



BEAR TRACKS
ENVIRONMENTAL SERVICES

2025 Environmental and Land Use Evaluation for Six Transmission Development Options in Lethbridge, Alberta

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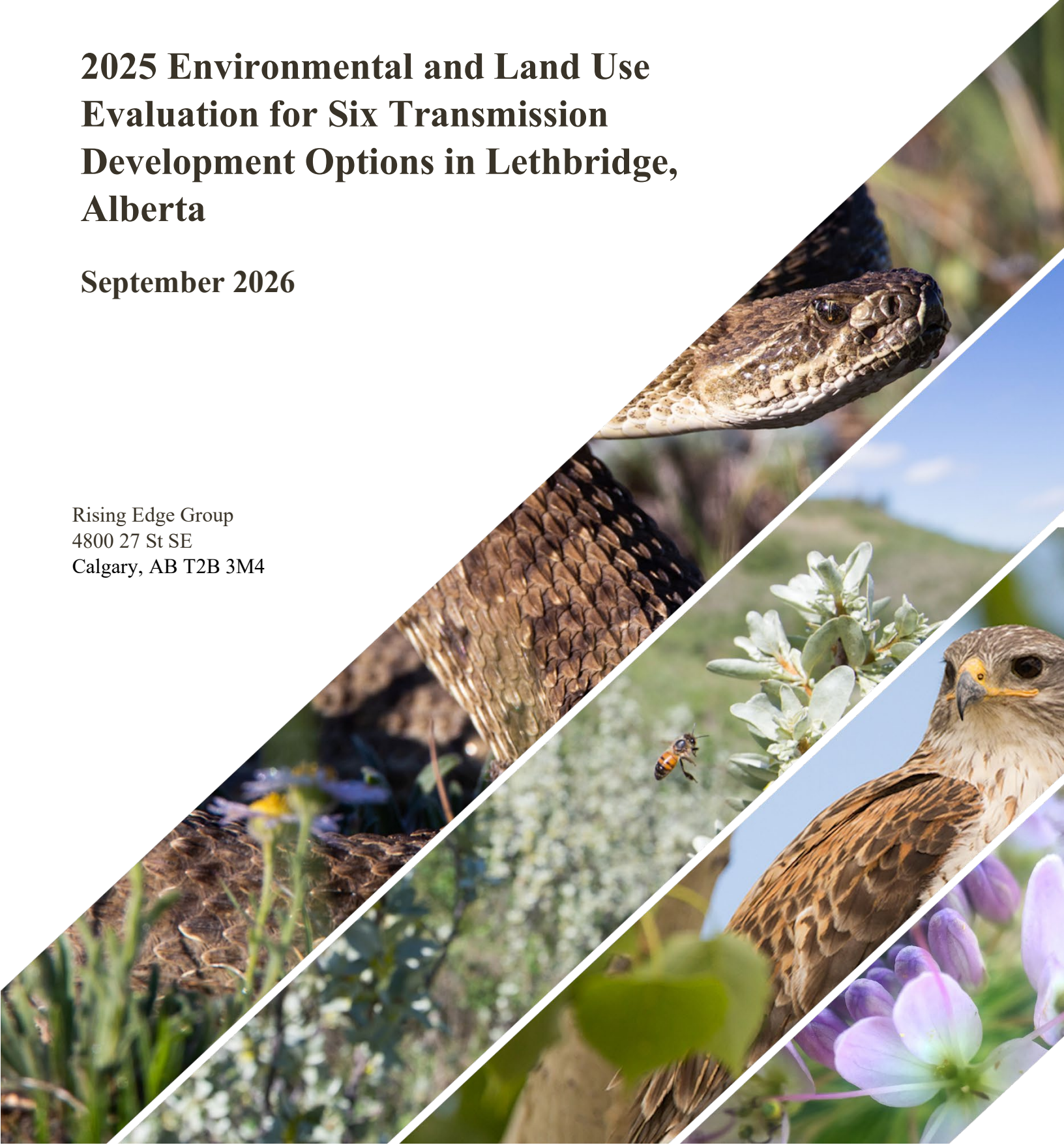


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Introduction

Bear Tracks Environmental Services (2015) Ltd. (Bear Tracks) was retained by Rising Edge Group (REG) to conduct an Environmental and Land Use Evaluation (ELE) for proposed transmission development in the Lethbridge area (hereafter ‘the Project’). Results of the evaluation will be prepared for the legal owners of the transmission facilities, AltaLink Management Ltd., and City of Lethbridge. The ELE consisted of a desktop assessment of the six options and compared environmental impact and land use of each.

The objective of the ELE was to provide a desktop review of the biophysical characteristics of the various locations included in the Project to determine any environmental constraints or sensitivities. The results of the desktop assessment for six locations were compared from an environmental impact perspective to determine relative environmental impact of each and evaluate overall environmental risk. It is important to note that this evaluation is conceptual in nature and will be used to determine the feasibility of the various options. Detailed field studies will need to take place once a preferred option is decided upon.

1 Project Description

Forecasted electrical system load growth to the Lethbridge sub-region will lead to potential violations of various criteria (AESO 2025). To compensate for the forecasted load growth, six development options are proposed for upgrading current electrical transmission systems in Lethbridge and the surrounding area (Figure 1). The desktop assessment will focus on upgrades included under the City of Lethbridge’s scope and will not cover additional Project scope which may be under AltaLink’s responsibility, specifically options 1, 2b, 2d, 2f, 3a, and 5a. Based on the NID Specification Lethbridge Area Transmission Development for this Project, these include:

1. Option 2a: New 240 kV Substation and Line to Bowron

This option includes adding a new substation west of Lethbridge, including one 240/138 kV transformer, 240 and 138 kV circuit breakers and associated equipment. Additionally, a new line 138 kV line from the new substation to Bowron 674 Substation (S) will be added, along with associated substation upgrades.

2. Option 2c: New 240 kV Substation and Line to Chinook

This option includes adding a new substation west of Lethbridge, including one 240/138 kV transformer, 240 and 138 kV circuit breakers and associated equipment, similar to Option 2a. In addition to the new line 138 kV line from the new substation to Bowron 674S (as in Option 2a), a new line 138 kV line would also be added from the new substation to Chinook 181S. This would include equipment upgrades at Chinook 181S and Bowron 674S to accommodate the changes.

3. Option 2e: Expand Chinook to 240 kV and Line to Bowron

This option includes expanding the Chinook 181S to a 240 kV Substation by adding upgrades (240/138kV transformer, 240 kV and 138 kV circuit breakers and associated equipment required). This would also include adding a new 138 kV Line from Chinook 181S to Bowron 674S, along with associated upgrades.

4. Option 4a: Phase Shifting Transformer

This option includes additions to Coalbanks 111S, including a phase shifting transformer, with a minimum continuous rating of 150 MVA and any applicable modifications or changes.

5. Option 4b: Power Flow Control

This option includes additions to Coalbanks 111S, including adding a Power Flow Control Solution and any necessary modifications or changes required.

6. Option 5b: Chinook Voltage support

This option includes adding a 24 MVar capacitor bank at Chinook 181S, along with any necessary modifications or changes required.

2 Study Area

The Project and all six options are within the Mixedgrass Natural Subregion within the Grassland Natural Region of Alberta (Alberta Parks 2015). Main land use within the subregion is agriculture with approximately 85% of the area planted to annual crops. Remaining native prairie is characterized by needle-and-thread grass (*Hesperostipa comata*), northern wheatgrass (*Elymus lanceolatus*), and western wheatgrass (*Pascopyrum smithii*). Although this subregion has dry hot summers, it has higher precipitation, cooler summers, and milder winters, when compared to the Dry Mixedgrass Natural Subregion (Alberta Parks 2015).

The study area of each Project site included the direct proposed or existing footprint, in addition to a surrounding 100 meter (m) search area for wetlands, a 300 m search area for rare plants and landcover, and a 1,000 m search area for wildlife and potential sensitive wildlife features (Figure 1). Search area buffers were based on the maximum activity setback distance for the associated potential environmental sensitivities within the area (GOA 2024, ECCC 2017).

The closest Important Bird Area (IBA) to the Project is St. Mary's Reservoir, approximately 40 kilometers (km) southwest of the City of Lethbridge boundary (Bird Studies Canada 2015). The IBA's are sites that support threatened bird species, large groups of birds, and bird species that have range or habitat restrictions. They also have international significance for bird conservation and are identified using standardized

criteria (Bird Studies Canada 2015). While the IBA distance is relatively far from Lethbridge, all six Project options are within close proximity (less than three kilometers) of the Old Man River valley. The river valley provides unique and optimal habitat for a variety of flora and fauna, cultural/historical significance, and watershed management. Development within the river valley within city limits is highly restricted, with only essential infrastructure permitted following specific approvals to protect the river valley's resources through land use controls that ensure public safety and preserve its significant historical, landform, and ecological values (City of Lethbridge 2004).

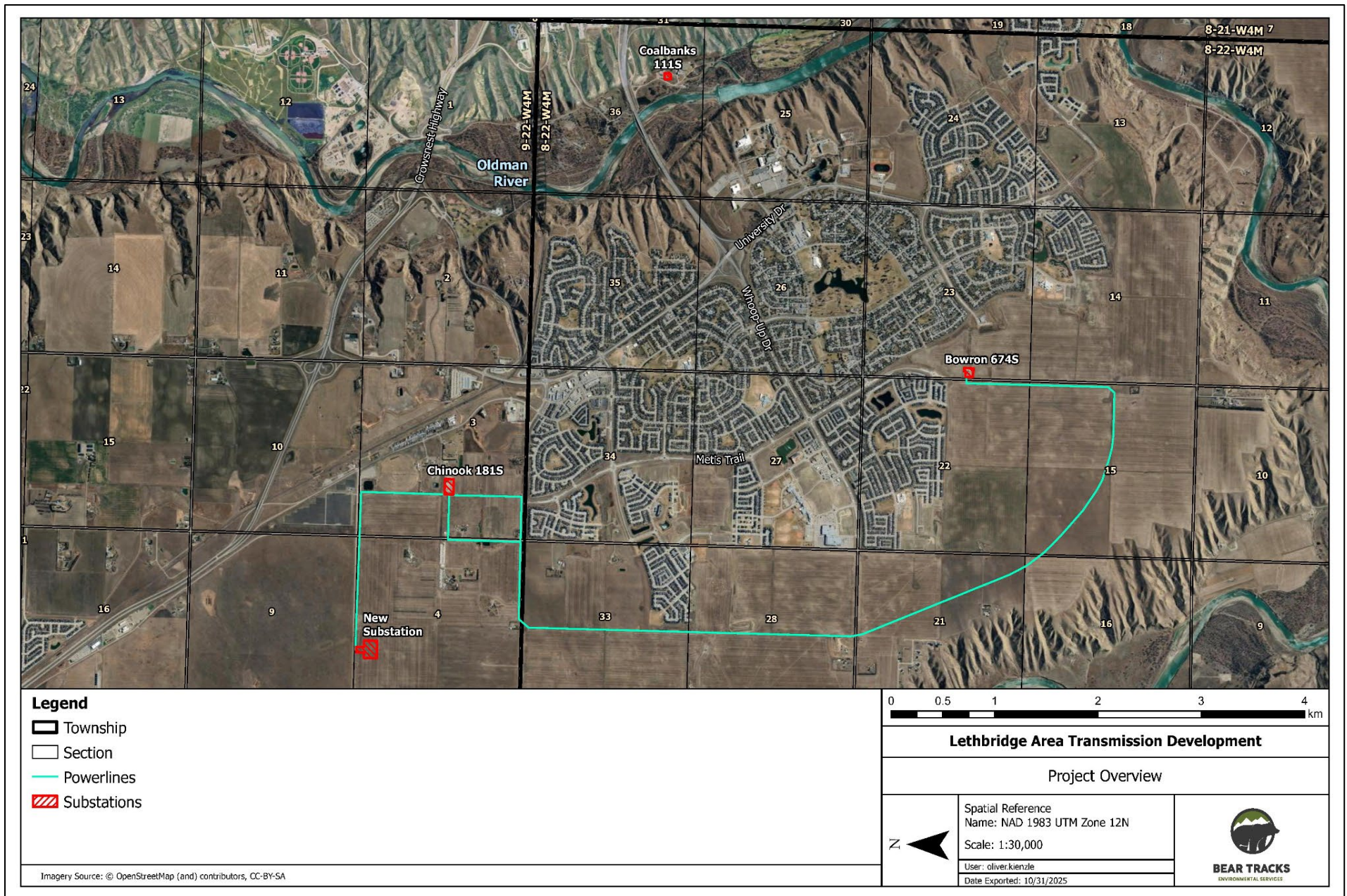


Figure 1. Locations of transmission development associated with the six options within the Project area.

