for the City of Lexington and the broader area of Dawson County. It has steady operations and continues to receive federal funds to maintain infrastructure and make necessary upgrades. However, it needs to take advantage of opportunities as they become available to increase revenue and decrease operating costs. Serving as a host for a solar PV facility as a new asset to the Lexington community will help the LAA achieve those objectives.

2.2.2 Electricity Supply

The City of Lexington, like all municipalities in Dawson County, own and operate their own electrical distribution systems and purchase power wholesale from the Nebraska Public Power District (NPPD). Lexington Utilities System provides electricity, water, and sewer services to the residents of Lexington. Some of Lexington's electricity is generated by a 26,000-panel solar array northeast of Plum Creek Parkway and Commerce Road.

NPPD is the largest electric utility in the state of Nebraska serving all or parts of 91 of the

state's 93 counties. It delivers power to its member customers – 52 cities/villages and 25 rural public power districts and cooperatives – through wholesale power agreements. To supply current and projected needs, NPPD has a mix of generating systems, including coal, nuclear, hydro, gas, oil, wind and diesel sources. Nebraska's electric rates for typical industrial customers are 26.5 percent less than the national average and are among the lowest of the 48 contiguous states (Dawson County, 2020). Nebraska is the only state in the nation with electric service provided entirely by public power.

The City of Lexington will be purchasing the electricity generated by the solar facility at a rate specified in a PPA over a 25-year period. By committing to purchase electricity, the City expects that it will accrue electricity cost savings over the 25-year term by locking in their electricity price for a portion of their load at a rate at or below what they're current paying. This provides a long-term hedge for the city's utility and puts money back into the Lexington community.

This is the second solar installation in Lexington. The first was widely viewed as popular triggering the demand for a second project in a more visible location resulting in the airport site on North Airport Road across from the City's athletic fields. After the completion of the airport solar project, Lexington will be procuring 10% of its annual electricity demand from solar, which hits a cap imposed by NPPD in its wholesale agreement with the community.

3.0 Alternatives

3.1 Introduction

This section of the EA describes the project alternatives to achieving the purpose and need. It includes the No Action Alternative (which is the existing condition), the Preferred Alternative (which is the Proposed Action), and any other Alternatives considered. Each alternative is considered relative to:

- the purpose of the project (**increase airport revenues, and support local customer access to solar power**) and
- the need for the project (**shortage of revenue to fund airport operations, and lack of**

renewable energy purchasing options in the community).

3.2 No Action Alternative

For the No Action Alternative, the Proposed Action or other Alternatives are not taken to address the purpose and need. As a consequence, there remains a shortage of revenue to fund airport operations, and there is a lack of renewable energy purchasing options in the community. It is inherent that the No Action Alternative does not meet the project purpose and need. However, it serves as a baseline for a comparison of impacts to the preferred alternative and is therefore retained for analysis.

3.3 Alternative A – Solar Project Located at a Different Airport Project Site

In Alternative A, the Proposed Action of leasing airport land for a community solar project would be conducted, but on an alternative airport project site.

Any airport development must be compatible with the Airport Layout Plan (ALP). The ALP shows existing airport conditions and facilities and depicts future improvements based on forecasts for airport operations and the need for additional facilities to support the type and number of future operations. LXN prepared an updated ALP and Master Plan published in 2011. It shows existing land and facilities and future land and facilities including a new paved cross runway (05/23) to replace the existing turf runway (01/19) and land acquisition necessary to accommodate it. An alternative site for the solar project is constrained to the existing airport property but must also be compatible with future airport development.

There are no other areas of the existing airport property that is large enough to support the Proposed Action given the setback to runways established by FAA safety zones, including the object free area and limitations on structure height imposed by the airspace transitional surface. The only location where there is vacant land is a small triangular shaped parcel on Highway 30 between the ends of Runways 01 and 32. Given that this alternative is not viable, it is determined not to be reasonable, and no further analysis is presented.

3.4 Alternative B – Use the Land for a Different Revenue Generating Activity

In Alternative B, the airport would use the subject land for a different revenue generating activity. This Alternative could meet one part of the Purpose and Need related to generating revenue sources to fill the lack of revenue generating streams. Considering the feasible revenue generating activities, Alternative B would not meet the second part of the Purpose and Need related to generating solar electricity to meet customer needs for renewable energy.

The LAA utilizes some airport property for agricultural crops. However, the Proposed Action increases the LAA's revenue streams as the lease for solar would be more on an annual basis and guaranteed for a longer duration than previous agricultural leases. The LAA has not been approached by other potential lessees who could offer a better opportunity to increase alternative revenue streams from the proposed location. These potential alternative lease proposals would also not help the community meet its renewable energy purchasing needs. As no other use of the property has been considered in planning or as a concrete proposal, these are not considered to be reasonable alternatives and no further analysis is presented.

3.5 Preferred Alternative – the Proposed Action

The preferred alternative is the Proposed Action – to release airport property for a non-aeronautical use associated with solar photovoltaic electricity generation to meet the Purpose and Need. The Proposed Action would allow the LAA to take existing underutilized airport property and turn it into a long-term revenue source through a land lease thereby helping to fund airport operations and supporting a partnership with the community to increase opportunities for renewable energy purchasing. The approximate area of the lease and the general footprint of the proposed project are included in **Figure 2**.



Figure 2. Approximate Extent of Proposed Lease Area and Solar Project Footprint

4.0 Affected Environment

4.1 Introduction

The affected environment described in this section includes only those environmental resources the proposed action and no action alternatives are likely to affect. This section is combined with Section 5.0, Environmental Consequences and Mitigation, to address the analysis required in NEPA. Section 4.0 provides a summary of the overall resources in the project area while Section 5.0 lists the impact categories and includes the affected environment, potential impacts and mitigation for each impact category.

4.2 Location Map, Vicinity Map, ALP, Photographs

The project is located in south central Nebraska north of Interstate 80 as shown on **Figure 3**.



Figure 3. Location Map for Proposed Action

It is located on the property of the Jim Kelly Field Airport (also referred to as the Lexington Municipal Airport) in the vicinity of the City of Lexington, about 2 miles northwest of the city center as shown on **Figure 4**.

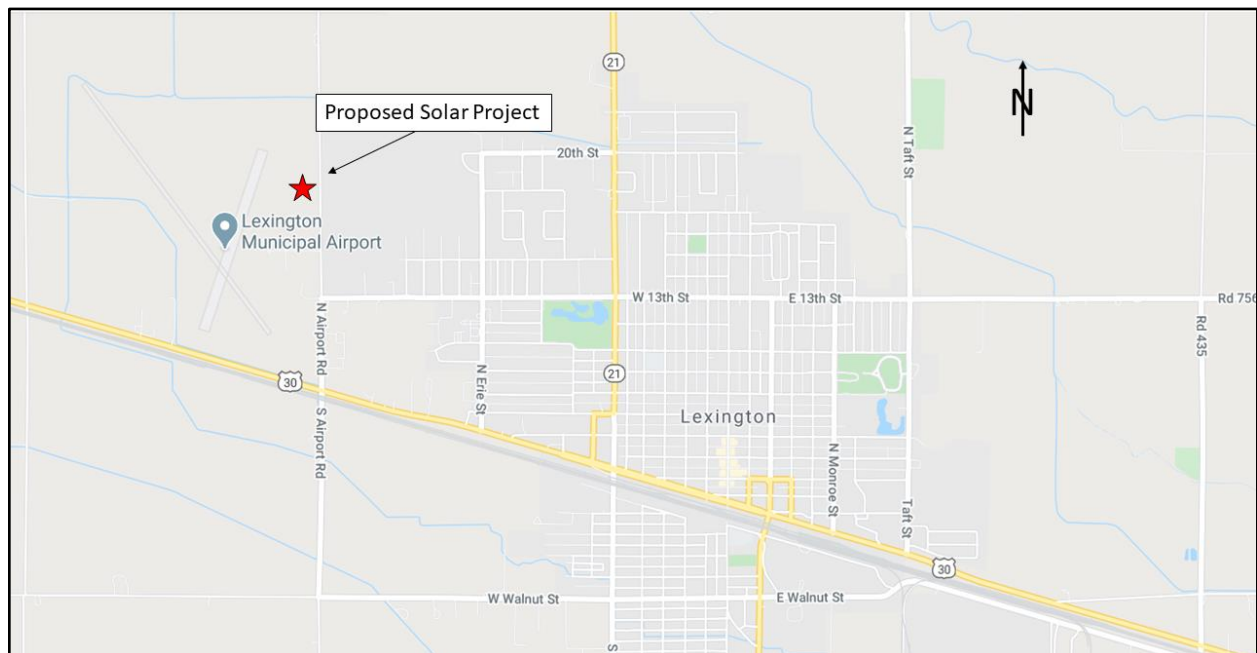


Figure 4. Vicinity Map for Proposed Action

The project is compatible with the future airport development program as shown in the Airport

Layout Plan published in 2011. **Figure 5** shows the location of the project on the ALP Ultimate Plan. While there is a lot of detail provided in the ALP Ultimate Plan, what is important to see is that the project site is located on existing airport property and there are no proposed facilities or activities shown in the area of the proposed project today or in the future. The ALP shows that the airport's long-term development includes a new cross runway and land acquisition to accommodate the runway, and the proposed project is consistent with these plans.

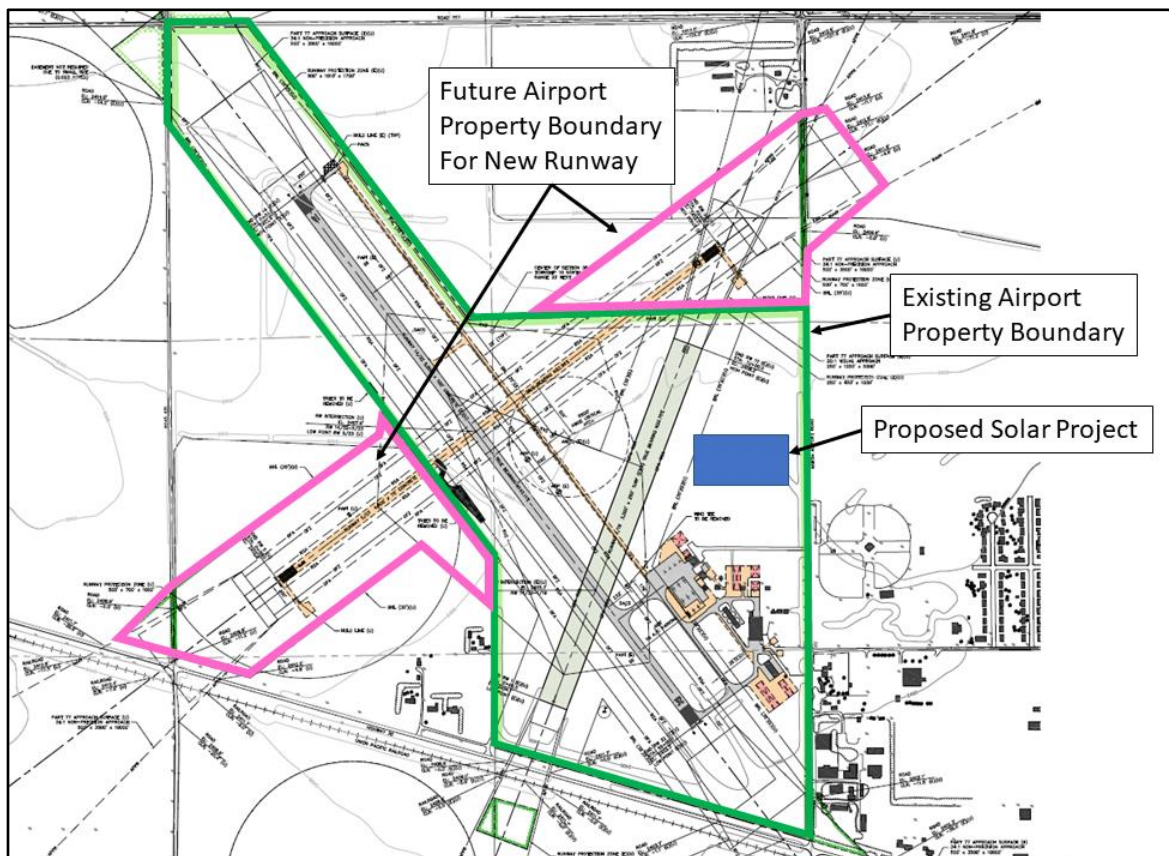


Figure 5. ALP Ultimate Plan Showing Proposed Action

A pen-and-ink change to the ALP showing the proposed action will be prepared by the sponsor and approved by the FAA as part of the project approval.

A photograph of the proposed site is shown in **Figure 6**. It shows that the project site is flat land covered with turf grass that is actively managed by the airport.



Figure 6. Photo of Proposed Project Site

4.3 Existing and Planned Land Uses and Zoning

The City of Lexington's existing and planned land uses and zoning program is incorporated within community plans and ordinances developed by the City to encourage long-term planning and growth. In 2013, it developed a Comprehensive Development Plan (the LexPlan), which provides a strategy for the City's development program focused on land use sustainability. The LexPlan is incorporated into the City's Zoning Ordinance and considered during review of capital planning and development proposals by the Planning Commission. In addition, the City released an Economic Development Program in 2019 which provides additional guidance on how the City proposed to use local revenues to support economic development activities. The City of Lexington's Future Land Use Map completed in 2013 as part of the Comprehensive Land Use Plan is provided as **Figure 7**.

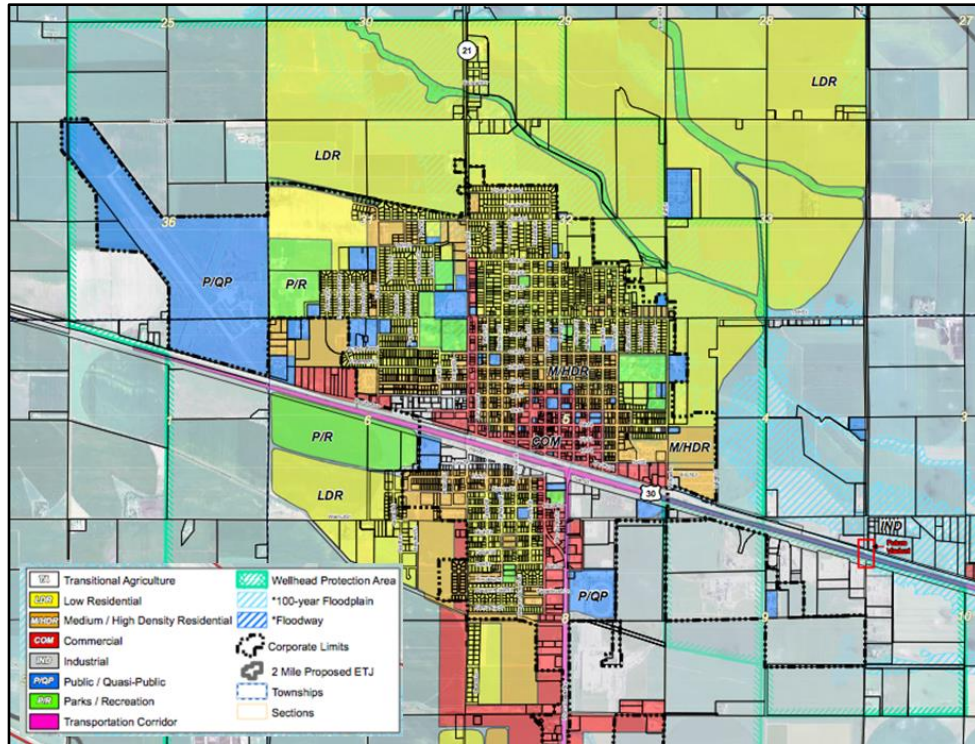


Figure 7. City of Lexington Future Land Use Planning Map

As part of its zoning ordinance, the City has enacted an airport hazard overlay district which is shown in **Figure 8**. The overlay district ensures that projects proposed for approval before the Planning Commission are compatible with airport operations as defined by the FAA and its regulations and guidance for protecting the National Airspace System.

