



Renewable Energy Project Submission Report for the NU-E Corp Lethbridge Two-Three Solar Power Project

March 2023

Prepared by:



BEAR TRACKS
ENVIRONMENTAL SERVICES

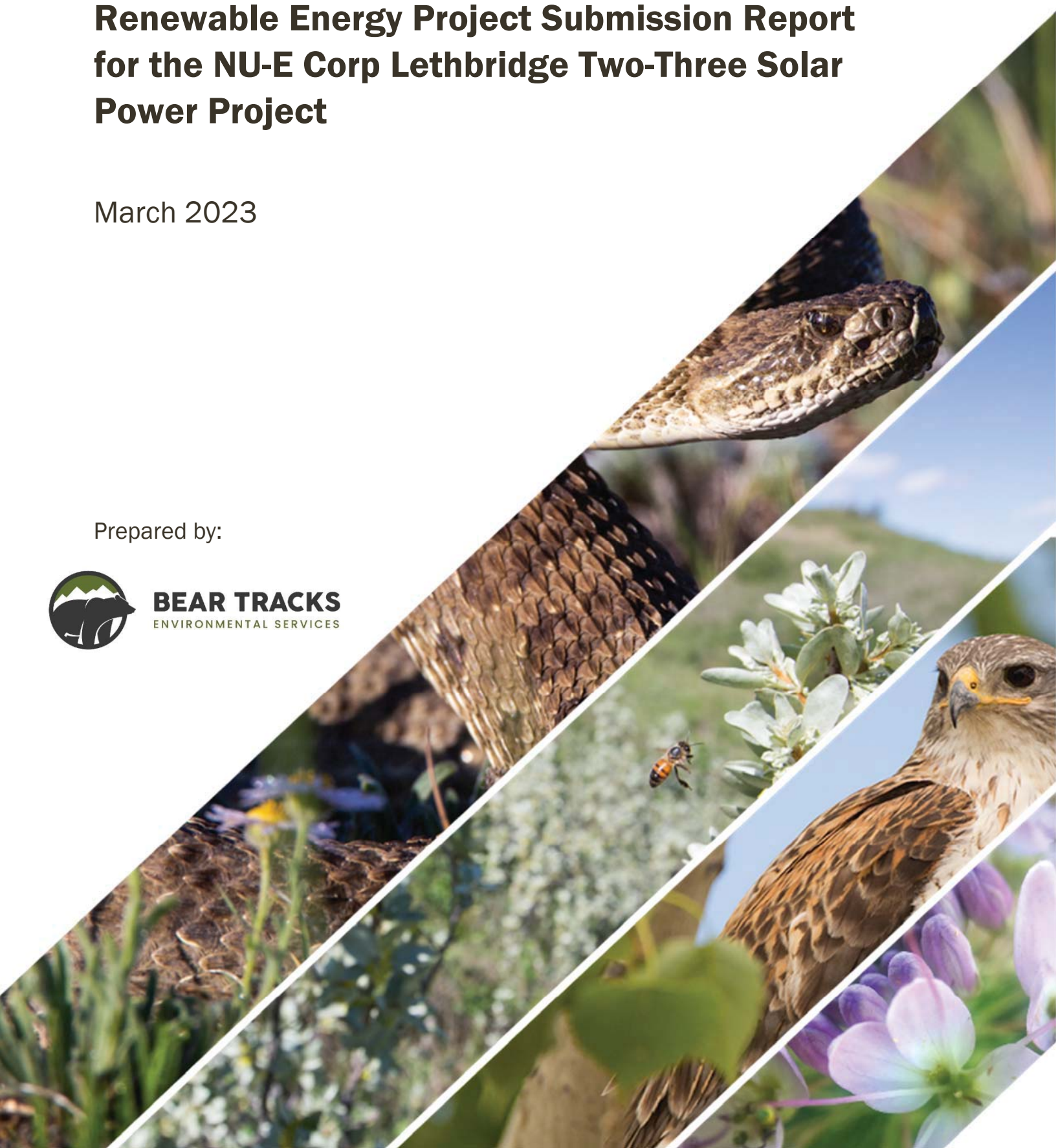


Table of Contents

Table of Contents	i
Tables.....	i
Project Overview	1
Wildlife Habitat Land Cover	3
Wildlife Zones and Critical Habitat.....	4
Lakes, Wetlands and Watercourses.....	5
Pre-Assessment Wildlife Surveys.....	10
Required Surveys.....	10
Site Specific Wildlife Surveys.....	33
Construction and Operation within Other Key	45
Wildlife Zones.....	45
Minimizing Impacts on Wildlife and Wildlife Habitat.....	45
Construction and Operation Mitigation Plan	47
Post-Construction Monitoring and Mitigation Plan	51
Maps and Figures	52
Other Comments.....	54
Final Statement of Compliance	62
References.....	63

Tables

Table 1. Project Location for the NU-E Corp L2-3S.....	1
Table 2. Habitat types within the NU-E Corp L2-3S.....	3
Table 3. Table of Wetlands for which AEP-WM Setbacks are Infringed.	6
Table 4. Weather Conditions during Amphibian Surveys.....	7
Table 5. Amphibians documented during surveys on June 15 and 28, 2022.	8
Table 6. Summary of the Wildlife Biologists Conducting Surveys for the RSSP.	10
Table 7. Weather Conditions during Spring Migration Bird Surveys.....	12
Table 8. Land Cover within the Surveyed Areas – Spring Migration.	12
Table 9. Observations by Survey Location and Round: Number of individuals (abundance) detected at each survey location (point surveys and stop over points during each survey round) during spring migration.	14
Table 10. Observations by Species (Spring Migration).....	14

Table 11. Bird Guild Summary (Spring Migration).....	17
Table 12. Weather Conditions during Fall Migration Bird Surveys.	20
Table 13. Land Cover within the Surveyed Areas – Fall Migration.....	20
Table 14. Observations by Survey Location and Round: Number of individuals detected at each survey location (point surveys and stop over points during each survey round) during fall migration.	21
Table 15. Observations by Species (fall migration).	21
Table 16. Bird Guild Summary (fall migration).	24
Table 17. Weather Conditions during Breeding Bird Surveys.	26
Table 18. Land Cover within the Surveyed Area.....	26
Table 19. Survey Location and Round Summary: number of individuals detected at each survey location during each round (Breeding Bird Surveys).....	27
Table 20. Observations by Species (Breeding Bird Surveys).....	28
Table 21. Incidental Observations by Species (Breeding Bird Surveys).....	29
Table 22. Weather Conditions during Raptor Nest Surveys.	30
Table 23. Raptor Nesting Location and Proximity of Project Infrastructure.	31
Table 24. Weather Conditions during Burrowing Owl Survey.....	33
Table 25. Land Cover within the Surveyed Area (Burrowing Owl Surveys) where call playback surveys were completed.....	34
Table 26. Weather Conditions during Sharp-tailed Grouse Surveys.	36
Table 27. Weather Conditions during Snake Hibernacula Searches.	39
Table 28. Fence Details for the NU-E Corp L2-3S.	47

Project Overview

This section asks for a general overview of the project including information about the proponent, project type, location, and infrastructure.

1. What type of project is being proposed (wind, photovoltaic solar or other)?

Photovoltaic (PV) solar and battery storage

2. What is the name of the project?

NU-E Corp Lethbridge 2-3 Solar Power Project (NU-E Corp L2-3S).

3. WIND PROJECTS ONLY: What type of application is being proposed (standard submission, buildable area, preferred and alternate turbine locations, other)?

Not applicable

4. What is the name of the proponent? Provide a contact name, phone number and email for the proponent.

Proponent: NU-E Corp
 Contact Name: Pamela Pelletier
 Phone Number: 403-860-5685
 Email: pamela@nu-ecorp.com

5. What is the wildlife consultant company name(s) and contact information?

Keneco Environmental Inc.
 320, 717-7th Ave SW
 Calgary, AB T2P 0Z3
 Attention: Troy Wawrinchuk
 (403) 237-8137 (office); (403) 585-51904 (cell)
twawrinchuk@kenecoenviro.com

Bear Tracks Environmental Services (2015) Ltd.
 220, 376 – 1st Ave South
 Lethbridge, AB T1J 0Y6
 Attention: Darryl Jarina
 (403) 942-0067 (office); (403) 894-4210 (cell)
darryl.jarina@beartracksenv.ca

6. What is the project location? Provide the location information in a table with the below headings and using additional rows if needed.

Table 1. Project Location for the NU-E Corp L2-3S.

Quarter Section	Section	Township	Range	Meridian
SW/SE	36	007	22	4
NE/SE/NW/SW	30	007	21	4

Quarter Section	Section	Township	Range	Meridian
NE	25	007	22	4
SW/SE	31	007	21	4

6. Provide the UTM zone for the project.

12 U

7. Provide the total MW size of the Project.

Solar: up to 160 MWac, Battery: up to 50 MWac

8. What is the size of the project construction footprint (include all infrastructure, temporary workspace or other related project related space) in hectares?

441 ha

9. What is the size of project operation footprint (include all infrastructure and other project related space) in hectares?

114.6 ha

11. WIND PROJECTS ONLY: Provide locations of all proposed wind turbines in a table with the following headings, using as many rows as needed. If applicable, indicate if the turbine location is a preferred or alternate location.

Not applicable.

12. WIND PROJECTS ONLY: Provide the below turbine details in a table with the below format.

Not applicable.

13. Provide any general information about the proponent, or the project that may be applicable to the AEP-WM review.

NU-E Corp (NU-E Corp) proposes the construction of a photovoltaic (PV) solar power electrical generation southwest of Lethbridge, Alberta (hereafter NU-E Corp L2-3S). The NU-E Corp L2-3S is within Lethbridge County and will be located on privately-owned cultivated lands within SW/SE 36-007-22 W4M, NE/SE/NW/SW 30-007-21 W4M, NE 25-007-22 W4M, and SW/SE 31-007-21 W4M with the total development area approximately 440.97 hectares in size. The proposed development will have a solar capacity of up to 160 MWac and battery storage of up to 50 MWac. The NU-E Corp L2-3S is exclusively within cultivation consisting of introduced agronomic species.

Wildlife Habitat Land Cover

14. Land Cover within the project area: Provide the amount of each type of land cover within the project area, as identified within the project area map (refer to the *Maps and Figures* section below) in a table with the below format. For each habitat type, provide the total number of hectares within the entire project area, the number of hectares that will be disturbed during construction (include all temporary work space) and the number of hectares that will be used to support the operation of the proposed facility. Ensure the reported permanent and temporary footprint for all infrastructure (i.e., turbines, solar arrays, access roads, collection lines, substation etc.) aligns with the definition as per the Government of Alberta's Wildlife Directive for Alberta Solar Energy Projects (the Directive). Additional rows may be added for land cover types not already identified in the below table. If an identified habitat type does not occur in the proposed project area, clearly state that it does not occur in the project footprint.

Table 2. Habitat types within the NU-E Corp L2-3S.

Habitat Type	Total Project Area (ha)	Temporary Project Footprint (ha)	Permanent Project Footprint (ha)
Native Grassland	66.9	Does not occur in project footprint	Does not occur in project footprint
Tame Grassland/Hay Land	Does not occur in project footprint	Does not occur in project footprint	Does not occur in project footprint
Aspen Forest	Does not occur in project footprint	Does not occur in project footprint	Does not occur in project footprint
Boreal Forest	Does not occur in project footprint	Does not occur in project footprint	Does not occur in project footprint
Montane Forest	Does not occur in project footprint	Does not occur in project footprint	Does not occur in project footprint
Mixed Forest	Does not occur in project footprint	Does not occur in project footprint	Does not occur in project footprint
Cultivation	492.8	413.5	107.5
Ephemeral Wetlands	10.6	10.3	2.6
Temporary Wetlands	14.6	14.4	3.8
Lake/Waterbody	Does not occur in project footprint	Does not occur in project footprint	Does not occur in project footprint
River/Watercourse	Does not occur in project footprint	Does not occur in project footprint	Does not occur in project footprint
Oil and Gas Infrastructure	1.3	Does not occur in project footprint	Does not occur in project footprint
Other- Road and Right-of-Way	0.5	Does not occur in project footprint	Does not occur in project footprint
Other- Trail	2.4	2.8	0.7
Other- Yard	.03	Does not occur in project footprint	Does not occur in project footprint
Total number of hectares	589.1	441	114.6

Map 1 – NU-E Corp L2-3S Wildlife habitat.

15. As per the Directive, is any part or portion of the project sited in the following habitat types (a yes or no answer will suffice):
- a. Native grassland? **No**
 - b. Old growth forests? **No**
 - c. Named waterbodies? **No**
 - d. Valley breaks/coulee breaks? **No**
 - e. Valleys of large watercourse? **No**
 - f. Eastern slopes? **No**

If the project is sited in the any of the above habitat types, provide the details of the project infrastructure (location, type of infrastructure, and amount of area impacted) in each habitat type and the rationale for siting the project in an area identified as higher risk by AEP-WM policy. Detail any proposed alternative mitigation(s) the proponent will implement to meet the intent of the Directive. If the proposed project will impact more than one of the identified habitat types, provide the details for each habitat type.

Not applicable

Wildlife Zones and Critical Habitat

16. As per the Directive, is the project sited in the following wildlife zones (a yes or no answer will suffice):
- a. Greater Sage-Grouse Range (inclusive of the area covered by Environment Canada's Emergency Protection Order)? **No**
 - b. Trumpeter Swan Waterbodies and Watercourses (inclusive of 800 m setback from waterbody and watercourse)? **No**
 - c. Caribou Zones? **No**
 - d. Mountain Goat and Sheep Zones? **No**
 - e. Piping Plover Waterbodies (inclusive of 200 m setback from waterbody)? **No**

If the project is sited in the above wildlife zones, provide the details of the project infrastructure (location, type of infrastructure, and amount of area impacted) in each habitat type and the rationale for siting the project in an area identified as higher risk by AEP-WM policy. Detail any proposed alternative mitigation(s) the proponent will implement to meet the intent of the Directive. If the proposed project will impact more than one of the identified wildlife zones, provide the details for each type of wildlife zone separately.

Not applicable.

17. Is the project sited within federally designated Critical Habitat (*Species at Risk Act*)? If yes, identify the species for which the Critical Habitat is designated, provide the details of the project infrastructure (location, type of infrastructure, and amount of area impacted) in Critical Habitat and rationale for siting the project in an area deemed high risk by AEP-WM policy. If the proposed project will impact more than one of the identified Critical Habitats, provide the details for each species' Critical Habitat that will be impacted.

No.

18. Is the project sited within 100 m of a valley or coulee break? If yes, provide the details of the project infrastructure (location, type of infrastructure, and amount of area impacted) within 100 m of a valley or coulee break and rationale for siting the project in an area deemed higher risk by AEP-WM policy. Detail any proposed alternative mitigation(s) the proponent will implement to meet the intent of the Directive.

No.

Lakes, Wetlands and Watercourses

19. Provide details of the methods used to identify and classify wetlands. Note the term wetland is inclusive of natural wetlands, wetlands that have been altered by humans and or man made wetlands (i.e., dugout). Is the project sited within 100 m of any seasonal marshes/seasonal shallow open waterbodies, semi-permanent marsh/semi-permanent shallow open waterbodies, permanent shallow open water or intermittent shallow open water (i.e., Class III, Class IV, Class V and Class VI wetlands) as defined by the Alberta Wetland Classification System (Government of Alberta 2015)? If the project is sited within a wetland setback, provide a summary of the details (location, type of infrastructure, and amount of area impacted) and rationale for the siting decision in a table with the following headings.

Potential wetlands, waterbodies, and watercourses occurring in the Project study area were identified and preliminarily classified through the use of current and historic satellite imagery, as well as geospatial datasets characterizing hydrology in the area. Field assessments of the Project were conducted on June 17th and October 22nd, 2022, in order to delineate and field verify any wetlands of Class III or greater (i.e., seasonal, semi-permanent, and permanent) occurring in this portion of the proposed Project area and to verify the boundaries of these wetland areas. Expected wetland boundaries (from the satellite imagery review) were verified at the site based on the presence of wetland attributes including the presence of hydrophytic plants and/or soil conditions exhibiting evidence of prolonged saturation (gleying, mottling, iron and manganese concretions etc. within 30 cm of the soil surface). Soil inspections were conducted at an approximate interval of 50-100 m along the expected wetland boundary. The boundary of identified wetlands was considered the interface between upland and wetland soils. The field delineated wetland boundaries were recorded using a hand-held Global Positioning System (GPS) unit.

Classification of wetlands at the Project followed the *Alberta Wetland Classification System* (ESRD 2015) and included an evaluation of biophysical conditions at the site to determine the type of wetland that best represents on site conditions. The classification included an evaluation of soil conditions, dominant wetland vegetation species/communities, and a determination of water permanency. Additional wetland information relative to the requirements of the Government of Alberta - *Alberta Wetland Rapid Evaluation Tool Actual* (ABWRET-A) (Government of Alberta 2015) was also collected for each wetland identified during the assessment for the purpose of potential regulatory applications (if applicable).

A total of 11 ephemeral waterbodies and 5 temporary wetlands were documented in the

project area. No seasonal or higher classification wetlands were identified within the Project footprint and no setbacks are infringed upon.

Table 3. Table of Wetlands for which AEP-WM Setbacks are Infringed.

Wetland Name/ID number	Wetland Class	Proposed infrastructure type within setback	Proximity of infrastructure to the nearest edge of the wetland (m)	Rationale/ justification for siting decision
No setbacks infringed for seasonal, semi-permanent or permanent wetlands.	N/A	N/A	N/A	N/A

Provide details of construction and operational mitigation the Proponent will implement to meet the intent of the Directive.

20. Is the project sited within 1000 m of a named lake or waterbody? If the project is sited within a waterbody setback, provide the details of the project infrastructure (location, type of infrastructure, and amount of area impacted) within the setback and the rationale for siting the project in an area identified as higher risk by AEP-WM policy.

No.

Provide details of any proposed alternative mitigation(s) the proponent will implement to meet the intent of the Directive.

As a function of the Project layout planning process, potential wetlands classified as seasonal marsh, semi-permanent marsh/open water, and permanent open water wetlands (i.e., Class III and above) were avoided. A total of 11 wetlands classified as ephemeral and five wetlands classified as a temporary marsh will be directly disturbed by Project activities. The disturbance of temporary marsh wetlands and ephemeral waterbodies will trigger the need for application and notifications under the Alberta *Water Act*. All the ephemeral and temporary wetlands are cultivated through.

Infrastructure proposed within these wetlands will include fence and access construction, solar arrays, and a laydown area. Construction activities will be completed under dry conditions only to further reduce rutting and compaction at these locations. Additionally, the Stormwater Management Plan will incorporate wetland areas to assist in management of stormwater flow.

During construction, sedimentation and the deposition of deleterious substances present the greatest risk to impacting water quality at wetlands within and adjacent to the Project.

A Stormwater Management Plan will be developed to adequately manage surface water runoff, to ensure that existing hydrologic patterns are not compromised. Post-construction drainage patterns will match those observed pre-construction where feasible to minimize the alteration of downstream flows.