3 Methods

3.1 Biophysical Desktop Review

Multiple resources were reviewed to determine the biophysical characteristics and potential environmental sensitivities or constraints associated with the proposed Project sites. Each resource used to research the study areas is summarized in Table 1.

Table 1. Resources reviewed for the desktop assessment and description/information provided by each.

Resource	Description and Information Provided
Soil and Landforms	
Alberta Soil Information Viewer (AEP 2025a)	The Alberta Soil Information Viewer is an online tool that allows users to search soil information from the Agricultural Region of Alberta Soil Inventory Database (AGRASID). Information provided includes soil and landform type. This viewer was used to determine the soil and landform type within the Project study area.
Land Cover	
Grassland Vegetation Inventory (AEP 2019)	The Grassland Vegetation Inventory (GVI) is a comprehensive geospatial dataset (geodatabase) that delineates biophysical, anthropogenic, and land inventory in southern Alberta's White Area. With the use of ArcGIS, the GVI was mapped for the Project study area to determine the main land cover types that may be impacted by the Project.
Satellite Imagery (Copernicus Sentinel-2 2025)	Satellite imagery from Copernicus Sentinel-2 was used to assess recent land cover and disturbance. Landcover was mapped based on the most recent imagery.
Rare Plants	
Alberta Conservation Information Management System (Alberta Parks 2025)	The Alberta Conservation Information Management System (ACIMS) database was searched for natural ecological communities and sites, specifically rare plant occurrences. Search area included the township (13-18 W4M) that the Project study area is located within.
Global Biodiversity Information Facility (GBIF.org 2025)	Research-grade iNaturalist data was accessed via GBIF.org for historical plant species observations, within 300 m of the Project footprints. Data summarized focused on provincially or federally protected and tracked/watched species.
Wildlife	
Alberta Wild Species General Status Listing (GOA 2022)	The Alberta Wild Species General Status Listing is a compilation of the status of wildlife in Alberta. This status is the province's general status evaluation system. The general status for historically and potentially occurring species with the Project study area was reviewed.

Resource	Description and Information Provided
Committee on the Status of Endangered Wildlife in Canada (GOC 2025a)	The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) is an advisory panel for the Minister of Environment and Climate Change Canada that assess the status of wildlife species at the risk of extinction. The COSEWIC statuses of historically and potentially occurring species within the Project study area was reviewed.
Fish and Wildlife Information System (AEP 2025b)	The Fish and Wildlife Internet Mapping Tool (FWIMT) was used to identify wildlife species of management concern that have been previously observed within a 2-kilometer radius from the Project study area (AEP 2021b) and to identify the ranges of sensitive wildlife species that may overlap with the Project area. The ranges provided in FWIMT specifically include the provincial distribution of several species considered to have special status in Alberta (GOA 2022), as well as species listed under the Alberta <i>Wildlife Act</i> , and the federal <i>Species at Risk Act (SARA)</i> . A more detailed search of data from the Fish and Wildlife Management Information System (FWMIS) was also conducted to identify specific locations of wildlife and wildlife features observed historically within 1 km of the Project study area (AEP 2021c), which is the maximum setback for wildlife features in this area as per the Master Schedule of Standards and Conditions (MSSC) (GOA 2024).
Global Biodiversity Information Facility (GBIF.org 2025)	Research-grade iNaturalist data was accessed via GBIF.org for historical wildlife species observations, within 1,000 m of the Project footprints. Data summarized focused on provincially or federally protected and tracked/watched species.
Master Schedule of Standards and Conditions (GOA 2024)	The MSSC identifies conditions that apply to formal dispositions applications approved under the <i>Public Lands Act</i> , the <i>Mines and Minerals Act</i> , and Geophysical Regulations. The MSSC was reviewed to determine applicable conditions for the Project in order to mitigate potential environmental impacts.
Sensitive Species Inventory Guidelines (GOA 2013)	The Sensitive Species Inventory Guidelines (SSIG) is a compilation of inventory guidelines for a number of wildlife species in Alberta, with focus on pre-development surveys. This document was reviewed to determine the future survey effort for the Project to verify findings of the desktop assessment.
Species at Risk Public Registry (GOC 2025b)	The Species at Risk (SAR) Public Registry provides all documents relating to the species listed under the <i>Species at Risk Act (SARA)</i> . The SAR registry was reviewed to determine the statuses of the historically and potentially occurring species within the Project study area.
Bear Tracks Internal Database	Observations from previous environmental work recorded by Bear Tracks staff.
Environmental Managed Areas	

Resource	Description and Information Provided
Environmentally Significant Areas (Alberta Parks 2014)	The geospatial data (shapefile) for the Environmentally Significant Areas (ESA) was reviewed using ArcGIS to determine the ESA scores for the quarter sections within the Project study area. The ESA indicates areas that are important for biological diversity, soil and water or that may have rare or unique elements that may require special management. Environmentally Significant Areas are evaluated relative to four broad criteria (for each quarter section); these include (1) focal species, species groups, or their habitats; (2) rare, unique, or focal habitat; (3) ecological integrity; and (4) contribution to water quality and quantity. These criteria have multiple sub-criteria (Fiera 2014). In order to be deemed as an ESA, a quarter section must receive a summed score of greater than 0.189.
Historical Values	
Alberta Historic Resources and Management Branch (Government of Alberta 2024a)	A search for listings of historical resources was conducted through the Alberta Historic Resources and Management Branch. The Historical Resource Value (HRV) scores generated from the mapping tool to assess whether permitting and clearance is required for historical resources. HRV's were based on definition as per Alberta's Listing of Historical Resources: Instructions for Use (GOA 2023).

3.2 Geospatial Review

In order to identify potential habitat impacted by the Project, broad land cover within 300 m of each option footprint was digitized with the use of current and historic satellite imagery and ArcGIS Pro (version 3.4.2, ESRI Inc 2024). Land cover categories used in the classification included cultivation, native grassland, tame pasture, wetlands and waterbodies, trees/shrubs, industrial, roads, dugouts/anthropogenic water features, and recreational anthropogenic features (Table 2). The GVI dataset (AEP 2019) and Copernicus Sentinel-2 (2025) satellite imagery were used as a guide to assist in land cover classification. Minimum polygon size classified was 0.02 hectares (ha) and total area for each land cover type was calculated to hectares. Other provincial geospatial data was mapped in ArcGIS for the Project study area such as ESA scores (Alberta Parks 2014), parks and protected areas (AEP 2025c), and FWMIS observations (AEP 2025b).

Table 2. Land cover types used for classification within the Project study area.

Land Cover Type	Description
Native Grassland	Grassland in a natural state composed of native grasses, forbs and other herbaceous plants typically used for grazing livestock, or in protected preserved areas.

Land Cover Type	Description
Tame Pasture	Land previously broken, seeded to agronomic species used for livestock grazing or forage production (e.g., alfalfa, brome, etc.).
Cultivation	Cropland cultivated annually for agriculture.
Trees/Shrubs	Natural deciduous/coniferous stands, willows, and shelterbelts.
Old Man River	Wetted area of the Old Man River, side channels or oxbows.
Industrial	Includes any development for industrial use or services.
Road	All mapped roads and trails.
Other - Anthropogenic Features	Recreational areas such as bike tracks, walking paths, or other anthropogenic features that don't fit into other categories.
Residential	Areas that are zoned as residential where homes, apartments, and multi-family units occur.
Wetlands	Includes ephemeral waterbodies, temporary, seasonal, semi-permanent, and permanent wetlands.
Dugouts/Anthropogenic Water Features	Man-made water features such as dugouts and water holding ponds/storage.

3.3 Regulations

Based on the desktop assessment, the Project will be subject to provincial and federal environmental legislation. Guidelines, protocols, and conditions with respect to these legislations will need to be considered during Project planning and construction (Table 3).

Table 3. Regulations applicable to the Project.

Regulations	Description
Provincial	
<i>Historical Resources Act</i> (GOA 200)	Protect important historical resources by regulating land disturbance and designating areas as historic sites.
<i>Public Lands Act</i> (Province of Alberta 2000a)	Manages public land in Alberta, including waterbodies and watercourses.
<i>Water Act</i> (Province of Alberta 2000b)	Manages and protects rivers, streams, lakes, and wetlands. The act regulates activities conducted in and around surface water and groundwater.
<i>Wildlife Act</i> (Province of Alberta 1997)	Prohibits the disturbance or destruction of a house, nest, or den of wildlife listed under the act.

Regulations	Description
Federal	
<i>Migratory Birds Convention Act</i> (GOC 1994)	Protects migratory birds, eggs and nests for species listed under the act.
<i>Species at Risk Act</i> (GOC 2002)	Protects endangered and threatened species under the act as well as their critical habitat.

3.4 Option Comparison and Analysis

A constraint analysis was used to assist in comparing the characteristics of the six proposed routes, based on quantitative (descriptive statistics) and qualitative (presence of environmental risk factors) results of each option. Constraints from the desktop review fell within each Option that was used for analysis.

Quantitative descriptive statistics were used in the comparison, and each numerical statistic was determined if above or below the overall mean. Values above the mean were considered to be a constraint. These included:

- Area of land (ha) of the proposed option footprint and surrounding 300 m buffer.
- Area of wetlands (ha) of the option footprint and surrounding 100 m buffer.

Qualitative results were also used in the comparison based on whether option outcomes presented potentially higher environmental risk. Each of the factors were framed for a binary outcome: ‘Yes’, indicating presence of the increased potential environmental impact, or ‘No’, indicating no data to support an increased environmental impact. ‘Yes’ results were considered to be a constraint. Qualitative characteristics used in the comparison included:

- Native prairie grassland directly impacted by option footprint.
- Historical rare plants identified within 300 m of the option footprint.
- Historical sensitive wildlife habitat features within 1,000 m of the footprint.
- Soil compaction risk of direct option footprint.
- If the option footprint encompasses an ESA.
- If the footprint encompasses parks or protected areas.
- If the option footprint has historical resource value that triggers additional assessments or applications.

For ease of analysis, we assumed that all quantitative and qualitative results in the table carried equal weight, and constraints for each option were compared to one another. Options with the higher number of constraints were viewed as less desirable options for route selection or were deemed options that may require more extensive field programs if that option was selected.

4 Results

4.1 Option 2a: New 240 kV Substation and line to Bowron

4.1.1 *Land Cover and Option Footprint*

Option 2a includes a new disturbance footprint, due to installation of a new line, which will run from a new substation (outside of this scope) along the west Lethbridge city limits to connect to the existing substation to the south (Bowron 674S). No new disturbance will be required for upgrades at Bowron 674S, as these will occur within the existing footprint.

The Option 2a footprint and surrounding 300 m buffer (area classified) is dominated by cultivation (68.2%), accounting for 573.17 ha of the area classified (Table 4, Figure 2). The second greatest area of land cover is tame pasture, which covers approximately 10.6% of the classified area (88.96 ha), followed by industrial land at 5.8% (48.32 ha). Native grassland, which accounts for 4.0% of the classified area (33.43 ha) primarily occurs directly north of the new proposed substation and new line footprint. This is closely followed by wetlands, which cover approximately 3.9% of total area classified. The remaining classified area is roads (3.7%), residential (3.4%), anthropogenic water features (<1%), and trees (<1%).

Table 4. Calculated landcover within 300 m of the Option 2a footprint.

Land Cover Type	Option Footprint*	
	Area (ha)	Percent of Total Area (%)
Cultivation	573.17	68.2
Tame Pasture	88.96	10.6
Industrial	48.32	5.8
Native Grassland	33.43	4.0
Wetland	32.80	3.9
Road	31.06	3.7
Residential	28.17	3.4
Anthropogenic Water Features	2.35	<1
Trees	2.01	<1
Total	840.29	100.00

*Direct option footprint and 300 m area impact buffer.