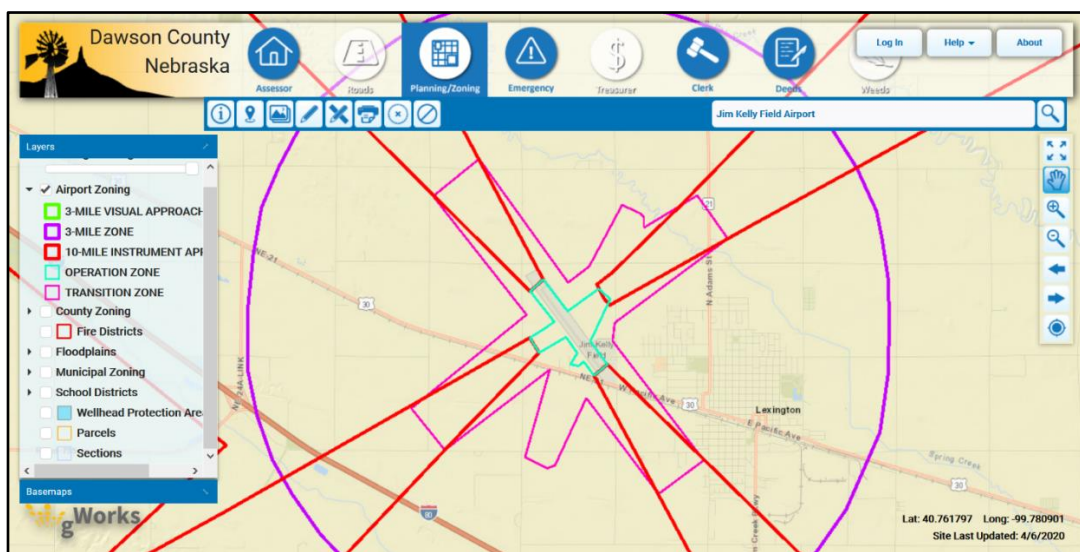


Figure 8. City of Lexington Airport Hazard Overlay District

In the context of the City's planning programs and its planning map, existing and planned land uses, and zoning potentially affected by the proposed action and no action alternatives include the following resources.

4.3.1 Industrial and Commercial Activities

The Future Land Use Planning Map shows industrially zoned areas (in gray) primarily to the southeast of the City center on either side of Route 30. Areas zoned for commercial uses are identified in red and occur along the intersection of Route 21 (North Adams Street) and Route 30. The proposed project is located on airport property which is identified on the land use planning map in light blue as public and quasi-public. The proposed project will not affect existing and planned industrial and commercial land uses and zoning. The project is located in and will support uses associated with the public and quasi-public zone. Existing and future industrial and commercial zones shown on the map will not be impeded and otherwise affected.

4.3.2 Residential areas, schools, places of worship or outdoor assembly used by churches or hospitals

Low density residential land uses are shown on the Future Land Use Planning Map in yellow occurring northeast and southeast of the proposed project. Medium and high-density residential development is shown between the airport

Schools are shown in **Figure 9**.

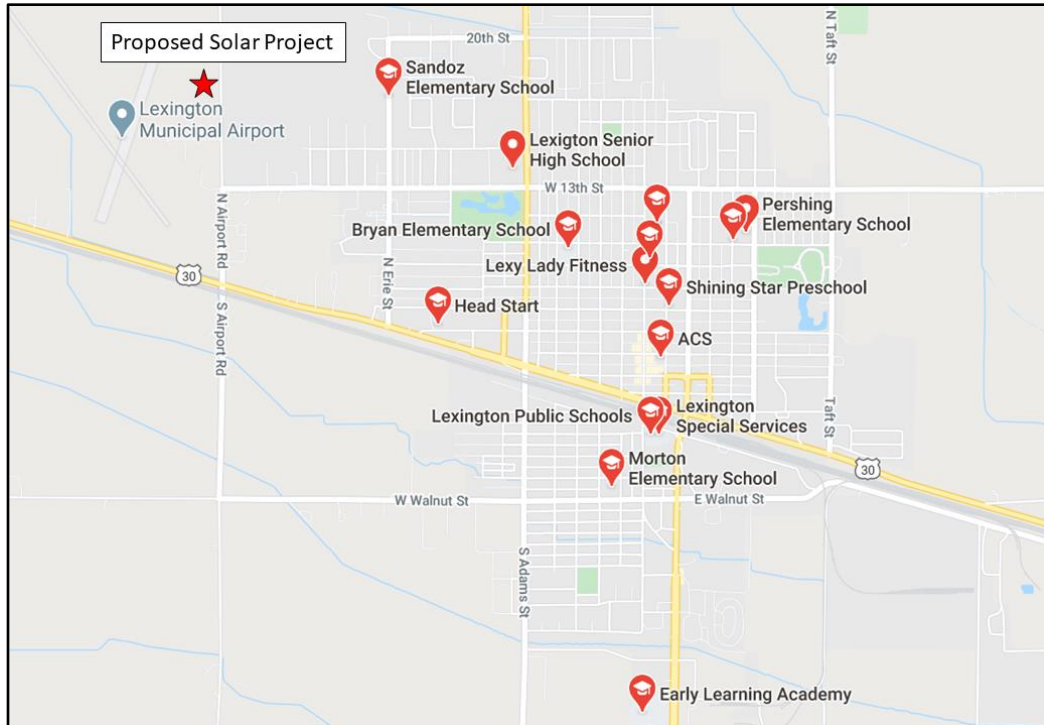


Figure 9. Schools in the City of Lexington

Places of worship are shown in Figure 10.

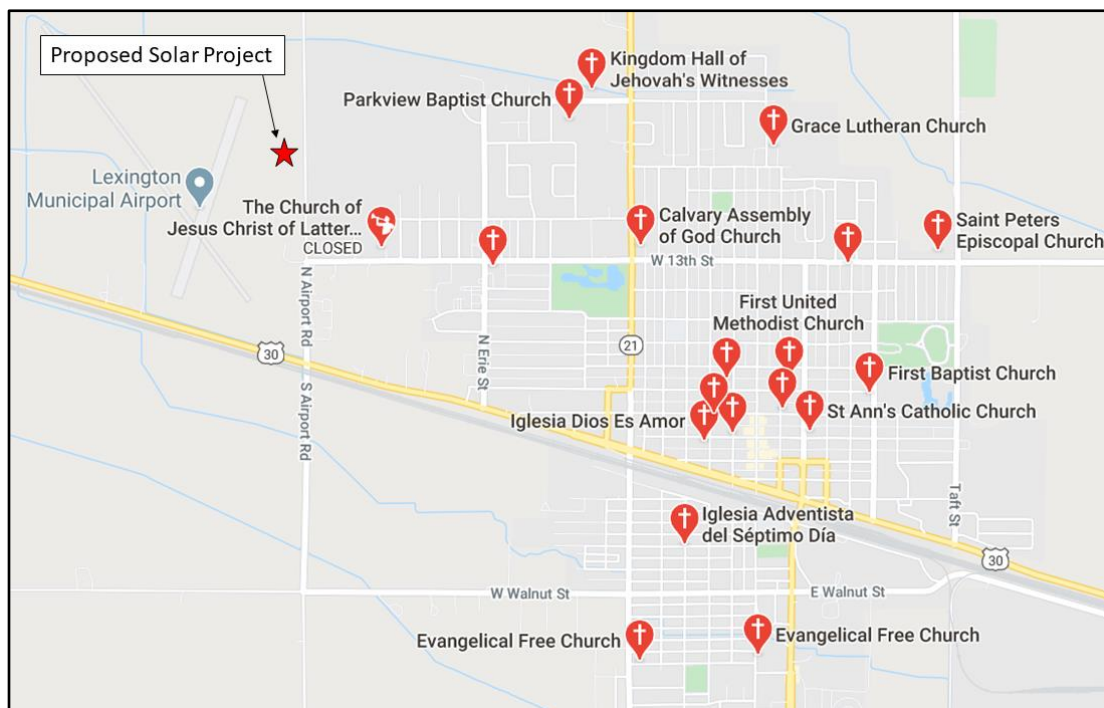


Figure 10. Places of Worship in the City of Lexington

Lexington Regional Hospital is located less than half a mile east of the airport on West 13th Street.

The proposed project will not impact residential areas, schools or places of worship. These land uses will exist and be planned in the areas included on the City of Lexington's Future Zoning Map and will not be impeded by the proposed action or the no action alternative.

4.3.3 Publicly-owned and used parks, recreational areas, wildlife and waterfowl refuges

Parks and recreational areas in the City of Lexington are shown on the Future zoning map in green. State recreation and wildlife management areas in the region are shown on **Figure 11**. The proposed project will not impact any of these resources. The scope and impact of the proposed project is limited to the project site. Natural and public resources associated with these properties will not be affected.

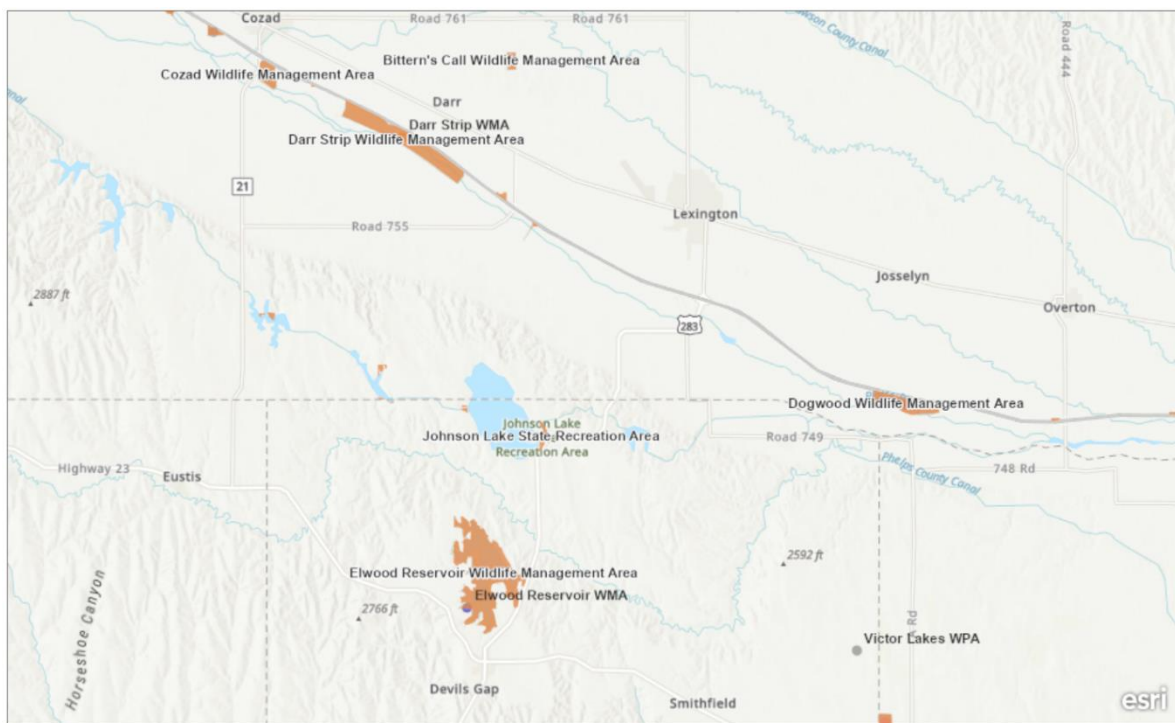


Figure 11. State Recreation and Wildlife Management Areas near the City of Lexington

4.3.5 National and State Forests, Wilderness Areas, Wild and Scenic Rivers

National forests and Wild and Scenic Rivers are shown on **Figure 12**. There are no designated Wilderness Areas in the State of Nebraska.

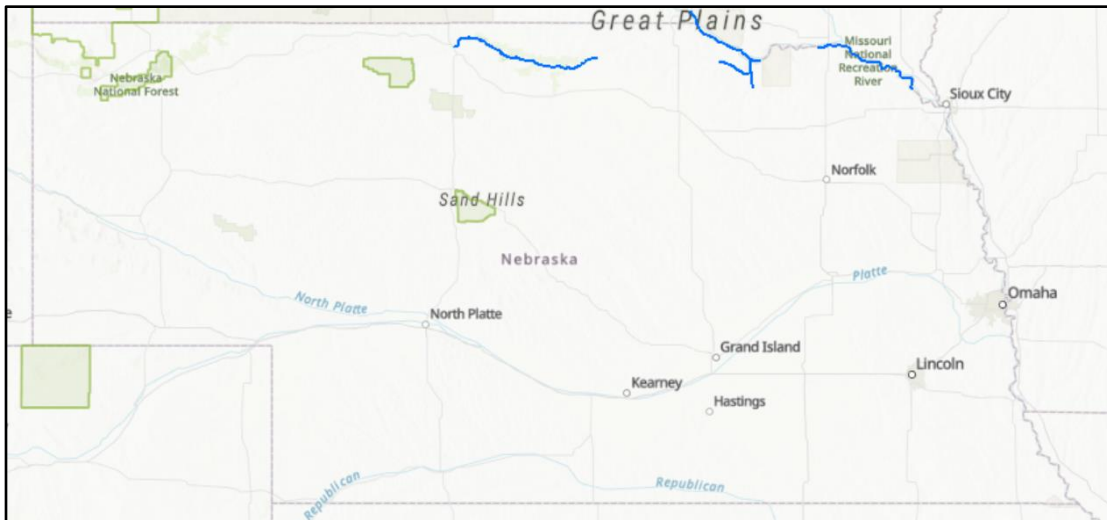


Figure 12. National Forests and Wild and Scenic River Segments in Nebraska

The closest National Forest property is the Sand Hills north of Lexington and North Platte. The only Wild and Scenic River segments in Nebraska are associated with the Missouri River in the northeastern part of the state. The proposed project is far removed from these resources and will not have an effect.

4.3.6 Federally-listed threatened or endangered species or their critical habitat

Affected environment associated with Federally-listed threatened or endangered species or their critical habitat is discussed in Section 5.5, Biological Resources, along with environmental consequences and mitigation.

4.3.7 Wetlands, floodplains, coastal zones, or coastal barriers

Nebraska is a landlocked state and does not have any coastal features including coastal barriers that are associated with states located adjacent to the Atlantic or Pacific Oceans, or the Great Lakes. These resources are addressed in Section 5.3, Environmental Impact Categories Not Affected.

Affected environment associated with wetlands and floodplains is discussed in Section 5.13, Water Resources, along with environmental consequences and mitigation.

4.3.8 Historic, archeological, or cultural resources

Affected environment associated with historic, archeological or cultural resources is discussed

in Section 5.8, Historical, Architectural, Archeological, and Cultural Resources, along with environmental consequences and mitigation.

4.4 Affected Political Jurisdiction

The project is proposed at the Jim Kelly Field Airport, a city-owned property, within the City of Lexington. The population of Lexington was 10,230 in 2010 (official U.S. Census count) and estimated to be 10,121 in 2018. It is the county seat of Dawson County. The City covers about 4.51 square miles. The airport is located in the northwest corner of the city limits.

The city government is a council-manager form of government with a city administrative manager and an elected City Council.

The airport is managed by the Lexington Airport Authority.

The proposed project will provide benefits to both the airport and the City. The primary benefit to the airport will be regularly scheduled lease payments that are at or exceed the air market value of the property. Currently, the land is not generating revenue for the airport.

The proposed project will provide benefits to the City in the form of a distributed renewable electricity source. The power will feed into the existing electricity grid supporting grid stability and providing diversity of electricity fuel sources. The project will not result in any negative effects on the airport, the City or any other political jurisdictions.