21. Amphibian Surveys: Were amphibian surveys completed? If no, continue to question 22.

a. Provide details of the amphibian surveys completed including if the established survey protocols within the AEP-WM *Sensitive Species Inventory Guidelines* were followed, search area, survey duration, time of day, how survey points were chosen, and the number of visits to each survey point.

An auditory survey for amphibians was conducted on June 15th, 2022, following a period of precipitation greater than 75 mm, as per the Sensitive Species Inventory Guidelines. A total of seven roadside survey points were conducted in the project area, during which surveyors stopped and listened for amphibians. The survey was conducted from approximately a half hour after sunset to no later than 01:00 am.

A second visual amphibian survey was conducted on June 28th, 2022, under appropriate weather conditions throughout the project footprint, to further confirm the presence of any amphibian breeding ponds in the project area. However, by this time all wetlands in the area had dried up.

b. Provide the survey dates.

June 15th and 28th, 2022

c. Provide the number of survey points.

7

d. The location of survey points must be provided in a map (refer to the *Maps and Figures* section below); provide the name of this map.

Map 5 – NU-E Corp L2-3S Amphibian Survey Location

e. Provide weather conditions during each survey in a table with the following headings.

Table 4. Weather Conditions during Amphibian Surveys.

Survey Date	Weather Conditions	Comments
June 15, 2022	Temperature: 10-12°C Wind: 10-13 km/hr Precipitation: None	Plains spadefoot (<i>Spea bombifrons</i>) and boreal chorus frog (<i>Pseudacris maculate</i>) were heard calling in the Project footprint and area.
June 28, 2022	Temperature: 12°C Wind: 11 km/hr Precipitation: None	No amphibians (i.e., adults, juveniles, tadpoles or egg masses) were observed. Wetlands were observed to be dry.

f. Provide details of the survey conditions (recent rainfall amount and temperature) and confirm if the conditions met the required conditions for Great Plains Toad and Plains Spadefoot surveys, as per the AEP-WM *Sensitive Species Inventory Guidelines*.

On June 13th and 14th, 2022 survey conditions became adequate for the detection of plains spadefoot and great plains toad, as a significant rainfall event of approximately 75 mm of rainfall occurred in a 2-day period. Auditory and visual surveys were completed on June 15 and 28, 2022, under suitable weather conditions (Table 4).

g. Provide the total survey time (time spent actively conducting survey).

4 hours

h. Results: Were amphibians found?

Yes, plains spadefoot (listed as *May be at Risk* under the Alberta General Status) and boreal chorus frogs (listed as *Secure* under the Alberta General Status) were detected calling in the Project area on June 15, 2022. Plains spadefoot and boreal chorus frogs were heard calling within the Project footprint from a temporary wetland (WL11, Map 9). Plains spadefoot and boreal chorus frog were also heard over 800 m southwest of AM7, but the location of the breeding pond could not be determined due to land access restrictions, and it was also determined to not be on the Project footprint. Boreal chorus frogs were also heard from a dugout (12U 366259E 5496920N) between AM2 and AM3 that was not located on the Project footprint.

A second visual amphibian survey was conducted on June 28, 2022 in conjunction with breeding bird surveys, to further determine the presence of amphibians in the project area. No amphibians (including adults, juveniles, tadpoles or egg masses) were observed and all wetlands on the Project footprint had dried up and therefore did not provide suitable breeding habitat for amphibian species. Plains spadefoot are known to have a fast larval (i.e., tadpoles) development rate and in Alberta, the species has been observed to metamorphose 21 to 34 days after hatching. The number of days between the amphibian surveys was 15 days and therefore, it is unlikely that any successful breeding took place due to the wetlands lack of water retention.

i. If amphibians were found, provide the locations of all wetlands/locations where amphibians were detected and species of amphibian in a table with the following headings.

Table 5. Amphibians documented during surveys on June 15 and 28, 2022.

Amphibian Species	Wetland
Plains spadefoot	WL11 – temporary marsh (12U 367340E 5495209N)
Boreal chorus frog	WL11 – temporary marsh (12U 367340E 5495209N)
Boreal chorus frog	Dugout (12U 366259E 5496920N)

j. If a required setback is not being met, provide the details of the project disturbance (location, type of infrastructure, and amount of area impacted), rationale for siting decision and any proposed alternative mitigation(s) the proponent will implement to meet the intent of the Directive. Note as there is a direct link between question 20 and question 21,

include alternative mitigations for sensitive amphibians in the Proponent's response to question 20.

See question 19 above. No additional setback infringements to water features.

k. Discussion of results—Provide additional information such as habitat characteristics that support or inhibit amphibian presence and any amphibian observations that were not associated with wetlands.

Continuous agricultural activities such as cultivation, seeding and spraying are generally detrimental to amphibians and provide poor amphibian habitat. All the wetlands in the Project footprint are regularly disturbed (i.e., cultivated through) and therefore provide limited breeding habitat for amphibians. Plains spadefoot are opportunistic breeders, requiring specific heavy rain events, which means they will attempt to breed in any potentially suitable wetlands (even if heavily disturbed by agricultural activities) provided conditions are appropriate. However, as these wetlands were severely degraded, they lack the appropriate site characteristics (e.g., water depth, water retention, substrate and vegetation) to sustain successful breeding opportunities.

Except for deep wetlands such as dugouts, most wetlands in the project footprint including WL11 were observed to be dry during subsequent surveys and were therefore not suitable amphibian breeding habitat (even after a heavy rain event) during any of the wildlife and wetland assessments conducted at the time.

22. Identify any project infrastructure sited within:

a. 45 meters from the top of the break of intermittent watercourses or springs?

Not applicable.

b. 45 meters from the top of the break of small permanent watercourses?

Not applicable.

c. 100 meters from the top of the break of large permanent watercourses?

Not applicable.

If the project is sited in the any of the above setbacks, provide the details of the project infrastructure (location, type of infrastructure, and amount of area impacted) within the setback of a watercourse and rationale for siting the project in an area deemed higher risk by AEP-WM policy. Provide details of any proposed alternative mitigation(s) the proponent will implement to meet the intent of the Directive.

Not applicable.

Pre-Assessment Wildlife Surveys

23. Were all wildlife surveys completed by an experienced wildlife biologist as defined by the Directive?

Yes.

Table 6. Summary of the Wildlife Biologists Conducting Surveys for the RSSP.

Name	Credentials	Experience	Surveys Completed
Ashlyn Herron	B.Sc., B.I.T	2 years	Fall Migration
Brook Skagen	B.Sc., P. Biol	5 years	Snake Hibernacula
Erik Cline	B.Sc., P. Biol	10 years	Wetland Delineation, Land Use
Jason Headley	B.Sc., P.Biol	10 years	Snake Hibernacula, Spring Migration
Johnal Palahniuk	B.Sc., B.I.T	2 years	Burrowing Owl, Spring Migration, Sharp-tailed Grouse
Natalie Pittman	B.Sc., B.I.T	2 years	Amphibian, Breeding Bird, Spring Migration, Snake Hibernacula

24. Provide all Research and Collection license numbers that apply to this project.

#22-048, #22-218

25. Has all pre-assessment wildlife survey data been submitted to AEP-WM in a FWMIS load form? Provide the date(s) of FWMIS Submission to AEP-WM.

Yes

Required Surveys

This section asks for information about the methods and results from required surveys as identified in the Directive.

26. Spring Migration Bird Surveys

- a. Provide details of survey protocols including the search area, the survey duration, how survey points were chosen, and the number of visits to each survey point. In addition, describe what was considered an incidental observation and if these observations were recorded and reported. Clearly state adherence to existing AEP survey protocols. If alternative survey methods were used provide details of the survey methods with justification and rationale for using alternative methods.

The migration surveys were designed to assess spring bird use within proximity to the NU-E Corp L2-3S study area. The primary objective was to identify areas of high flight

activity or staging activity, as well as to quantify flight paths in relation to the Project. Surveys followed the Government of Alberta's *Bird Migration Survey Protocol* (2020).

Three rounds of surveys were conducted (12 - 15 days apart) for the spring migratory period to ensure the various stages of migration (i.e., early, mid, late) were documented. Five pre-determined survey locations were plotted in the Project study area. Survey point locations were chosen to provide appropriate coverage of the Project and surrounding area. Survey points consisted of 3 distance classes (0-400 m; 400 – 800 m; beyond 800 m) where all individuals detected (visual and auditory) within the distance class and indefinite column of airspace above the point were counted. The information collected included: weather conditions (temperature, wind speed, direction, cloud cover, precipitation), date, time of day, species, number of individuals observed, number of flocks observed, distance category from survey point center (first observed and closest distance), whether the observation was within the Project boundary, direction from survey point center, direction of travel, and activity (staging, flying, etc.). Each location was surveyed twice during each visit, once in the morning (between the period of sunrise and 3-4 hours after sunrise) and once in the afternoon/evening (3-4 hours before sunset) to allow surveyors to capture both nocturnal migrants, diurnal migrants, and to document waterfowl during 'foraging or roosting flights'. This resulted in approximately 3-4 hours of survey time per location over the course of the migration survey. The order of survey points was changed for each survey round to ensure that an unbiased representation of migration activity within the study area was documented. Observations of flocks of staging or migrating birds that were outside of the dedicated survey time or greater than 800 m from the survey point center were recorded as incidentals. Stopover counts were also conducted to identify locations of preferred migratory bird habitats not accounted for in the point count surveys. One stopover count location was assessed for the NU-E Corp L2-3S based on habitat suitability and the size of the assessment area.

In instances where the ability to accurately count individual birds became unfeasible, the block counting method was used. This method consists of blocking off a group of individuals, counting them, and then extrapolating the results to the entire flock to estimate the number of individuals. For example, in a flock of several thousand geese, the assessor would count by the lowest common denominator (often 10 or 50) to determine a "block". The size and shape of the "block" was then extrapolated to the remainder of the group to estimate the total number of birds. This is the method typically used to provide a conservative estimate when counting large flocks of birds.

b. Provide the survey dates.

- April 14th, 2022
- April 29th, 2022
- May 11th, 2022

c. Provide the time of day surveys were conducted.

Between the period of sunrise and 3-4 hours after sunrise (morning migration) and 3-4 hours before sunset (afternoon/evening migration).

d. Provide the number of survey points.

Five point counts and one stop-over point count

e. Provide the total survey time (time spent actively conducting survey).

17.5 hours.

f. The location of survey points must be provided in a map (refer to the *Maps and Figures* section below); provide the name of this map.

Map 2 – NU-E Corp L2-3S Migration Survey Locations.

g. Provide weather conditions during each survey date and time in a table with the following headings.

Table 7. Weather Conditions during Spring Migration Bird Surveys.

Survey Date	Weather Conditions	Comments
April 14 th , 2022	Temperature: -10 to -7°C Wind: 5 to 6 km/hr No precipitation	Morning Survey
April 14 th , 2022	Temperature: -4 to 2°C Wind: 0 to 2 km/hr No precipitation	Afternoon Survey
April 29 th , 2022	Temperature: 3 to 4°C Wind: 4 to 5 km/hr No precipitation	Morning Survey
April 29 th , 2022	Temperature: 12 to 13°C Wind: 5 to 11 km/hr No precipitation	Afternoon-Evening Survey
May 11 th , 2022	Temperature: 17 to 18 °C Wind: 18 to 23 km/hr No precipitation	Afternoon-Evening Survey
May 12 th , 2022	Temperature: 1 to 9°C Wind: 8 to 11 km/hr No precipitation	Morning Survey

h. Describe the habitat type or land use within the surveyed area.

Table 8. Land Cover within the Surveyed Areas – Spring Migration.

Survey Point	Land Cover*	Topography
KSM1	60% cultivation; 40% Airport property.	Nearly flat
KSM2	95% cultivation; 5% homestead	Flat
KSM3	50% cultivation; 50% native prairie (coulee edge habitat)	Flat to gently rolling

Survey Point	Land Cover*	Topography
KSM4	100% cultivation	Flat to gently rolling
KSM5	80% cultivation; 20% native prairie (coulee edge habitat)	Flat
SC1	50% tame pastures; 30% coulee edge habitat; 10% treed; 10% river	Flat to gently rolling

* Proportions of land cover are within an 800 m radius of the survey point.

- i. Results: Provide the survey results in tables using the following format. The tables must provide an understanding of the number of observations at each survey location and during each round of surveys, a list of the species observed and a summary of the observations per bird guild. Provide a brief written description of the results.

The number of avian observations and identified species continuously increased during each round of surveys. Round 2 had the greatest number of identified individuals with approximately 45% (n=272) observed. Round 3 had the next greatest diversity of species (n=29). Round 1 had the lowest number of individual species observations (n=16), number of observations (n=45) and number of individuals (n=101) compared to the other rounds.

KSM2, located north of the project boundary was observed to consistently have the greatest abundance during each survey round, and overall had the greatest number of individuals (n=198). KSM2 also had the greatest species diversity, with 16 species observed over spring migration; however, the SC1 point count had the richest species diversity of all with 22 species observed. KSM1, KSM4, KSM5 showed to have the same number of species diversity, with 14 species observed. The least number of individuals observed was at KSM5 with 67 individuals observed, while KSM4 had the second lowest individuals observed (n=71) (Table 8).

Table 9. Observations by Survey Location and Round: Number of individuals (abundance) detected at each survey location (point surveys and stop over points during each survey round) during spring migration.

Survey Location	Round 1 (April 14, 2022)	Round 2 (April 29, 2022)	Round 3 (May 11 & 12, 2022)	Total Number of Individuals Detected
KSM1	9	40	53	102
KSM2	26	107	65	198
KSM3	12	33	29	74
KSM4	5	47	19	71
KSM5	7	17	43	67
SC1	42	28	29	99
Total	101	272	238	611

Four (4) species of management concern were observed during the spring migration period (Table 9; sensitive species listed in bold). These species are listed under the Alberta General Status and/or under federal legislation (SARA).

Twenty-one (21) of the 36 bird species detected (58%) are also protected under the *Migratory Birds Convention Act (MBCA)* (excludes raptors, corvids, Galliformes [grouse, quail, pheasants, ptarmigan], cormorants, pelicans, and kingfishers). This act is federal, with the purpose of protecting a variety of migrant native bird species across Canada during nesting and migration periods. A list of the species observed during the surveys and their provincial general status are presented in Table 9.

Table 10. Observations by Species (Spring Migration).

Species	Provincial General Status	Number of Individuals	Number of Flocks (>2 birds of the same species)	# of individuals observed within 0- 400m	# of individuals observed within 400- 800m	# of individuals observed greater than 800 m
Birds						
American Kestrel	Sensitive	1	0	0	1	0
American Robin	Secure	5	0	2	1	2
American Tree Sparrow	Secure	1	0	1	0	0
Barn Swallow	May Be At Risk	2	0	2	0	0
Black-billed Magpie	Secure	25	2	10	11	4
Canada Goose	Secure	113 (+ 20 INC)	14	29	51	33
Common Grackle	Secure	16	1	16	0	0
Common Merganser	Secure	2	0	2	0	0
Common Raven	Secure	2 (+ 5 INC)	0	0	2	0
Common Redpoll	Secure	3	1	3	0	0

Species	Provincial General Status	Number of Individuals	Number of Flocks (>2 birds of the same species)	# of individuals observed within 0-400m	# of individuals observed within 400-800m	# of individuals observed greater than 800 m
Downy Woodpecker	Secure	1	0	1	0	0
European Starling	Exotic/Alien	130	12	93	37	0
Great Horned Owl	Secure	5 (+ 1 INC)	1	5	0	0
Horned Lark	Secure	7 (+ 3 INC)	1	2	4	1
House Sparrow	Exotic/Alien	3	1	3	0	0
Killdeer	Secure	2	0	2	0	0
Long-billed Curlew	May Be At Risk	11	2	0	9	2
Lincoln's Sparrow	Secure	1	0	0	1	0
Marbled Godwit	Secure	7	1	1	5	1
Mallard	Secure	20	1	13	5	2
Mourning Dove	Secure	5	1	5	0	0
Northern Flicker	Secure	1 (+ 1 INC)	0	1	0	0
Northern Harrier	Secure	3	0	3	0	0
Ring-billed Gull	Secure	6	1	2	4	0
Ring-necked Pheasant	Exotic/Alien	6	0	3	2	1
Rough-legged Hawk	Secure	1	0	0	0	1
Rock Pigeon	Exotic/Alien	59 (+ 3 INC)	9	13	43	3
Red-tailed Hawk	Secure	1	0	1	0	0
Red-winged Blackbird	Secure	15	1	5	10	0
Savannah Sparrow	Secure	4	0	4	0	0
Spotted Sandpiper	Secure	1	0	1	0	0
Sharp-tailed Grouse	Sensitive	4	0	4	0	0
Swainson's Hawk	Secure	2 (+ 1 INC)	0	1	0	1
Tree Swallow	Secure	8	1	8	0	0
Vesper Sparrow	Secure	23	4	23	0	0
Western Meadowlark	Secure	61 (+ 2 INC)	5	40	18	3
Mammals						
Pronghorn	Secure	1	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Common Raccoon	Secure	7	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mule Deer	Secure	5	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Richardson's Ground Squirrel	Secure	1	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Striped Skunk	Secure	1	Not Applicable	Not Applicable	Not Applicable	Not Applicable

Species	Provincial General Status	Number of Individuals	Number of Flocks (>2 birds of the same species)	# of individuals observed within 0-400m	# of individuals observed within 400-800m	# of individuals observed greater than 800 m
White-tailed Deer	Secure	1	Not Applicable	Not Applicable	Not Applicable	Not Applicable

*flocks are defined as a group of greater than 2 birds of the same species gathered or moving together.

The passerines guild accounted for the greatest individual abundance, with 53% (n=323) of total individuals, as well as largest species abundance, accounting for 16 out of 36 species detected (44%). The passerine guild also had the greatest number of flocks, with 34 flocks observed (Table 10). Fourteen (14) observations were not identified to the species level, attributed to their distance from point locations. Most of the passerine species' observations (n=107) were recorded at KSM2. The most abundant species observed within this guild was the European starling (*Sturnus vulgaris*) which accounted for 46% of passerine observations (n=130). The greatest number of passerine observations (n=205) were observed between 0-400 m. Six passerines were incidentally observed during the first round of spring migration (Table 9).

The waterfowl guild accounted for the second largest proportion of individuals observed at the migration survey points, accounting for approximately 23% of all individual observations (n=142) during spring migration surveys. Four waterfowl observations were not identified to the species level, due to their distance from observer. The most abundant waterfowl species observed was the Canada goose (*Branta canadensis*), which accounted for 113 individuals, followed by mallard (*Anas platyrhynchos*) (n=20) (Table 9). Canada geese were detected at all survey points, whereas mallards were only detected at KSM1, KSM2 and SC1. Most waterfowl observations (80%) were made within 400-800 m of the survey point. Twenty Canada goose observations were incidentally recorded between survey rounds.

The others guild accounted for the third greatest proportion of individuals observed, accounting for approximately 15% of all individuals detected. One observation was not identified to the species level, attributed to the distance from the point location. The most abundant species detected was the rock pigeon (*Columba livia*), of which 59 individuals were observed, followed by the black-billed magpie (*Pica hudsonia*) with 25 observations. This guild also accounted for the third greatest number of flocks, with 12 observed (Table 10). The majority of individuals (n=60) were observed at KSM2 and the majority of these observations were recorded within 400-800 m of the survey points. Eight incidental observations from the others guild were recorded between survey rounds (Table 9).