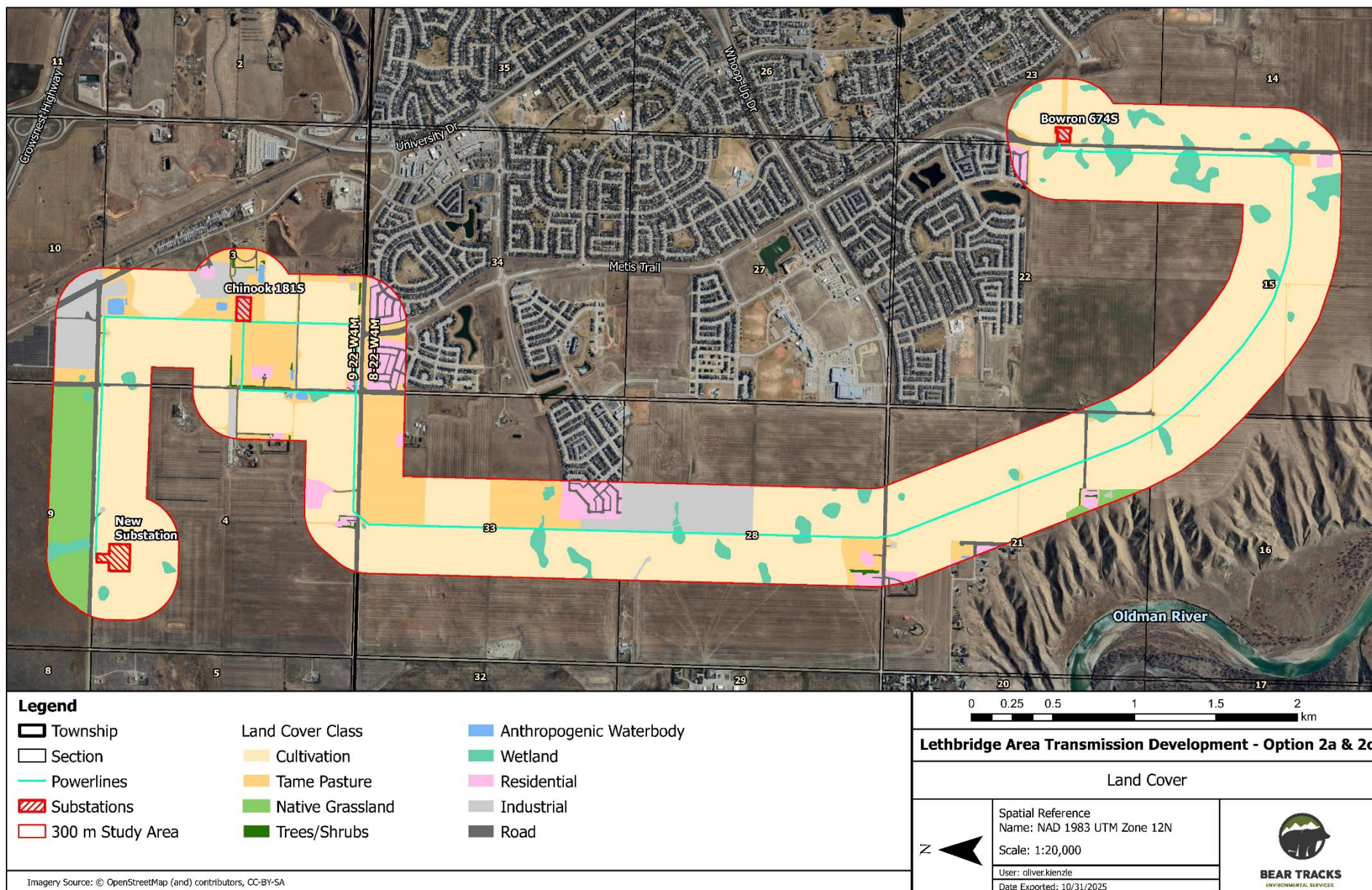


Figure 2. Landcover within 300 m of the Option 2a footprint.

4.1.2 *Soils and Landforms*

Soils and landscape information identified in the Alberta Soil Information Viewer database for the lands included in the Option 2a footprint is listed in **Error! Reference source not found.** (AEP 2025a). The results of the soil information indicate that the polygons which the option footprint intercepts have high clay content, which increase their potential to compaction. Additionally, the Project has a large area that is new disturbance, so risk of compaction is greater in new disturbance footprints (new proposed line).

Table 5. Soil polygon information for the Option 2a footprint.

Unit Name	LEWN5/U1h	
Landform	U1h - undulating - high relief	
LSRS Rating (Spring Grains)	3M (10)	
	3: Moderate limitations	
	M: Water holding capacity/texture	
	(10): Proportion of Area (100%)	
Landscape Description	Orthic Dark Brown Chernozem on medium textured (L, SiL) sediments deposited by wind and water (LET). Orthic Dark Brown Chernozem on medium textured (L, SiCL, CL) materials over medium (L, CL) or fine (C) textured till (WNY). The polygon includes soils that are finer textured than the dominant or co-dominant soils (5). Undulating, high relief landform with a limiting slope of 4% (U1h).	
Unit Name	RDM8/H11	
Landform	H11 - hummocky - low relief	
LSRS Rating (Spring Grains)	3MT(8) - 5W(2)	
	3: Moderate limitations M: Water holding capacity T: Slope and risk to water erosion	5: Very severe limitations W: Soil drainage
	(8): Proportion of Area (80%)	(2): Proportion of Area (20%)
Landscape Description	Orthic Dark Brown Chernozem on medium textured (L, CL) till (RDM). The polygon includes poorly drained soils and soils with Rego profiles (8). Hummocky, low relief landform with a limiting slope of 6% (H11).	
Unit Name	RDM4/H11	
Landform	H11 - hummocky - low relief	
LSRS Rating (Spring Grains)	3MT(10)	
	3: Moderate limitations M: Water holding capacity	

	T: Slope and risk to water erosion
	(10): Proportion of Area (100%)
Landscape Description	Orthic Dark Brown Chernozem on medium textured (L, CL) till (RDM). The polygon includes soils with Rego profiles (4). Hummocky, low relief landform with a limiting slope of 6% (H11).

4.1.3 Rare Plants

The review of the ACIMS database revealed two sensitive element occurrences of vascular plants, both of soapweed (*Yucca glauca*), previously documented within the township which intersects the Option 2a footprint. The Project does not fall within any rare plant ranges as identified through FWIMT. Results of the ACIMS search are provided in Appendix B – Background Information Review Search Results.

The results of the GBIF data search of research-grade iNaturalist observations indicated no rare plants identified within 300 m of the Option 2a footprint. The closest potentially suitable habitat for soapweed, occurs approximately 330 m southwest of the line, within coulee habitat (Figure 2).

4.1.4 Wildlife

Based on the FWIMT search results, the Project study area is located within the ranges of seven sensitive wildlife species or groups (Appendix A – Background Information Review Search Results). The sensitive species ranges that overlap the Project study area include: ferruginous hawk (*Buteo regalis*), golden eagle (*Aquila chrysaetos*), prairie falcon (*Falco mexicanus*), sharp-tailed grouse (*Tympanuchus phasianellus*), sensitive snake habitat and hibernacula ranges, and sensitive amphibian range. The FWIMT search also indicated three wildlife species of conservation concern that have been historically observed within one kilometer of the Project study area boundary. This included two birds and one reptile species. Of these, one species is listed as ‘Threatened’ and one is listed as ‘Special Concern’ under federal or provincial legislation (e.g., *SARA*, *Wildlife Act*). Sensitive species historically observed in proximity to the Project are summarized in Table 6 which includes the provincial and federal status associated with each species.

The query of the FWMIS database resulted in four historic wildlife species observed within 1,000 m of the Project study area boundary, one of which was not in the FWIMT search list (long-billed curlew [*Numenius americanus*]). The GBIF database search of iNaturalist research-grade observations had eight species historically observed within 1,000 m, six of which were not in the other databases. These included American white pelican (*Pelecanus erythrorhynchos*), American kestrel (*Falco sparverius*), wandering garter-snake

(*Thamnophis elegans*), bullsnake (*Pituophis catenifer*), American badger (*Taxidea taxus taxus*), and plains spadefoot (*Spea bombifrons*). Additionally, previous data from Bear Tracks has indicated two historically active osprey nests within 1,000 m of Options 2a, 2e and 2c. One is approximately 850 m northeast of the proposed transmission line (12U 362320E 5502802N) and is not of concern to the Project. However, the other nest (12U 363580E 5502556N) is directly adjacent the existing Bowron substation, approximately 20 m to the east. This nest was confirmed active during the 2025 nesting season. Ospreys are provincially listed as ‘Secure’ in Alberta (GOA 2022). However, active nests of the species have an recommended activity setback of 750 m from high disturbance (Table 6, Figure 3) (GOA 2024).

Table 6. Species of conservation concern historically observed in proximity (1 km) of the Option 2a footprint.

Common Name	Latin Name	Species Status				Data Source
		AB General Status ¹	WA ²	COSEWIC ³	SARA ⁴	
Amphibians						
Plains Spadefoot	<i>Spea bombifrons</i>	May Be at Risk	-	Not at Risk	-	GBIF
Birds						
American Kestrel	<i>Falco sparverius</i>	Sensitive	-		-	GBIF
American White Pelican	<i>Pelecanus erythrorhynchos</i>	Sensitive	-	Not at Risk	-	GBIF
Barn Swallow	<i>Hirundo rustica</i>	May Be at Risk	-	Special Concern	Threatened	FWIMT; FWIMIS; GBIF
Long-billed Curlew	<i>Numenius americanus</i>	May Be at Risk	-	Threatened	Special Concern	FWIMIS; GBIF
Sora	<i>Porzana carolina</i>	Sensitive	-	-	-	FWIMT; FWIMIS
Mammals						
American Badger (taxus subspecies)	<i>Taxidea taxus taxus</i>	Sensitive	-	Special Concern	Special Concern	GBIF
Reptiles						
Bullsnake	<i>Pituophis catenifer</i>	Sensitive	-		Special Concern	GBIF
Prairie Rattlesnake	<i>Crotalus viridis</i>	Sensitive	-	Special Concern	Special Concern	FWIMT; FWIMIS; GBIF

Common Name	Latin Name	Species Status				Data Source
		AB General Status ¹	WA ²	COSEWIC ³	SARA ⁴	
Wandering Garter Snake	<i>Thamnophis elegans</i>	Sensitive	-	-	-	GBIF

1 – (Government of Alberta 2022)

2 – (Province of Alberta 1997)

3 – (Government of Canada 2025)

4 – (Government of Canada 2002)

4.1.5 Environmental Management Areas

Environmentally Significant Areas (ESA)

No quarter sections had an ESA higher than 0.189 within the Option 2a Project footprint. Quarter sections which the footprint intercepts have an ESA value range of 0.025 to 0.1555 (Figure 4).

Protected Areas

There are two municipal parks near Option 2a (Pacific Park and Country Meadows Entrance Park), though the direct footprint does not overlap these. No provincial or federal parks, protected areas (e.g., ecological reserves, natural areas, wilderness areas), or wildlife sanctuaries are within the option footprint or surrounding area.

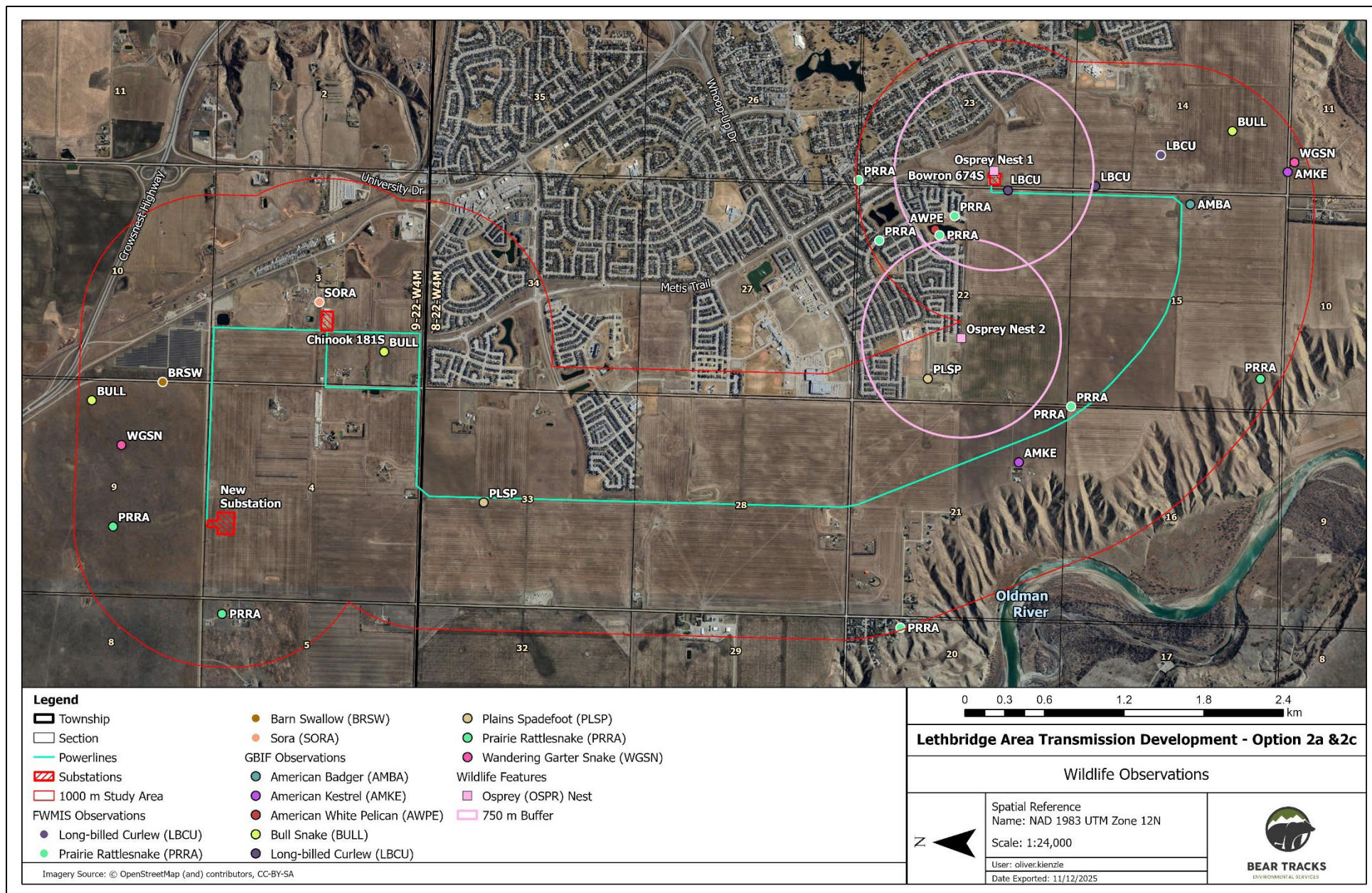


Figure 3. Historically observed wildlife species of management concern within 1,000 m of Option 2a footprint.