4.5 Demographic Information / Bureau of Census Map

The U.S. Census Bureau provides a variety of information on the demographics of the residents living in the City of Lexington. Some of the highlights include:

- Population estimate (as of July 1, 2018): 10,121
- Population by gender: Female 45.9%, Male 54.1%
- Population by age: over 65 years old 10.1%. under 18 years old 30.0%
- Population by race/origin: white 78.6%, black/African-American 13.1%, other 8.2%
- Persons in poverty: 16.6%

The proposed project will provide electricity to the electric grid used by all citizens in Lexington regardless of their demographic characteristics.

4.6 Past, Present and Reasonably Foreseeable Future Actions

Planning and implementation of actions, whether they be past, present or reasonably foreseeable in the future, is primarily overseen and regulated by the City of Lexington through its planning and zoning ordinance enforcement responsibilities.

The City has developed a planning and zoning program which is implemented through the City Zoning Ordinance informed by the Comprehensive Development Plan and the Future Land Uses Plan. The proposed solar project fits within the plan as it is located on and supportive of public property and uses, compatible with the airport uses as regulated by the airport hazard overlay district, and compatible with other land use zones including residential, commercial, and industrial zones. Compatibility with existing land uses demonstrates that the project will not affect past and present actions, while its compatibility with the future land use zoning map demonstrates that it will not affect reasonably foreseeable future actions

5.0 Environmental Consequences and Mitigation

5.1 Introduction

This section reviews the potential environmental impacts and mitigation for NEPA categories as required in *FAA Order 1050.1F, Environmental Impacts: Policies and Procedures*, and the 1050.1F Desk Reference for the proposed action, the no build action and proposed action alternatives. It presents the affected environment (and references Section 4.0 where applicable), describes potential affects for the required environmental impact categories, and presents evidence and analysis necessary for the FAA to determine whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI).

Based on the type and location of the project, it is determined that some of the environmental impact categories are not affected. These are listed in Section 5.3 and no further information is presented on those resources. For the other environmental impact categories that are determined to be Potentially Affected, these are listed and described in the Sections following

Section 5.4. For each Section, the affected environment is provided, followed by the potential effects of the no action and proposed alternatives. Considering the information presented for the environmental impact category, mitigation is described.

5.2 Identification of the Study Area and Analysis Years

Two study areas are considered in the evaluation of impacts. The first is the area directly impacted by the physical installation of the proposed action. The second is a general study area that varies by resource category. For example, the extent of impacts will be different for visual impacts (i.e. an area surrounding the project where it can be seen) versus socioeconomic impacts which more generally may affect the residences in the City of Lexington as a whole. The applicable study area is briefly described in each impact category under affected environment.

The analysis year is 2019-2020 or whenever the most recent data is available.

5.3 Environmental Impact Categories Not Affected

Based on the nature and characteristics of the Proposed Action and the project location, the No Action and Proposed Action would not affect the following environmental impact categories.

- Air Quality
- Climate
- Coastal
- Farmlands
- Noise

No further analysis of these environmental categories is necessary.

In addition, Section 4(f) is not applicable to the Project because the Proposed Action would not have a transportation purpose and therefore, would not be a "transportation project" under the statute. Conversion of existing transportation property to non-transportation does not qualify as a Section 4(f) "use". As a result, no further consideration of impacts under Section

4(f) is recommended.

5.4 Environmental Impact Categories Potentially Affected

The environmental impact categories potentially affected are listed in **Table 4.**

Table 4. List of Environmental Impact Categories Potentially Affected

Section	Category
5.5	Biological
5.7	Hazardous Materials, Solid Waste, Pollution Prevention
5.8	Historical, Architectural, Archeological, Cultural
5.9	Land Use
5.10	Natural Resources and Energy Supply
5.11	Socioeconomics, Environmental Justice, Children's Health
5.12	Visual Effects
5.13	Water Resources
5.14	Cumulative Effects

The environmental impacts of the no action and proposed action alternatives are analyzed for each of the impact categories in the sections below. For each section, the affected environment is presented with reference to Section 4.0 where applicable, the environmental consequences for each alternative is analyzed, and proposed mitigation presented.

5.5. Biological Resources

Biological resources include species protected under the Federal Endangered Species Act (ESA) and their critical habitat, state protected species, and migratory birds.

The FAA has established that a significant impact would occur if the U.S. Fish and Wildlife Service or the National Marine Fisheries Service determines that the action would be likely to jeopardize the continued existence of a federally listed threatened or endangered species, or

would result in the destruction or adverse modification of federally designated critical habitat. The FAA has not established a significance threshold for non-listed species, however, factors to consider include if the action would have the potential for: A long-term or permanent loss of unlisted plant or wildlife species; Adverse impacts to special status species or their habitats; Substantial loss, reduction, degradation, disturbance, or fragmentation of native species' habitats or their populations; or Adverse impacts on a species' reproductive success rates, natural mortality rates, non-natural mortality, or ability to sustain the minimum population levels required for population maintenance.

5.5.1 Affected Environment

Biological resources include fish, wildlife and plants. The detailed study area is the project site proposed for disturbance, and the general study area is the general territories and migratory patterns of species that may use the project site.

The proposed project location consists of a regularly disturbed, hay field managed as part of the airport property. There are no water resources on the land that could support fish. Wildlife is limited to mammals and birds that are adapted to urban areas and may pass through the project site. As the land has been managed as a hayfield, it does not support a natural flora community.

The project site is within the range of the state-listed threatened northern long-eared bat (*Myotis septentrionalis*), and the state-listed endangered whooping crane (*Grus americana*). The US Fish and Wildlife Service (USFWS) and Nebraska Game and Parks Commission have been consulted. Their comment letters are provided in Appendix B. They report that there are no known records of any protected species within the immediate vicinity of the project area, and that the project site does not appear to support any suitable habitat for either of the listed species identified. Both agencies have concluded that the project is not expected to affect protected species, critical habitats, or migratory birds.

5.5.2 Environmental Consequences

No Action – there is no impact from the no action alternative as no changes to current land

management would occur.

Proposed Action - due to the lack of suitable habitat, the commenting resource agencies have concluded that it is unlikely the project will have an adverse impact on any state-listed threatened or endangered species. The FAA has determined that the Proposed Action will have "no effect" on any federal or state-listed threatened or endangered species, therefore impacts to this resource are not anticipated to be significant.

5.5.3 *Proposed Mitigation*

Should new information on biological resources be collected prior to or during construction, the resource agencies consulted during the preparation of the EA will be notified.

5.6 Hazardous Materials, Solid Waste, Pollution Prevention

Hazardous materials, solid waste and pollution prevention includes disturbance of existing hazardous materials and cleanup efforts as well as materials and pollution that may be generated by the project through its components or construction activity.

The FAA has not established a significance threshold for Hazardous Materials, Solid Waste, and Pollution Prevention. However, factors to consider include if the action would have the potential to:

- Violate applicable Federal, state, tribal, or local laws or regulations regarding hazardous materials and/or solid waste management;
- Involve a contaminated site (including but not limited to a site listed on the National Priorities List);
- Produce an appreciably different quantity or type of hazardous waste;
- Generate an appreciably different quantity or type of solid waste or use a different method of collection or disposal and/or would exceed local capacity; or
- Adversely affect human health and the environment

5.6.1 *Affected Environment*

The affected environment in relation to this section is the specific area where the project will

be installed and potentially immediately adjacent areas that may be affected through groundwater flow, the most prevalent transit mechanism for disposed waste.

The location of sites on the U.S. Environmental Protection Agency's (EPA) National Priority List (NPL) (also known as Superfund cleanup sites) is shown on **Figure 13**. There no site sites within the general vicinity of the proposed project. The city's solid waste landfill is 9.5 miles north of the center of Lexington on Highway 21 and more than 8 miles from the nearest existing or future runway end.

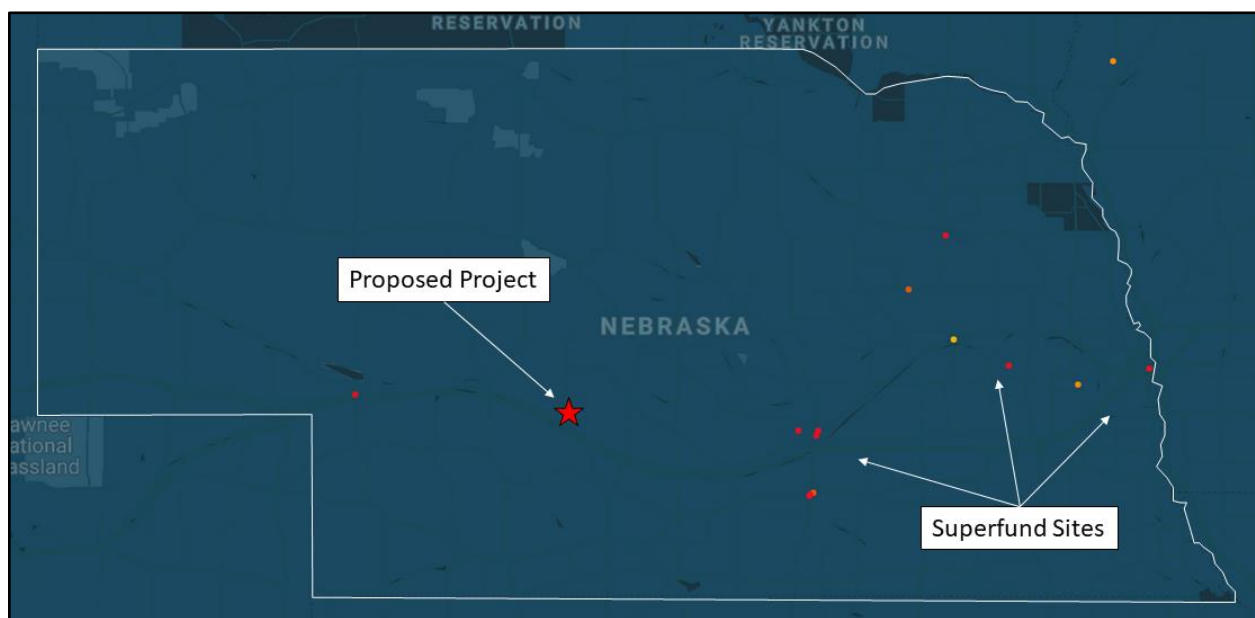


Figure 13. Superfund Sites in Nebraska

The project site is managed hayfield with pervious soils which allow for groundwater replenishment. It is located in a wellhead protection area with an estimated 20-year path to public well site at Plum Meadow. Groundwater resources and wellhead protection measures are detailed in Section 5.12, Water Resources.

Adjacent activities can be sources of hazardous material contamination including the airport fuel farm located on the southern boundary of the airport property, and motor vehicles traveling on North Airport Road. Existing activities associated with fuels and municipal solid waste are managed in accordance with existing local, state and federal laws and regulations.

5.6.2 Environmental Consequences

No Action – there is no impact from the no action alternative on hazardous materials, solid waste, and pollution prevention as the project site currently does not generate resource category materials and any wastes generated from adjacent land uses are managed in accordance with existing laws.

Proposed Action – the Proposed Action is installation of a solar PV facility. Solar PV panels (or modules) are made of naturally occurring materials including silicon cells, aluminum frames, glass, steel, and copper wiring. At the end of the useful life of the facility, the project will be repurposed, and materials will be removed from the site and reused, recycled or disposed of in accordance with existing laws and regulations to avoid environmental impacts. Construction of the facility will be conducted with typical construction equipment including excavators, pile drivers, and trench diggers. Petroleum fuels used to power this equipment will be appropriately managed to avoid any contamination. The Proposed Action is not anticipated to have a significant impact on this resource.

5.6.3 Proposed Mitigation

No mitigation is necessary.

5.7 Historical, Architectural, Archeological, and Cultural Resources

Historical, architectural, archeological, and cultural resources include a variety of sites, properties, and physical resources relating to past and present human activities, society, and cultural institutions. They include both human features of the physical environment, such as prehistoric and historic archaeological sites, structures, objects, and districts, and natural features and biota, which signify culture, community values and human history. As part of the NEPA review, the FAA must ensure that the proposed action is in compliance with the National Historic Preservation Act (NHPA).

The FAA has not established a significance threshold for Historical, Architectural, Archeological, and Cultural Resources. However, factors to consider include if the action would result in a finding of *Adverse Effect* through the Section 106 process. Furthermore, an adverse

effect finding does not automatically trigger preparation of an EIS (i.e., a significant impact).

5.7.1 Affected Environment

The affected environment includes both resources that may occur on the project site, and features in general area of the project that may be affected (referred to under NHPA as the Area of Potential Effect (APE). The APE is typically constrained to area where the project can be viewed.

The National Register of Historic Places compiled by the National Park Service includes three properties in the City of Lexington which are listed in **Table 5**.

Table 5. Historic Properties in the City of Lexington

Name	Location
Dawson County Courthouse	Washington Street between 7 th and 8 th Streets
Ira Webster Olive House	401 East 13 th Street
Harry V. Temple House	305 East 13 th Street

The locations of the historic properties are included on **Figure 14**.

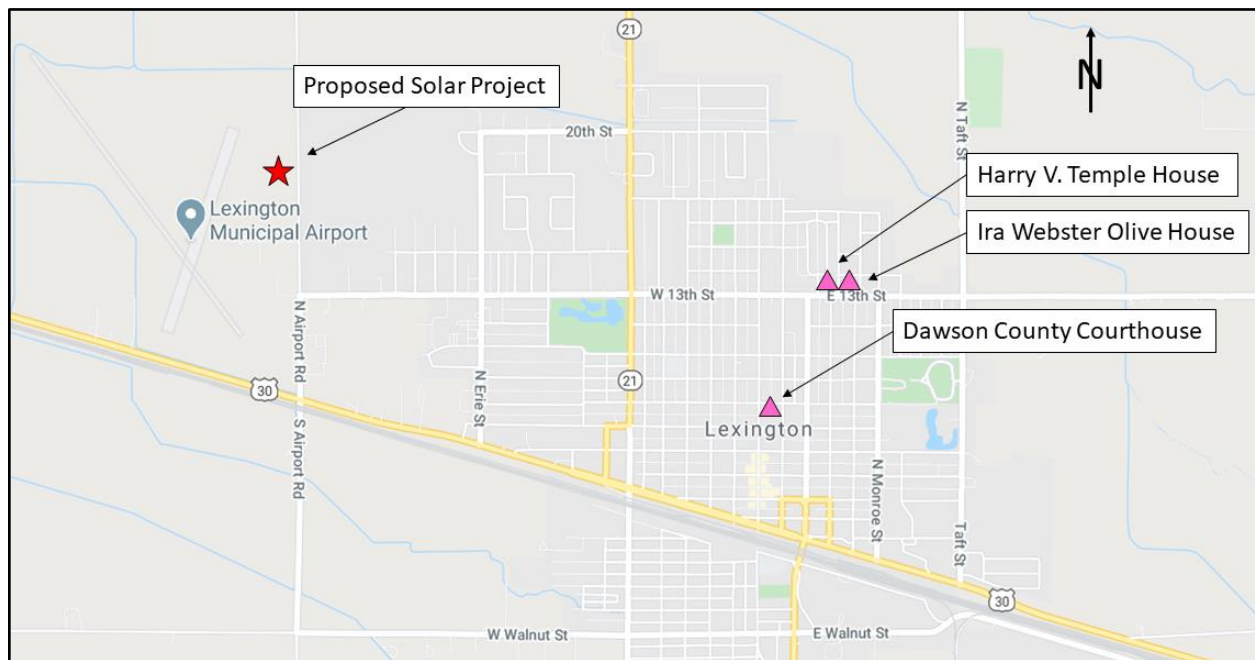


Figure 14. Properties Listed on the National Register of Historic Places in Lexington

5.7.2 Environmental Consequences

No Action – the no action alternative will not change existing conditions as they relate to historical and cultural resources and therefore will have no effect.

Proposed Action – the State Historic Preservation Office (SHPO), History Nebraska, was contacted to review the potential effects of the proposed project on historical and cultural resources. It is responsible for reviewing projects for compliance with the NHPA. It concluded that no historic properties would be affected by the proposed project. The FAA has determined that no historic properties will be affected, therefore impacts to this resource are not anticipated to be significant.