Fifteen (15) individuals from the birds of prey guild were observed at the spring migration survey points, accounting for 2% of total species detected. Three bird of prey observations were not identified to the species level due to the distance from observer. Birds of prey sightings occurred at all survey points except for KSM3 and generally observations consisted of one or two individuals per sighting. The greatest number of individuals was recorded at the stopover point SC1 (8 recorded individuals). Great horned owl (*Bubo virginianus*) was the most observed bird of prey (n=6). The majority of birds of prey observations (61%) were recorded between 0 – 400 m from survey points (Table 10). One great horned owl and a Swainson's hawk (*Buteo swainsoni*) were incidentally recorded between survey rounds.

Nine (9) individuals from the shorebirds/waterbirds guild were observed at the spring migration survey points, accounting for 13% of total species detected. The most abundant shorebird/waterbird species detected was long-billed curlew (*Numenius americanus*), of which 11 individuals were observed, followed by marbled godwit (*Limosa fedoa*) with seven observations. The shorebird/waterbirds guild accounted for the third greatest number of flocks, with 4 observed (Table 10). The majority of shorebirds/waterbirds (n=13) were observed at KSM4 and the majority of shorebird/waterbirds observations were recorded within 400-800 m of the survey points.

One species (approximately 1% of total species observations) was detected in the obligate waterbirds guild during the spring migration surveys, totaling 2 individuals of all birds observed during designated surveys. The common merganser (*Mergus merganser*) was the only species observed from this guild during the spring migration. This species was only observed at SC1 and within 0-400 m of the survey point.

Finally, the grouse and allies guild accounted for 2% (n=10) with only two species, ring-necked pheasant (*Phasianus colchicus*) and sharp-tailed grouse (*Tympanuchus phasianellus*), observed during the surveys. The majority of these individuals were observed at survey point KSM5 at a distance of 0-400m.

Table 11. Bird Guild Summary (Spring Migration).

Bird Guild	Number of Individuals*	Number of Flocks	# of individuals observed within 0-400m	# of individuals observed within 400-800m	# of individuals observed greater than 800 m
Obligate Waterbirds	2	0	2	0	0
Waterfowl	122 (+ 20 INC)	17	42	60	40
Shorebirds/Waterbirds	27	4	6	18	3
Passerines	317 (+ 6)	34	205	85	33
Birds of Prey	12 (+ 3 INC)	1	10	1	4
Grouse and Allies	10	0	7	2	1
Others	84 (+ 8 INC)	12	29	56	7

* Number of individuals observed during designated survey period. Individuals observed outside of the survey period (incidental observations) are in brackets.

j. Provide the total number of individuals observed during the surveys.

a. Point count

512 individuals were observed at the dedicated point count survey points during the dedicated survey time (incidentals removed).

b. Stopover count

99 individuals were observed at the dedicated survey points during the dedicated survey time (incidentals removed).

c. Combined

611 individuals were observed at both the dedicated point count locations and the stopover count location during the dedicated survey time (incidentals removed).

k. Provide the number of species observed.

a. Point count

26 species were observed at the dedicated point count survey points during the dedicated survey time (incidentals removed).

b. Stopover count

20 species were observed at the dedicated stopover count survey point during the dedicated survey time (incidentals removed).

c. Combined

36 distinct species were observed between the dedicated point count locations and the stopover count location during the dedicated survey time (incidentals removed).

l. Provide the number of bird observations per minute of survey time.

Based on 611 individuals observed and 612 minutes of dedicated survey time, 1.0 birds per minute were documented during spring migration surveys.

- m. Discussion of results—Provide additional information such as the spatial or temporal trends of bird observations. Other relevant information may include average flight height, notes on behaviour (long distance flight, short distance flights between local features or foraging in area), if there were certain survey points with more bird activity than others or habitat features that may have attracted (or reduced) activity and a summary of incidental observations including total numbers and species.

The majority of the species observed during spring migration surveys at the NU-E Corp L2-3S are designated as 'Secure' in Alberta. Four species listed as 'Sensitive' (American kestrel (*Falco sparverius*), barn swallow (*Hirundo rustica*), long-billed curlew and sharp-tailed grouse), were observed during the dedicated survey rounds. KSM2 had the greatest number of individuals observed, accounting for 32% of the individuals observed. Moreover, a total of 32 individuals of 4 exotic species were observed (approximately 5% of total bird species) which can be attributed to the project being in close proximity to urban areas. The majority of waterfowl (49%) were observed flying over, while approximately 28% were recorded to be foraging during the spring migration surveys.

Fifty-three individuals (9%) were incidentally recorded between surveys in addition to the 611 individuals observed during the dedicated survey periods (Table 9).

27. Fall Migration Bird Surveys

- a. Provide details of survey protocols including the search area, the survey duration, how survey points were chosen, and the number of visits to each survey point. In addition, describe what was considered an incidental observation and if these observations were recorded and reported. Clearly state adherence to existing AEP survey protocols. If alternative survey methods were used provide details of the survey methods with justification and rationale for using alternative methods.

Three rounds of surveys were conducted (20 - 26 days apart) for the fall migratory period to ensure the various stages of migration (i.e., early, mid, late) were documented. Surveys were only suspended if visibility was impeded. Five pre-determined survey locations and one stop-over count were plotted in the Project study area.

Survey point locations were chosen to provide appropriate coverage of the Project and

surrounding area. Survey points consisted of 3 distance classes (0-400 m; 400 – 800 m; beyond 800 m) where all individuals detected (both visual and auditory) within the distance class and indefinite column of airspace above the point were counted. The information collected included: weather conditions (i.e., temperature, wind speed, direction, cloud cover, precipitation), date, time of day, species, number of individuals observed, number of flocks observed, distance category from survey point center (first observed and closest distance), whether the observation was within the Project boundary, direction from survey point center, direction of travel, and activity (staging, flying, etc.). Each location was surveyed twice during each visit, once in the morning (between the period of sunrise and 3-4 hours after sunrise) and once in the afternoon/evening (3-4 hours before sunset) to allow surveyors to capture both nocturnal migrants, diurnal migrants, and to document waterfowl during 'foraging flights,' which resulted in approximately two hours of survey time per location over the course of the migration survey. The order of survey points was changed for each survey round to ensure that an unbiased representation of migration activity within the study area was documented. Observations of flocks of staging or migrating birds that were outside of the dedicated survey time or greater than 800 m from the survey point center were recorded as incidentals. Stopover counts were also conducted to identify locations of preferred migratory bird habitats not accounted for in the point count surveys. One stopover count location was assessed for the NU-E Corp L2-3S based on habitat suitability and the size of the assessment area.

In instances where the ability to accurately count individual birds became unfeasible, the block counting method was used. This method consists of blocking off a group of individuals, counting them, and then extrapolating the results to the entire flock to estimate the number of individuals. For example, in a flock of several thousand geese, the assessor would count by the lowest common denominator (often 10 or 50) to determine a "block." The size and shape of the "block" were then extrapolated to the remainder of the group to estimate the total number of birds, which is the method typically used to provide a conservative estimate when counting large flocks of birds.

b. Provide the survey dates.

- September 26, 2022
- October 5, 2022
- October 26, 2022

c. Provide the time of day surveys were conducted.

Between the period of sunrise and 3-4 hours after sunrise (morning migration) and 3-4 hours before sunset (afternoon/evening migration).

d. Provide the number of survey points.

Five point counts and one stop-over point count

e. Provide the total survey time (time spent actively conducting survey).

15.5 hours.

f. Location of survey points must be provided in a reference map (refer to the *Maps and Figures* section below). Provide name of reference map.

Map 2 – NU-E Corp L2-3S Migration Survey Locations

g. Provide weather conditions during each survey date and time in a table with the following headings.

Table 12. Weather Conditions during Fall Migration Bird Surveys.

Survey Date	Weather Conditions	Comments
September 12, 2022	Temperature: 13 to 20°C Wind: 11 to 21 km/hr No precipitation	Morning/evening survey
October 5, 2022	Temperature: -2 to 11°C Wind: 10 to 28 km/hr No precipitation	Morning/evening survey
October 26, 2022	Temperature: 4 to 21°C Wind: 9 to 18 km/hr No precipitation	Morning/evening survey

h. Provide a description of the habitat type or land use within the surveyed area.

Table 13. Land Cover within the Surveyed Areas – Fall Migration.

Survey Point	Land Cover*	Topography
KMS1	60% cultivation; 40% Airport property.	Nearly flat
KMS2	95% cultivation; 5% homestead	Flat
KMS3	50% cultivation; 50% native prairie (coulee edge habitat)	Flat to gently rolling
KMS4	100% cultivation	Flat to gently rolling
KMS5	80% cultivation; 20% native prairie (coulee edge habitat)	Flat
SC1	50% tame pastures; 30% coulee edge habitat; 10% treed; 10% river	Flat to gently rolling

* Proportions of land cover are within an 800 m radius of the survey point.

i. Results: Provide the survey results in tables using the following format. The tables must provide an understanding of the number of observations at each survey location and during each round of surveys, a list of the species observed and a summary of the observations per bird guild. Provide a brief written description of the results.

The number of avian individuals and species richness detected varied between the three rounds of fall migration surveys. More individuals were detected during Round 1 (94%) than in Round 2 (3.1%) and Round 3 (2.7%) (Table 13). The proportion of individuals observed per survey location was greatest at KMS2 (52%) followed by KMS1 (29%). Species richness was highest in Round 1 (S=22) and almost equal in Round 2 (S=13) and Round 3 (S=14).

Table 14. Observations by Survey Location and Round: Number of individuals detected at each survey location (point surveys and stop over points during each survey round) during fall migration.

Survey Location	Round 1 (Sep 12, 2022)	Round 2 (Oct 5, 2022)	Round 3 (Oct 26, 2022)	Total Number of Individuals Detected
KMS1	4078	210	183	4471
KMS2	7763	113	80	7956
KMS3	2372	46	56	2474
KMS4	168	90	17	275
KMS5	31	14	48	93
SC1	11	6	24	41
Total	14423	479	408	15310

Two avian species of management concern (American kestrel [*Falco sparverius*] and bald eagle [*Haliaeetus leucocephalus*]) were observed during the fall migration surveys and two incidental avian species of management concern (prairie falcon [*Falco mexicanus*] and peregrine falcon [*Falco peregrinus*]), were observed between surveys (Table 14; sensitive species listed in bold). Furthermore, thirteen (13) of the 27 bird species detected (48%) are protected under the *MBCA* (excludes raptors, corvids, Galliformes [grouse, quail, pheasants, ptarmigan], cormorants, pelicans, and kingfishers). This act is federal, with the purpose of protecting a variety of migrant native bird species across Canada during nesting and migration periods. A list of the species observed during the surveys and their provincial general status are presented in Table 14.

Table 15. Observations by Species (fall migration).

Species	Provincial General Status	Number of Individuals	Number of Flocks (>2 birds of the same species)	# of individuals observed within 0- 400m	# of individuals observed within 400- 800m	# of individuals observed greater than 800 m
Birds						
American Crow	Secure	1	0	0	1	0
American Kestrel	Sensitive	15 + 3 INC	2	8	7	0
American Pipit	Secure	19	3	19	0	0
American Robin	Secure	4	0	4	0	0
Bald Eagle	Sensitive	1	0	0	1	0

Species	Provincial General Status	Number of Individuals	Number of Flocks (>2 birds of the same species)	# of individuals observed within 0-400m	# of individuals observed within 400-800m	# of individuals observed greater than 800 m
Black-billed Magpie	Secure	56 + 9 INC	4	42	12	2
Blue Jay	Secure	1	0	1	0	0
Canada Goose	Secure	775 + 150 INC	43	142	229	404
Common Merganser	Secure	1	0	1	0	0
Common Raven	Secure	16	0	6	7	3
European Starling	Exotic/Alien	270	9	99	171	0
Franklin's Gull	Secure	3000	11	1100	1900	0
Gray Partridge	Exotic/Alien	12 INC	1	-	-	-
Great Horned Owl	Secure	1	0	1	0	0
Horned Lark	Secure	11	2	11	0	0
House Sparrow	Exotic/Alien	9	1	9	0	0
Lincoln's Sparrow	Secure	1	0	1	0	0
Merlin	Secure	2 + 1 INC	0	2	0	0
Mourning Dove	Secure	1	0	1	0	0
Northern Harrier	Secure	1 + 1 INC	0	1	0	0
Peregrine Falcon	At Risk	1 INC	0	-	-	-
Prairie Falcon	Sensitive	1 INC	0	-	-	-
Ring-billed Gull	Secure	2345	11	630	1715	0
Rock Pigeon	Exotic/Alien	123	9	26	97	0
Red-tailed Hawk	Secure	1	0	1	0	0
Savannah Sparrow	Secure	18	1	17	1	0
Snow Goose	Secure	25	1	0	25	0
Swainson's Hawk	Secure	7 + 1 INC	0	5	1	1
White-crowned Sparrow	Secure	1	0	1	0	0
Western Meadowlark	Secure	49	6	36	13	0
Mammals						
Coyote	Secure	2 INC	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mule Deer	Secure	44 INC	Not Applicable	Not Applicable	Not Applicable	Not Applicable
White-tailed Deer	Secure	3 INC	Not Applicable	Not Applicable	Not Applicable	Not Applicable

*flocks are defined as a group of greater than 2 bird of the same species gathered or moving together.

The shorebirds/waterbirds guild had the greatest number of individuals (n=13,845)

observed and the second greatest number of flocks (n=25) (Table 15). Two (2) species were observed during fall migration surveys, accounting for approximately 5% of all species detected. The most abundant shorebird/waterbird detected was the Franklin's gull (*Leucophaeus pipixcan*), of which 3,000 individuals were observed. Approximately 56% of all observations were recorded at 800 m, followed by 26% between 400 – 800 m. Approximately 61% (n=8,500) of all shorebirds/waterbirds observations were not identified to the species level, attributed to their distance from point locations.

The waterfowl guild accounted for the second greatest individual abundance (n=800), comprising 5% of all species detected. The most abundant waterfowl species observed was the Canada goose (n=775), followed by snow geese (n=25) (Table 14). Canada goose was detected at all six locations (point count and stopover count locations), whereas snow geese were only detected at KMS3. The waterfowl guild accounted for the greatest number of flocks, with 44 observed (Table 15). Most waterfowl observations (51%) were recorded at 800 m of the survey point. One-hundred fifty (150) Canada geese were incidentally observed during the third round of fall migration.

The passerine guild accounted for the third greatest individual abundance (n=438), number of flocks (n=24), and the species abundance (n=10). The most abundant passerine species detected was European starling (n=270), followed by western meadowlark (n=49) and American pipit (n=19). The majority (36%) of passerines were observed at KMS3 (n=158) and at 400 – 800 m from the survey points. Fifty-five (55) passerine observations (13%) were not identified to the species level, attributed to their distance from point locations.

In the others guild, five (5) species (approximately 20% of total species observations) were detected during the fall migration surveys, totaling 197 individuals or 3% of all birds observed during designated surveys (Table 15). The greatest number of individuals were recorded at survey point KMS2 (n=102). Rock pigeons were the most abundant (n=123) species in this guild and were recorded at all point count locations except for KMS5. The black-billed magpie was the second most common species observed in the others guild (n=56). Thirteen (13) flocks were observed from this guild. One species from the shorebirds/waterbirds guild was not identified to the species level, which is attributed to the distance from point the location. Nine (9) black-billed magpies were incidentally observed during the first and third round of surveys.

Seven (7) species within the birds of prey guild (approximately 23% of total species observations) were detected at the migration survey points (Table 15). Birds of prey sightings generally consisted of one individual per sighting. The greatest number of individuals were recorded at survey point KSM3 (n=15). American kestrel was the most recorded bird of prey during fall migration (n=15), and was documented at KMS1, KMS3, and KMS5. Swainson's hawk was the second most observed species (n=7) and was detected at all point count locations except for KMS4. The majority of birds of prey observations (64%) were recorded between 0 m – 400 m from the survey points. Seven (7) birds of prey were incidentally observed during the first and second round of surveys, including American kestrel, merlin (*Falco columbarius*), northern harrier (*Circus hudsonius*), prairie falcon, peregrine falcon, and Swainson's hawk (Table 14).

One species within the obligate waterbirds guild was observed during fall migration surveys, accounting for approximately 3% of all species detected. The common merganser was only recorded at SC1 during round 3 within 0 – 400 m from the survey point.

No species from the grouse and allies guild were detected at any survey location during the fall migration surveys; however, twelve (12) gray partridge (*Perdix perdix*) were

incidentally observed during the third round of surveys.

Table 16. Bird Guild Summary (fall migration).

Bird Guild	Number of Individuals*	Number of Flocks	# of individuals observed within 0-400m	# of individuals observed within 400-800m	# of individuals observed greater than 800 m
Obligate Waterbirds	1	0	1	0	0
Waterfowl	800 (+150 INC)	44	142	254	404
Shorebirds/Waterbirds	13845	25	1730	3615	8500
Passerines	438	24	204	220	14
Birds of Prey	28 (+7 INC)	2	18	9	1
Grouse and Allies	0 (+12 INC)	0	0	0	0
Others	198 (+9 INC)	13	75	117	6

* Number of individuals observed during designated survey period. Individuals observed outside of the survey period (incidental observations) are in brackets.

j. Provide of the total number of individuals observed during the surveys.

a. Point count

15,269 individuals were observed at the dedicated point count survey points during the dedicated survey time (incidentals removed).

b. Stopover count

41 individuals were observed at the dedicated survey points during the dedicated survey time (incidentals removed).

c. Combined

15,310 individuals were observed at both the dedicated point count locations and the stopover count location during the dedicated survey time (incidentals removed).

k. Provide the number of species observed.

a. Point count

21 species were observed at the dedicated point count survey points during the dedicated survey time (incidentals removed).

b. Stopover count

11 species were observed at the dedicated stopover count survey points during the dedicated survey time (incidentals removed).

c. Combined

27 distinct species were observed between the dedicated point count locations and the stopover count location during the dedicated survey time (incidentals removed).

l. Provide the number of bird observations per minute of survey time.

Based on 15,310 individuals observed and 930 minutes of dedicated survey time, 16.5 birds per minute were documented during fall migration surveys.

- m. Discussion of results—Provide additional information such as the spatial or temporal trends of bird observations. Other relevant information may include average flight height, notes on behaviour (long distance flight, short distance flights between local features or foraging in area), if there were certain survey points with more bird activity than others or habitat features that may have attracted (or detracted) activity and a summary of incidental observations including total numbers and species.

Four species were observed during fall migration surveys that are designated as ‘Sensitive’ and ‘At Risk’ in Alberta (Table 14). Individual detection rate progressively decreased from Round 1 to Round 3. The proportion of individuals observed per survey location was greatest at KMS2, which is surrounded by cultivation. Most individual avian activity observed was flying, foraging, or local movement. No inherent trend between the point survey locations and waterfowl presence was apparent.

In addition, three (3) mammal species were observed during the dedicated survey periods, including, forty-four (44) mule deer (*Odocoileus hemionus*), three (3) white-tailed deer (*Odocoileus virginianus*) and two (2) coyotes.