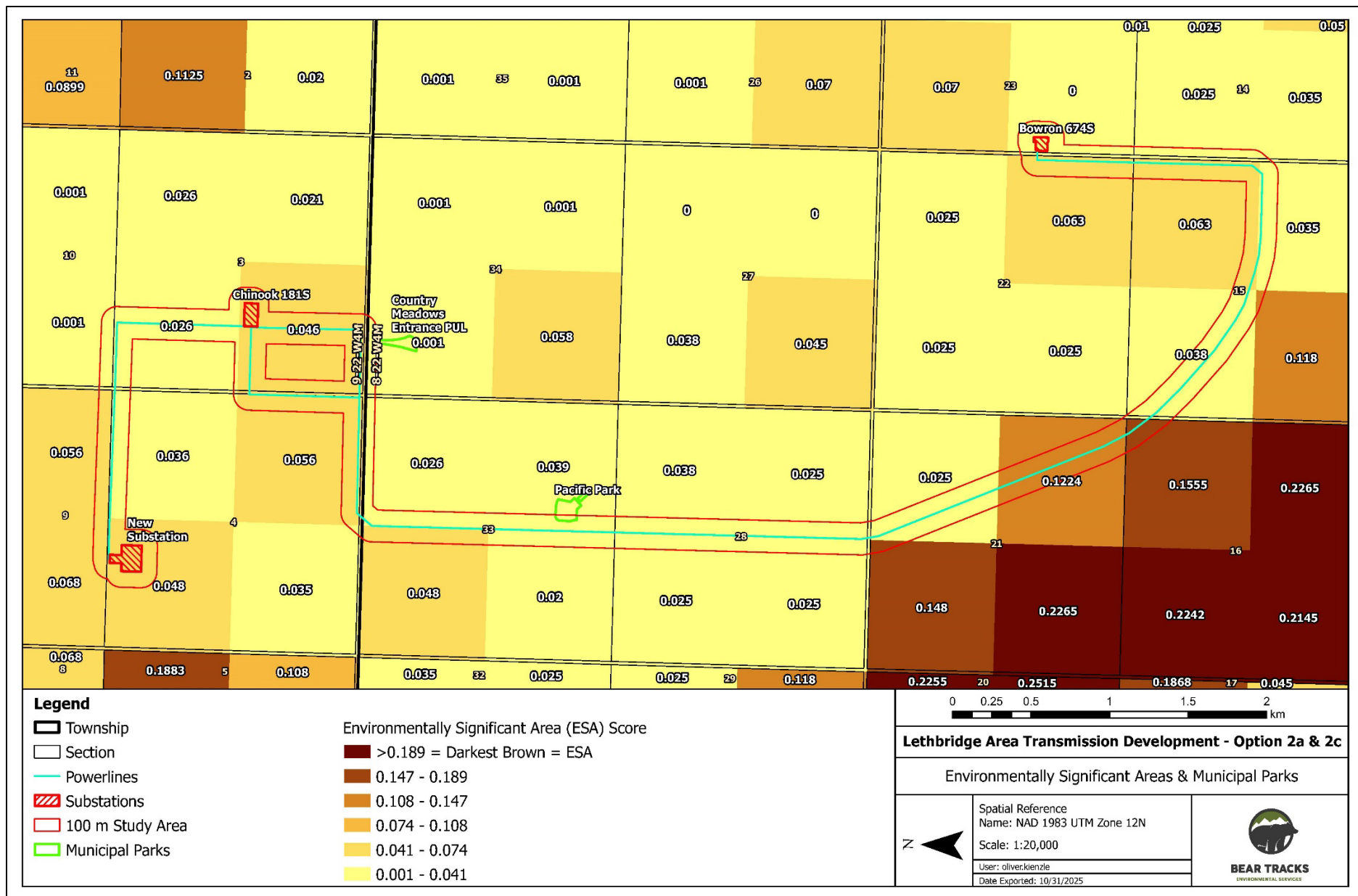


Figure 4. Environmentally Significant Areas (ESA) and protected areas within the Option 2a footprint

4.1.6 Wetlands and Waterbodies

There are several wetlands within 100 m of the proposed transmission line and associated infrastructure. Twenty-six wetlands were visible from aerial imagery and delineated during the desktop classification, covering 23.5 ha of the study area. The majority of these wetlands are surrounded by cultivation and crops are planted through them (Figure 5). The permanence of these wetlands appears to include ephemeral water bodies (labelled as Class 1) and temporary marsh wetlands (labelled as Class 2), but a formal field assessment following the Alberta Wetland Classification System (ESRD 2015) would be required to verify the permanence of these wetlands. Additionally, several dugouts or anthropogenic water features (stormwater ponds, etc.) were identified within 100 m.

4.1.7 Cultural and Historical Resources

While the majority of Option 2a does not intersect land with any HRV, portions of the new substation and new line do intercept three sections (21 and 15-008-22 W4M and 04-009-22 W4M) of land with HRV scores of 5 (high potential for historical resources to be present), including new disturbance associated with the proposed substation and line connected to the existing Bowron. Because the option requires new disturbance within an area of historical resource value, *Historical Resources Act* approval will be required for this option by submitting a Historical Resources Application. For more information, refer to Appendix A: Historical Resource Search Reports.

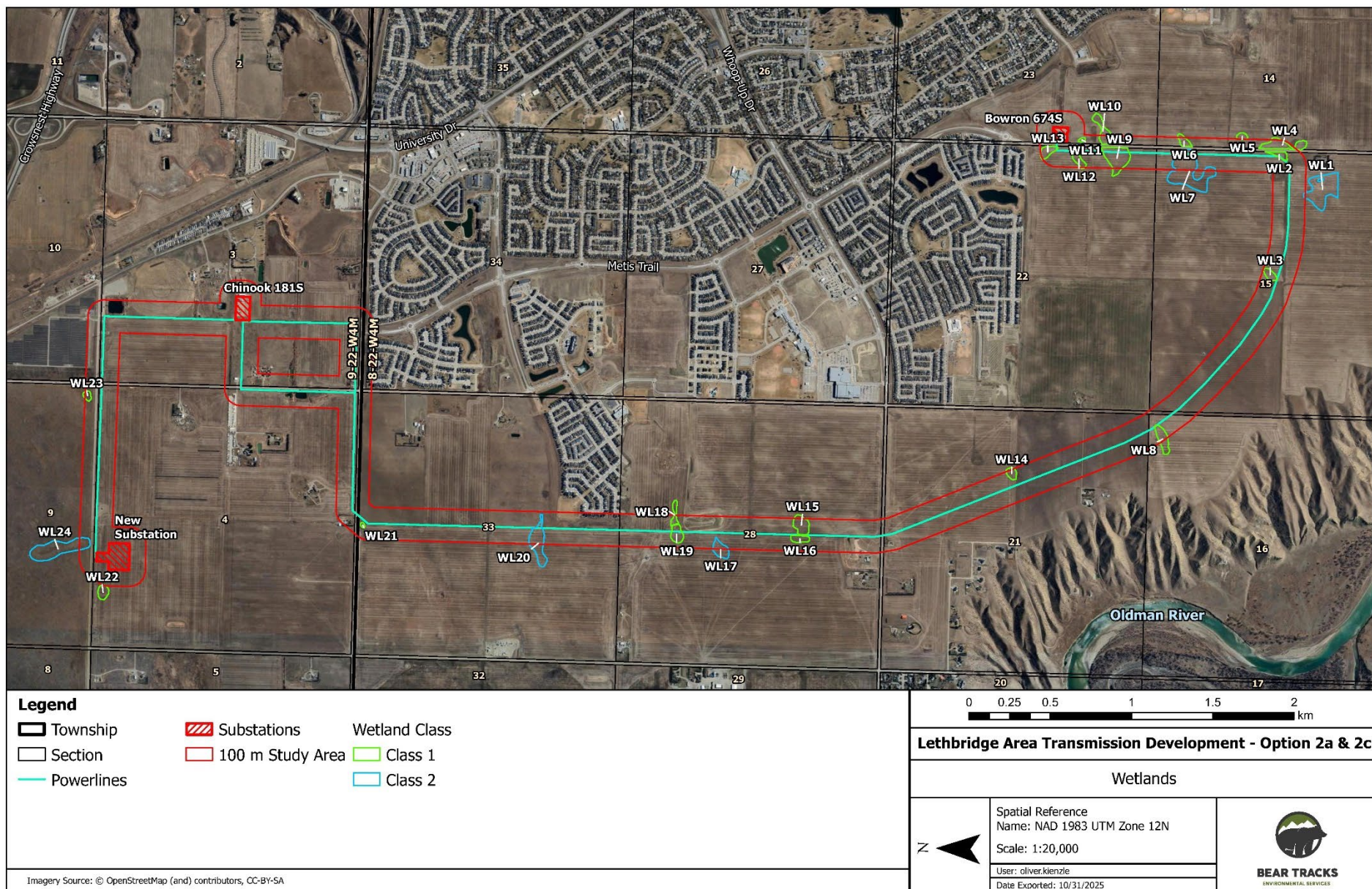


Figure 5. Wetlands and waterbodies within 100 m of the Option 2a footprint.

4.2 Option 2c: New 240 kV Substation and line to Chinook

4.2.1 Land Cover and Option Footprint

The footprint for Option 2c is located along the west edge of the City of Lethbridge boundary. Upgrades are proposed within existing infrastructure (Chinook and Bowron substations), as well as a new disturbance footprint, including one substation, and new or updated lines connecting all three substations. Based on the information provided prior to analysis, the footprint of 2c is assumed to be the same as the footprint of 2a, and thus results will be very similar for both options. The Option 2c footprint and surrounding 300 m buffer will be the same as Option 2a. Refer to section 4.1 Option 2a: New 240 kV Substation and line to Bowron for more information.

4.2.2 Soils and Landforms

Soils and landscape information for Option 2c will reflect the same results as Option 2a, as the footprint is assumed to be the same (Table 5).

4.2.3 Rare Plants

The review of the ACIMS and GBIF database results will reflect the same results as Option 2a.

4.2.4 Wildlife

The FWIMT search results, FWIMIS database results, and GBIF historical observations will all reflect the same results as Option 2a (Table 6, Figure 3).

4.2.5 Environmental Management Areas

The ESA and Protected Areas results of Option 2c will reflect the same results as Option 2a: No quarter sections had an ESA higher than 0.189 within the Option 2c Project footprint (Figure 4). Additionally, the same two municipal parks were observed as in Option 2a (Pacific Park and Country Meadows Entrance Park).

4.2.6 Waterbodies and Waterbodies

The review of wetlands within 100 m of Option 2c will be the same results as the Option 2a wetlands (Figure 5).

4.2.7 Cultural and Historical Resources

The results of the historical resources search will be the same for Option 2c as Option 2a. Because the option requires new disturbance within an area of historical resource value,

Historical Resources Act approval will be required for the Option by submitting a Historical Resources Application. For more information, refer to Appendix A: Historical Resource Search Reports.

4.3 Option 2e: Expand Chinook and New Line to Bowron

4.3.1 Land Cover and Option Footprint

The footprint for Option 2e is located along the west edge of the City of Lethbridge boundary. Footprint expansion is planned at Chinook 181S and a new line connecting this substation to Bowron 674S, using the same proposed footprint as Options 2a and 2c. However, the Option 2e does not include the new proposed transmission line connecting the new proposed substation, and therefore the footprint analyzed is slightly different.