The FAA provided consultation materials to eight tribes (see Appendix B). No tribes responded to the request for consultation. The proposed project is entirely on airport property and does not significantly or uniquely affect tribes. The Proposed Action is not anticipated to adversely affect any archeological, historical, or sacred sites.

5.7.3 Proposed Mitigation

If historic, cultural, or archaeological resources are encountered during construction, then all work within the immediate area of the discovered resource shall stop until FAA, SHPO, and tribes are consulted.

5.8 Land Use

The FAA has not established a significance threshold for Land Use. There are no specific independent factors to consider for Land Use. The determination that significant impacts exist in the Land Use impact category is normally dependent on the significance of other impacts.

The impacts on land use, if any, are analyzed and described under the appropriate impact category. The potential effects on particular land uses is addressed in several other impact categories including Noise and Noise-Compatible Land Use, and reference is provided to other sections of the EA. Noise has been identified as a no affect category under Section 5.3.

Beyond these specific impact categories, this land use section is focused on evaluating if the proposed action and no action alternatives are compatible with normal airport operations. These are considered in association with existing and planned land uses.

5.8.1 *Affected Environment*

The land use affected environment includes both the particular use of the property and land uses surrounding the project in the City of Lexington. Existing and planned land uses and zoning is described in detail in Section 4.3. It shows that the project is located on airport property owned and managed by government and resides on land that is adjacent to the City of Lexington with a variety of existing and planned land uses. In addition, much of the existing land uses to the north and west of the airport is agricultural. An Airport Hazard Overlay District has been established as part of the City of Lexington zoning ordinance to ensure that proposed projects are compatible with airport design and operations.

5.8.2 *Environmental Consequences*

No Action – in the no action alternative, existing and future land uses remain as they currently exist or are planned, resulting in no effect.

Proposed Action – the Proposed Action, a solar photovoltaic facility, is compatible with existing and future land uses as presented above including the Airport Layout Plan (ALP) and Airport Hazard Overlay District. The existing land use is unused airport property managed as a hayfield. The ALP shows the future airport development activities and the subject area is not proposed for any airport development in the foreseeable future. The proposed project would be subject to FAA airspace review which is, in part, the purpose of the Airport Hazard Overlay District. Given the height of the project and subject to results of a glare study described in Section 5.11, Visual Effects, is compatible for airspace safety. The proposed project will not affect other existing or planned land uses in the area as discussed in Section 4.3.

5.8.3 *Proposed Mitigation*

No mitigation is necessary.

5.9 Natural Resources and Energy Supply

Natural resources and energy supply addresses the project's consumption of natural resources (such as water, asphalt, aggregate, wood, etc.) and use of energy supplies (such as coal for electricity; natural gas for heating; and fuel for aircraft, commercial space launch vehicles, or other ground vehicles). Consumption of natural resources and use of energy supplies may result from construction, operation, and/or maintenance of the proposed action or alternative(s).

The FAA has not established a significance threshold for Natural Resources and Energy Supply. Factors to consider include if the action would have the potential to cause demand to exceed available or future supplies of these resources.

5.9.1 *Affected Environment*

The geographic scope of this impact category is consumption of natural resources on site as well as procurement of natural resources for project consumption. In-state vs out-of-state provides a simple geographic point of demarcation for understanding the relative proximity of resources to the project site.

Natural resources that may be affected by the project includes fuel for existing electricity production and materials necessary to build the project. The NPPD electricity supply comes from a mix of generating systems, including coal, nuclear, hydro, gas, oil, wind and diesel sources. Coal for power production at three in-state coal-fired power plants comes from out of state mines (Wyoming's Powder River Basin) as no coal mining occurs in Nebraska. Oil and gas are also delivered from out-of-state sources to power additional power stations for supplementary baseload or to provide peaking capacity. Hydropower is produced at two generating facilities: one in North Platte west of the project and one in Kearney east of the project. There are at least 8 wind farms in Nebraska that supply electricity to the regional grid. Finally, solar power is being installed to provide on-site generation and to support the regional grid supply.

Most of the components that make up the solar facility are sourced and manufactured from

out-of-state. These resources include silicon, aluminum, and glass for the solar PV modules which are manufactured in China with resources often from the region. A small amount of aggregate may be needed to support a short access road and to line utility trenches which could be supplied from in-state sources.

5.9.2 Environmental Consequences

No Action – there is no impact from the no action alternative as natural resource consumption and use will not change.

Proposed Action – the Proposed Action will have a negligible effect on natural resources in two ways. First, it will generate new solar electricity for use in the regional grid increasing the amount of solar as well as its share of the electricity generation mix. Second, the project will use some aggregate materials as part of construction which can be supplied from in-state sources. Both of these project effects will be positive in supporting electricity supply and reliability and contributing to local and regional economic development. No significant impacts are anticipated for this resource.

5.9.3 Proposed Mitigation

No mitigation is necessary.

5.10 Socioeconomics, Environmental Justice, and Children’s Health and Safety Risk

This impact category covers three subcategories: Socioeconomics, Environmental Justice, and Children’s Health. Socioeconomics considers potential effects on the human environment such as population, employment, housing, and public services might be affected by the proposed action and alternative(s). The project must also consider effects on Environmental Justice, defined by the EPA as the “fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.” Federal agencies must also make sure that projects do not disproportionately affect children in the area of environmental health risks and safety.

The FAA has not established a significance threshold for these resources. However, the FAA has established some factors to consider when making a significance determination:

Socioeconomic - The action would have the potential to: Induce substantial economic growth in an area, either directly or indirectly; Disrupt or divide the physical arrangement of an established community; Cause extensive relocation when sufficient replacement housing is unavailable; Cause extensive relocation of community businesses that would cause severe economic hardship for affected communities; Disrupt local traffic patterns and substantially reduce the levels of service of roads serving an airport and its surrounding communities; or Produce a substantial change in the community tax base.

Environmental Justice - The action would have the potential to lead to a disproportionately high and adverse impact to an environmental justice population, i.e., a low-income or minority population, due to: Significant impacts in other environmental impact categories; or Impacts on the physical or natural environment that affect an environmental justice population in a way that the FAA determines are unique to the environmental justice population and significant to that population.

Children's Health and Safety - The action would have the potential to lead to a disproportionate health or safety risk to children.

5.10.1 Affected Environment

The affected environment is the project site, though there are no populations at the current site that may be affected. More realistically, the affected environment is the human environment associated with the City of Lexington.

Statistics collected by the Census Bureau and presented in Section 4.5, Demographic Information, provide insight into the population of the City of Lexington.

5.10.2 Environmental Consequences

No Action – there is no impact from the no action alternative as EJ indicators will be unchanged.

Proposed Action – the Proposed Action will not disrupt the current socioeconomic conditions in the area as described by the factors above such as causing a dramatic change in economic conditions, force movement of populations, or affect the transportation network.

Furthermore, it will not generate pollution that could have a disproportionately high and adverse human health or environmental effect on minority or low-income populations or lead to a disproportionate health or safety risk to children. No significant impacts are anticipated for these resources.

5.10.3 Proposed Mitigation

No mitigation is necessary.

5.11 Visual Effects

This impact category includes two subcategories: light emissions, and visual resources and visual character. These effects may occur for specific resource categories listed elsewhere in the EA including Biological, Coastal, Section 4(f), Historical/Cultural, and Water, particularly Wild and Scenic Rivers. Where appropriate, potential visual effects are discussed in the applicable section. Potential effects on other resources not specifically addressed above are discussed below for each of the two subcategories.

Light emissions can be any light that is produced by the project and affects the surrounding environment. Examples of light emissions associated with airport activities include airfield and apron flood lighting, navigational aids, terminal lighting, parking facility lighting, roadway lighting, safety lighting on launch pads, additional lighting to support nighttime commercial space launches, and light generated from such launches. Glare is also identified as a potential source of light emission that can be generated when light is reflected off a surface (e.g., window glass, solar panels, or reflective building surfaces).

Visual resources include buildings, sites, traditional cultural properties, and other natural or manmade landscape features that are visually important or have unique characteristics. Visual character refers to the overall visual makeup of the existing environment where the proposed action and alternative(s) would be located. The analysis considers if the proposed action and

no action has a visual effect on individual resources or on the broader landscape which is not otherwise addressed in the other specific resource categories.

The FAA has not established a significance threshold for these resources. However, the FAA has established some factors to consider when making a significance determination:

Light Emissions - The degree to which the action would have the potential to: Create annoyance or interfere with normal activities from light emissions; and Affect the visual character of the area due to the light emissions, including the importance, uniqueness, and aesthetic value of the affected visual resources.

Visual Resources/Visual Character - The extent the action would have the potential to: Affect the nature of the visual character of the area, including the importance, uniqueness, and aesthetic value of the affected visual resources; Contrast with the visual resources and/or visual character in the study area; and Block or obstruct the views of visual resources, including whether these resources would still be viewable from other locations.

5.11.1 Affected Environment

The affected environment includes any visual effects observed at the project site which is limited in scope and area. Of more relevant consideration is any adjacent areas where the project or light produced from the project can be viewed. Given that the landscape is relatively flat and the built environment including existing structures is limited to buildings only a few stories tall, the scope of adjacent areas that may see the project is limited.

Existing light emissions are primarily associated with land uses surrounding the proposed project site. These include lighting at the airport such as street and parking lighting and runway lighting (i.e., medium intensity runway and taxiway lights), street lighting along North Airport Road near the entrance to the airport, lighting at the City Athletic Fields across North Airport Road from the airport, and lighting from adjacent residential and commercial land uses on the east side of North Airport Road.

Visual resources and visual character in the area of the airport can be described as those

associated with the boundary of urban, suburban, and agricultural landscapes in the North American central plains. Existing views are of the Jim Kelly Field, residential and commercial areas along North Airport Road, and the City Athletic field complex.

5.11.2 Environmental Consequences

No Action – under the no action, visual effects will be unchanged and there will be no impact.

Proposed Action – no lighting is proposed under the Proposed Action. However, solar panels, given their design with a smooth glass surface, can reflect sunlight and generated glare.

Potential effects of glare can be evaluated using the Solar Glare Hazard Analysis Tool (SGHAT) which was developed by the Department of Energy for the FAA to assess potential effects of glare from solar PV projects on airport sensitive receptors. SGHAT is used to generate results which can be compared to the FAA's Solar Policy and ocular hazard standard to determine if the glare will result in a significant impact. SGHAT can also be used in a similar manner to assess potential impacts of glare on non-aviation receptors, such as motor vehicles or adjacent residences. Because there are no standards to evaluate potential effects on non-aviation receptors, the model results can be used to assess if glare can occur with a finding of significance impact open to a broader interpretation.

Appendix E is a glare study prepared using SGHAT and evaluating the potential effects of glare from the proposed project on aviation and non-aviation receptors. The results show no glare on pilots on final approach to the six runway ends confirming that the project complies with the FAA's Solar Policy and ocular hazard standard. Additional results for non-aviation receptors demonstrate that there will be no glare on motorists traveling on North Airport Road and West 13th Street, or on receptors associated with the City Athletic Fields and the closest residence to the project. These results show that the Proposed Action will not have an effect relative to light emissions.

As for visual resources and visual character, the proposed project will change the view of the project area as seen by the public. The locations where the project will be seen and the view will change will be primarily from North Airport Road, 13th West Street, and the City Athletic

Fields. However, one of the reasons the project location was selected was to increase the visibility of the City's efforts to develop solar energy. The airport location was considered to be a good location specifically because it would be seen from North Airport Road and the City Athletic Fields. Therefore, the proposed action will have a positive effect on visual resources and visual character.

No significant impacts are anticipated for these resources.

5.11.3 Proposed Mitigation

No mitigation is necessary.

5.12 Water Resources

This impact category includes five subcategories: wetlands, floodplains, surface waters, groundwater, and wild and scenic rivers. These resources provide a variety of benefits including as drinking water, hazard mitigation, recreation, wildlife habitat, and visual resources. Each is summarized below.

The FAA has established the following significance thresholds for the resources listed above:

Wetlands - The action would:

1. Adversely affect a wetland's function to protect the quality or quantity of municipal water supplies, including surface waters and sole source and other aquifers;
2. Substantially alter the hydrology needed to sustain the affected wetland system's values and functions or those of a wetland to which it is connected;
3. Substantially reduce the affected wetland's ability to retain floodwaters or storm runoff, thereby threatening public health, safety or welfare;
4. Adversely affect the maintenance of natural systems supporting wildlife and fish habitat or economically important timber, food, or fiber resources of the affected or surrounding wetlands;
5. Promote development of secondary activities or services that would cause the circumstances listed above to occur; or

6. Be inconsistent with applicable state wetland strategies.

Floodplains - The action would cause notable adverse impacts on natural and beneficial floodplain values.

Surface Waters and Groundwater - The action would:

1. Exceed water quality standards established by Federal, state, local, and tribal regulatory agencies; or
2. Contaminate aquifer or public drinking water supply such that public health may be adversely affected.

Wild and Scenic Rivers - The FAA has not established a significance threshold for Wild and Scenic Rivers. However, consideration should be given if the action would have an adverse impact on the values for which a river was designated.

5.12.1 Affected Environment

The affected environment for water resources includes both those onsite and within the region. The geographic extent of affected water resources beyond the project site is primarily based on visibility, except for water resources that are physically connected to the site by drainage and groundwater and extend some distance off-site.

The project site includes no wetlands, floodplain, surface waters, or wild and scenic rivers. Water that infiltrates into the soils of the site becomes groundwater. **Figure 15** below shows groundwater flow as drawn by public drinking water wells in the City of Lexington. It shows that water flow to the Plum Creek drinking water well comes from the area around the airport and the project site to the northwest. The estimated travel time of groundwater from the airport and project site to the drinking water well is 20 years.

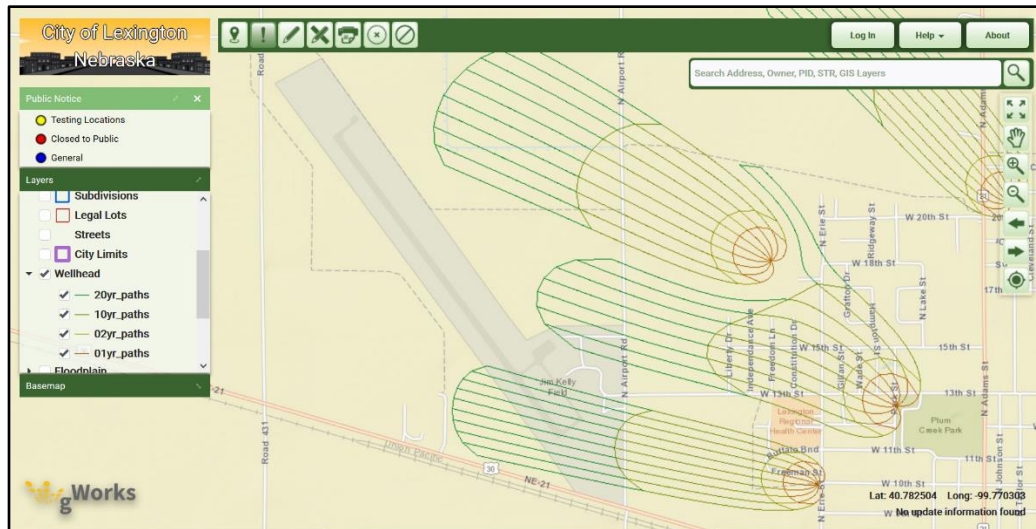


Figure 15. Groundwater Contribution to City's Public Drinking Water Wells

A drainage canal, referred to as Lateral 1, flows from the north, along airport property and adjacent to North Airport Road by the east side of the project site. It is identified on the USGS topographic maps as an intermittent stream as shown on **Figure 16**. It connects to an unnamed perennially flowing stream along the south edge of the airport at the intersection of North Airport Road and Route 30.