28. Breeding Bird Surveys

- a. Were the established survey protocols within the AEP-WM *Sensitive Species Inventory Guidelines* followed? Provide details of the survey protocol including the search area, the survey duration, how survey points were chosen, and the number of visits to each survey point. In addition, describe what was considered an incidental observation and if these observations were recorded and reported.

Breeding Bird Surveys were conducted in accordance with the *Sensitive Species Inventory Guidelines* (2013). Three breeding bird survey (BBS) rounds were completed on June 16, June 28 and July 12, 2022, under survey appropriate weather conditions. A total of nine BBS locations, spaced 800 m apart, was placed throughout the proposed Project to accurately document the biodiversity within the Project area. A five-minute point count was conducted at each location between sunrise and 10 am, during which all bird species occurrences (visual and auditory identification) within 200 m of the surveyor’s location were recorded. Incidental observations (i.e., occurrences not observed during the dedicated point count survey) of species of management concern (including other wildlife groups) or species that were not already identified during the surveys, were also recorded, which included the documentation of wildlife (birds, mammals, reptiles, and amphibians) and habitat features (nests and dens). The maximum provincially or federally recommended setback distance for a species of concern likely to occur in the regional vicinity of the Project is 1,000 m. Therefore, lands within 1,000 m of the Project were searched for sensitive habitat features. Within the study area, the surveyor would search high value habitat areas (waterbodies, shrub rows, trees, grassland, etc.) by foot, or vehicle and scan these areas with binoculars or spotting scope. Where adjacent lands were not accessible due to land ownership, a thorough visual scan in place of ground search was conducted.

- b. Provide the survey dates.
- June 16th, 2022

- June 28th, 2022
- July 12th, 2022

c. Provide the time of day surveys were conducted.

Surveys were conducted between the hours of sunrise and 10:00 am.

c. Provide the number of survey points.

Nine (9).

d. Provide the total survey time (time spent actively conducting survey).

9.5 hrs.

f. Location of survey points must be provided in a reference map (refer to the *Maps and Figures* section below). Provide name of reference map.

Map 3 – NU-E Corp L2-3S Breeding Bird and Burrowing Owl Survey Locations.

g. Provide weather conditions during each survey date and time in a table with the following headings.

Table 17. Weather Conditions during Breeding Bird Surveys.

Survey Date	Weather Conditions	Comments
June 16, 2022	Temperature: 7 to 15°C Wind: 9-12 km/hr Precipitation: None	<5% cloud cover
June 28, 2022	Temperature: 12°C Wind: 9 km/hr Precipitation: None	20% cloud cover
July 12, 2022	Temperature: 12°C Wind: 9 km/hr Precipitation: None	15% cloud cover

h. Provide a description of the habitat type or land use within the surveyed area.

Table 18. Land Cover within the Surveyed Area.

Survey Point	Land Cover*	Topography
BBS1	Cultivation	Nearly Flat
BBS2	Cultivation	Nearly Flat
BBS3	Cultivation & Native Prairie	Nearly Flat - Gently Rolling
BBS4	Cultivation	Nearly Flat
BBS5	Cultivation & Hay	Nearly Flat
BBS6	Cultivation	Nearly Flat

Survey Point	Land Cover*	Topography
BBS7	Cultivation & Native Prairie	Nearly Flat - Gently Rolling
BBS8	Cultivation & Native Prairie	Nearly Flat - Gently Rolling
BBS9	Cultivation	Nearly Flat

* Within 200 m radius of point.

i. Results: Provide the survey results in tables using the following format. Provide a brief written description of the results.

More avian individuals were detected during Round 3 (n=305) than in the first two rounds; however, this round had the lowest species richness (n=14). Total individual abundance was greatest at survey location BBS5 (n=174), followed by BBS4 (n=146) and BBS6 (n=103). BBS4 had the greatest species richness (n=14) followed by BBS1 and BBS5 which both had 13 individual species recorded.

Table 19. Survey Location and Round Summary: number of individuals detected at each survey location during each round (Breeding Bird Surveys).

Survey Location	Round 1; June 16, 2022	Round 2; June 28, 2022	Round 3; July 12, 2022	Total Number of Individuals Detected*
BBS1	14	11	71	96
BBS2	12	10	18	40
BBS3	8	15	14	37
BBS4	22	95	29	146
BBS5	40	17	117	174
BBS6	10	83	10	103
BBS7	9	0	15	24
BBS8	17	0	12	29
BBS9	8	0	19	27
BBS Total	140	231	305	676

*Incidentals not included.

Five species of management concern were recorded during the BBS survey. Of these, four are listed as 'Sensitive' and one listed as 'May be at Risk' under the Alberta General Status (Table 18); the remaining species are listed as 'Secure'. Four species (gray partridge [*Perdix perdix*], house sparrow [*Passer domesticus*], ring-necked pheasant [*Phasianus colchicus*], and rock pigeon [*Columba livia*]) are listed as 'Exotic/Alien'. One mammalian species, American badger (*Taxidea taxus taxus*), was incidentally recorded between survey points. A complete list of species detected during BBS point counts and their provincial general status can be found in Table 19 below (sensitive species listed in bold).

The shorebirds/waterbirds guild comprised the majority of the species detected (48%), with Franklin's gull being the most predominant (n=284). The passerine guild had ten species detected and 312 individuals observed, accounting for approximately 46% of the species detected. The most common species observed in this guild was the western meadowlark.

The waterfowl, grouse and allies, and others guilds all comprised of less than 2% of all species detected. The waterfowl guild had 13 species recorded; grouse and allies guild had 12 species detected; The birds of prey guild represented the least of all species detected (0.04%), which included one American kestrel and two Swainson's hawk observations.

No species from the obligate waterbird guild were documented during point counts.

Table 20. Observations by Species (Breeding Bird Surveys).

Species	Provincial General Status	Number of Individuals
BIRDS		
American Kestrel	Sensitive	1
Black-billed Magpie	Secure	5
Brown-headed Cowbird	Secure	9
Brewer's Blackbird	Secure	68
Clay-colored Sparrow	Secure	6
Common Raven	Secure	3
Eastern Kingbird	Sensitive	1
Franklin's Gull	Secure	284
Gadwall	Secure	4
Gray Partridge	Exotic/Alien	2
Horned Lark	Secure	46
House Sparrow	Exotic/Alien	2
Killdeer	Secure	4
Long-billed Curlew	May be at Risk	20
Marbled Godwit	Secure	5
Mallard	Secure	9
Mourning Dove	Secure	1
Ring-billed Gull	Secure	7
Ring-necked Pheasant	Exotic/Alien	8
Rock Pigeon	Exotic/Alien	2
Red-winged Blackbird	Secure	5
Sharp-tailed Grouse	Sensitive	2
Savannah Sparrow	Secure	18
Swainson's Hawk	Secure	2
Upland Sandpiper	Sensitive	5
Vesper Sparrow	Secure	67
Western Meadowlark	Secure	90

j. Provide of the total number of individuals observed during the surveys.

676 birds observed (incidentals excluded).

k. Provide the number of species observed.

27 species (incidentals excluded).

l. Provide the number of bird observations per minute of survey time.

Based on 676 individuals observed and 570 minutes of total survey time, 1.2 individuals were observed per minute.

m. Discussion of results—Provide additional information such as the spatial or temporal trends of bird observations. Other relevant information may include if there were certain survey points with more bird activity than others or habitat features that may have attracted or detracted activity and a summary of incidental observations including total numbers and species.

A total of 27 avian species were identified during breeding bird surveys conducted in 2022. Survey locations BBS5 (predominately cultivation) and BBS4 (cultivation), were found to have the most observed individuals. The cultivation may have provided favorable forage for two large flocks of Franklin’s gulls observed at BBS5 and BBS4, which totaled 216 individual observations at these two points during the BBS surveys. Species richness was highest at BBS4 (n=14) and BBS5 and BBS1 (n=13). This is likely attributed to the increased patch dynamic and interruption of a relatively homogenous landscape; thus, providing habitat for multiple species. Numerous long-billed curlew were observed utilizing the Project footprint and exhibited defensive behavior indicating the presence of nests or young on the proposed Project lands.

Seven species were incidentally observed within 1 km of the Project lands. Incidental observations are summarized in Table 19 below (sensitive species listed in bold).

Table 21. Incidental Observations by Species (Breeding Bird Surveys).

Species	Provincial General Status	Number of Individuals
American Badger (taxus subspecies)	Sensitive	1
Coyote	Secure	2
Long-billed Curlew	Sensitive	1
Mule Deer	Secure	2
Swainson's Hawk	Secure	1
Upland Sandpiper	Sensitive	1
White-tailed Deer	Secure	2

n. If the project is sited within native habitats, such as native grassland or parkland, identify if construction activities will avoid the restricted activity period for breeding birds (April 1st- July 15th)? If no, detail any proposed alternative mitigation(s) the proponent will implement to meet the intent of the Directive.

Not applicable.

29. Raptor nest surveys:

Raptor nest surveys must be conducted for the entire project area plus 1000m from the edge of the project boundary.

- a. Were the established survey protocols within the AEP-WM *Sensitive Species Inventory Guidelines* followed? Provide details of the survey protocol including the search area, the survey duration, time of day and search method.

Raptor nest surveys were conducted, as per the *Sensitive Species Inventory Guidelines* methodology, in conjunction with three rounds of spring migration surveys, three rounds of breeding bird surveys, and two rounds of sharp-tailed grouse surveys (Table 21), in which any raptors and/or stick nests identified were documented. Any known historic locations of nests were also visited to confirm their activity. Each survey was completed between a half hour after sunrise and a half hour before sunset. Nest sites were identified using binoculars or a spotting scope, and nesting activity was confirmed by observing raptors on the nest and/or the display of defensive behavior by one or more raptors in the immediate vicinity of a suspected nesting location. During the search, the surveyor conducted a meandering search of the Project area and adjacent lands out to 1,000 m for areas of suitable nesting habitat (e.g., trees, anthropogenic structures), and evidence of raptors nesting in the area (e.g., stick nests, breeding pairs, defensive behavior). Where access was restricted by land ownership, a survey was conducted for roads using binoculars and spotting scope.

- b. Provide the survey dates.
- April 29 and May 25, 2022 (passive search in conjunction with two rounds of sharp-tailed grouse surveys)
 - April 14, 29, and May 11, 2022 (passive and targeted search, in conjunction with three rounds of spring migration)
 - June 16, 28, and July 12, 2022 (passive search in conjunction with three rounds of breeding bird surveys)
- c. Provide weather conditions during each survey in a table using the following format.

Table 22. Weather Conditions during Raptor Nest Surveys.

Survey Date	Weather Conditions	Comments
April 29, 2022	Temperature: 3°C Wind: 4 km/hr Precipitation: None	Passive
May 25, 2022	Temperature: 8°C Wind: 21 km/hr Precipitation: None	Passive
April 14, 2022	Temperature: -7 to 2°C Wind: 0 to 6 km/hr Precipitation: None	Passive
April 29, 2022	Temperature: 3 to 13°C Wind: 4 to 15 km/hr Precipitation: None	Passive
May 11, 2022	Temperature: 1 to 18°C Wind: 8 to 23 km/hr Precipitation: None	Targeted
June 16, 2022	Temperature: 7 to 15°C	Passive

Survey Date	Weather Conditions	Comments
	Wind: 9 to 12 km/hr Precipitation: None	
June 28, 2022	Temperature: 12°C Wind: 11 km/hr Precipitation: None	Passive
July 12, 2022	Temperature: 12°C Wind: 6 km/hr Precipitation: None	Passive

d. Survey Results: Were raptor nests found?

Yes

e. If raptor nests were found, provide locations of all raptor nests detected in a table using the following format. Identify if the required setback is met and the distance in meters from the edge of the nest to the nearest edge of project related disturbance.

Table 23. Raptor Nesting Location and Proximity of Project Infrastructure.

Nest ID	Species	Location of nest (UTM NAD 83)	Is the required setback met (Y/N)	Distance from nest to nearest project related disturbance (meters)	Comments
Nest1	Great horned owl	12 U 363961E 5494704N	Y	Approximately 1.1 km southwest of project boundary.	One adult and at least 3 nestlings observed.

f. Nest locations and associated setbacks must be provided in a map (refer to the *Maps and Figures* section below). Provide name of reference map.

Map 9 – NU-E Corp L2-3S Wildlife Features.

f. If a required setback is not being met, provide the details (location, type of infrastructure, and amount of area impacted), rationale for siting decision and any proposed alternative mitigations identified. For the purpose of AEP-WM review, infringement from any temporary workspace must be included.

Not applicable.

h. Discussion of results—Provide additional information such as a description of the habitat/ land use that may attract or detract raptor activity in the area and a summary of incidental observations of raptors including total numbers, behaviour and species.

The Project footprint provides few nesting opportunities for raptors due to extensive cultivation. However, the general Project area does provide potential nesting habitat for raptors in the form of human development (e.g., power lines, farmyards, shelterbelts) and the St. Mary River valley. One active great horned owl nest was observed approximately 1.8 km southwest of the Project footprint on the west side of Range Road 221A, well

beyond the recommended 100 m setback. No other active raptor nests were observed during the wildlife surveys.

A total of ten raptor species were documented in the Project area including several species of falcon, hawk and eagle.

30. Acoustic Bat Surveys: WIND PROJECTS ONLY

- a. *Were the established AEP-WM survey protocols followed? Provide details of survey protocols including the detector locations, the detector deployment duration, how detector locations were chosen, and a brief description of the analysis of the audio files.*
- b. *Surveys Dates, provide the acoustic survey period for both the spring and fall surveys.*
- c. *Provide the total number of detectors during spring and fall surveys.*
- d. *Provide the number of raised detectors (30 m) during spring and fall surveys.*
- e. *Provide the total number of detector nights (i.e. excluding nights that a detector malfunctioned) during spring and fall surveys.*
- f. *Provide location of survey points in a map (refer to the Maps and Figures section below). Detector location must be included and the detector height must be identified. Provide name of reference map.*
- g. *Describe the habitat type or land use near each detector location.*
- h. *Identify any issues encountered during the survey or analysis that impacted the results.*
 - i. *Survey Results: Provide details of the survey results in tables using the following format.*
 - j. *Results Graphs: Provide a bar or line graph of bat activity by night with the date on the x-axis and mean number of bat passes on the y-axis. Data must include all bat passes per detector night and migratory bat passes per detector night.*
 - k. *Results Summary: Provide a brief written summary of the results including, total bat passes, mean bat passes per detector night, a subset of the migratory bat passes per detector night and a list of species that were detected. Provide other relevant information such as the spatial or temporal trends of bat activity or if there were certain survey points with more bat activity than others or habitat features that may have attracted or reduced activity.*
- l. *Provide a summary of the survey results in a table using the following format.*
- m. *Based on the risk of bat mortality, as per AEP-WM policy, is pre-emptive mitigation being applied to the project? If yes, provide the details of any proposed alternative mitigation(s) the proponent will implement to meet the intent of the Directive.*
- n. *Discussion of results—Provide additional information such as a description of the habitat/ land use that may attract or reduce bat activity in the area, interpretation of the data collected or general information on bat activity and the proposed project.*

Refer to the Post-Construction Monitoring and Mitigation section to provide details on post-construction monitoring, analysis and general results based on mitigation needs.

Site Specific Wildlife Surveys

The following section asks for information for the surveys conducted if the project is sited within an identified wildlife range or wildlife layer, as defined in the applicable Directive. If the project was not sited within the identified wildlife range or wildlife layer and surveys were not completed, indicate as such in part “a” of the question and then skip to the next question.

31. Burrowing Owl:

- a. Is any part or portion of the project within Burrowing owl range?

No – however one burrowing owl survey was conducted to take a precautionary approach and be confident no nesting burrowing owls were utilizing the Project area.

- b. If yes, were surveys conducted following the established survey protocols within the AEP- WM *Sensitive Species Inventory Guidelines*? Provide details of the burrowing owl surveys completed including search area, survey duration, time of day, how survey points were chosen, and the number of visits to each survey point.

One burrowing owl survey was conducted on June 16, 2022 following the established survey protocols within the AEP-WM *Sensitive Species Inventory Guidelines*. Due to the extensive cultivation in the Project area limited habitat is available for burrowing owl.

- c. Provide the survey dates.

June 16, 2022

- d. Provide the time of day each survey was conducted.

From sunrise to 10:00am

- e. Provide the number of survey points.

9

- f. Provide the total survey time (time spent actively conducting survey).

4.5 hours

- g. The location of survey points must be provided in a map (refer to the *Maps and Figures* section below); provide the name of this map.

Map 3 – NU-E Corp L2-3S Breeding Bird and Burrowing Owl Survey Locations

- h. Provide weather conditions during each survey date and time in a table using the following format.

Table 24. Weather Conditions during Burrowing Owl Survey.

Survey Date	Weather Conditions	Comments
June 16, 2022	Temperature: 15°C Wind: 12 km/hr Precipitation: None	None

i. Describe the habitat type or land use within the surveyed area.

The Project area is entirely located on cultivation and adjacent to the river valley of the St. Mary River.

Table 25. Land Cover within the Surveyed Area (Burrowing Owl Surveys) where call playback surveys were completed.

Survey Point	Land Cover*	Topography
BUOW1	Cultivation	Nearly Flat
BUOW2	Cultivation	Nearly Flat
BUOW3	Cultivation & Native Prairie	Nearly Flat - Gently Rolling
BUOW4	Cultivation	Nearly Flat
BUOW5	Cultivation & Hay	Nearly Flat
BUOW6	Cultivation	Nearly Flat
BUOW7	Cultivation & Native Prairie	Nearly Flat - Gently Rolling
BUOW8	Cultivation & Native Prairie	Nearly Flat - Gently Rolling
BUOW9	Cultivation	Nearly Flat

* Within 200 m radius of point.

j. Survey Results: Was there burrowing owl activity—nests or individuals present?

No.

k. If burrowing owl nests were found, provide locations of all burrowing owl nests detected in a table using the following format. Identify if the required setback is met and the distance in meters from the edge of the nest to the nearest edge of project related disturbance.

Not applicable.

l. Nest locations and associated setbacks must be provided in a map (refer to the *Maps and Figures* section below). Provide name of reference map.

Not applicable.

m. If a required setback is not being met, provide a summary of the project disturbance details (location, type of infrastructure, and amount of area impacted), rationale for siting decision and details of any proposed alternative mitigation(s) the proponent will implement to meet the intent of the Directive.

Not applicable.

n. Discussion of results including any burrowing owl observations that were not associated with a nest or any potential nest sites (i.e. any burrows/holes 10cm or larger).

No burrowing owls and no sign (i.e., whitewash, pellets, feathers, prey remains, etc.) indicating burrowing owl presence was observed during any of the wildlife surveys. Limited

suitable burrows (with >10 cm entrances) were observed and cultivation generally provides poor habitat for burrowing owls.

32. Sharp-tailed Grouse:

a. Is any part or portion of the project within Sharp-tailed Grouse range?

Yes

b. If the project is proposed in the Sharp-tailed Grouse range, were Sharp-tailed Grouse lek surveys conducted? If surveys were not conducted, provide justification and rationale for why surveys were not conducted.