The Option 2e footprint and surrounding 300 m buffer (classified area) is dominated by cultivation (70.7%), accounting for 488.17 ha of the area classified (Table 7, Figure 6). The second greatest area of land cover is tame pasture, which covers approximately 12.0% of the classified area (82.75 ha), followed by industrial land at 4.9% (34.00 ha). This is closely followed by wetlands, which account for 4.2% of the classified area (28.98 ha), residential (4.1%), and roads (3.3%). Native grassland, treed areas, and dugouts/anthropogenic water features make up the remaining one percent. The small area of native grassland occurs near the west end of the line in SE 21-008-22 W4M, beyond the direct footprint near a residential yard.

Table 7. Calculated landcover within 300 m of the Option 2e footprint.

Land Cover Type	Option Footprint*	
	Area (ha)	Percent of Total Area (%)
Cultivation	488.17	70.7
Tame Pasture	82.75	12.0
Industrial	34.00	4.9
Wetland	28.98	4.2
Residential	28.16	4.1
Road	23.01	3.3
Native Grassland	2.12	<1
Trees	2.00	<1
Open Water	1.37	<1
Total	690.54	100.00

*Direct option footprint and 300 m area impact buffer.

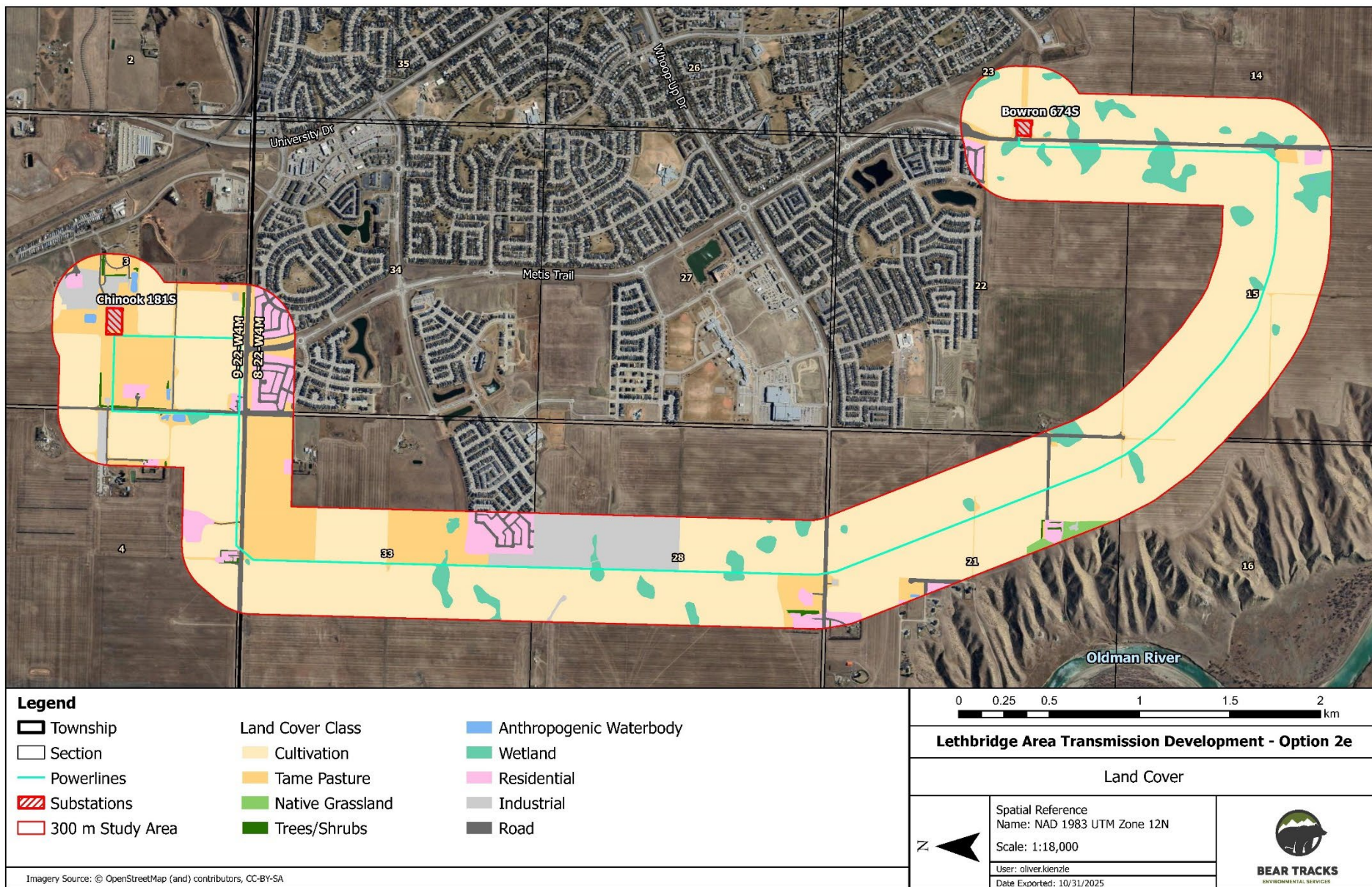


Figure 6. Landcover within 300 m of the Option 2e footprint.

4.3.2 *Soils and Landforms*

Soils and landscape information identified in the Alberta Soil Information Viewer database for the lands included in the Option 2e footprint is listed in Table 8 (AEP 2025a). The results of the soil information indicate that the polygons which the option footprint intercepts have high clay content, which increase their potential to compaction. Additionally, the Project has a large area that is new disturbance, so risk of compaction is greater in new disturbance footprints (new proposed lines).

Table 8. Soil polygon information for the Option 2e footprint.

Unit Name	LEWN5/U1h	
Landform	U1h - undulating - high relief	
LSRS Rating (Spring Grains)	3M (10)	
	3: Moderate limitations	
	M: Water holding capacity/texture	
	(10): Proportion of Area (100%)	
Landscape Description	Orthic Dark Brown Chernozem on medium textured (L, SiL) sediments deposited by wind and water (LET). Orthic Dark Brown Chernozem on medium textured (L, SiCL, CL) materials over medium (L, CL) or fine (C) textured till (WNY). The polygon includes soils that are finer textured than the dominant or co-dominant soils (5). Undulating, high relief landform with a limiting slope of 4% (U1h).	
Unit Name	RDM8/H11	
Landform	H11 - hummocky - low relief	
LSRS Rating (Spring Grains)	3MT(8) - 5W(2)	
	3: Moderate limitations M: Water holding capacity T: Slope and risk to water erosion	5: Very severe limitations W: Soil drainage
	(8): Proportion of Area (80%)	(2): Proportion of Area (20%)
Landscape Description	Orthic Dark Brown Chernozem on medium textured (L, CL) till (RDM). The polygon includes poorly drained soils and soils with Rego profiles (8). Hummocky, low relief landform with a limiting slope of 6% (H11).	
Unit Name	RDM4/H11	
Landform	H11 - hummocky - low relief	
LSRS Rating (Spring Grains)	3MT(10)	
	3: Moderate limitations M: Water holding capacity T: Slope and risk to water erosion	
	(10): Proportion of Area (100%)	

Landscape Description	Orthic Dark Brown Chernozem on medium textured (L, CL) till (RDM). The polygon includes soils with Rego profiles (4). Hummocky, low relief landform with a limiting slope of 6% (H11).
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4.3.3 Rare Plants

The review of the ACIMS database revealed two sensitive element occurrences of vascular plants, both of soapweed, previously documented within the township which intersects the Option 2e footprint. The Project does not fall within any rare plant ranges as identified through FWIMT. Results of the ACIMS search are provided in Appendix A – Background Information Review Search Results.

The results of the GBIF data search or research-grade iNaturalist observations indicated no rare plants identified within 300 m of the Option 2e footprint. The closest potentially suitable habitat for soapweed, occurs approximately 330 m southwest of the line, within coulee habitat (Figure 6).

4.3.4 Wildlife

Based on the FWIMT search results, the Project study area is located within the ranges of seven sensitive wildlife species or groups (Appendix B – Background Information Review Search Results). The sensitive species ranges that overlap the Project study area include: ferruginous hawk, golden eagle, prairie falcon, sharp-tailed grouse, sensitive snake habitat and hibernacula ranges, and sensitive amphibian range. The FWIMT search also indicated three wildlife species of concern that have been historically observed within one kilometer of the Project study area boundary. This included two birds and one reptile species. Of these, one species is listed as ‘Threatened’ and one is listed as ‘Special Concern’ under federal or provincial legislation (e.g., *SARA, Wildlife Act*). Sensitive species historically observed in proximity to the Project are summarized in Table 9 which includes the provincial and federal status associated with each species. Additionally, previous data from Bear Tracks has indicated two historically active osprey nests (and) within 1,000 m of the proposed Option. One is approximately 850 m northeast of the powerline (12U 362320E 5502802N) and is not of concern to the project. However, the other nest (12U 363580E 5502556N) is directly adjacent the existing Bowron substation, approximately 20 m to the east. The nest was confirmed active during the 2025 nesting season. Ospreys are provincially listed as ‘Secure’ in Alberta (GOA 2022). However, active nests of the species have a recommended activity setback of 750 m from high disturbance (Figure 7) (GOA 2021).

The query of the FWMIS database resulted in four historic wildlife species observed within 1,000 m of the Project study area boundary, one of which was not in the FWIMT search

list (long-billed curlew). The GBIF database search of iNaturalist research-grade observations had eight species historically observed within 1,000 m, six of which were not in the other databases. These included American-white pelican, American kestrel, wandering garter-snake, bullsnake, American kestrel, American badger, and plains spadefoot (Table 9, Figure 7).

Table 9. Species of concern historically observed in proximity (1 km) of the Option 2e footprint.

Common Name	Latin Name	Species Status				Data Source
		AB General Status ¹	WA ²	COSEWIC ³	SARA ⁴	
Amphibians						
Plains Spadefoot	<i>Spea bombifrons</i>	May Be at Risk	-	Not at Risk	-	GBIF
Birds						
American Kestrel	<i>Falco sparverius</i>	Sensitive	-		-	GBIF
American White Pelican	<i>Pelecanus erythrorhynchos</i>	Sensitive	-	Not at Risk	-	GBIF
Barn Swallow	<i>Hirundo rustica</i>	May Be at Risk	-	Special Concern	Threatened	FWIMT; FWIMIS; GBIF
Long-billed Curlew	<i>Numenius americanus</i>	May Be at Risk	-	Threatened	Special Concern	FWIMIS; GBIF
Sora	<i>Porzana carolina</i>	Sensitive	-	-	-	FWIMT; FWIMIS
Mammals						
American Badger (taxus subspecies)	<i>Taxidea taxus taxus</i>	Sensitive	-	Special Concern	Special Concern	GBIF
Reptiles						
Bullsnake	<i>Pituophis catenifer</i>	Sensitive	-		Special Concern	GBIF
Prairie Rattlesnake	<i>Crotalus viridis</i>	Sensitive	-	Special Concern	Special Concern	FWIMT; FWIMIS; GBIF
Wandering Garter Snake	<i>Thamnophis elegans</i>	Sensitive	-	-	-	GBIF

1 – (Government of Alberta 2022)

2 – (Province of Alberta 1997)

3 – (Government of Canada 2025)

4 – (Government of Canada 2002)

4.3.5 Environmental Management Areas

Environmentally Significant Areas (ESA)

No quarter sections had an ESA higher than 0.189 within the Option 2c Project footprint. Quarter sections which the footprint intercepts have an ESA value range of 0.025 to 0.1555 (Figure 8).

Protected Areas

There are two municipal parks near Option 2c (Pacific Park and Country Meadows Entrance Park), though the direct footprint does not overlap these. No provincial or federal parks, protected areas (e.g., ecological reserves, natural areas, wilderness areas), or wildlife sanctuaries are within the option footprint or surrounding area.