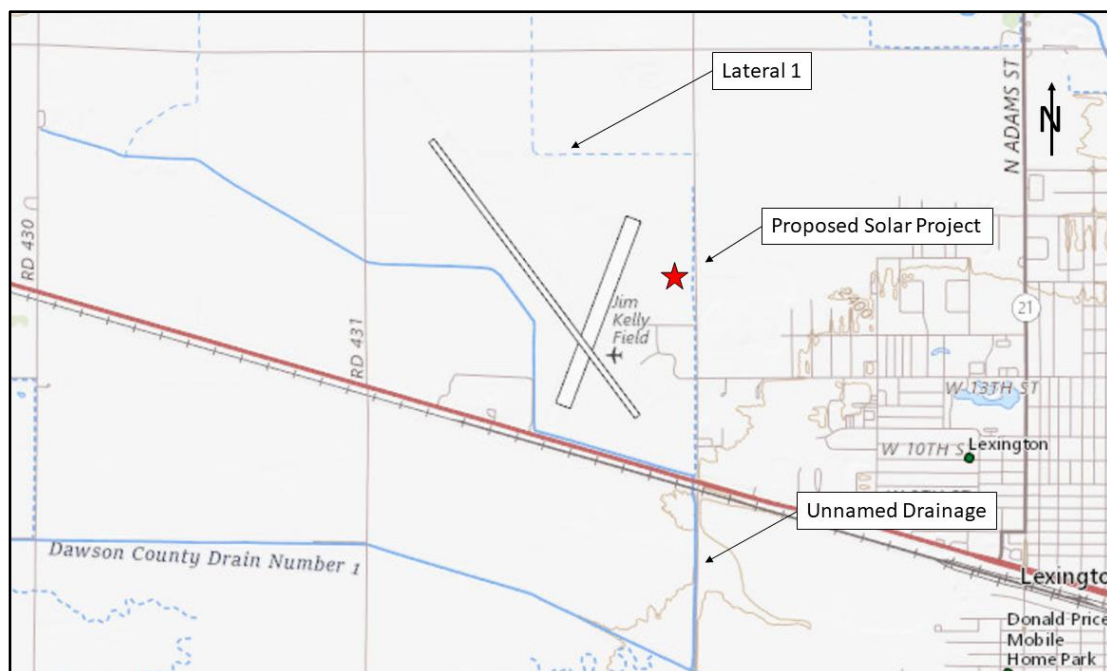


Figure 16. Surface Waters Near the Proposed Project Site

There are also a number of other small surface water resources in the area. Two small city ponds in Plum Creek Park and Kirk Patrick Memorial Park are more than 1 mile east of the project site and Johnson Lake, a larger recreational lake, is 6.5 miles to the south. There are also a variety of small farm ponds that support local agricultural activities scattered around the area.

As discussed above, there are no wetlands on the project site. **Figure 17** shows wetlands resource near the project site identified in the National Wetlands Inventory (NWI). It includes the drainage channel which flows intermittently from the north along North Airport Road by the site to the south.



Figure 17. Wetlands Near the Project Site as Shown on NWI Map

Floodplains are mapped by the Federal Emergency Management Agency (FEMA) on the central and eastern side of the City of Lexington. These are shown on **Figure 18**. The blue-hatched areas are locations likely to flood once every 100 years and the gray areas are those likely to flood every 500 years. No floodplains are located on or adjacent to the project site.

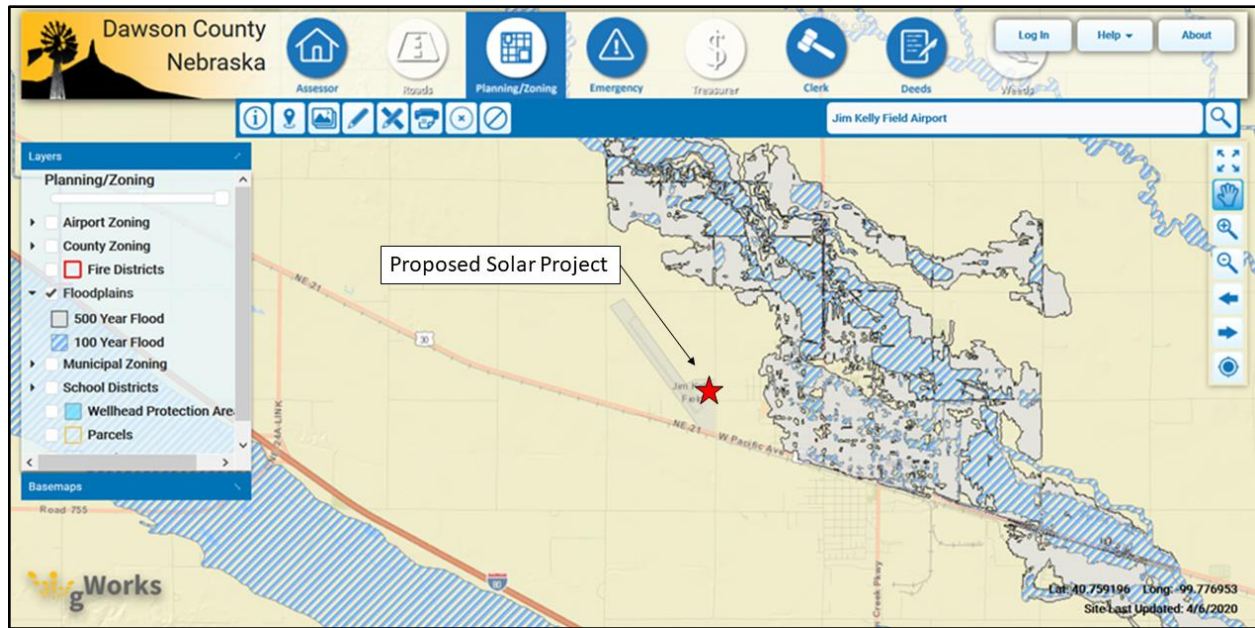


Figure 18. Floodplains Near the Project Site as Shown on NWI Map

Wild and scenic rivers are discussed in Section 4.3.5. There are no wild and scenic rivers in central or southern Nebraska.

5.12.2 Environmental Consequences

No Action – under the no action, the site will remain a hayfield, rainwater will infiltrate into the subsoils and other water resources in the area will continue to function as they currently do providing drinking water supply, flood storage mitigation, recreation, wildlife habitat, and a component of the visual landscape.

Proposed Action – under the proposed action, a solar photovoltaic facility will be constructed and operated at the site. The project will be setback from the drainage channel which seasonally conveys water from the north to the south past the site to ensure that it is impacted and does not lose functionality. Construction activity will manage disturbed ground to ensure that soils are not mobilized during rain events causing erosion and sedimentation into the drainage channel and off-site. This may include erosion control measures around the perimeter of the disturbed area to contain surface water flow during precipitation events. The contractor will develop and implement a stormwater pollution prevention plan (SWPPP) to guide erosion and sedimentation measures during construction. The project site will remain

predominantly pervious allowing rainwater to infiltrate into the soils and replenish groundwater across the project site.

No significant impacts are anticipated for these resources.

5.13.3 *Proposed Mitigation*

The project will disturb an acre or greater of land and therefore must obtain a Non-Point Discharge Elimination System (NPDES) Construction General Permit from the Nebraska Department of Environment and Energy. In compliance with the NPDES Permit, the contractor will prepare and implement a SWPPP to prevent erosion and sedimentation from occurring during construction.

5.13 Cumulative Effects

Cumulative impacts are defined by the Council on Environmental Quality in 40 CFR 1508.7 as “impacts on the environment which result from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.” Cumulative impacts can be considered to be the total combined impacts on the environment of the proposed action or alternatives.

5.13.1 *Affected Environment*

The affected environment is both the project site and the broad area around the project site. Past and present actions primarily involve the development of existing built conditions which are the airport and its facilities, transportation access to the project site from North Airport Road and connectors, and current land uses surrounding the site including the City of Lexington and surrounding agricultural activities. Reasonably foreseeable future actions are presented in various planning documents including the airport layout plan with a future cross-runway and supporting facilities, and the City of Lexington’s Comprehensive Development Plan. These plans are discussed in Section 4.3, Existing and Planned Land Uses and Zoning and in Section 4.6, Past, Present, and Reasonably Foreseeable Future Actions.

5.13.2 Environmental Consequences

No Action – when considering environmental consequences for the no action alternative of all of the resource categories described above and in considering the past, present, and reasonably foreseeable future actions, the information supports a conclusion of no effect for cumulative effects.

Proposed Action – when considering environmental consequences for the proposed action for all of the resource categories described above and in considering the past, present, and reasonably foreseeable future actions, the information supports a conclusion of no effect for cumulative effects.

A summary of impact category mitigation is provided in **Table 6**.

Table 6. Summary of Impact Category Mitigation

Environmental Consequences	Proposed Action Alternative		No Action Alternative	
Impact Category	Impacts	Mitigation	Impacts	Mitigation
Air Quality	None	Not necessary	None	None
Biological Resources	None	If new biological information is collected prior to or during construction, resource agencies will be contacted.	None	None
Climate	None	Not necessary	None	None
Coastal Resources	None	Not necessary	None	None
Section 4(f)	None	Not necessary	None	None
Farmlands	None	Not necessary	None	None
Hazardous Materials, Solid Waste, & Pollution Prevention	None	Not necessary	None	None
Historical, Architectural,	None	Contact SHPO and FAA if resources uncovered prior to or during construction.	None	None

Archeological, and Cultural Resources				
Land Use	None	Not necessary	None	None
Natural Resources and Energy Supply	None	Not necessary	None	None
Noise and Noise Compatible Land Use	None	Not necessary	None	None
Socioeconomic, Environmental Justice, & Children's Health	None	Not necessary	None	None
Visual Effects	None	Not necessary	None	None
Water Resources				
Wetlands	None	Not necessary	None	None
Floodplains	None	Not necessary	None	None
Surface Water	Not significant	The applicant with obtain a NPDES Permit and the Contractor will prepare and implement a SWPPP to control erosion and sedimentation during and after construction.	None	None
Ground Water	None	Not necessary	None	None
Wild and Scenic Rivers	None	Not necessary	None	None
Cumulative Impacts	None	Not necessary	None	None

5.13.3 Proposed Mitigation

No additional mitigation beyond what has been proposed for applicable, individual resource categories is proposed.

6.0 Summary of Public Involvement

Agencies were contacted in writing to request information and comment on potential environmental impacts of the Proposed Action. A list of agencies and dates of their responses is provided in **Table 7** with the letters included in Appendix B.

Table 7. Agency Letters and Date of Response

Agency	Resource Category	Response Date
History Nebraska / SHPO	Historical Properties / NHPA	March 17, 2020
Nebraska Game and Parks Commission	State-listed Endangered and Threatened Species	March 17, 2020
US Fish and Wildlife Service	Federal-listed Endangered and Threatened Species, Migratory Birds, Bald and Golden Eagles	April 10, 2020
Tribal Historic Preservation Office (THPO)	Native American Cultural Resources	May 5, 2020

Notice of the availability of the EA has been published in the _____ on _____.

Copies of the EA have been provided at the Lexington City Hall, Lexington Library, and the Airport for public review. The EA is also available for review on the City of Lexington's website. The public comment period lasted 30 days. Written comments and response to those comments are included in Appendix C.

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US FWS. (2020). National Wetlands Inventory.

<https://www.fws.gov/wetlands/data/mapper.html>

Appendix A List of Preparers

This Environmental Assessment (EA) was prepared by Stephen Barrett, Principal and Owner, Barrett Energy Resources Group.

Mr. Barrett has 25 years of experience in the environmental field. Over that time, he has prepared permit applications and secured approvals from local, state and federal agencies a wide variety of projects with a focus on transportation and utility infrastructure. Project types that he has permitted have included airport terminals, natural gas power plants, submarine electrical cables, and water desalination facilities.

For the past 10 years, Mr. Barrett has worked almost exclusively in the field of aviation, where he established himself as an industry leader in integrating energy projects into the airport landscape. He was the lead author of the *Technical Guidance for Selected Solar Technologies at Airports*, also referred to as the FAA's Solar Guide (November 2010). He has also served as the Principal Investigator for numerous Airport Cooperative Research Program (ACRP) Reports including Report 151, *Developing the Business Case for Renewable Energy at Airports* (April 2016) and Synthesis Report 100, *Airport Greenhouse Gas Reduction Efforts* (October 2019). He has also supported FAA permitting efforts for a number of solar projects at airports including a 25 MW solar facility at Indianapolis International Airport in 2014, and recently gained approvals for an 8 MW solar project at Pontiac Municipal Airport in Illinois.

From 2016-2019, Mr. Barrett served as a Technical Advisor to the International Civil Aviation Organization (ICAO) for programs seeking to reduce CO₂ emissions from international aviation. He authored three guidance documents for ICAO states including Renewable Energy and Aviation (November 2017). He also served as the technical expert overseeing design and construction of solar facilities combined with gate electrification equipment to decarbonize aircraft at-gate operations at three airports in Cameroon, Jamaica, and Kenya. These projects, between 100 kW and 1.2 MW, came online in 2018 and 2019.

Appendix B Agencies/Tribes/Persons Consulted – Letters Received

The list of agencies/tribes/persons consulted are included in Table 8.

Table 7. Agencies/Tribes/Persons Consulted

Agency	Type of Correspondence
History Nebraska / SHPO	Letter
Nebraska Game and Parks Commission	Letter
US Fish and Wildlife Service	Letter
Tribal Historic Preservation Office (THPO)	Letter

Letters received are listed above Table 7 and included in this Section.



United States Department of the Interior

FISH AND WILDLIFE SERVICE
9325 South Alda Road
Wood River, Nebraska 68883



April 10, 2020

FWS NE: 2020-301

Ms. Bridget Callahan
Associate Development Manager
Sol Systems, LLC
1101 Connecticut Ave. NW, 2nd Floor
Washington, DC 20036

RE: Lexington II Community Solar Project, City of Lexington, Dawson County, Nebraska

Dear Ms. Callahan:

Please make reference to your email dated February 12, 2020, about the proposed Lexington II (Lexington II) Community Solar Project located on North Airport Road in the City of Lexington, Dawson County, Nebraska. Lexington II is being developed by Sol System, LLC in concert with GenPro Energy. The project is proposed to be located adjacent to the existing municipal airport on the west side of Lexington in an existing hayfield. Approximately 3,200 solar panels would be installed and collection lines would be buried underground at the site. Our comments are based on information you provided in your February 12, 2020, email and a site inspection conducted on February 13, 2020.

The U.S. Fish and Wildlife Service has completed a review of Lexington II with regard to potential impacts to federally listed threatened and endangered species, migratory birds, and bald and golden eagles, as requested. We have determined that it is unlikely that the proposed solar project would have a negative impact on any of these species given that the project area is located adjacent to commercial and residential areas and lacks suitable habitat.

Thank you for the opportunity to provide comments about the proposed project. Should you have any questions, please contact Mr. Robert Harms within our office at Robert_Harms@fws.gov or by telephone at (308) 382-6468, extension 208.

INTERIOR REGION 5
MISSOURI BASIN

KANSAS, MONTANA*, NEBRASKA, NORTH DAKOTA,
SOUTH DAKOTA

*PARTIAL

INTERIOR REGION 7
UPPER COLORADO RIVER BASIN

COLORADO, NEW MEXICO, UTAH, WYOMING

Sincerely,

A handwritten signature in blue ink, appearing to read "Eliza Hines", enclosed within a thin black rectangular border.