Yes

c. If Sharp-tailed Grouse lek surveys were conducted, were surveys conducted following the established survey protocols within the AEP-WM *Sensitive Species Inventory Guidelines*? Provide details of the surveys completed including search area, survey duration, time of day, how survey points were chosen, and the number of visits to each survey point.

Sharp-tailed grouse lek surveys generally followed the survey protocol in the AEP-WM *Sensitive Species Inventory Guidelines* for General Survey Method. However, the search method specified for non-linear disturbances (e.g., walking transect) was modified due to largely low-quality habitat (cultivation) within the Project footprint. Surveys were primarily conducted by vehicle along roadways adjacent the Project area on April 29th and May 25th, 2022, during which the surveyor scanned the area with binoculars, looking and listening for evidence of grouse and/or leks. Roadside searches of the Project Area and adjacent lands out to 500 m were also conducted, during which the surveyor scanned the area with binoculars and a spotting scope, looking and listening for evidence of grouse and/or active leks. Surveys were completed from one half hour before sunrise until up to 3 hours after sunrise, under survey appropriate weather conditions.

Throughout the spring, additional parcels of land were added to the project. In addition, land access restrictions were also present of some project lands. For this reason, two rounds of detailed surveys on all project lands could not be completed in 2022. Because of this, NU-E Corp has committed to completing additional sharp-tailed grouse surveys in the spring of 2023 on all project lands as per the *Sensitive Species Inventory Guidelines*. Results of these surveys will be provided to EAP upon completion.

d. Provide the survey dates.

- April 29th, 2022
- May 25th, 2022

e. Provide the time of day surveys were conducted.

Between the hours of one half hour before sunrise and 10:00 am.

f. Provide the number of survey points.

Sixteen (16) survey points.

g. Provide the total survey time (time spent actively conducting survey).

4 hours

h. The location of survey points must be provided in a map (refer to the *Maps and Figures* section below); provide the name of this map.

Map 4 – NU-E Corp L2-3S Sharp-tailed Grouse Survey Locations

i. Provide weather conditions during each survey date and time in a table using the following format.

Table 26. Weather Conditions during Sharp-tailed Grouse Surveys.

Survey Date	Weather Conditions	Comments
April 29 th , 2022	Temperature: 3 °C Wind: 4 km/hr Precipitation: None	None
May 25 th , 2022	Temperature: 8 °C Wind: 0 km/hr Precipitation: None	None

j. Describe the habitat type or land use within the surveyed area.

Project area is comprised of cultivated lands occurring on gently undulating terrain, scattered with heavily disturbed wetlands. The coulees and river valley of the St. Mary River are southwest and adjacent to the Project area.

k. Survey Results: Were sharp-tailed grouse leks found?

No

l. If sharp-tailed grouse leks were found, provide the locations of leks detected in a table using the following headings. Identify if the required setback is met and the distance in meters from the edge of the nest to the nearest edge of project related disturbance.

Not applicable

m. Lek locations and associated setbacks must be provided in a map (refer to the *Maps and Figures* section below). Provide name of reference map.

Not applicable

n. If a setback is being infringed upon, provide the details (location, type of infrastructure, and amount of area impacted), rationale for siting decision and details of any proposed alternative mitigation(s) the proponent will implement to meet the intent of the Directive.

Not applicable

- o. Discussion of results including any incidental sharp-tail grouse observations that were not associated with a lek.

Sharp-tailed grouse were incidentally observed in the Project area during Round 3 of spring migration surveys with at least 2 adults observed near KSM5 on May 11, 2022. However, no evidence of lekking (i.e., scat, cecal matter, feathers, trampled ground, vocalizations, dancing behaviour) was observed during the wildlife surveys. As the Project area is entirely cultivated land and in proximity to urban development (i.e., roads, highways, airport, houses, powerlines, etc.) suitable habitat for sharp-tailed grouse and active leks is limited. The gently undulating topography of the Project area also allowed for good lines of sight to observed potential lek activity. For these reasons the likelihood of a sharp-tailed grouse lek occurring on or within 500 m of the Project footprint is very low. Potential sharp-tailed grouse habitat exists in the form of coulees and remnant patches of native prairie along the St. Mary River, however, no sign indicating any active leks was observed in the Project area during the surveys.

33. Eastern Short-horned Lizard:

- a. *Is any part or portion of the project within 200m of Eastern Short-horned Lizard range?*
No

- b. *If the project is proposed in the Eastern short horned lizard range, were Eastern Short-horned Lizard surveys conducted? If surveys were not conducted, provide justification and rationale for why surveys were not conducted.*

Not applicable.

- c. *If Eastern Short-horned Lizard surveys were conducted, were the established survey protocols within the AEP-WM Sensitive Species Inventory Guidelines followed? Provide details of the surveys completed including search area, survey duration, time of day, how survey points were chosen, and the number of visits to each survey point.*

Not applicable.

- d. *Provide the survey dates.*

Not applicable.

- e. *Provide the time of day surveys were conducted.*

Not applicable.

- f. *Provide the number of survey points.*

Not applicable.

- g. *Provide the total survey time (time spent actively conducting survey).*

Not applicable.

- h. *The location of survey transects/area(s) must be provided in a map (refer to the Maps and Figures section below); provide the name of this map.*

Not applicable.

i. Provide weather conditions during each survey date and time in a table using the following format.

Not applicable.

j. Survey Results: Were Eastern Short-horned Lizards found?

Not applicable.

k. If Eastern Short-horned Lizards were found, provide the locations of all lizards detected.

Not applicable.

l. If any temporary or permanent project related disturbance infringes on the 200m setback, provide the details (location, type of infrastructure, and amount of area impacted), rationale for siting decision and details of any proposed alternative mitigation(s) the proponent will implement to meet the intent of the Directive.

Not applicable.

m. Discussion of results including description of habitat (soil characteristics, slope, direction of exposure, and vegetation details).

Not applicable.

34. Sensitive Snakes:

a. Is any part or portion of the project sited within 500m of sensitive snake range?

Yes

b. If yes, were surveys conducted following the established survey protocols within the AEP- WM Sensitive Species Inventory Guidelines? Provide details of the surveys completed including search area, survey duration, time of day, how survey points were chosen, and the number of visits to each survey point.

No. Potential suitable snake hibernacula habitat (i.e., south facing slopes, rocky outcrops, etc.) is present adjacent to the Project footprint in the coulees along the St. Mary River valley. Due to land access restrictions and changes in Project lands only one round of snake hibernacula searches was conducted and the entire length of the Project adjacent the coulee break was not surveyed. The survey was restricted to Project lands and surveyors followed the edge of the coulee system looking for suitable hibernacula habitat (i.e., burrows, cracks, slumps, rocky outcrops, etc.). No snake species, sign (i.e., snake sheds) or hibernacula were observed. No incidental snake observations occurred during any other environmental surveys.

NU-E Corp has committed to completing additional surveys for sensitive snakes in the spring of 2023 on all project lands, and will attempt to gain permission for access onto lands within the river valley in order to complete a more detailed survey.

A snake protection plan has been developed for this Project.

c. Provide the survey dates.

September 26, 2022

d. Provide the time of day surveys were conducted.

Daylight hours during favourable temperatures

e. Provide the number of survey points.

Not applicable.

f. Provide the total survey time (time spent actively conducting survey).

2 hours.

g. The location of survey transects/area(s) must be provided in a map (refer to the Maps and Figures section below); provide the name of this map.

Map 6 – NU-E Corp L2-3S Snake Hibernacula Survey

h. Provide weather conditions during each survey date and time in a table using the following format.

Table 27. Weather Conditions during Snake Hibernacula Searches.

Survey Date	Weather Conditions	Comments
September 26 th , 2022	Temperature: 20-25 °C Wind: 0-15 km/hr Precipitation: None	None

i. Describe the habitat type or land use within the surveyed area.

The Project footprint is located on cultivated land and suitable habitat for snake hibernacula is limited to south-facing coulees that are adjacent to the Project area.

j. Survey Results: Was a snake hibernaculum found?

No.

k. If a snake hibernaculum was found, provide the locations of all hibernacula detected in a table using the following format. Identify if the required setback is met and the distance in meters from the edge of the nest to the nearest edge of project related disturbance.

Not applicable.

l. Hibernaculum locations and associated setbacks must be provided in a map (refer to the Maps and Figures section below). Provide name of reference map.

Not applicable.

m. If a required setback is not being met, provide the details (location, type of infrastructure, and amount of area impacted), rationale for siting decision and details of any proposed alternative mitigation(s) the proponent will implement to meet the intent of the Directive.

Not applicable.

n. Discussion of results including description of habitat (soil characteristics, slope, direction of exposure, and vegetation details).

Not applicable.

35. Ord's Kangaroo Rat:

a. *Is any part or portion of the project within 250m of Ord's Kangaroo Rat range?*

No

b. *If yes, were surveys conducted following the established survey protocols within the AEP- WM Sensitive Species Inventory Guidelines? Provide details of the surveys completed including search area, survey duration, time of day, how survey points were chosen, and the number of visits to each survey point.*

Not applicable.

c. *Provide the survey dates.*

Not applicable.

d. *Provide the time of day or night surveys were conducted.*

Not applicable.

e. *Provide the number of survey points.*

Not applicable.

f. *Provide the total survey time (time spent actively conducting survey).*

Not applicable.

g. *The location of survey points must be provided in a map (refer to the Maps and Figures section below); provide the name of this map.*

Not applicable.

h. *Provide weather conditions during each survey date and time in a table using the following format.*

Not applicable.

i. *Describe the habitat type or land use within the surveyed area.*

Not applicable.

j. *Survey Results: Were Ord's Kangaroo Rats found?*

Not applicable.

k. *If Ord's Kangaroo Rats were found, provide the locations of all Ord's Kangaroo Rats detected.*

Not applicable.

l. *If any temporary or permanent project related disturbance is within 250m of identified Ord's Kangaroo Rat range, provide the details (location, type of infrastructure, and amount of area impacted), rationale for siting decision and details of any proposed alternative*

mitigation(s) the proponent will implement to meet the intent of the Directive.

Not applicable.

m. Discussion of results including description of habitat (soil characteristics, slope, and vegetation details) and any sign of Ord's Kangaroo Rat (burrows, runways, feces, footprints, etc.).

Not applicable.

36. Swift Fox:

a. Is any part or portion of the project within Swift Fox range?

No

b. If yes, were surveys conducted following the established survey protocols within the AEP- WM Sensitive Species Inventory Guidelines? Provide details of the surveys completed including search area, survey duration, time of day, how survey points were chosen, and the number of visits to each survey point.

Not applicable.

c. Provide the survey dates.

Not applicable.

d. Provide the time of day surveys were conducted.

Not applicable.

e. Provide the number of survey points.

Not applicable.

f. Provide the total survey time (time spent actively conducting survey).

Not applicable.

g. The location of survey points must be provided in a map (refer to the Maps and Figures section below); provide the name of this map.

Not applicable.

h. Provide weather conditions during each survey date and time in a table using the following format.

Not applicable.

i. Describe the habitat type or land use within the surveyed area.

Not applicable.

j. Survey Results: Was there swift fox activity—dens or individuals present?

Not applicable.

k. If swift fox dens were identified, provide the locations of all swift fox dens detected in a table using the following format. Identify if the required setback is met and the distance in

meters from the edge of the nest to the nearest edge of project related disturbance.

Not applicable.

l. Den locations and associated setbacks must be provided in a map (refer to the Maps and Figures section below). Provide name of reference map.

Not applicable.

m. If a required setback is not being met, provide the details (location, type of infrastructure, and amount of area impacted), rationale for siting decision and details of any proposed alternative mitigation(s) the proponent will implement to meet the intent of the Directive.

Not applicable.

n. Discussion of results including any swift fox observations that were not associated with a den or any potential den sites.

Not applicable.

37. Endangered and Threatened Plants:

a. Is any part or portion of the project within Endangered and Threatened Plant range?

No

b. If yes, were surveys conducted following the established survey protocols within the AEP-WM Sensitive Species Inventory Guidelines? Provide details of the surveys completed including target species, search area, survey duration, how survey points were chosen, and the number of visits to each survey point.

Not applicable.

c. Provide the survey dates.

Not applicable.

d. Describe the search area or distance between transects.

Not applicable.

e. Provide the total survey time (time spent actively conducting survey).

Not applicable.

f. The location of survey transects/area(s) must be provided in a map (refer to the Maps and Figures section below); provide the name of this map.

Not applicable.

g. Provide weather conditions during each survey date and time in a table using the following format.

Not applicable.

h. Describe the habitat type or land use within the surveyed area.

Not applicable.

i. Survey Results: Were any Endangered or Threatened plant populations identified?

Not applicable.

j. If any Endangered or Threatened plant populations were identified, provide the locations, population extents and species of all Endangered and Threatened plants detected in a table using the following format. Identify if the required setback is met and the distance in meters from the edge of the nest to the nearest edge of project related disturbance.

Not applicable.

k. Plant population locations and associated setbacks must be provided in a map (refer to the Maps and Figures section below). Provide name of reference map.

Not applicable.

l. If a required setback is not being met, provide the details (location, type of infrastructure, and amount of area impacted), rationale for siting decision and details of any proposed alternative mitigation(s) the proponent will implement to meet the intent of the Directive.

Not applicable.

m. Discussion of results including description of habitat (soil characteristics, slope, and vegetation details).

Not applicable.

38. The proponent must commit to ensuring that wildlife data is kept current as per the *Directive*. Confirm that the following surveys will be repeated at a minimum once every two years until the project is commissioned by indicating yes, no, or not applicable by each:

a. Burrowing owl

Not applicable.

b. Sensitive raptors

Yes

c. Sharp-tailed grouse

Yes

c. Swift fox

Not applicable.

d. Ord's kangaroo rat

Not applicable.

e. Grizzly bear den surveys

Not applicable.

f. Endangered and Threatened Plants

Not applicable.

Provide details of the proposed surveys and what process will be followed if a new wildlife site is identified and how it will be mitigated.

- Sensitive raptors survey: one round of surveys will be conducted every two years until the Project is commissioned. The survey will be conducted during the nesting season for raptors, generally May 1 to June 30. The Project area and surrounding lands out to 1000 m will be searched for raptor activity during the survey, and any potential nesting sites (e.g., trees, tall shrubs, anthropogenic structures) will be investigated for evidence of nesting activity and nest status (e.g., hatchlings present, adults brooding, etc.). Historic nest locations within the search area will also be revisited to confirm activity.
- Sharp-tailed grouse survey: two rounds of surveys will be conducted in the spring of 2023 and the survey will cover the entire project footprint. An additional two rounds of surveys will be conducted every two years until the Project is commissioned. The survey will follow similar methodology that was used in 2022/2023 surveys, which will include surveying the Project footprint and adjacent roads/trails out to 500 m from the Project lands. Surveys will be conducted between the period of March 15th to June 15th and between the hours of one half hour before sunrise and three hours after sunrise.
- Snake Hibernacula Survey: two rounds of snake hibernacula searches will be conducted in the spring of 2023. Surveys will focus on the coulee edge along the southwest portion of the Project area. Any potential habitat suitable for hibernacula (i.e., mammal burrows, erosion, rocky outcrops, etc.) will be investigated more closely for snakes or snake sign (e.g., skin sheds)

In the event that a new wildlife feature is identified within the associated setback distance from the Project footprint (e.g., a sharp-tailed grouse lek within 500 m or sensitive raptor nest within 1,000 m), the proponent will immediately notify the AEP-WM of the new wildlife feature. Mitigation for the feature in question will be determined after discussion with AEP and will vary depending on feature-specific factors such as line of sight, distance to the Lethbridge Two-Three Solar Project boundary, location of nearest foraging grounds, etc. Examples of potential mitigation may include adjusting the timing of construction and/or future maintenance activities, active monitoring during construction/maintenance, and adjustment of the Lethbridge 2 Solar Project layout.

39. Projects for which construction has not begun within 5 years of the completion of the AEP-WM Renewable Energy Referral Report must repeat all surveys and a new AEP-WM Renewable Energy Referral Report will be completed. Confirm this process will be followed.

If construction of the NU-E Corp L2-3S has not begun within 5 years of completion of the AEP-WM Energy Referral Report, all required site-specific surveys will be repeated and a new AEP-WM Energy Referral Report will be completed.

Construction and Operation within Other Key Wildlife Zones

40. As per the Directive is the project sited in any of these wildlife zones:

a. Special Access Zones?

No

b. Key Wildlife and Biodiversity Zones?

Yes

c. Grizzly Bear Zones?

No

If yes, will the project meet the required standards identified in the Directives for the associated zone? Provide details of the proposed standard or alternative mitigations if proposed.

The proposed Project fence line intersects with a Key Wildlife and Biodiversity Zone (KWBZ) in SW 36-007-22 W4M, NE 25-007-22 W4M and SW/SE 30-007-21 W4M. However, the fence line will be located entirely on cultivation (Map 8 - NU-E L2-3S Wildlife Features).

As the project footprint is located east of Highway 2 no timing restrictions for construction or maintenance activities are applicable. Any required access within the KWBZ will be temporary and sufficient roadside vegetation will be maintained to eliminate line-of-sight into clearings. Access control and management must be in place to restrict unauthorized access of vehicles. All temporary access will be reclaimed immediately after construction.

41. If the proposed project is sited within the Grizzly Bear Zones, do the project related access roads in addition to the existing roads in the area meet with the open road thresholds defined within the Alberta Grizzly Bear Recovery Plan? If no has been selected, provide a summary of the details (location, type of access roads, and amount of area impacted), rationale for siting decision and any proposed alternative mitigation to meet the intent of the *Directive*.

Not applicable

Minimizing Impacts on Wildlife and Wildlife Habitat

42. Have guy wires been designed to meet the requirements outlined in the *Directive*. Provide details of mitigation that is proposed.

Guy wires not required.

43. Are all collection lines sited underground? Provide details of construction techniques and how impacts to wildlife and wildlife habitat will be minimized.

Yes, collection lines will be sited underground. The proponent will use general trenching or plowing techniques for the installation of collector lines. To minimize impacts to wildlife and wildlife habitat, trenches will only be left open for a limited time and will be checked daily to ensure no entrapment of wildlife. If entrapped wildlife are documented, an environmental professional with an appropriate permit will be required to remove and relocate individuals to suitable habitat in the immediate area.

44. Provide details on any other wildlife or wildlife habitat risk identified by the proponent and proposed mitigations to reduce this risk. This may include mitigations for the reduction of noise and light pollution, prevention of predator nests on anthropogenic features, minimization of collision risk or other project associated wildlife risks.