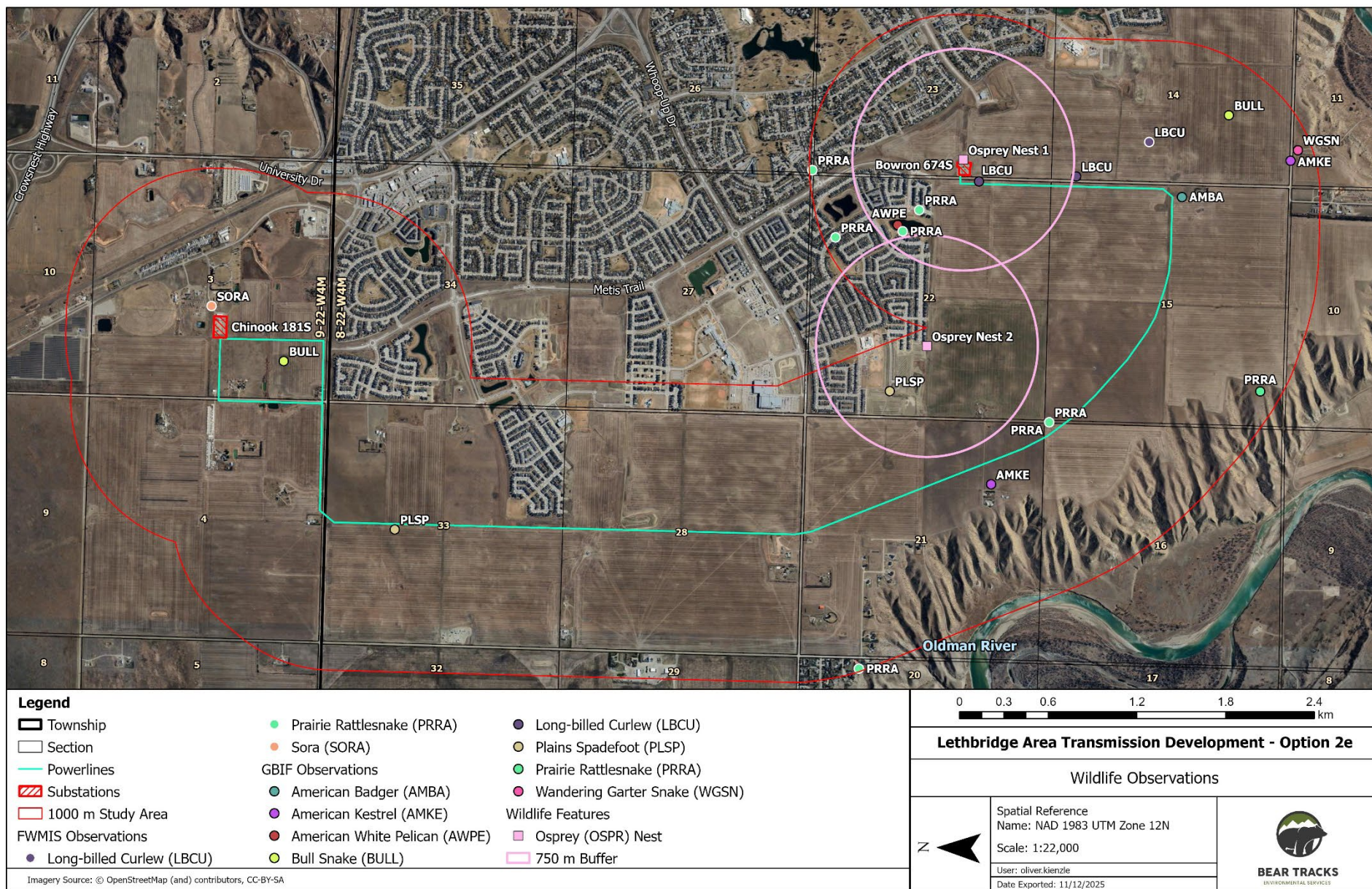


Figure 7. Historical observations of wildlife species of concern within 1,000 m of Option 2e footprint.

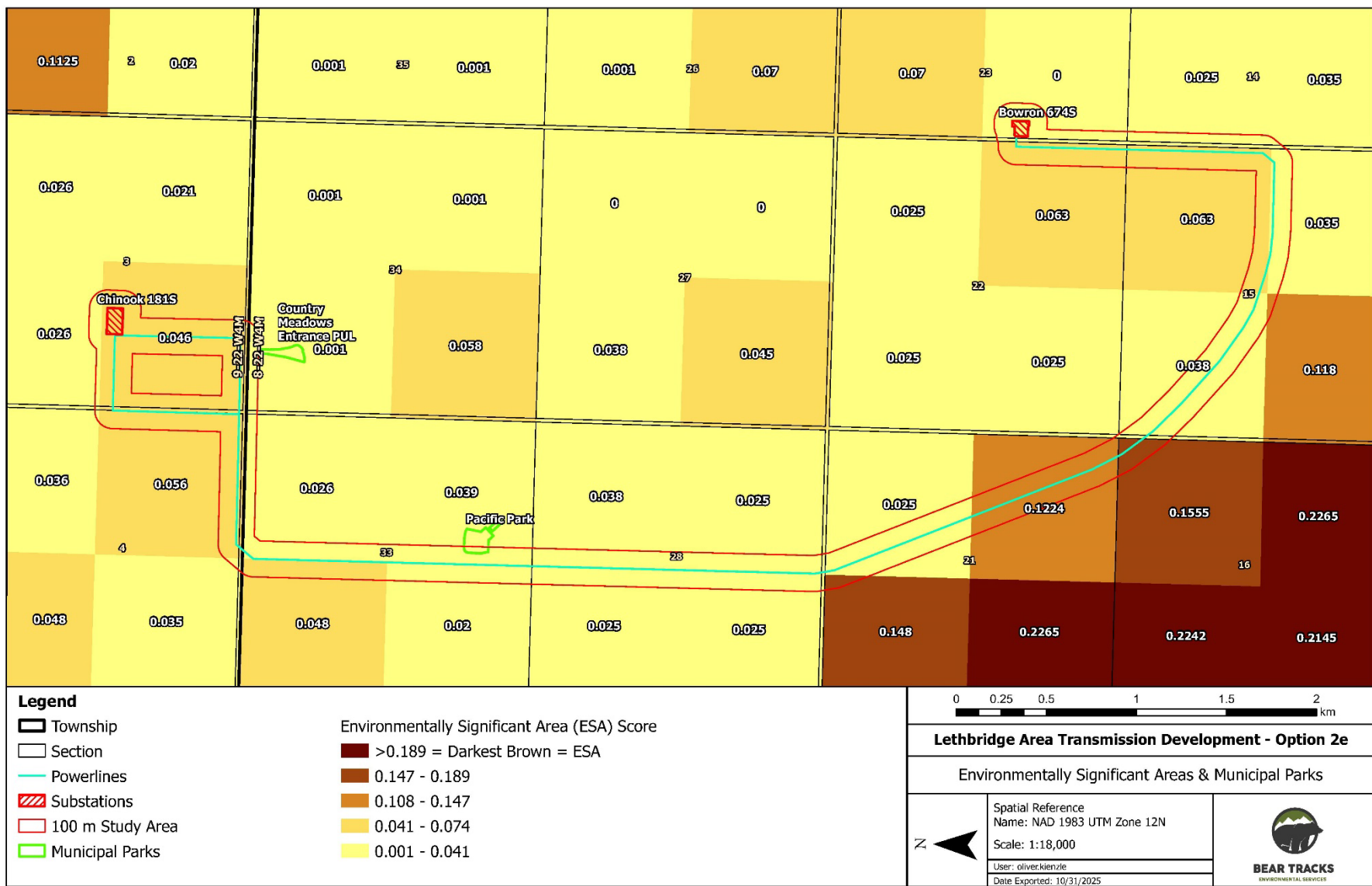


Figure 8. Environmentally Significant Areas (ESA's) protected areas within the Option 2e footprint.

4.3.6 Wetlands and Waterbodies

There are several wetlands within 100 m of the proposed transmission line and associated infrastructure. Twenty-three wetlands were visible from aerial imagery and delineated during the desktop land cover classification, covering 4.2% of the study area. The majority of these wetlands are surrounded by cultivation and crops are planted through them (Figure 9). The permanence of these wetlands appears to include ephemeral water bodies (labelled as Class 1) and temporary marsh wetlands (labelled as Class 2), but a formal field assessment following the Alberta Wetland Classification System (ESRD 2015) would be required to verify the permanence of these wetlands. Additionally, several dugouts or anthropogenic water features (stormwater ponds, etc.) were identified within 100 m.

4.3.7 Culture and Historical Resources

While the majority of Option 2e does not intersect land with any HRV, portions of the new substation and new line do intercept two sections of land (21 and 15-008-22 W4M) with HRV scores of 5 (high potential for historical resources to be present), including new disturbance associated with the proposed line connected to the existing Bowron. Because the option requires new disturbance within an area of historical resource value, Historical Resources Act approval will be required for the Option by submitting a Historical Resources Application. For more information, refer to Appendix A: Historical Resource Search Reports.

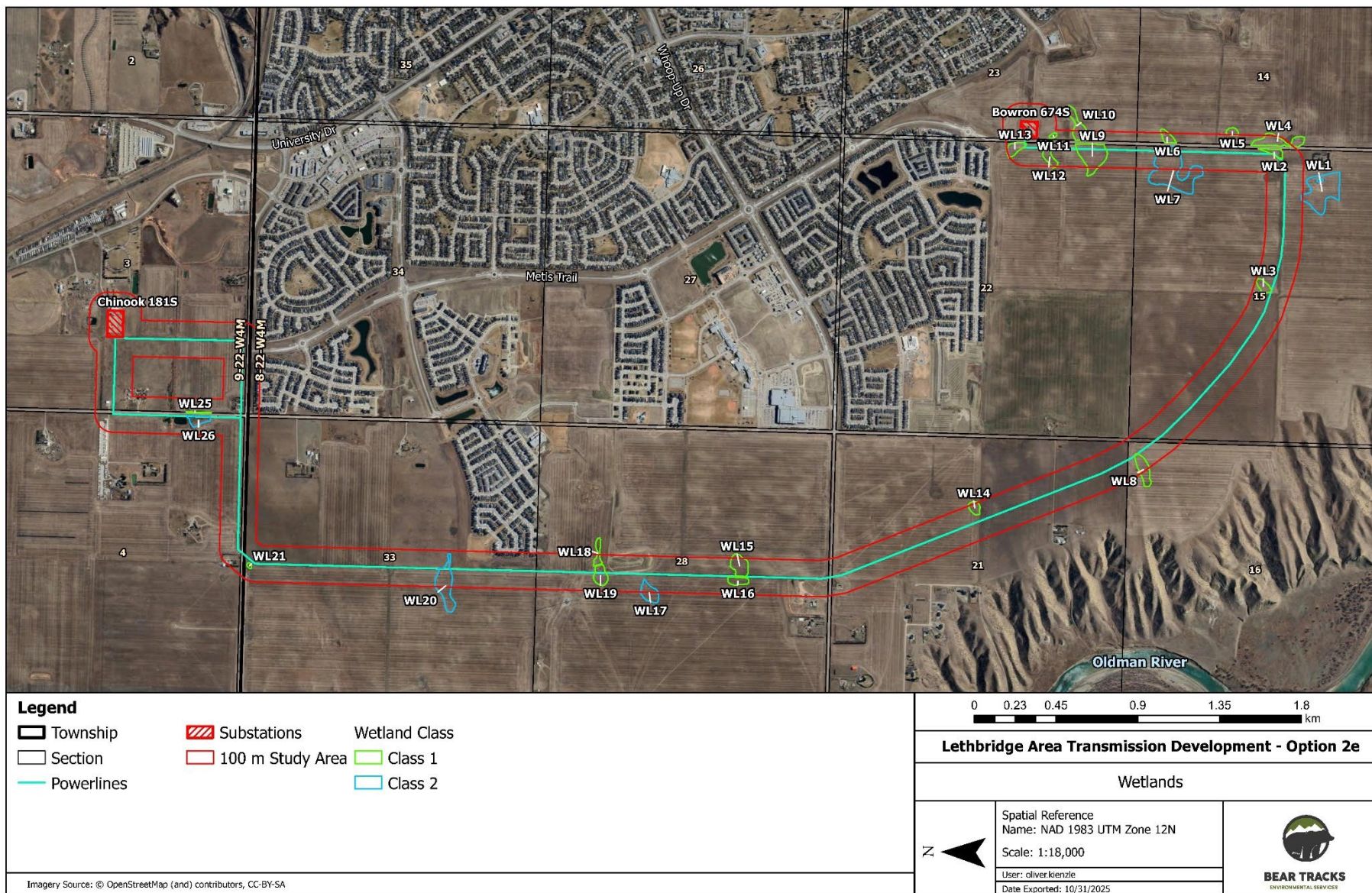


Figure 9. Wetlands and waterbodies within 100 m of the Option 2e footprint.

4.4 Option 4a: Phase shifting transformer

4.4.1 Land Cover and Option Footprint

The footprint for Option 4a includes upgrades to the existing Coalbanks 111S substation, which will require expansion of the existing disturbance to the west into tame pasture (Figure 10).

The Option 4a footprint (Coalbanks 111S) and surrounding 300 m buffer is dominated by native grassland, accounting for 54.0% of total surrounding land cover (Table 10, Figure 10). The Old Man River accounts for 12.1% of the study area (4.28 ha), and occurs west of the footprint, followed by treed habitat and tame pasture which cover 10.6% (3.77 ha) and 8.3% (2.94 ha) of surrounding area, respectively. The remaining 15% of landcover is primarily industrial development (including the direct substation footprint), roads, and other anthropogenic features (recreational), with less than one percent accounting for walking trails, wetlands and anthropogenic water features (dugouts).

Table 10. Calculated landcover within 300 m of the Option 4a footprint.