Eliza Hines
Nebraska Field Supervisor

cc: Melissa Marinovich, Assistant Division Administrator, Nebraska Game and Parks
Commission



2200 N. 33rd St. • P.O. Box 30370 • Lincoln, NE 68503-0370 • Phone: 402-471-0641

March 17, 2020

Ms. Bridget Callahan
1101 Connecticut Ave. NW, 2nd Floor
Washington, DC 20036

Re: Sol Systems & GenPro Lexington Solar Energy Generation Facility, Dawson County, Nebraska

Dear Ms. Callahan:

Please make reference to your email dated February 12, 2020. This letter is in response to your request for a review of this project's potential impacts to endangered and threatened species in Dawson County, Nebraska. As we understand it, the project involves construction and operation of a 1.2 kW (dc) and 1.0 kW (ac) capacity solar energy generation facility, consisting of approximately 3,200 panels, on land adjacent to the Lexington Airport, Jim Kelly Field, property. The Nebraska Game and Parks Commission has responsibility for protecting endangered and threatened species under authority of the Nongame and Endangered Species Conservation Act (NESCA) (Neb. Rev. Stat. § 37-801 to 37-811). We have reviewed the project pursuant to NESCA and offer the following comments.

This project is within the range of the state-listed threatened northern long-eared bat (*Myotis septentrionalis*), and the state-listed endangered whooping crane (*Grus americana*). There are no known records of any state-listed species within the immediate vicinity of the project area. The proposed project location consists of a regularly disturbed, hay field. It does not appear that any suitable habitat exists within the project area for either of the listed species identified above. Due to the lack of suitable habitat, it is unlikely this project will have an adverse impact on any state-listed threatened or endangered species.

This information is being provided based on a review of the material you sent, aerial photographs, and our Nebraska Natural Heritage Database. If the proposed project is changed, then we recommend further coordination with the Nebraska Game and Parks Commission Planning & Programming Division.

For an assessment of potential impacts to habitats and species protected under federal wildlife laws, including federally listed, candidate or proposed endangered or threatened species, please contact Eliza Hines (eliza_hines@fws.gov), Nebraska Field Office, U.S. Fish and Wildlife Service, 9325 South Alda Road, Wood River, NE 68883.

Please note this correspondence does not satisfy requirements of Neb. Rev. Stat. §37-807 (3) of the Nongame and Endangered Species Conservation Act. Under authority of Neb. Rev. Stat. §37-807 (3), all Nebraska state agencies are required to consult with the Commission to ensure any actions authorized, funded or carried out by them do not jeopardize the continued existence of a state listed species. This requirement would extend to any permit issued or authorized by a state agency.

TIME OUTDOORS IS TIME WELL SPENT

OutdoorNebraska.org

Thank you for the opportunity to comment. If you have any questions or need additional information, please feel free to contact me at (402) 471-5422 or melissa.marinovich@nebraska.gov.

Sincerely,



Melissa Marinovich
Assistant Division Administrator
Planning and Programming Division

cc: Eliza Hines, U.S. Fish and Wildlife Service
Anna Noucas, Sol Systems
Lauren Aycock, Sol Systems
Michael Larsen, GenPro

From: [Bacon, Kelli](#)
To: [Bridget Callahan](#)
Subject: RE: NeSHPO - Solar Project in Lexington, Nebraska
Date: Tuesday, March 17, 2020 5:00:10 PM
Attachments: [image009.png](#)
[2003-086-01.pdf](#)

Ms. Callahan,

RE: HP# 2003-086-01 Solar Photovoltaic Plant Installation, Lexington, Dawson County, NE

Thank you for submitting the project proposal for our review and comment. Our comment on this project and its potential to affect historic properties is required by Section 106 of the National Historic Preservation Act of 1966, as amended, and implementing regulations 36 CFR Part 800.

I have attached the Section 106 review for the above referenced project. Should any changes in the project be made or in the type of funding or assistance provided through federal or state agencies, please notify this office of the changes before further project planning continues.

Please retain this correspondence and your documented finding in order to show compliance with Section 106 of the National Historic Preservation Act, as amended. If you have any questions, please contact me at 402-471-4766.

Kelli Bacon

Certified Local Government coordinator / acting Section 106 coordinator



1500 R Street
Lincoln, Nebraska 68508-1651

t . 402-471-4766 | f . 402-471-3100
kelli.bacon@nebraska.gov | history.nebraska.gov

Preserving the Past. Building the Future



From: Bridget Callahan <bridget.callahan@solsystems.com>
Sent: Tuesday, March 17, 2020 3:07 PM
To: HP, HN <hn.hp@nebraska.gov>
Subject: NeSHPO - Solar Project in Lexington, Nebraska

Nebraska State Historic Preservation Office (c/o John Risetto),

I hope this message finds you well. Please find attached an online Section 106 Project Form for Individual Standing Structures compliance form. This submission is related to the proposed installation of a solar photo-voltaic (PV) plant at the Jim Kelly Field/Lexington Municipal Airport on North Airport Road in Lexington, Nebraska. I believe that you have previously worked with my colleagues Andrew Grin and Rich Baltimore on similar requests in the past.

Please let me know after you've had a chance to review the documentation if you have any questions or if there is any additional information that I may provide. Thank you for your assistance in this matter!

Best,

Bridget Callahan

Project Development Manager



Sol Customer Solutions

c/o Sol Systems, LLC

1101 Connecticut Avenue NW | Second Floor | Washington, DC 20036

C (317) 443-2905 | D (202) 448-7643

[website](#) | [vCard](#) | [email](#)



Confidentiality Statement: The information contained in this message may be privileged and/or confidential and protected from disclosure. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution or copy of this communication is strictly prohibited. If you have received this communication in error, please notify us immediately by replying to this message and deleting the material from any computer. Thank you.



Submission of a completed Project Information Form with adequate information and attachments constitutes a request for review pursuant to Section 106 of the National Historic Preservation Act of 1966 (as amended). More information may be required to adequately complete the Section 106 process. Submit completed form to HN.HP@nebraska.gov.

NOTE: Section 106 regulations provide for a 30-day response time by the Nebraska State Historic Preservation Office from the date of receipt.

PROJECT NAME (if applicable)

Lexington II Community Solar Project

COUNTY

Dawson

STREET ADDRESS (No P.O. Box Numbers)

N. Airport Road (40.790972°N, 99.769417°W)

PROJECT NUMBER
(if applicable)

CITY

Lexington

FEDERAL AGENCY OR DESIGNEE

FAA

CONTACT PERSON

Bridget Callahan

CITY, STATE ZIP

Washington, D.C. 20036

TELEPHONE

+1 (202) 448-7643

EMAIL (for response)

bridget.callahan@solsystems.com

PROJECT DESCRIPTION

Briefly describe the overall project.

The installation of a solar photovoltaic (PV) plant, including PV modules, grid-interactive inverters, and single-axis trackers to supply power directly to the local electric utility grid is proposed at the Jim Kelly Field - the Lexington Municipal Airport. GenPro Energy Solutions and Sol Customer Solutions c/o Sol Systems, LLC are developing this project. We are in contact with Nathan Masten at the airport, as well as the City of Lexington. We do not beie

DESIGNATIONS

To the best of your knowledge, is the structure any of the following?

- ☐ Listed Individually on the National Register ☐ Listed within a National Register Historic District
☐ Designated Local Landmark ☐ Designated Local Landmark District

PHOTOGRAPHS

Please provide photographs of all structures. Photographs of neighboring or nearby buildings are helpful. Go to page 2 to insert photo(s).

NESHPO USE ONLY

Nebraska SHPO Determination

Site Number: _____

☐ No potential to cause effects

☐ Adverse effect (More consultation needed)

☒ No historic properties affected

☐ The SHPO requests additional information (see attached)

☐ No adverse effect

Kelli Baw

Date

3/17/2020

Review & Compliance Coordinator

State Historic Preservation Office, Nebraska State Historical Society

This website is recommended by ACHP: <https://egis.hud.gov/TDAT/>

Contact	Delivered (Cert Mail)	Response Returned	Action Requested
Mr. Bobby Komardly, Chairman Apache Tribe of Oklahoma P.O. Box 1330 Anadarko, OK 73005	3/24/20	5/5/20-No Response	
Ms. Virginia Richey, THPO Cheyenne and Arapaho Tribes, Oklahoma 100 Red Moon Circle Concho, OK 73022	3/27/20	5/5/20-No Response	
Ms. Bobi Roush Cultural Preservation Department Iowa Tribe of Oklahoma 335588 E 750 Road Perkins, OK 74059	3/23/20	5/5/20-No Response	
Ms. Diane Hunter Tribal Historic Preservation Officer Miami Tribe of Oklahoma P.O. Box 1326 Miami, OK 74355	3/23/20	5/5/20-No Response	
Ms. Yufna Soldier Wolf Tribal Historic Preservation Officer Northern Arapaho Tribe P.O. Box 67 St. Stephens, WY 82524	3/30/20	5/5/20-No Response	
Mr. Tony Provost Tribal Historic Preservation Officer Omaha Tribe P.O. Box 368 Macy, NE 68039	3/31/20	5/5/20-No Response	
Mr. Matt Reed Tribal Historic Preservation Office Pawnee Nation of Oklahoma P.O. Box 470 Pawnee, OK 74058	3/23/20	5/5/20-No Response	
Mr. Shannon Wright Tribal Historic Preservation Officer Ponca Tribe of Nebraska P.O. Box 288 Niobrara NE 68760	3/23/20	5/5/20-No Response	



U.S. Department
of Transportation

**Federal Aviation
Administration**

Central Region
Iowa, Kansas,
Missouri, Nebraska

901 Locust
Kansas City, Missouri 64106
(816) 329-2600

March 19, 2020

CERTIFIED MAIL

<NAME> [See Attached List]

<ADDRESS>

Section 106 Consultation
Lexington Municipal Airport
Lexington, Dawson County, Nebraska

Dear <NAME>:

An environmental evaluation is being prepared for a proposed solar facility at the Lexington Municipal Airport subject to the National Environmental Policy Act (NEPA). In conjunction with the NEPA process, the FAA intends to complete Section 106 of the National Historic Preservation Act (NHPA), as implemented through 36 CFR 800. The intent of this letter is to request your input on properties of cultural or religious significance that may be affected by the proposed project and invite you to participate in the Section 106 consultation process.

The proposed development includes the following (see attached maps):

- Land acquisition of approximately 8.5 acres of existing agricultural pasture land for the purpose of leasing the property for the solar facility
- Anticipated MW Capacity: 1.2 kW (DC) and 1.0 kW (AC)
- How many panels and what type: 3,200 panels (Renesola SPM(SLP) 375)
- Will collection lines be buried on site: the underground lines will be buried on site
- What is the anticipated construction start date: 5/1/2020
- When is the project anticipated to be online: 12/1/2020

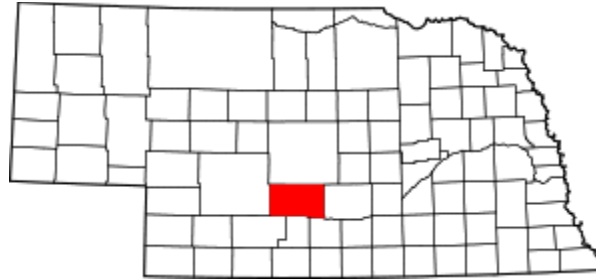
The FAA is the lead federal agency for the NEPA document. Jim Johnson, Director, FAA Central Region Airports Division, will be making the final FAA decision on the environmental determination.

To help in our preparation of the EA, we would appreciate your input (via mail or e-mail) within thirty (30) days. If you have questions or require additional information, please contact me at 816-329-2639 or scott.tener@faa.gov.

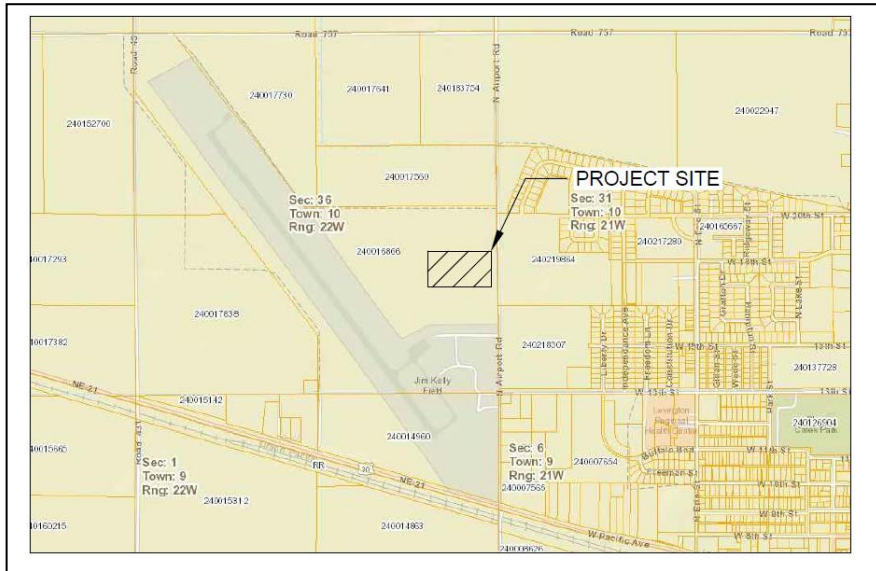
Sincerely,

Scott Tener
Environmental Specialist

Attachment (Vicinity Map, Project Map)



Dawson County, Nebraska

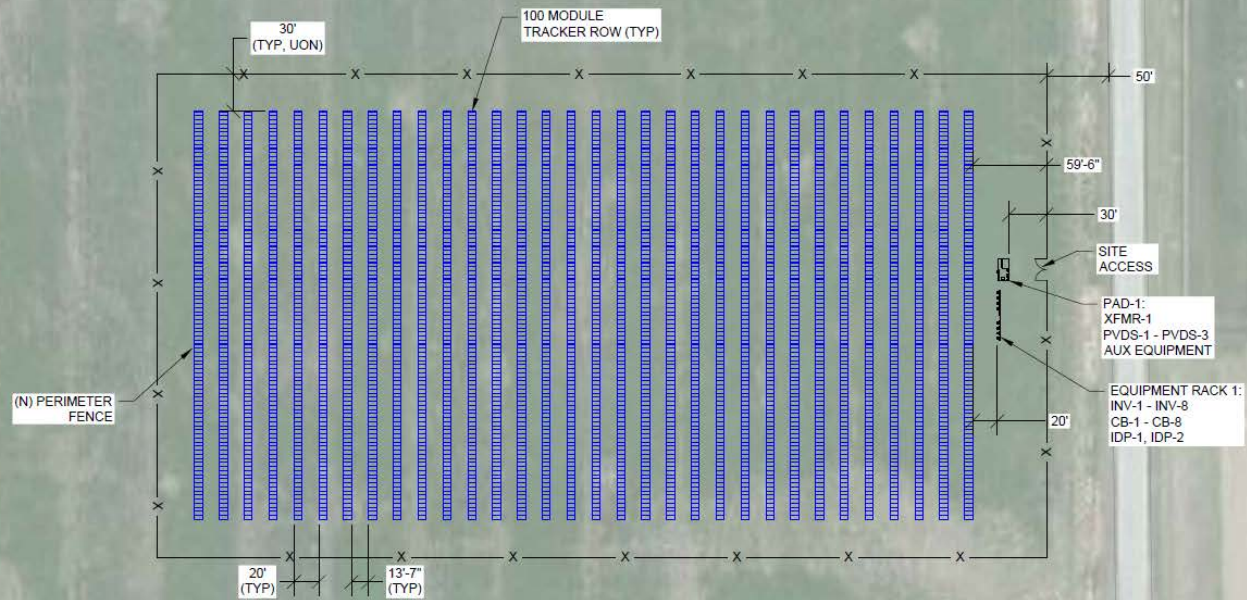


**Lexington, Nebraska
Lexington Municipal Airport**

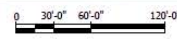


Project Area

Lexington Municipal Airport



1 OVERALL SITEPLAN
SCALE: 1" = 60'



Appendix C Public Involvement / Response to Comments

Notice of the availability of the EA has been published in the _____ on _____.

Copies of the EA have been provided at the Lexington City Hall, Lexington Library, and the Airport for public review. The EA is also available for review on the City of Lexington's website. The public comment period lasted 30 days.