Risks to wildlife may include collisions, predation, habitat loss, and visual/physical disturbance. Therefore, the proponent will implement the following mitigation measures to reduce these primary concerns, as well as address other potential concerns:

- Noise and light:
 - Where feasible, construction will occur during daylight hours to avoid light disturbance to wildlife. During operations, lighting of the Project will be minimized and controlled by sensors as much as possible.
 - If security lighting on buildings or inverters is installed, the NU-E Corp L2-3S project commits to using motion-activated lighting to minimize the duration that lighting is used and also commits to using down-shielding and directional lighting to restrict the area illuminated to the ground immediately within the building area.
- Vegetation removal and habitat loss:
 - Vegetation removal is anticipated to occur outside the breeding bird period (April 15 – August 15) to mitigate disturbance to breeding birds. If vegetation removal is required during the breeding season, a nest sweep will be conducted by a qualified biologist to identify any active nests. If a nest is documented, an appropriate setback around the nest will be applied and no construction activities will occur until the young have fledged or the nest is no longer active, as confirmed by a qualified professional.
 - If vegetation is to be mowed for vegetation maintenance during operation of the Project, nest sweeps will be conducted prior to prevent nest destruction or abandonment during the active grassland bird breeding season (April 15 – August 15). If a nest is documented, an appropriate setback around the nest will be applied and no work activities will occur until the young have fledged or the nest is no longer active, as confirmed by a qualified professional.
- Mortality: A follow-up monitoring program will be implemented after construction of the Project to determine the rates and causes of mortalities which in turn would identify possible mitigation measures.
- Collision:
 - If high mortality events occur during operations, visual markers will be added to the PV panels to mitigate collisions by birds, and indirectly reducing attraction from insects. These markers may include UV-reflective or solid contrasting bands spaced no further than 28 cm apart (Kagan et al. 2014). However, AEP-FWS should be aware this mitigation option has not been confirmed with a solar panel supplier. The NU-E Corp L2-3S project is aware that some manufacturers may not allow this as it potentially voids the panel warranties. The NU-E Corp L2-3S project will investigate this option once a supplier is confirmed.

- In the event of high mortality, the NU-E Corp L2-3S project would propose adding poles with flagging. The poles will be at least 25% taller than the panel tops and spaced at regular throughout the Project infrastructure. The intent would be to provide contrast to bird species to prevent further mortality.
 - Anti-nesting spikes may be installed on buildings, inverters, or other areas if there is evidence of high bird use in a specific area of the NU-E Corp L2-3S project and if the observed mortality appears in the same area(s).
 - Speed limit signs will be posted during construction and decommissioning phases of the project to reduce potential vehicle collisions with wildlife.
 - Predation: Deterrents such as bird spikes will be installed on the infrastructure to prevent perching and nest building from avian predators (e.g., raptors, ravens).
 - Contamination: In order to minimize and prevent potential spills and leaks and contamination of habitat, a spill prevention and response plan will be in place. Emergency spill kits will be on site and hazardous waste will be disposed in a safe manner.
45. SOLAR PROJECTS ONLY: Provide details of the proposed fence including type, shape, height, ground clearance and layout. Provide any wildlife mitigations that are proposed as per the requirements in the Directive. Refer to *Maps and Figures* for information on required map submissions.

See **Map 9-** NU-E Corp Project Layout and associated kmz files for fencing layout.

Table 28. Fence Details for the NU-E Corp L2-3S.

Fence Specifications	Detail
Type	9 gauge galvanized chain link with 3 strand barb wire
Shape	2 inch (T.W.) x 96 inch KG galvanized chain link
Height	6 feet
Ground Clearance	Approximately 5-15 cm

Construction and Operation Mitigation Plan

The following section asks for information about methods that will be implemented to reduce negative impacts on wildlife and wildlife habitat during construction and operation.

46. For projects sited in the Sensitive Snake Range or in close proximity of the range, provide details of the project’s Snake Protection Plan to protect snakes and on-site worker safety. This is a requirement for solar projects, but is strongly recommended for wind projects as well.

A Snake Protection Plan (SPP) was created to protect snakes and on-site personnel. The SPP includes mitigative strategies such as lowering speed limits, inspecting trenches and work areas and limiting attractive habitat. The SPP also states on what actions to take

when a snake is encountered and emphasizes that only a qualified professional with the proper experience and valid permit can handle any snakes.

47. Provide details about how injured or dead wildlife observed by on-site workers during construction or operation will be reported.

In the event that injured wildlife is found within the NU-E Corp L2-3S boundaries during operations, the Project Manager will contact either AEP directly, or will contact a qualified individual to assess the animals condition, who will in turn report the findings to AEP. All injured wildlife will be handled in accordance with regulatory direction and requirements.

48. Provide details of the proposed reclamation of the project area, both temporary and long term disturbances that will occur. Include information of the amount of area that will be reclaimed or restored following construction, methods that will be used and details of seed mixes if working in areas of native grasslands. Will an approved native seed mix be used to revegetation disturbed native habitats?

Temporary disturbances will include areas for staging, laydown area, parking, and equipment storage. Areas of long-term disturbances will include the installation of the permanent infrastructure such as roads, inverters, solar panels, and perimeter fence. Removal of vegetation and stripping of soils will be minimal, however some localized stripping, grading, and levelling may occur. The two-lift soil stripping method will be used in areas where soil removal is required during construction at NU-E Corp L2-3S. The two-lift soil stripping method will help to conserve the organic rich surface layer (Pettapiece and Dell 1996) and includes the following steps:

- The first lift will remove the A-horizon to the colour change of the B-horizon;
 - The second lift will remove the B-horizon;
 - Both A and B-horizons will be stockpiled with a 1 m separation;
 - Care will be taken to avoid admixing while handling and stockpiling soils;
 - The soils will be preserved and used for production and final reclamation; and
 - The remaining C-horizon will be used as cut and fill to level each lease to accommodate the necessary equipment.

In addition to the two-lift soil stripping method, the following methods will be used to mitigate potential effects on soils:

- If new accesses require upgrading, they will be upgraded to medium grade roads and graveled to allow culvert installation as required, assistance to drying of road bed, and safe travel conditions;
- Gravel will be used on the access roads as needed during the production life;
- Borrow areas may also be proposed in areas where there is insufficient material to construct an access road capable of hauling equipment to and from the sites;
- Culverts will be installed as required to maintain natural drainage where required; and
- All final access road construction and design will be completed in accordance with both landowner and municipality.

Interim and final reclamation will follow the *Conservation and Reclamation Directive for Renewable Energy Operations* (Government of Alberta - Alberta Environment and Parks 2018) and the *2010 Reclamation Criteria for Wellsites and Associated Facilities for Cultivated Lands – updated 2013* (Environment and Sustainable Resource Development 2013). Areas of temporary disturbances will be reclaimed to a land-cover and seed mix approved by the landowner(s) and reclamation will include site and debris clean-up, slope stabilization, recontouring of subsoil, and spreading of topsoil where required. During the life of the project, current vegetation communities will remain relatively intact. Soil/vegetation disturbance is not anticipated throughout much of the project, as panels will be screw-piled into the ground, and soil salvage is not necessary. In areas where soils salvage is required, these will be seeded to perennial grass approved by the landowner. The perennial vegetation will have a positive impact on the soil as it will prevent erosion and loss of topsoil and increase carbon stores. In section 31-07-21 W4M the landowner seeded in advance using a mix of smooth brome, meadow brome and a three way mix of alfalfa which includes creeping alfalfa. The mixture is drought tolerant and the creeping roots will spread into high traffic areas creating a solid mat over time. Some wildlife such as small mammals and generalist birds could also use the areas seeded to perennial vegetation for breeding and foraging habitat.

When the Project is decommissioned, the following methods will occur for the final reclamation of soils:

- All disturbed areas are to be recontoured to pre-construction conditions. Loading of slopes with unconsolidated material will be avoided during slope re-contouring.
- All grades and drainages will be restored by removing any culverts and fills.
- No topsoil will be removed as requested by landowner(s). Interior gravel roads will be constructed on top of topsoil. Landowner(s) will be responsible to seed (as specified above) the project area prior to construction.
- Once sub-soil has been adequately reclaimed, topsoil will be replaced. Topsoil replacement should not be done until all subsoil levelling and cleanup has been completed, to prevent mixing by levelling after topsoil replacement.
- Topsoil depths will be replaced to 80% of control point depths.
- Soil quality should not drop in soil quality class.
- Surface diversion berms will be installed, as required. Run-off will be diverted to stable and vegetated areas.
- Remove all foreign materials including geotextile.
- Fences and culverts are to be restored to meet or exceed pre-construction conditions.
- Rocks/stones exposed on the surface as a result of construction activity will be removed prior to and after topsoil/surface material replacement. The concentration of surface and profile rocks will be equivalent to, or better than the surrounding fields. Rocks/stones will be disposed of at a site approved by the landowner.
- Any areas with rutting or erosion gullies will be re-contoured and all strippings will be replaced evenly over all portions of disturbed areas. Replacement of soils during wet weather or high winds will be avoided. This will prevent damage to soil structure and reduce the potential for erosion of topsoil.
- Soil amendments (fertilizer/manure/compost) may be required on disturbed areas. The concentration of amendments required will be based upon nutrient levels in the undisturbed areas outside the boundaries of the Project areas and will be incorporated only if approval is obtained from the landowner.
- Erosion control may be necessary on slopes.

- Complete re-contouring and stabilization of disturbed areas. Smooth water channeling ruts and outside berms. Ensure that all erosion control and water management measures (e.g., water bars, drainage dips, culverts and ditches) are working.
- If grading or other earthwork is required to facilitate vehicle/equipment on areas, strip and salvage topsoil and organic material for replacement during clean-up procedures.
- Where soils have been disturbed, implement appropriate reclamation procedures (i.e., seeding, erosion blankets, slash rollback, straw crimping, etc.) to promote stability of the site, soil preservation, and plant re-establishment. Ensure the natural drainage is restored.
- Recovery strategies for vegetation during final reclamation will include the use of agronomic seed mixtures to revert the disturbed area back to tame pasture. The vegetation recovery strategy will be developed under the instruction of the landowner prior to final reclamation. Seeding rates and methods will be based upon characteristics of area, weather conditions, erosion potential of slopes and landowner recommendations. The reclaimed area will be monitored for four growing seasons which will include landscape, soils and vegetation assessments as recommended in the *Conservation and Reclamation Directive for Renewable Energy Operations* (Government of Alberta - Alberta Environment and Parks 2018) to ensure vegetation has established, erosion has been controlled, and landowner concerns have been mitigated.

49. Provide the proposed construction schedule for the project.

A proposed phased approach to the project construction within the development permit application will follow the proposed schedule below.

Environmental Assessment – 2022

Permit and Approval Process – 2023-2024

Begin Construction – June 2024

Energization – July 2026

Commercial Operation Date – September 2026

50. Provide details of any construction and operation mitigations or methods to reduce the impact to wildlife or wildlife habitat not identified in an above section.

- Construction outside the breeding and nesting season (April 15th to August 15th) for grassland nesting birds (Government of Alberta 2021) to mitigate potential nest abandonment, nest destruction, and incidental take.
- If mowing of vegetation underneath panels is required between April 15th and August 15th, it will only occur after a nest sweep is completed and any active nests discovered are adequately buffered.
- A weed management plan, according to the Weed Control Act (Government of Alberta 2008), should be in place during construction to mitigate the establishment of invasive and noxious weeds within the Project area.

SOLAR PROJECTS ONLY: Questions 52 to 55 are specific to solar energy projects only.

51. Will pilings be used to install the solar panels? Provide details of the type of pilings that will be used and installation techniques.

Yes, pilings are anticipated to install solar panels. It is expected that the piles will be I-beam (galvanized) W6x9 and installed using an excavator with a hydraulically powered torque

motor to the maximum depth of 7 m to provide support to solar panel racks.

52. Will there be levelling or grading of the project site? If yes, provide details. As topography is fairly flat minimal grading will be required (net cut 0 m).
53. Will the ground under solar panels be stripped or vegetation removed? If yes, provide details of the methods, wildlife mitigations and if areas will be revegetated, including type of seed mix.
- It is anticipated that panels will be installed without the need for soil or vegetation removal. If vegetation is to be stripped or removed during breeding and nesting season (April 15th to August 15th), a pre-construction sweep for wildlife will be conducted. During Project operation, disturbed areas will be re-seeded as necessary. There will be annual monitoring of bare ground cover and distribution, with periodic monitoring, reporting, and immediate eradication of noxious weed or invasive species occurring within all managed areas.
54. If there is vegetation under the panels, provide details about how and when it will be maintained. Detail all mitigation measures that will be used during vegetation maintenance to protect wildlife and wildlife habitat (e.g. survey sweeps for ground nesting birds).

Based on the seed mix selected by the landowner, no mowing of vegetation is anticipated. If annual vegetation mowing under the PV panels is required between April 15th and August 15th, a ground nest sweep will be conducted prior to ensure no nests will be disturbed or destroyed. There will be limited herbicide use to control weeds; only herbicides with low toxicity to wildlife and nontarget native plant species will be used, as determined in consultation with the County Agriculture Officer and/or Alberta Environment and Protected Areas and a nest sweep will be conducted prior to any herbicide application.

Post-Construction Monitoring and Mitigation Plan

The following section asks for information about the monitoring and, if required, the mitigation methods that the proponent commits to implementing during operation.

55. State that the post-construction surveys will be completed as directed by the AEP “Post-Construction Survey Protocols for Wind and Solar Energy Projects”?

Post-construction surveys will be completed as directed by the AEP “*Post-Construction Survey Protocols for Wind and Solar Energy Projects, January 2020*”.

56. If mortality is deemed higher than acceptable by AEP-WM, the proponent will be required to mitigate the mortality to acceptable levels as per AEP-WM Policy. Identify the proposed mitigation methods that will be implemented by the proponent if mortality is determined to be high.

Adaptive management may be implemented in the event where post-construction surveys determine that wildlife mortalities exceed acceptable levels (as determined by AEP) (Standard 100.4.9). Adaptive management will include determining the reason of mortality. Once mortality is determined mitigation may include installation of bird deterrents or markers, addition of white edges to solar reflectors, installation of nest spikes on areas to prevent raptor nesting, and/or other methods appropriate at the time.

Maps and Figures

Maps and figures are important to help AEP-WM understand the proposed project. The following maps and figures are required by AEP-WM in all renewable submissions. Additional maps/figures may be submitted at the discretion of the proponent.

57. Map and a KMZ file of the overall project area: map must include project boundary line, photo imagery, boundary line for the 1000 m setback of the project boundary, identification of all wildlife habitat types as identified in this submission (i.e. native grassland, cultivation, etc.). Provide the name of file(s).

Map 1 – NU-E Corp L2-3S Wildlife Habitat

Files:

LethbridgeTwoThreeSolar_WildlifeHabitat.jpeg

LethbridgeTwoThreeSolar_ProjectLands.kmz

LethbridgeTwoThreeSolar_100mBuffer.kmz

LethbridgeTwoThreeSolar_1000mBuffer.kmz

LethbridgeTwoThreeSolar_WildlifeHabitat.kmz

58. Map and a KMZ file of survey locations: Map must include project boundary line, photo imagery, and each wildlife survey point for all required surveys. To enable AEP-WM review, if the map is cluttered it is recommended that multiple maps be used with files labelled appropriately. Depending on the size of the project, it may improve clarity of information by providing a separate map for the survey locations of each type of survey conducted. Provide the name of file(s).

Map 2 – NU-E Corp L2-3S Spring and Fall Migration Survey Locations

Files:

LethbridgeTwoThreeSolar_MigrationSurvey.jpeg

LethbridgeTwoThreeSolar_MigrationSurveyPoints.kmz

LethbridgeTwoThreeSolar_400mSurveyArea.kmz

LethbridgeTwoThreeSolar_800mSurveyArea.kmz

Map 3 – NU-E Corp L2-3S Breeding Bird and Burrowing Owl Survey Locations

Files:

LethbridgeTwoThreeSolar_BBS&BUOW.jpeg

LethbridgeTwoThreeSolar_BBSandBUOWsurveypoints.kmz

Map 4 – NU-E Corp L2-3S STGR Survey Locations

Files:

LethbridgeTwoThreeSolar_STGRSurvey.jpeg

LethbridgeTwoThreeSolar_STGRsurveypoints.kmz

Map 5 – NU-E Corp L2-3S Amphibian Survey Locations

Files:

LethbridgeTwoThreeSolar_AmphibianSurvey.jpeg

LethbridgeTwoThreeSolar_AmphibianSurveyPoints.kmz

Map 6 – NU-E Corp L2-3S Snake Hibernacula Survey

Files:

LethbridgeTwoThreeSolar_SnakeHibernaculaSurvey.jpeg

59. Map and a KMZ file of the project layout: Map must include project boundary line, photo imagery, infrastructure locations including but not limited to turbines or solar arrays, access roads, collection lines, substations, temporary work spaces and fences. To enable AEP-WM review, if the map is cluttered it is recommended that multiple maps be used with files labelled appropriately. Provide the name of file(s).

Map 9 – NU-E Corp L2-3S Layout

Files:

LethbridgeTwoThreeSolar_ProjectLayout.jpeg
LethbridgeTwoThreeSolar_Layout-AccessRoad.kmz
LethbridgeTwoThreeSolar_Layout-BatteryStorageArea.kmz
LethbridgeTwoThreeSolar_Layout-ConnectionLine.kmz
LethbridgeTwoThreeSolar_Layout-DevelopmentArea.kmz
LethbridgeTwoThreeSolar_Layout-Fence.kmz
LethbridgeTwoThreeSolar_Layout-PowerStations.kmz
LethbridgeTwoThreeSolar_Layout-SolarArray.kmz
LethbridgeTwoThreeSolar_Layout-StockpileArea.kmz
LethbridgeTwoThreeSolar_Layout-Substation.kmz

60. Map and a KMZ file of Lake/Wetland/Waterbody/Watercourse Features: Map must include project boundary line, photo imagery, all classified wetlands and setback distance from nearest project infrastructure. To enable AEP-WM review, if the map is cluttered it is recommended that multiple maps be used with files labelled appropriately. Provide the name of file(s).

Map 7 – NU-E Corp L2-3S Wetlands and Waterbodies

Files:

LethbridgeTwoThreeSolar_Wetlands&Waterbodies.jpeg
LethbridgeTwoThreeSolar_Wetlands&Waterbodies.kmz

61. Map and a KMZ file of Wildlife Features: Map must include project boundary line, photo imagery, all identified wildlife features (house, nests, dens, leks, etc.) and associated setback boundary line, and setback distance from nearest project infrastructure. Labelling of wildlife features must match identification number of feature referenced in above section(s) of this submission. To enable AEP-WM review, if the map is cluttered it is recommended that multiple maps be used with files labelled appropriately. Provide the name of file(s).

Map 8 – NU-E Corp L2-3S Wildlife Features

Files:

LethbridgeTwoThreeSolar_WildlifeFeatures.jpeg
LethbridgeTwoThreeSolar_Coulee100mBuffer.kmz
LethbridgeTwoThreeSolar_CouleeEdge.kmz
LethbridgeTwoThreeSolar_1000mBuffer.kmz
LethbridgeTwoThreeSolar_GreatHornedOwlNest.kmz
LethbridgeTwoThreeSolar_100mNestSetback.kmz

LethbridgeTwoThreeSolar_KeyWildlifeBiodiversityZone.kmz
LethbridgeTwoThreeSolar_PlainsSpadefootObservation.kmz

62. Other associated maps and figures: (insert jpeg/pdf map file). Provide any other maps referenced by the proponent in the body of this submission. Additional maps or figures must be provided as a KMZ file, in addition to a figure in the submission. To enable AEP-WM review, if map is cluttered it is recommended that multiple maps be used with files labelled appropriately. Provide the name of file(s).

Not applicable.

Other Comments

This section allows the proponent to provide wildlife or wildlife habitat related information that has not already been addressed in any of the above sections.