Land Cover Type	Option Footprint*	
	Area (ha)	Percent of Total Area (%)
Native Grassland	19.16	54.0
River	4.28	12.1
Trees	3.77	10.6
Tame Pasture	2.94	8.3
Industrial	2.14	6.0
Road	2.01	5.7
Other	0.82	2.3
Walking Trail	0.28	<1
Wetland	0.03	<1
Dugout	0.02	<1
Total	35.45	100.00

*Direct option footprint and 300 m area impact buffer.

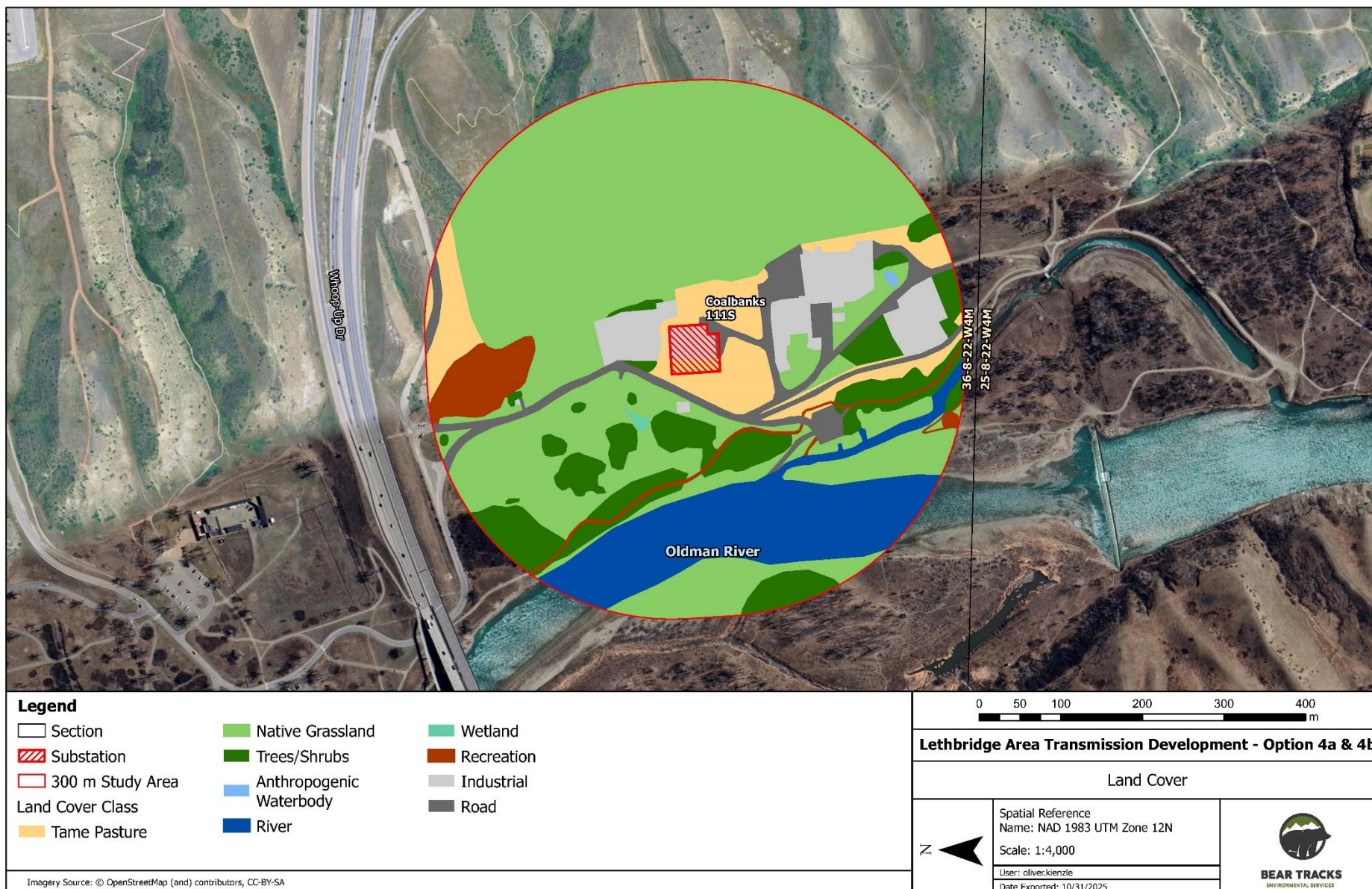


Figure 10. Land cover types within 300 m of the Option 4a footprint.

4.4.2 Soils and Landforms

Soils and landscape information identified in the Alberta Soil Information Viewer database for the lands included in the Option 4a footprint is listed in Table 11 (AEP 2025a). Because the polygon is primarily disturbed land, compaction risk is not able to be assessed for this site. Due to the location occurring within the river valley, soil likely has higher levels of course material, and less clay content at this location.

Table 11. Soil polygon information for the Option 4a footprint.

Unit Name	ZDL1/DL
Landform	DL - disturbed land
LSRS Rating (Spring Grains)	NR(10)
	NR: Not Rated Suitability Class
	(10): Proportion of Area (100%)
Landscape Description	Landscape Model Descriptions: Miscellaneous undifferentiated mineral soils (ZUN). The polygon may include soils that are not strongly contrasting from the dominant or co-dominant soils (1). Disturbed land (urban, open pit mines, gravel pits) (DL).

4.4.3 Rare Plants

The review of the ACIMS database revealed one sensitive element occurrences of soapweed, previously documented within the 300 m setback of the Option 4a footprint. The Project does not fall within any rare plant ranges as identified through FWIMT. Results of the ACIMS search are provided in Appendix B – Background Information Review Search Results.

The results of the GBIF data search or research-grade iNaturalist observations indicated no rare plants identified within 300 m of the Option 4a footprint. The closest potentially suitable habitat for soapweed surrounds the location within the slopes of coulees adjacent.

4.4.4 Wildlife

Based on the FWIMT search results, the Project study area is located within the ranges of seven sensitive wildlife species or groups (Appendix B – Background Information Review Search Results). The sensitive species ranges that overlap the Project study area include: ferruginous hawk, golden eagle, prairie falcon, sharp-tailed grouse, sensitive snake habitat and hibernacula ranges, and sensitive amphibian range. The FWIMT search also indicated six wildlife species of management concern that have been historically observed within

one-kilometer of the Project study area boundary. This included four birds and two reptile species. Sensitive species historically observed in proximity to the Project are summarized in Table 12 which includes the provincial and federal status associated with each species. Additionally, previous data from Bear Tracks has indicated two historically active snake hibernacula within 1,000 m of the disturbance, both of which were confirmed active in the previous 2025 season (Hibernaculum 1 and Hibernaculum 2, Figure 11). Both features were beyond the recommended 500 m setback for snake hibernacula in Alberta (GOA 2022). Additionally, one bank swallow colony was historically observed within the search area, though the nests are beyond the recommended 50 m setback from the Project footprint (Figure 11, Environment Canada 2009).

The query of the FWMIS database resulted in the same six historic wildlife species observed within 1,000 m of the Project study area boundary that the FWIMT search indicated. In addition to those species, 12 species of management concern were historically observed and recorded within the iNaturalist research grade observations from the GBIF dataset (Table 12, Figure 11).

Table 12. Species of concern historically observed within proximity (1 km) of the Option 4a footprint.

Common Name	Latin Name	Species Status				Data Source
		AB General Status ¹	WA ²	COSEWIC ³	SARA ⁴	
Amphibians						
Northern Leopard Frog	<i>Lithobates pipiens</i>	At Risk	Threatened	Special Concern	Special Concern	GBIF
Birds						
American Kestrel	<i>Falco sparverius</i>	Sensitive	-	-	-	FWIMT; FWIMIS;GBIF
American White Pelican	<i>Pelecanus erythrorhynchos</i>	Sensitive	-	Not at Risk	-	FWIMT; FWIMIS;GBIF
Bald Eagle	<i>Bald Eagle</i>	Haliaeetus leucocephalus	Sensitive	-	Not at Risk	GBIF
Bank Swallow	<i>Riparia riparia</i>	Sensitive	-		Threatened	FWIMT; FWIMIS;
Barn Swallow	<i>Hirundo rustica</i>	May Be at Risk	-	Special Concern	Threatened	GBIF
Broad-winged Hawk	<i>Buteo platypterus</i>	Sensitive	-		-	GBIF
Eastern Kingbird	<i>Tyrannus tyrannus</i>	Sensitive	-	-	-	GBIF
Great Blue Heron	<i>Ardea herodias</i>	Sensitive	-		-	GBIF

Common Name	Latin Name	Species Status				Data Source
		AB General Status ¹	WA ²	COSEWIC ³	SARA ⁴	
Horned Grebe	<i>Podiceps auritus</i>	Sensitive	-	Special Concern	Special Concern	GBIF
Pileated Woodpecker	<i>Dryocopus pileatus</i>	Sensitive	-	-	-	FWIMT; FWIMIS;
Rusty Blackbird	<i>Euphagus carolinus</i>	Sensitive	-	Special Concern	Special Concern	GBIF
Western Grebe	<i>Aechmophorus occidentalis</i>	At Risk	Threatened	Special Concern	Special Concern	GBIF
Western Wood Pewee	<i>Contopus sordidulus</i>	May Be at Risk	-	-	-	GBIF
Mammals						
Hoary Bat	<i>Lasiurus cinereus</i>	Sensitive	-	Endangered	No Status	GBIF
Reptiles						
Prairie Rattlesnake	<i>Crotalus viridis</i>	Sensitive	-	Special Concern	Special Concern	FWIMT; FWIMIS;
Wandering Garter Snake	<i>Thamnophis elegans</i>	Sensitive	-	-	-	FWIMT; FWIMIS;GBIF
Western Painted Turtle	<i>Chrysemys picta</i>	Sensitive	-	Not At Risk	-	GBIF

1 – (Government of Alberta 2022)

2 – (Province of Alberta 1997)

3 – (Government of Canada 2025)

4 – (Government of Canada 2002)

4.4.5 Environmental Management Areas

Environmentally Significant Areas (ESA)

The quarter section which the Option 4a footprint is within has an ESA value of 0.1377 and does not exceed the limit to be considered an ESA (Figure 12).

Protected Areas

The entirety of the Option 4a is within the municipal Botterill Bottom Park. No provincial or federal parks, or wildlife sanctuaries are within the vicinity of the location.

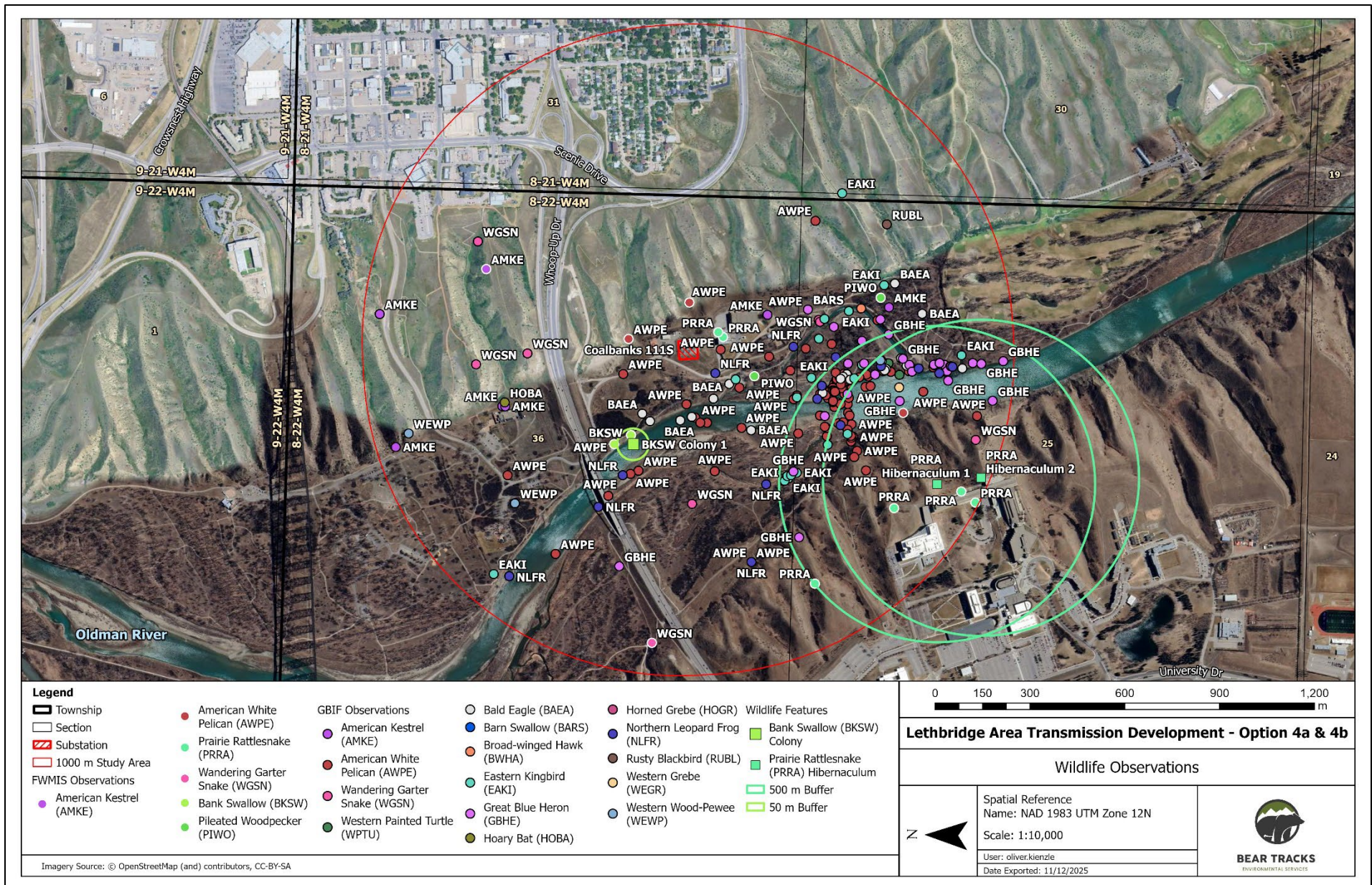


Figure 11. Historically observed species of management concern within 1,000 m of Option 4a footprint.