Appendix D Sponsor Land Use Letter



308-324-2341 ♦ Fax: 308-324-4590 ♦ www.cityoflex.com
406 East 7th Street ♦ P.O. Box 70 ♦ Lexington, Nebraska 68850-0070

May 5, 2020

Dear FAA Reviewer:

It is my understanding FAA Order 1050.1F Desk Reference, Section 9, Land Use, requires a letter from the airport sponsor with regard to local zoning and compatibility with airport uses. This letter is provided in Appendix D of the Lexington II Community Solar Project Environmental Assessment (EA).

The City of Lexington assures that per 49 USC 47107(a)(10), appropriate action, including the adoption of zoning laws, has been or will be taken, to the extent reasonable, to restrict the use of land adjacent to or in the immediate vicinity of Jim Kelly Field Airport to activities and purposes compatible with normal airport operations, including the landing and takeoff of aircraft. This applies to both existing and planned land uses.

Please refer to City of Lexington Zoning Ordinance, Section 5.18, Airport Hazard Overlay.

Please contact me if you have any questions.

Regards,

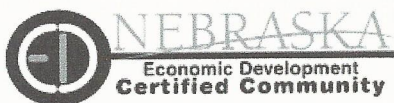
A handwritten signature in black ink, appearing to read "Joe Pepplitsch".

Joe Pepplitsch
City Manager

Approved as to Form and Content:

A handwritten signature in black ink, appearing to read "Nathan Masten".

Nathan Masten
Airport Manager
1501 North Airport Road
Lexington, NE 68850-3471



Appendix E Glare Study of Aviation and Non-Aviation Receptors

Technical Memorandum

To: Michael Larson, GenPro Solutions
From: Stephen Barrett
Date: April 13, 2020
RE: Glare Study, Solar Photovoltaic Project at Jim Kelly Field Airport,
Lexington, Nebraska

Executive Summary

GenPro Solutions (GenPro) is constructing a nominal 1.2 MWdc (1 MWac) single axis tracking solar photovoltaic (PV) project at Jim Kelly Field Airport (LXN) in Lexington, Nebraska. The project will be located near the intersection of the airport entrance road and North Airport Road. GenPro has engaged Barrett Energy Resources Group (BERG) to evaluate potential glare impacts of the proposed solar PV project on airport sensitive receptors at LXN and non-aviation receptors near the project site.

To complete this task, BERG has utilized the Solar Glare Hazard Analysis Tool (SGHAT) to predict potential glare and, for aviation receptors, has assessed the results relative to the FAA's Solar Policy and ocular hazard standard. BERG evaluated the existing asphalt Runway 14/32 and turf Runway 1/19, as well as a future Runway 5/23 shown on the Airport Layout Plan (ALP). As there is no air traffic control tower (ATCT) at LXN, only the pilot analysis was required. No glare was detected for aircraft on final descent to the six runway ends. The findings show that the project as designed meets the ocular hazard standard contained in the FAA Policy.

As part of the National Environmental Policy Act (NEPA) Environmental Assessment (EA), potential impacts of glare from the project on non-aviation receptors also require evaluation. To complete this, BERG used SGHAT to assess glare on motorists and stationary receptors (residence, athletic field) near the proposed project site. The analysis identified no glare impacts on these non-aviation receptors.

This memorandum describes the methodology and results of the glare study.

Project Description

GenPro is developing a 1 MWac solar PV project at Jim Kelly Field Airport (LXN) in Lexington Nebraska as shown on **Figure 1**. The array is characterized by a single axis tracking design whereby the solar panels follow the sun throughout the day to maximize electricity production.

LXN, owned by the City of Lexington and operated by the Lexington Airport Authority, is a general aviation airport which does not have an ATCT. It currently has a single paved runway (14/32) and a turf runway (1/19). The ALP also shows a future cross runway (5/23). Most recent records show that LXN has 25 based aircraft, fuel services, tie-downs, maintenance services, aerial applicators and pilot instruction.



Figure 1. Lexington II Community Solar Project Locus

FAA Solar Policy

In response to the growing solar electricity market and the specific interests of airports to develop solar projects on their property to meet revenue generation and public policy objectives, the FAA published on October 23, 2013 in the *Federal Register* "Interim Policy, FAA Review of Solar Energy System Projects on Federally-Obligated Airport." The FAA's Solar Policy is intended to communicate to airports and FAA technical reviewers the methods for assessing glare from solar PV projects proposed on airport property and the standards for determining impact. It also requires the use of modeling to assess glare and directs project proposers to the Solar Glare

Hazard Analysis Tool (SGHAT) which was developed by the US Department of Energy at the request of the FAA. While the FAA had previously prepared formal guidance titled “Technical Guidance for Evaluating Selected Solar Technologies on Airports” (November 2010), the Solar Policy published in 2013 provided the first regulatory requirement for assessing glare from solar projects and the methods for doing so.

Glare Methodology and Standard of Impact

Prediction of potential glare occurrence from a solar PV project requires knowledge of the sun position, observer location, and the solar module/array characteristics (e.g., tilt, azimuth or orientation, location, extent, etc.). Vector algebra is then used to determine if glare would be visible from the prescribed observation points. The time and duration of glare is influenced by the seasonal position and daily movement of the sun, as well as the location of the receptor and whether it is stationary (e.g., an ATCT) or moving (e.g., an aircraft). **Figure 2** provides a simple representation of how the sun can produce glare on an ATCT for a specific time and location. As the sun moves, the incidence of glare subsides.

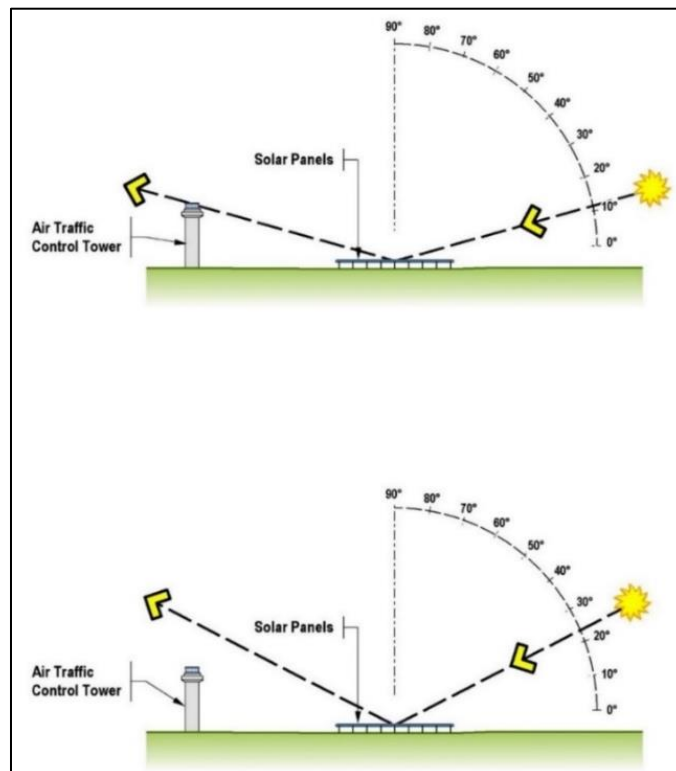


Figure 2. Geometric Representation of Potential Glare Impacts from the Sun

The FAA’s Solar Policy specifies the glare methodology and ocular hazard standard required for solar PV projects located at airports. The Policy directs proponents to model glare using SGHAT or an acceptable alternative. For this analysis, BERG used SGHAT version 3 released in the

spring of 2016 under the brand “GlareGauge.” For consistency with the FAA Policy, the model is referred to as SGHAT.

With regards to the ocular hazard standard, the SGHAT model reports predicted glare intensity in a color-coded system at three levels:

- green, a low potential for an after-image¹;
- yellow, a potential for an after-image; and
- red, a potential for retinal burn.

The Policy includes an ocular hazard standard which establishes the glare intensity depicted by the color-coded system that is deemed significant and thereby determined to produce a potential hazard to air navigation. The standard prohibits any glare from impacting the ATCT (i.e., results with green, yellow or red represent a significant impact), but allows for a low potential for an after image (green) for pilots on approach to the airport with yellow and red results representing a significant impact. The different standard for pilots recognizes that they are moving receptors with shorter duration of exposure and that they are commonly exposed to different natural and manmade glare sources. **Table 1** presents the airport sensitive receptors that must be evaluated for glare using the SGHAT model, the potential results reported by the model, and whether the result complies with the FAA’s Solar Policy.

Table 1. SGHAT Model Levels of Glare and Compliance with FAA Policy

Airport Sensitive Receptor	Level of Glare	Glare Color Result	Does Result Comply with FAA Policy?
ATCT	No glare	None	Yes
	Low Potential for After-Image	Green	No
	Potential for After-Image	Yellow	
	Potential for Permanent Eye Damage	Red	
Aircraft on approach	No glare	None	Yes
	Low Potential for After-Image	Green	No
	Potential for After-Image	Yellow	
	Potential for Permanent Eye Damage	Red	

SGHAT Model Setup for the Proposed Project

For the Lexington II Community Solar Project, BERG used the PV project polygon tool to draw the footprint of the solar array on SGHAT’s interactive Google map. The specific attributes of

¹ An after-image occurs when you look directly into a bright light, then look away. It typically takes several seconds for your vision to readjust and return to normal. It is also referred to as a temporary visual disability or flash blindness.

the solar array were then input into the model, namely a single axis tracking system with a tracking axis tilt of 0° , tracking axis orientation of 180° , module offset angle of 0° , and maximum tracking and resting angles (start and stop position of the panels at the beginning and ending of the tracking day) as 52° . The panel height of 8 feet above ground level (agl), and a panel surface with no anti-reflective coating as a baseline were input. **Figure 3** is a simple schematic showing how the panels for a single axis tracking design follow the sun's position throughout the day.

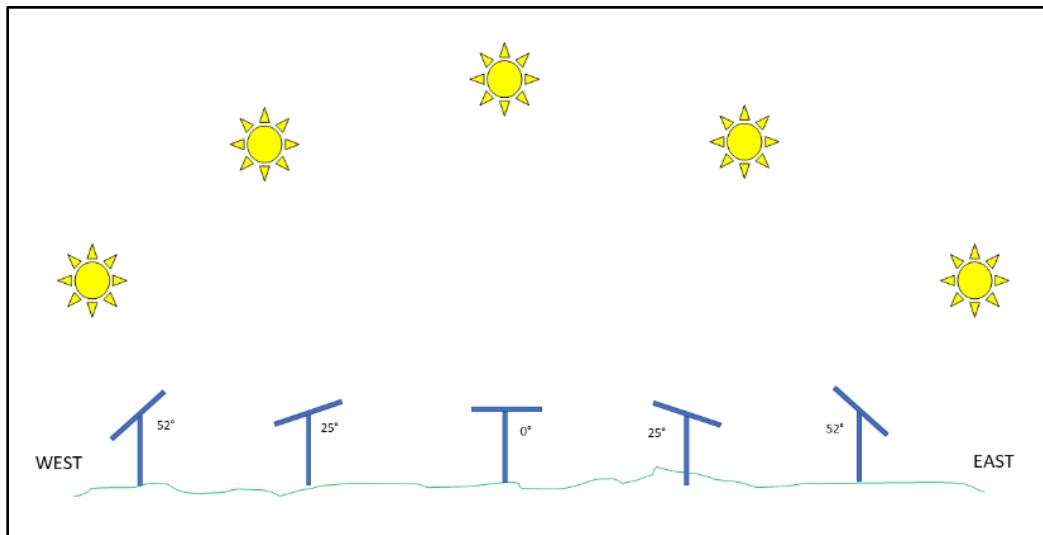


Figure 3. Schematic of Solar Tracking System Through a One-Day Cycle

The next step is to input information on the airport sensitive receptors to be analyzed in the model. LXN does not have an ATCT so the analysis was confined to assessing pilots on final approach to each of the runway ends.

To assess glare on pilots, BERG activated the flight path tool and selected the threshold (or end) of the first runway and selected a second point away from the threshold to represent a straight-on approach pathway. The model automatically draws the flightpath from the threshold out to two miles for analysis. This step was repeated for subsequent runway ends and associated approach pathways. The model assumes a 3-degree glide path as a default which was used for all runway approaches. As the ALP shows a future cross runway, 5/23, this alternative was also assessed. **Figure 4** shows the location of the solar project and the two-mile flight paths (in light purple) analyzed in accordance with FAA methodology. A total of six approach pathways were modeled.

The glare analysis button was activated and the model calculated potential glare from various sun angles at 1-minute intervals throughout the year to predict if glare could be observed by the specified sensitive receptors.



Figure 4. Airport Sensitive Receptors Analyzed at Jim Kelly Field Airport

Glare Model Results and Analysis

The SGHAT model output for the analysis of aviation receptors at LXN is included as **Attachment A**. The model results report no glare predicted on the six aircraft final approach pathways. These results demonstrate that the project design complies with the FAA's Solar Policy and ocular hazard standard.

The results reported are consistent with the operation of the single axis tracking system. This design is effective in eliminating potential glare from receptors close to the ground, including ATCTs and pilots on final approach, for two main reasons. First, the design and operational elements are such that the face of the panel is always perpendicular to the sun as it moves across the sky during the day. The effect is that the sun's rays contact the panel and the portion that is reflected returns back toward the sun and not toward any receptor closer to the ground. This concept is illustrated in **Figure 5**. For aircraft flying at "cruising" altitude well above the airport, glare will contact the belly of the aircraft.

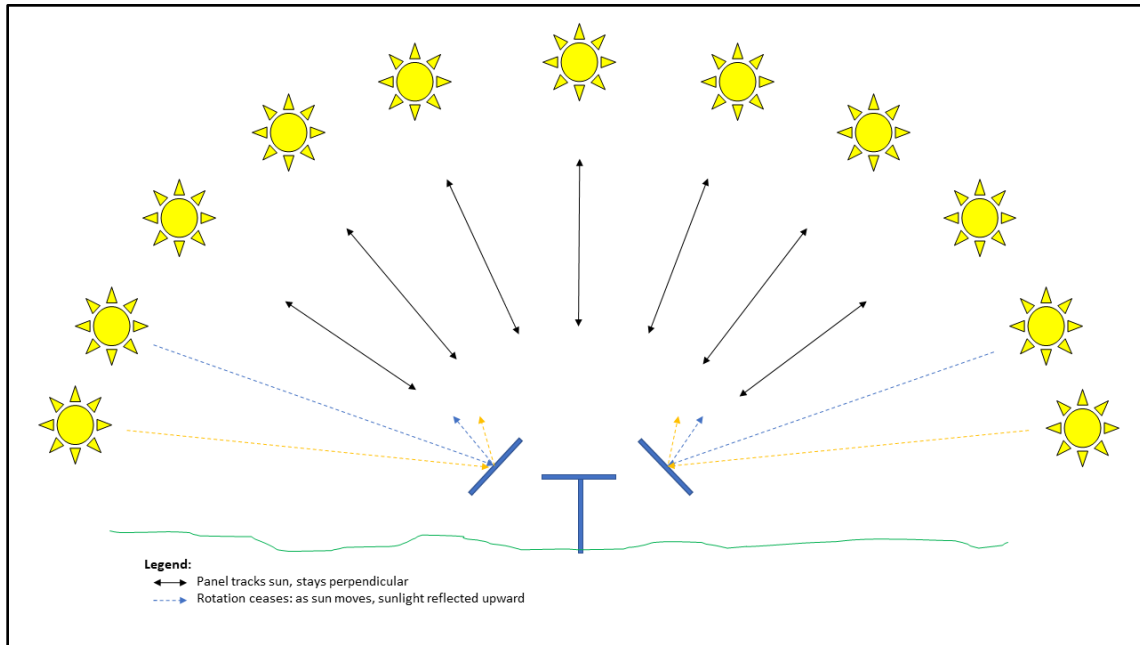


Figure 5. Tracking System Mitigates Glare for Low-to-Ground Receptors

The second design element of the tracking system that mitigates glare is the starting and stopping angle of the panels. Because the panels do not extract much energy from the sun when it is low on the horizon, the tracking system does not remain perpendicular to the sun at the beginning and end of each day. If it did, the sun may contact the panel surface and reflect back toward the sun at a low angle and closer to the ground. Instead, the panel is already angled such that any reflection from the rising or setting sun is cast upward and away from the ground. Once the sun rises to a position in the sky where it is perpendicular to the panel “resting” angle, the tracking commences. At the end of the day, the panel reaches the same angle where it started the day, stops tracking, and, as the sun continues to set, any reflection off the panel is cast upward. This concept is also shown in Figure 5.