63. If there is any additional wildlife related information that the proponent would like to include in the submission, provide the information here (e.g., photographs).



Photo 1. View facing north of migration survey point KSM4 showing Range Road 215 and cultivation (April 14, 2022).



Photo 2. View facing east of migration survey point KSM4 showing cultivated land (April 14, 2022).



Photo 3. View facing south of migration survey point KSM4 showing Range Road 215 and cultivation (April 14, 2022).



Photo 4. View facing west of migration survey point KSM4 showing cultivated lands (April 14, 2022).



Photo 5. View facing north of migration point KSM5 showing Range Road 115 and cultivation (September 12, 2022).



Photo 6. View facing east of migration point KSM5 showing Township Road 74 and cultivation (September 12, 2022).



Photo 7. View facing south of migration point KSM5 showing Range Road 115, cultivation to the southeast and native prairie to the southwest (September 12, 2022).



Photo 7. View facing west of migration point KSM5 showing native prairie to the southwest (September 12, 2022).



Photo 8. Incidental observation of two sharp-tailed grouse near KSM5 (May 11, 2022).



Photo 8. An active great horned owl nest with at least three nestlings observed near migration point SC1 (May 11, 2022).



Photo 9. View facing east of coulee system at west end of Project area leading down to the St. Mary River (May 7, 2022).



Photo 10. View facing east of an ephemeral wetland (WL3) on Project footprint showing disturbance by cultivation (June 17, 2022).



Photo 11. View facing north of an ephemeral wetland (WL29) on Project footprint showing disturbance by cultivation (October 22, 2022).



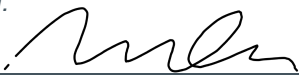
Photo 11. View facing north of a temporary wetland (WL11) on Project footprint where plains spadefoot toads were observed (June 17, 2022).

Final Statement of Compliance

Upon completion of the submission form, the applicant or applicant's representative must fill out the following and submit as part of their application.

Once the AEP-WM has received all required documents the submission will be forwarded to the local area Biologist for review and comment. A final referral report will be completed by the AEP-Wildlife Biologist and forwarded to the AUC for inclusion within the AUC application.

*I, **Pamela Pelletier**, as an authorized representative of **NU-E Corp**, ensure that this application meets the AEP requirements as detailed in the Wildlife Directive for Alberta Wind or Solar Energy Projects. Deviations from the Directive (if any) are outlined in this submission form and include proposed mitigations and any formal discussions or agreements with AEP-Wildlife. All other supporting documents and materials for this project will abide with the statements made in this submission form.*

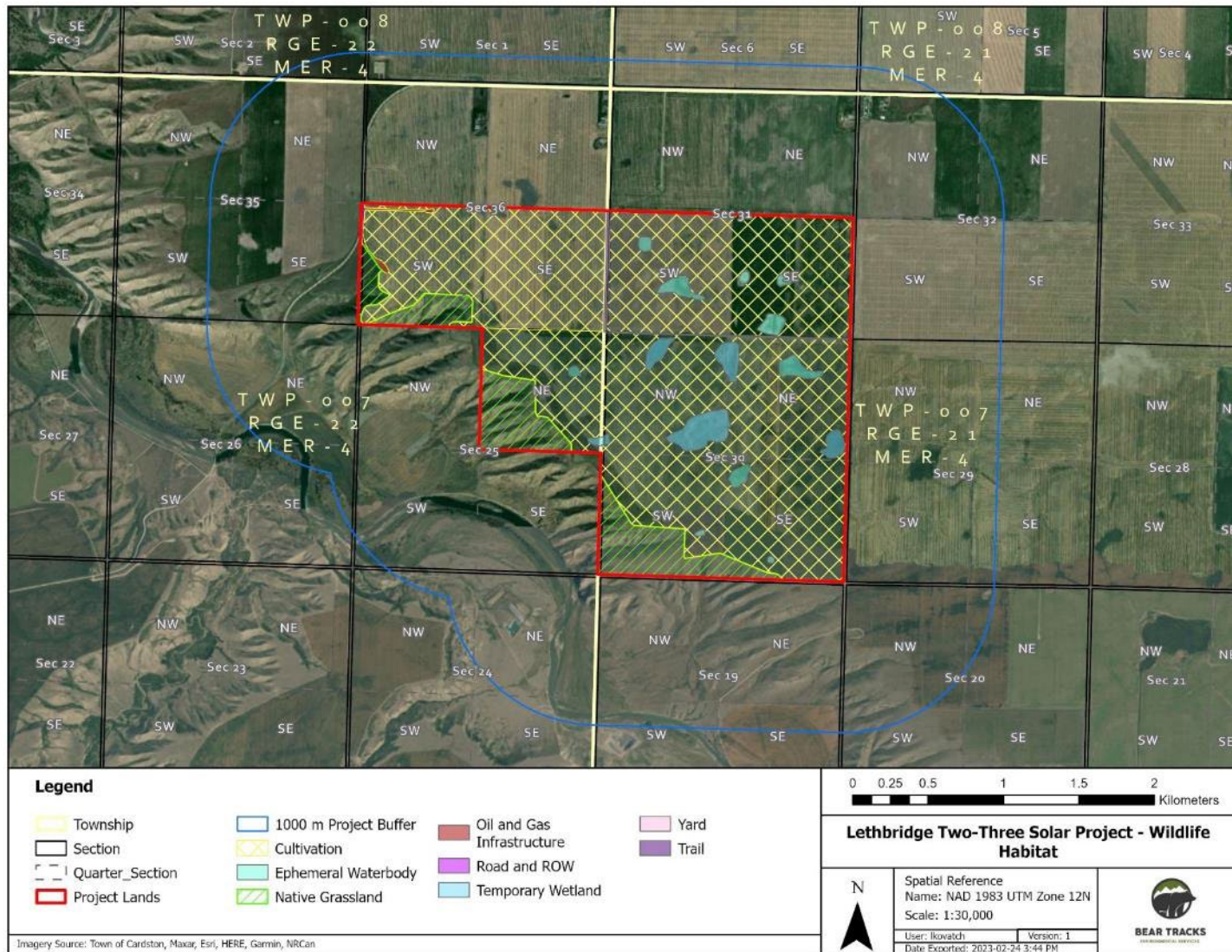
Signature: _____ 

Date: March 15, 2023

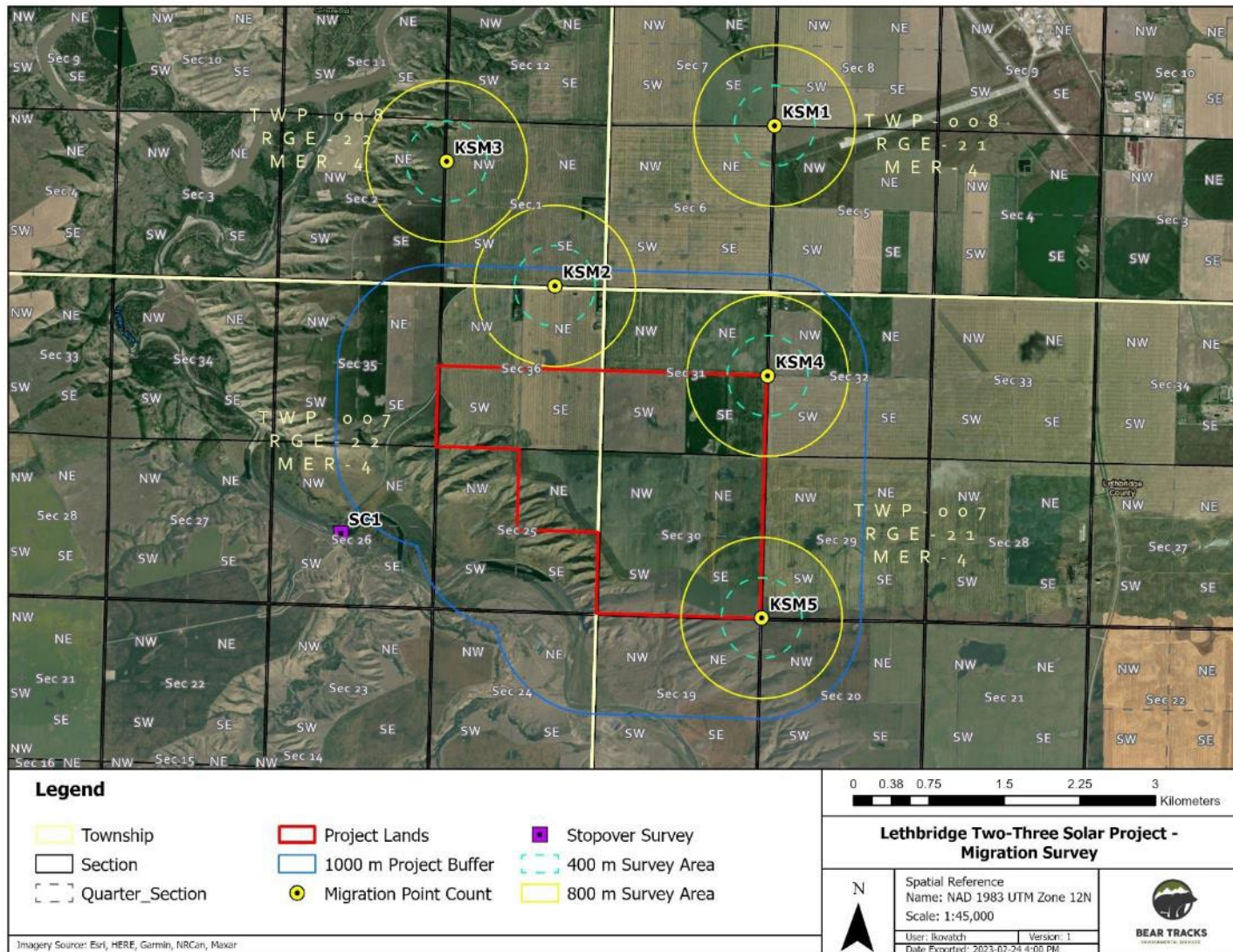
Once signed, the entire submission form, including all supporting documents identified in the submission form, must be emailed by the proponent to the appropriate AEP-WM representative.

References

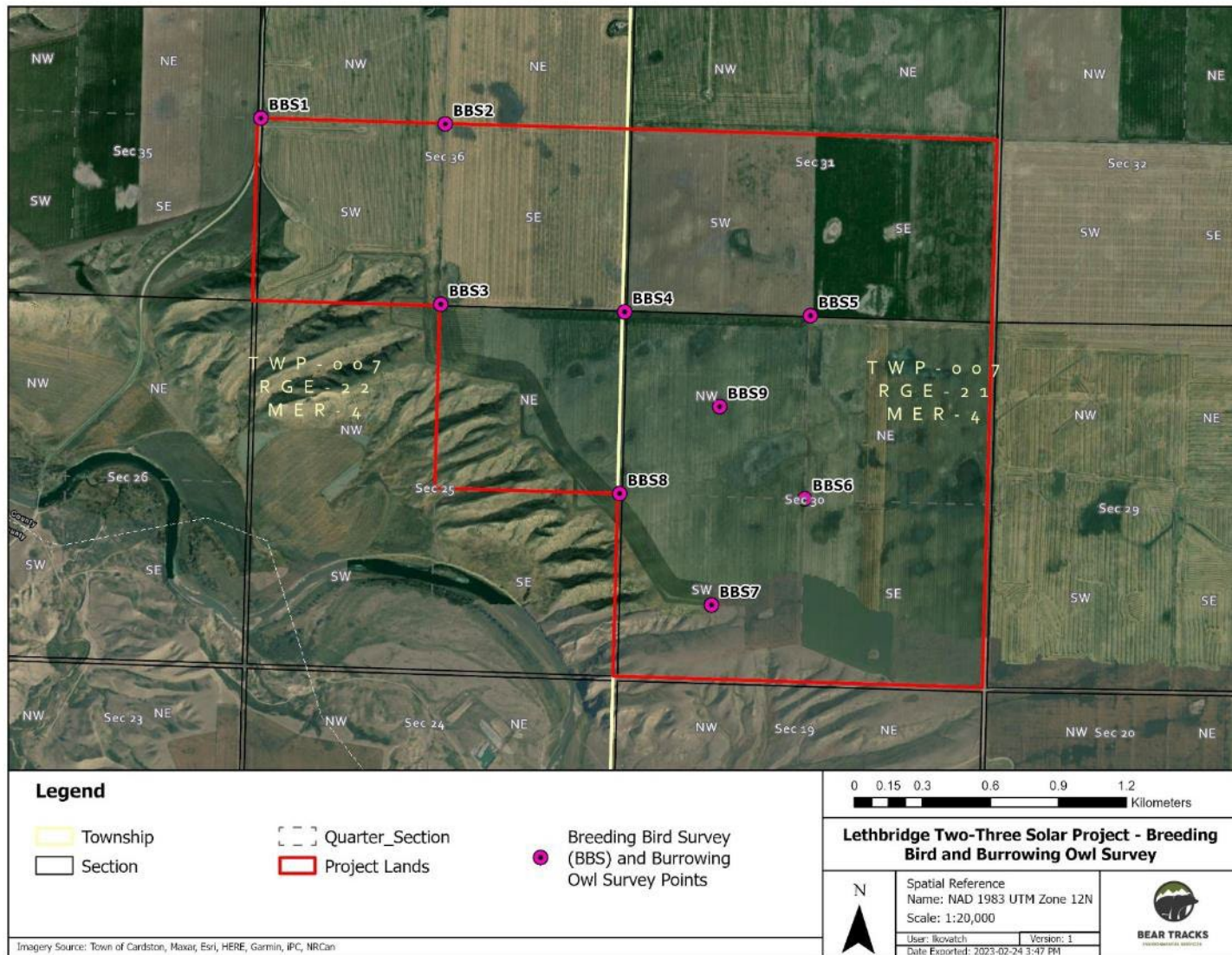
- Alberta Environment and Sustainable Resource Development (ESRD). 2015. Alberta Wetland Classification System. Water Policy Branch, Policy and Planning Division, Edmonton, AB.
- Environment and Sustainable Resource Development. 2013. 2010 Reclamation Criteria for Wellsites and Associated Facilities for Cultivated Lands (updated July 2013). Edmonton.
- Government of Alberta. 2008. Weed Control Act. Page 20. Alberta Queen's Printer, Canada.
- Government of Alberta. 2013. Sensitive Species Inventory Guidelines. Edmonton AB.
- Government of Alberta. 2015. Alberta Wetland Rapid Evaluation Tool – Actual (ABWRET-A) Manual. Water Policy Branch, Alberta Environment and Parks. Edmonton, Alberta.
- Government of Alberta. 2017. Wildlife Directive for Alberta Solar Energy Projects. Edmonton AB.
- Government of Alberta. 2021. Master Schedule of Standards and Conditions. Edmonton AB.
- Government of Alberta - Alberta Environment and Parks. 2018. Conservation and Reclamation Directive for Renewable Energy Operations. Edmonton AB.
- Huso, M., T. Dietsch, and C. Nicolai. 2016. Mortality Monitoring Design for Utility-Scale Solar Power Facilities:44.
- Kagan, R.A., Viner, T.C., Trail, P.W. and Espinoza, E. O. 2014. Avian mortality at solar energy facilities in southern California: a preliminary analysis.
- Pettapiece, W. W., and M. W. Dell. 1996. Guidelines for Alternative Soil Handling Procedures During Pipeline Construction.



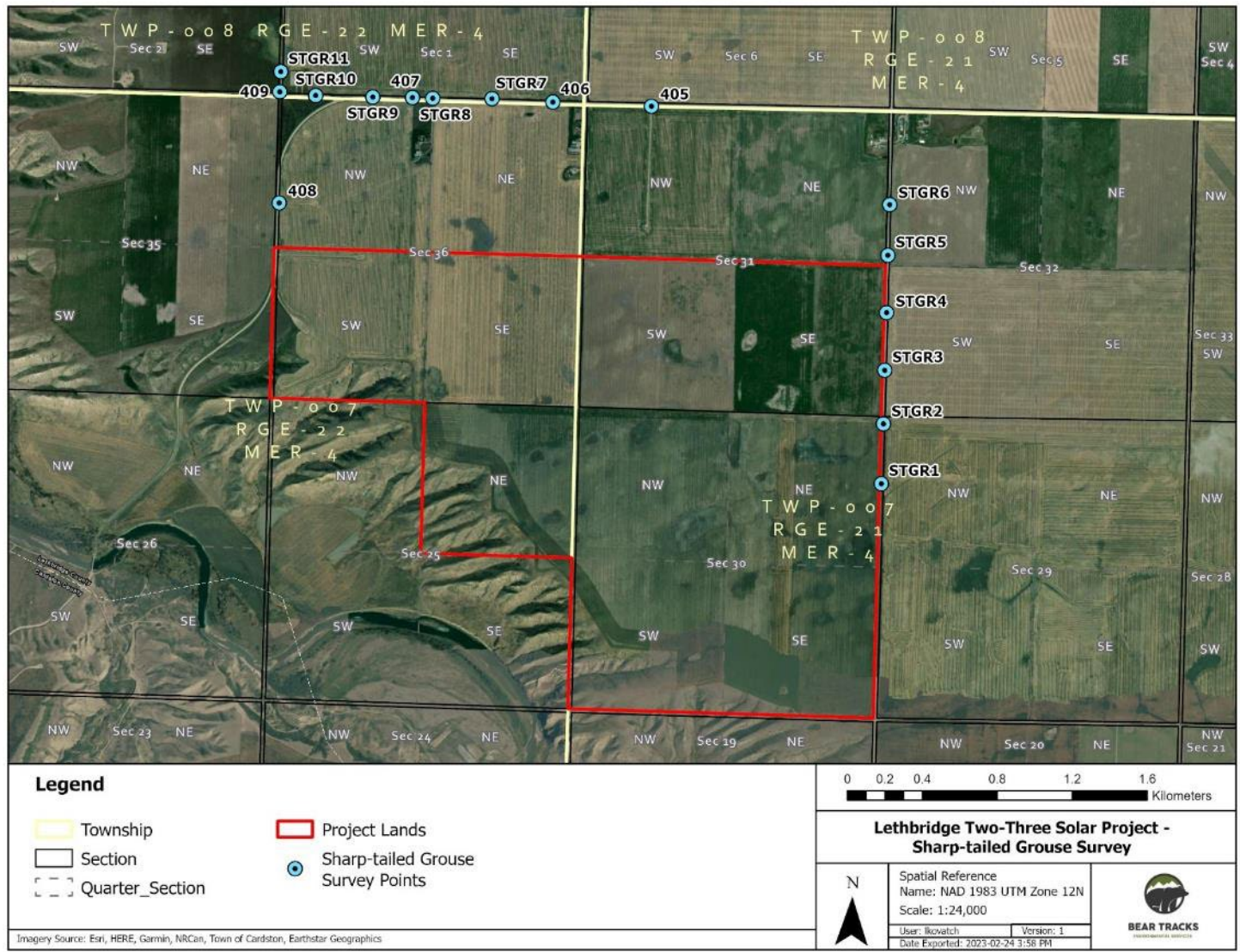
Map 1 – NU-E Corp L2-3S Wildlife Habitat.