Non-aviation Receptors

BERG also used SGHAT to evaluate potential glare effects from the project on non-aviation receptors near the project site. The SGHAT model produces the same type of result about potential glare regardless of the type of receptor analyzed. For aviation receptors, the color-coded results are compared to the Solar Policy and ocular hazard standard to determine if the results constitute a significant impact. Because there is no similar standard for non-aviation receptors, the results simply provide information on whether glare can be seen or not. If glare is seen, then the potential for significant impact must be evaluated based on other factors associated with the receptor.

For this analysis, five nearby receptors were identified for evaluation based on proximity to the project site. Three receptors are locations of motorists driving along nearby roads: southbound on North Airport Road, northbound on North Airport Road, and westbound West 13th Street approaching the intersection with North Airport Road. In addition, two stationary receptors were identified: a central location in the City Athletic Fields on the east side of North Airport Road, and the closest residence to the project at the southeast corner of West 13th Street and North Airport Road. The location of the receptors is shown on **Figure 6**. For each receptor, the viewpoint was set at 5 feet above ground level to represent the view of a person sitting in a vehicle or standing on the property.



Figure 6. Non-aviation Receptors Analyzed for Glare

The SGHAT model output for the analysis of non-aviation receptors near the proposed solar project is included as **Attachment B**. The model results report no glare predicted on the five receptors analyzed. These results are consistent with those discussed above for single axis tracking systems.

Conclusions

Barrett Energy Resources Group (BERG) has evaluated potential glare impacts of a solar photovoltaic (PV) project proposed by GenPro at Jim Kelly Field Airport in Lexington, NE. The project, a nominal 1 MWac single axis tracking system, has been assessed for aviation sensitive receptors relative to the FAA's Interim Solar Policy and ocular hazard standard. The project is located on airport property and must demonstrate compliance with the FAA policy and standard. In accordance with requirements associated with an EA prepared under NEPA, impacts have also been assessed for non-aviation receptors near the project site.

As the airport does not have an ATCT, the analysis of aviation sensitive receptors was confined to pilots on final approach to each runway end. The modeling recorded no glare on pilots on approach to the existing Runways 14/32 and 1/19, or for a future Runway 5/23. These results demonstrate that the project as designed meets the FAA's Solar Policy and ocular hazard standard. The results for non-aviation receptors also showed no exposure to glare and therefore no effect.

Attachment A

Glare Modeling Results

Aviation Sensitive Receptors

FORGESOLAR GLARE ANALYSIS

Project: **Lexington II Community Solar Project**

A ground-mounted single axis tracking solar array on property of the Jim Kelly Field Airport.

Site configuration: **LXN Preferred**

Analysis conducted by Stephen Barrett (steve@barrettenergygroup.com) at 13:04 on 13 Apr, 2020.

U.S. FAA 2013 Policy Adherence

The following table summarizes the policy adherence of the glare analysis based on the 2013 U.S. Federal Aviation Administration Interim Policy 78 FR 63276. This policy requires the following criteria be met for solar energy systems on airport property:

- No "yellow" glare (potential for after-image) for any flight path from threshold to 2 miles
- No glare of any kind for Air Traffic Control Tower(s) ("ATCT") at cab height.
- Default analysis and observer characteristics (see list below)

ForgeSolar does not represent or speak officially for the FAA and cannot approve or deny projects. Results are informational only.

COMPONENT	STATUS	DESCRIPTION
Analysis parameters	PASS	Analysis time interval and eye characteristics used are acceptable
2-mile flight path(s)	PASS	Flight path receptor(s) do not receive yellow glare
ATCT(s)	N/A	No ATCT receptors designated

Default glare analysis parameters and observer eye characteristics (for reference only):

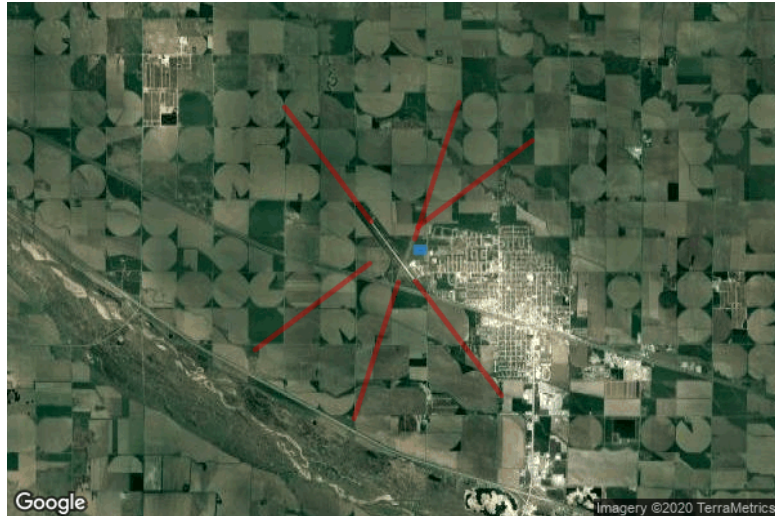
- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians

FAA Policy 78 FR 63276 can be read at <https://www.federalregister.gov/d/2013-24729>

SITE CONFIGURATION

Analysis Parameters

DNI: peaks at 1,000.0 W/m²
Time interval: 1 min
Ocular transmission coefficient: 0.5
Pupil diameter: 0.002 m
Eye focal length: 0.017 m
Sun subtended angle: 9.3 mrad
Site Config ID: 37976.6952



PV Array(s)

Name: Preferred Action
Description: Groundmounted single axis tracking solar PV facility
Axis tracking: Single-axis rotation
Tracking axis orientation: 180.0°
Tracking axis tilt: 0.0°
Tracking axis panel offset: 0.0°
Max tracking angle: 52.0°
Resting angle: 52.0°
Rated power: 1200.0 kW
Panel material: Smooth glass without AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	40.791859	-99.771285	2404.23	8.00	2412.23
2	40.790689	-99.771285	2404.12	8.00	2412.12
3	40.790689	-99.768796	2402.12	8.00	2410.12
4	40.791843	-99.768775	2403.56	8.00	2411.56

Flight Path Receptor(s)

Name: Runway 5

Description:

Threshold height: 50 ft

Direction: 53.0°

Glide slope: 3.0°

Pilot view restricted? Yes

Vertical view: 30.0°

Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	40.788549	-99.783544	2407.67	50.00	2457.67
Two-mile	40.771149	-99.814077	2416.19	594.94	3011.13

Name: Rwy 1

Description:

Threshold height: 50 ft

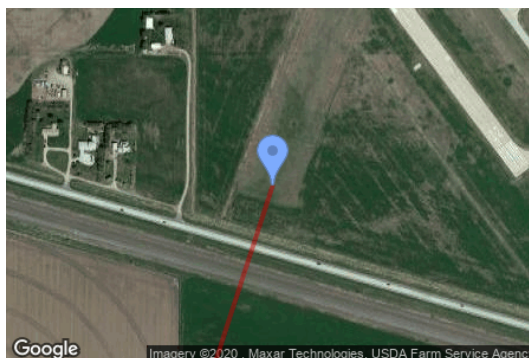
Direction: 18.0°

Glide slope: 3.0°

Pilot view restricted? Yes

Vertical view: 30.0°

Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	40.784773	-99.775877	2403.67	50.00	2453.67
Two-mile	40.757275	-99.787691	2405.34	601.79	3007.13

Name: Rwy 14

Description:

Threshold height: 50 ft

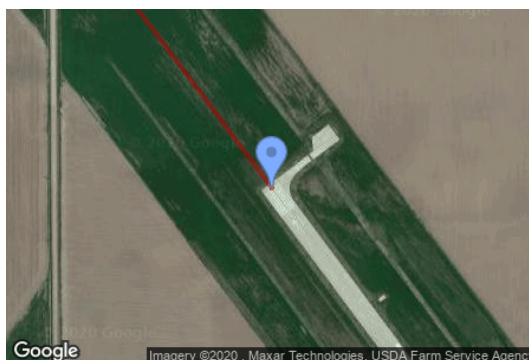
Direction: 143.0°

Glide slope: 3.0°

Pilot view restricted? Yes

Vertical view: 30.0°

Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	40.796977	-99.783185	2412.42	50.00	2462.42
Two-mile	40.820068	-99.806197	2431.06	584.81	3015.87

Name: Rwy 19

Description:

Threshold height: 50 ft

Direction: 198.0°

Glide slope: 3.0°

Pilot view restricted? Yes

Vertical view: 30.0°

Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	40.793490	-99.771512	2408.22	50.00	2458.22
Two-mile	40.820987	-99.759697	2417.11	594.57	3011.67

Name: Rwy 23

Description:

Threshold height: 50 ft

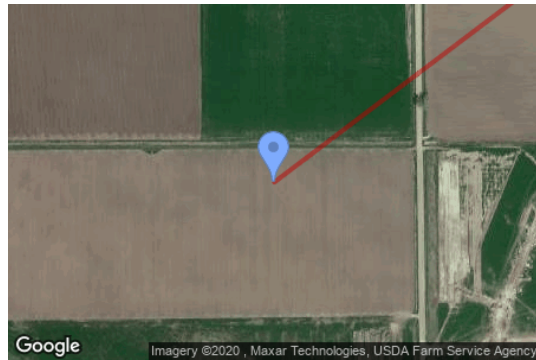
Direction: 233.0°

Glide slope: 3.0°

Pilot view restricted? Yes

Vertical view: 30.0°

Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	40.795916	-99.770690	2410.73	50.00	2460.73
Two-mile	40.813316	-99.740154	2407.50	606.69	3014.19

Name: Rwy 32

Description:

Threshold height: 50 ft

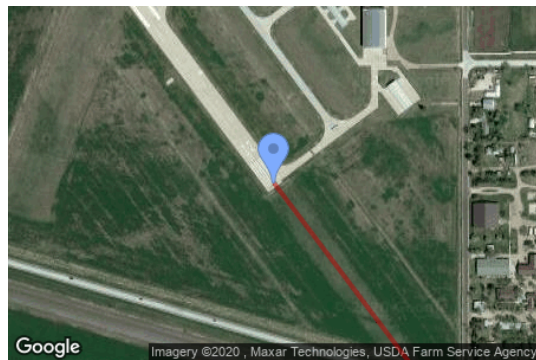
Direction: 323.0°

Glide slope: 3.0°

Pilot view restricted? Yes

Vertical view: 30.0°

Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	40.784997	-99.771352	2403.55	50.00	2453.55
Two-mile	40.761907	-99.748345	2390.32	616.69	3007.01

GLARE ANALYSIS RESULTS

Summary of Glare

PV Array Name	Tilt	Orient	"Green" Glare	"Yellow" Glare	Energy
	(°)	(°)	min	min	kWh
Preferred Action	SA tracking	SA tracking	0	0	3,621,000.0

Total annual glare received by each receptor

Receptor	Annual Green Glare (min)	Annual Yellow Glare (min)
Runway 5	0	0
Rwy 1	0	0
Rwy 14	0	0
Rwy 19	0	0
Rwy 23	0	0
Rwy 32	0	0

Results for: Preferred Action

Receptor	Green Glare (min)	Yellow Glare (min)
Runway 5	0	0
Rwy 1	0	0
Rwy 14	0	0
Rwy 19	0	0
Rwy 23	0	0
Rwy 32	0	0

Flight Path: Runway 5

0 minutes of yellow glare
0 minutes of green glare

Flight Path: Rwy 1

0 minutes of yellow glare
0 minutes of green glare

Flight Path: Rwy 14

0 minutes of yellow glare

0 minutes of green glare

Flight Path: Rwy 19

0 minutes of yellow glare

0 minutes of green glare

Flight Path: Rwy 23

0 minutes of yellow glare

0 minutes of green glare

Flight Path: Rwy 32

0 minutes of yellow glare

0 minutes of green glare

Assumptions

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.

Glare analyses do not account for physical obstructions between reflectors and receptors. This includes buildings, tree cover and geographic obstructions.

Several calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare.

The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size.

Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)

Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.

Glare vector plots are simplified representations of analysis data. Actual glare emanations and results may differ.

The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. Actual results and glare occurrence may differ.

Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.

Refer to the Help page at www.forgesolar.com/help/ for assumptions and limitations not listed here.

Attachment B

Glare Modeling Results

Non-Aviation Sensitive Receptors



GlareGauge Glare Analysis Results

Site Configuration: LXN Preferred - Non-aviation

Project site configuration details and results.



Created **April 14, 2020 11:21 a.m.**
 Updated **April 14, 2020 11:34 a.m.**
 DNI **varies** and peaks at **1,000.0 W/m²**
 Analyze every **1 minute(s)**
0.5 ocular transmission coefficient
0.002 m pupil diameter
0.017 m eye focal length
9.3 mrad sun subtended angle
 Timezone **UTC-6**
 Site Configuration ID: 38012.6952

Summary of Results No glare predicted!

PV Name	Tilt	Orientation	"Green" Glare	"Yellow" Glare	Energy Produced
	deg	deg	min	min	kWh
Preferred Action	SA tracking	SA tracking	0	0	3,621,000.0

Component Data

PV Array(s)

Name: Preferred Action
Description: Groundmounted single axis tracking solar PV facility
Axis tracking: Single-axis rotation
Tracking axis orientation: 180.0 deg
Tracking axis tilt: 0.0 deg
Tracking axis panel offset: 0.0 deg
Maximum tracking angle: 52.0 deg
Resting angle: 52.0 deg
Rated power: 1200.0 kW
Panel material: Smooth glass without AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 6.55 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	40.791859	-99.771285	2404.23	8.00	2412.23
2	40.790689	-99.771285	2404.12	8.00	2412.12
3	40.790689	-99.768796	2402.12	8.00	2410.12
4	40.791843	-99.768775	2403.56	8.00	2411.56



Discrete Observation Receptors

Number	Latitude	Longitude	Ground elevation	Height above ground	Total Elevation
	deg	deg	ft	ft	ft
OP 1	40.793081	-99.768000	2406.90	5.00	2411.90
OP 2	40.788497	-99.767871	2404.23	5.00	2409.23
OP 3	40.788980	-99.766296	2404.93	5.00	2409.93
OP 4	40.786669	-99.766424	2403.04	5.00	2408.04
OP 5	40.786320	-99.767428	2403.09	5.00	2408.09

PV Array Results

Summary of PV Glare Analysis PV configuration and predicted glare

PV Name	Tilt	Orientation	"Green" Glare	"Yellow" Glare	Energy Produced	Data File 
	deg	deg	min	min	kWh	
Preferred Action	SA tracking	SA tracking	0	0	3,621,000.0	-

Click the name of the PV array to scroll to its results

PV & Receptor Analysis Results detailed results for each PV array and receptor

Preferred Action no glare found



Predicted energy output: 3,621,000.0 kWh (assuming sunny, clear skies)

Component	Green glare (min)	Yellow glare (min)
OP: OP 1	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0

No glare found

Assumptions

- Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
- Glare analyses do not account for physical obstructions between reflectors and receptors. This includes buildings, tree cover and geographic obstructions.
- Detailed system geometry is not rigorously simulated.
- The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. Actual values and results may vary.
- The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.
- Several calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare.
- The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
- Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.
- Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
- Glare vector plots are simplified representations of analysis data. Actual glare emanations and results may differ.
- Glare analysis methods used: OP V1, FP V1, Route V1
- Refer to the **Help page** for assumptions and limitations not listed here.