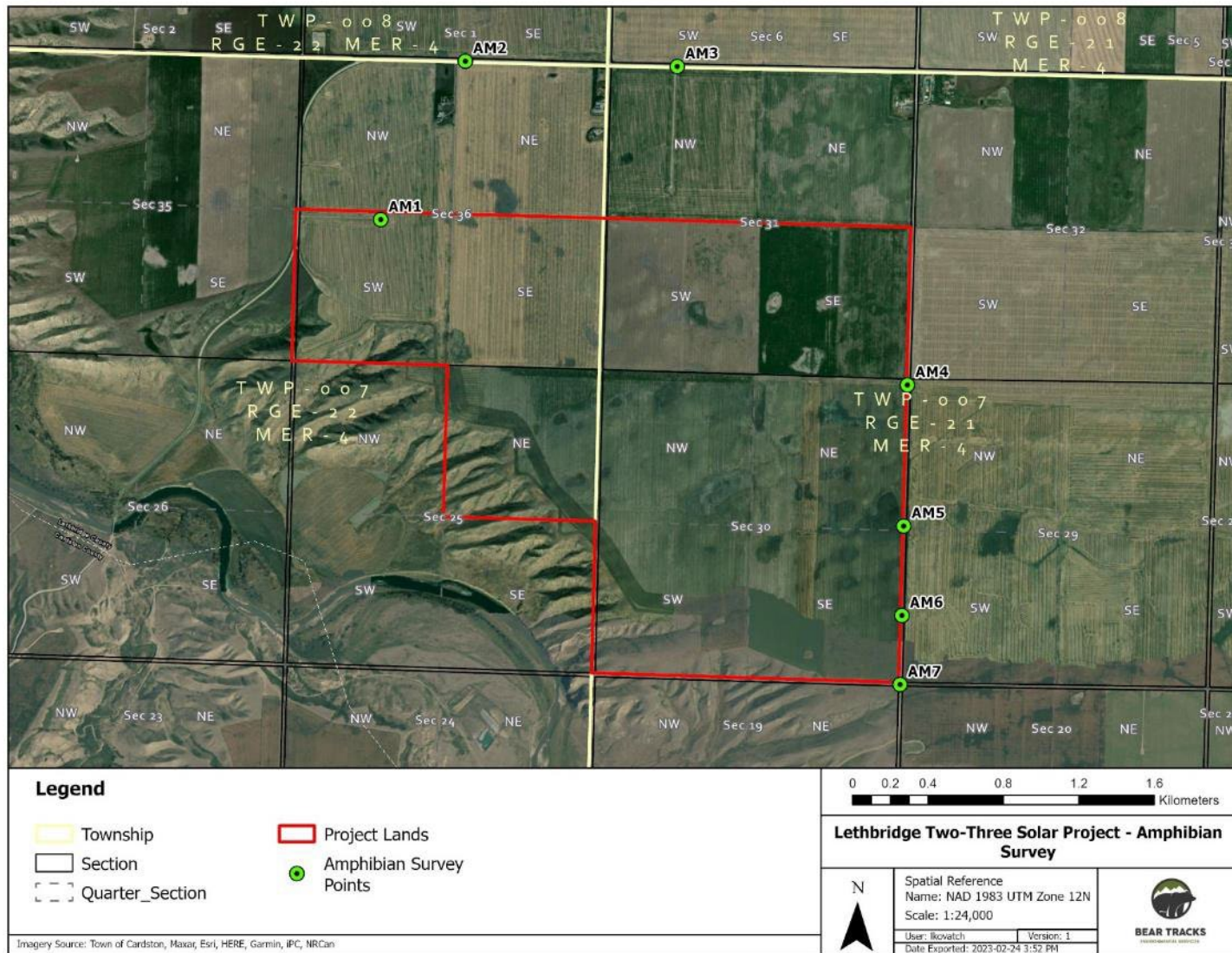
Map 2 – NU-E Corp L2-3S Migration Survey Locations



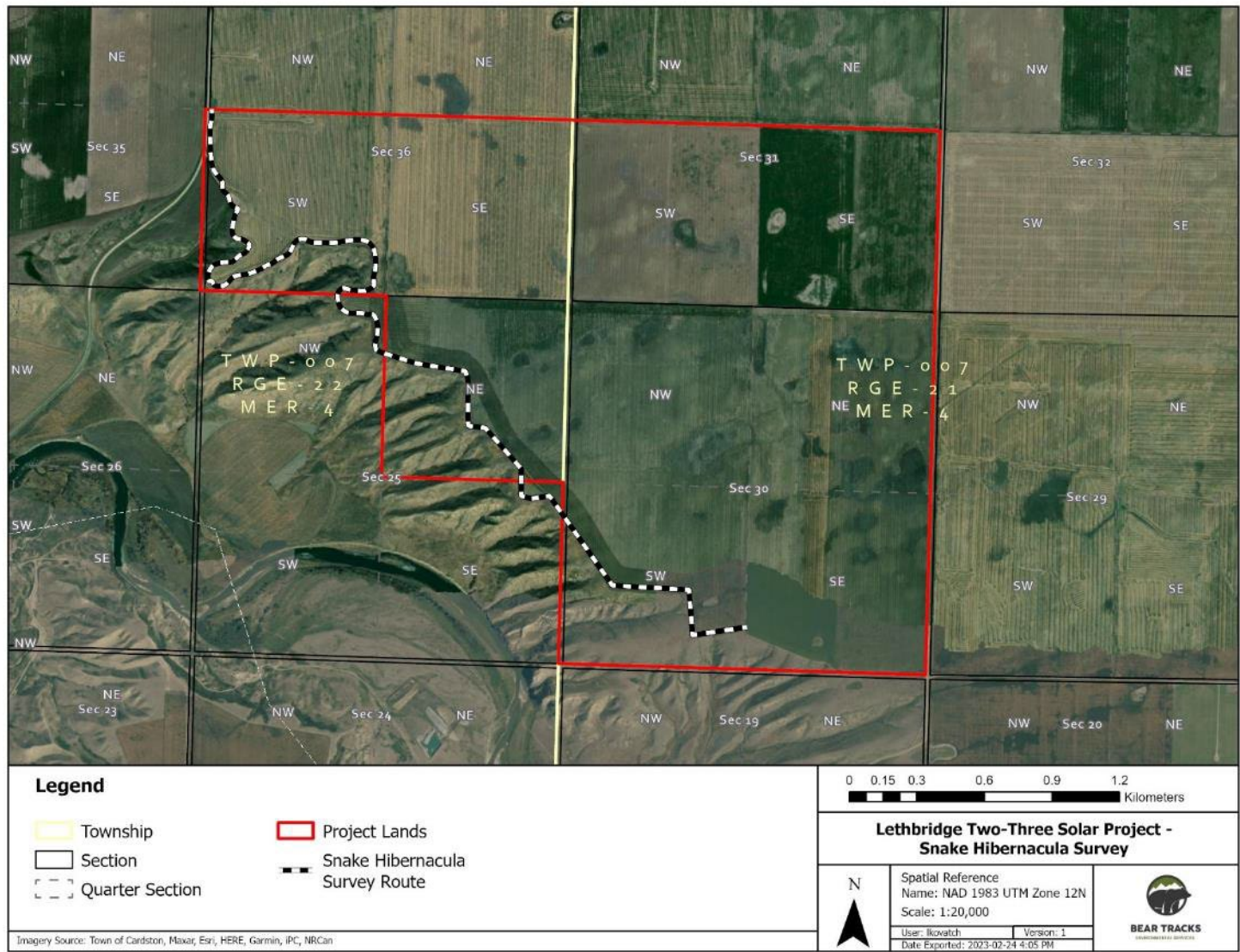
Map 3 – NU-E Corp L2-3S Breeding Bird and Burrowing Owl Survey Locations



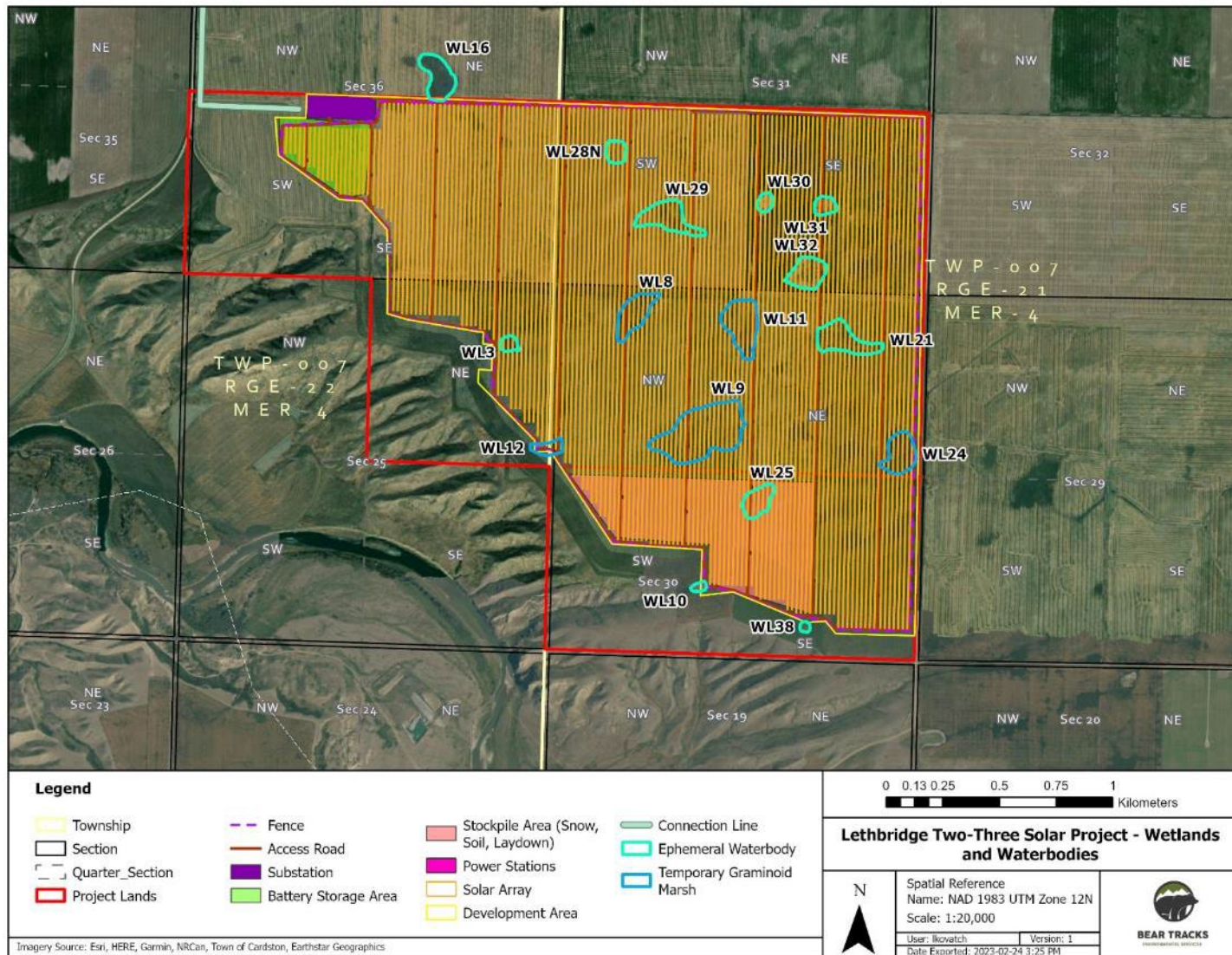
Map 4 – NU-E Corp L2-3S STGR Survey Locations



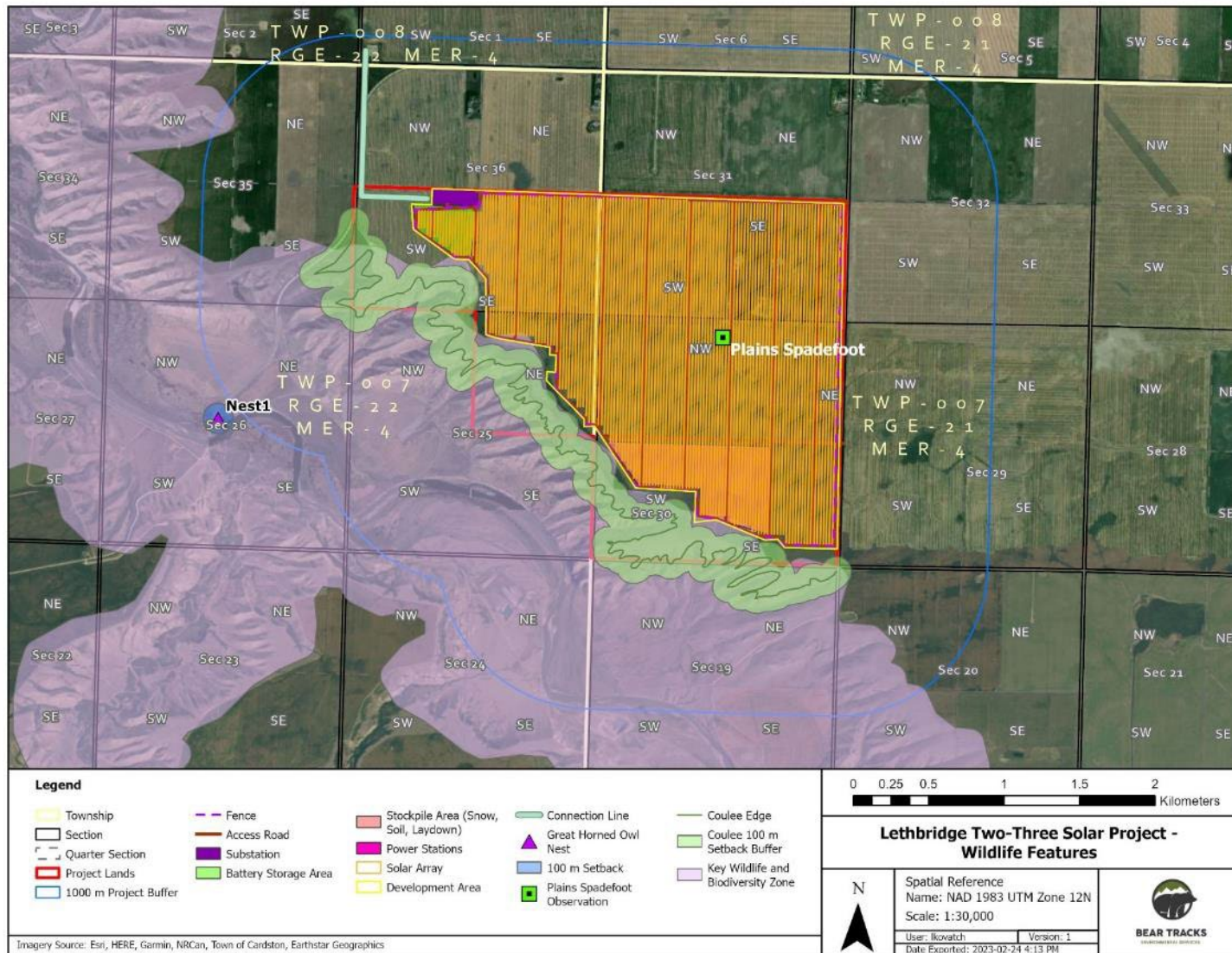
Map 5 – NU-E Corp L2-3S Amphibian Survey Locations



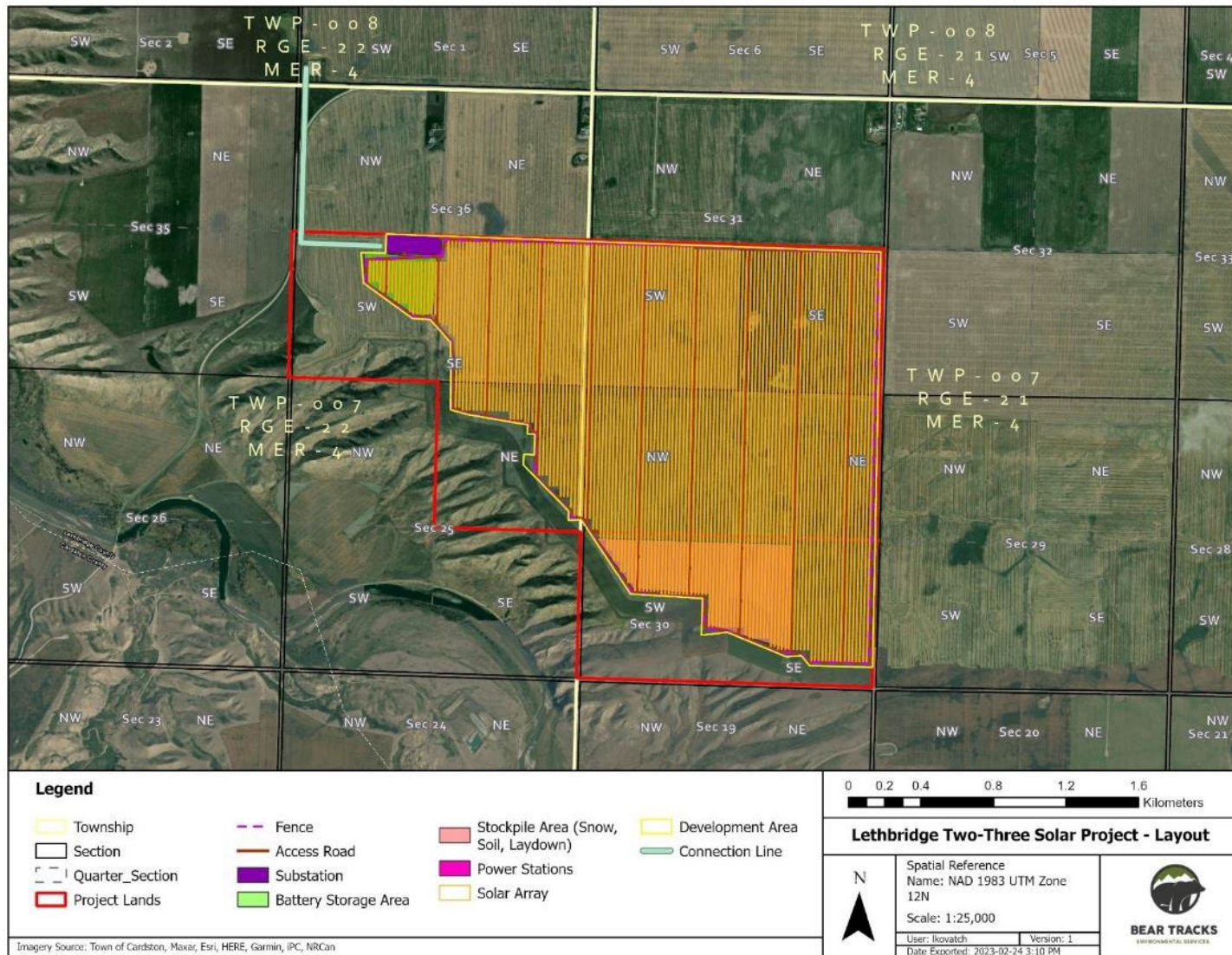
Map 6 – NU-E Corp L2-3S Snake Hibernacula Survey



Map 7 – NU-E Corp L2-3S Wetland and Waterbodies



Map 8 – NU-E L2-3S Wildlife Features



Map 9 – NU-E L2-3S Layout