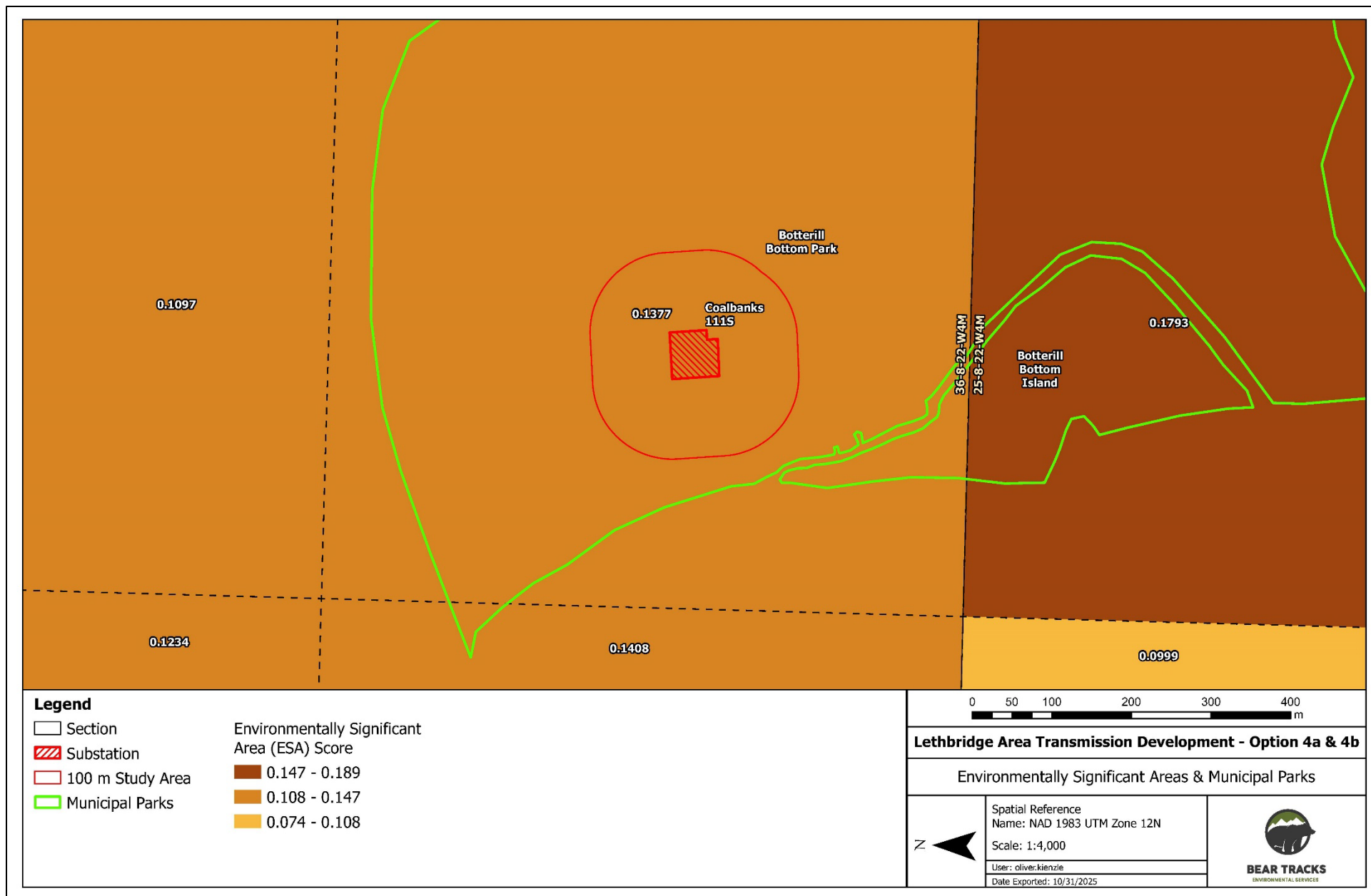


Figure 12. Environmentally Significant Areas (ESA) and protected areas within the Option 4a footprint.

4.4.6 Wetlands and Waterbodies

One ephemeral waterbody (labeled as Class 3) is visible from imagery within 100 m of the proposed footprint (Figure 13). No wetlands of temporary, seasonal, semi-permanent, or permanent classifications were observed within 100 m of the footprint.

4.4.7 Historical and Cultural Resources

Option 4a footprint intersects land with a HRV5 score (high potential to contain a historic resource but not confirmed). Because the option requires new disturbance within an area of historical resource value, *Historical Resources Act* approval will be required for the Option by submitting a Historical Resources Application. For more information, refer to Appendix A: Historical Resource Search Reports.

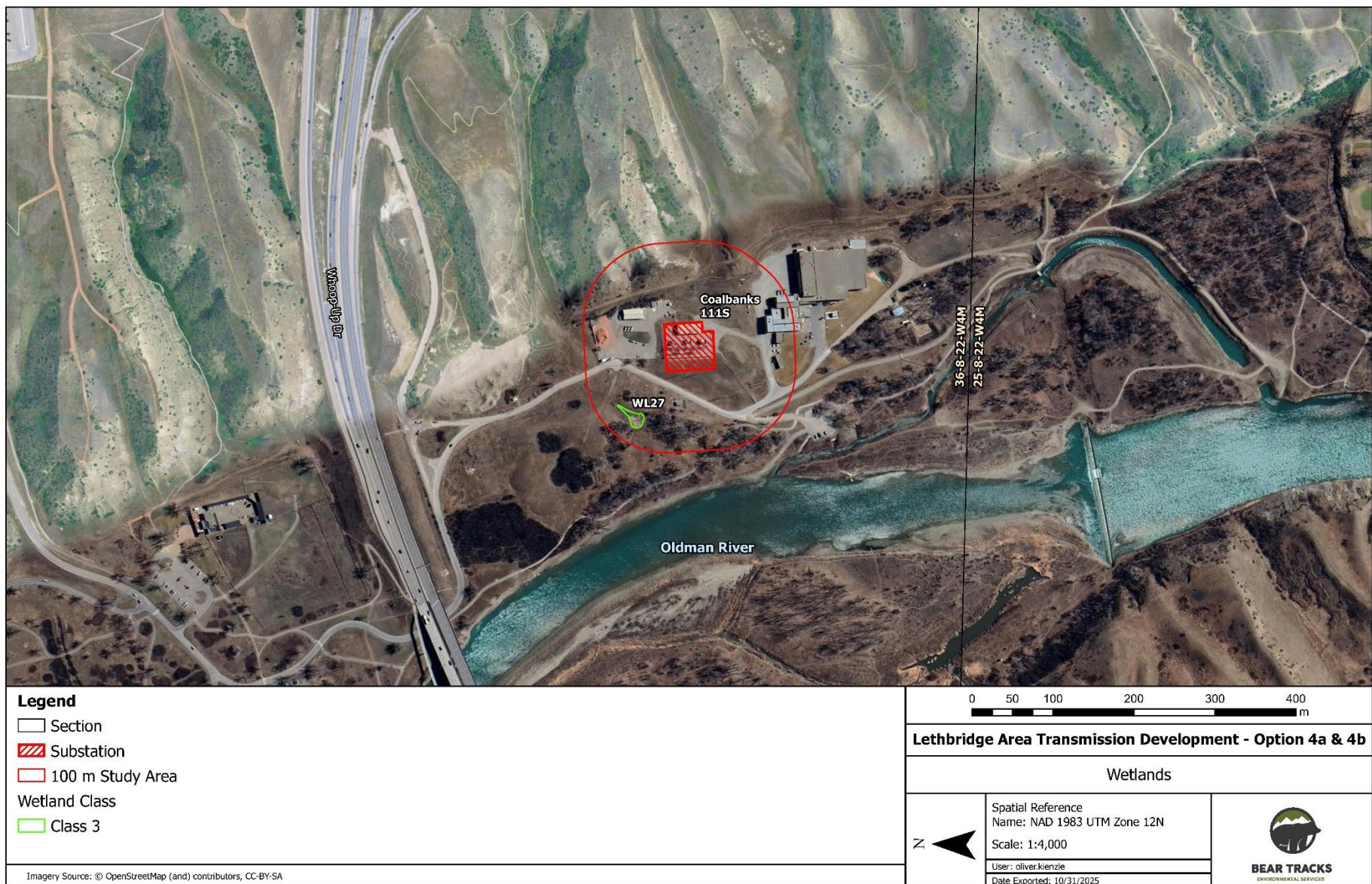


Figure 13. Wetlands and waterbodies within 100 m of the Option 4a footprint.

4.5 Option 4b: Power Flow Control

4.5.1 Land Cover and Option Footprint

The footprint for Option 4b includes upgrades to the existing Coalbanks 111S substation, which will require expansion of the existing disturbance to the west. Upgrades at the location will be slightly different than Option 4a, but the footprint will be the same. As such, all results of the desktop analysis will be the same for both projects.

The Option 4b footprint and surrounding 300 m buffer will be the same as Option 2a. Refer to section 4.4 Option 4a: Phase Shifting Transformer for more information.

4.5.2 Soils and Landforms

Soils and landscape information for Option 4b will reflect the same results as Option 4a, as the footprint is assumed to be the same (Table 11).

4.5.3 Rare Plants

The review of the ACIMS and GBIF database results will reflect the same results as Option 2a.

4.5.4 Wildlife

The FWIMT search results, FWIMIS database results, and GBIF historical observations will all reflect the same results as Option 4a (Table 12, Figure 11).

4.5.5 Environmental Management Areas

The ESA and Protected Areas results of Option 4b will reflect the same results as Option 4a: The quarter section which the Option 4a footprint does not exceed the limit to be considered an ESA. Additionally, in the site is located within Botterill Municipal Park, but does not impact any provincial or federal parks or protected areas.

4.5.6 Wetlands and Waterbodies

Results of the wetland search within 100 m of Option 4b will be the same as the Option 4a wetland search (Figure 13).

4.5.7 *Historical and Cultural Resources*

Option 4b footprint intersects land with a HRV5 score and *Historical Resources Act* approval will be required for the Option by submitting a Historical Resources Application. For more information, refer to Appendix A: Historical Resource Search Reports.

4.6 Option 5b: Chinook Voltage support

4.6.1 *Land Cover and Option Footprint*

The Project footprint for Option 5b includes expanding the existing Chinook 181 Substation to the west, which will require additional disturbance to Tame Pasture.

The Option 5b footprint (Chinook 181S) and surrounding 300 m buffer is dominated by tame pasture, accounting for 47.5% of total surrounding land cover (Table 13, Figure 14). Tame pasture primarily occurs west of the footprint and where expansion of the substation is proposed. This is followed by cultivation and industrial, which cover 32.4% (14.05 ha) and 13.5% (5.84 ha) of surrounding area, respectively. The remaining 7% of landcover is primarily residential, roads, other anthropogenic water features (dugouts and ponds), and trees.

Table 13. Calculated landcover within 300 m of the Option 5b footprint.

Land Cover Type	Option Footprint*	
	Area (ha)	Percent of Total Area (%)
Tame Pasture	20.55	47.5
Cultivation	14.05	32.4
Industrial	5.84	13.5
Residential	0.88	2.0
Road	0.88	2.0
Anthropogenic Water Features	0.69	1.6
Trees	0.40	<1
Total	43.29	100.0

*Direct option footprint and 300 m area impact buffer.

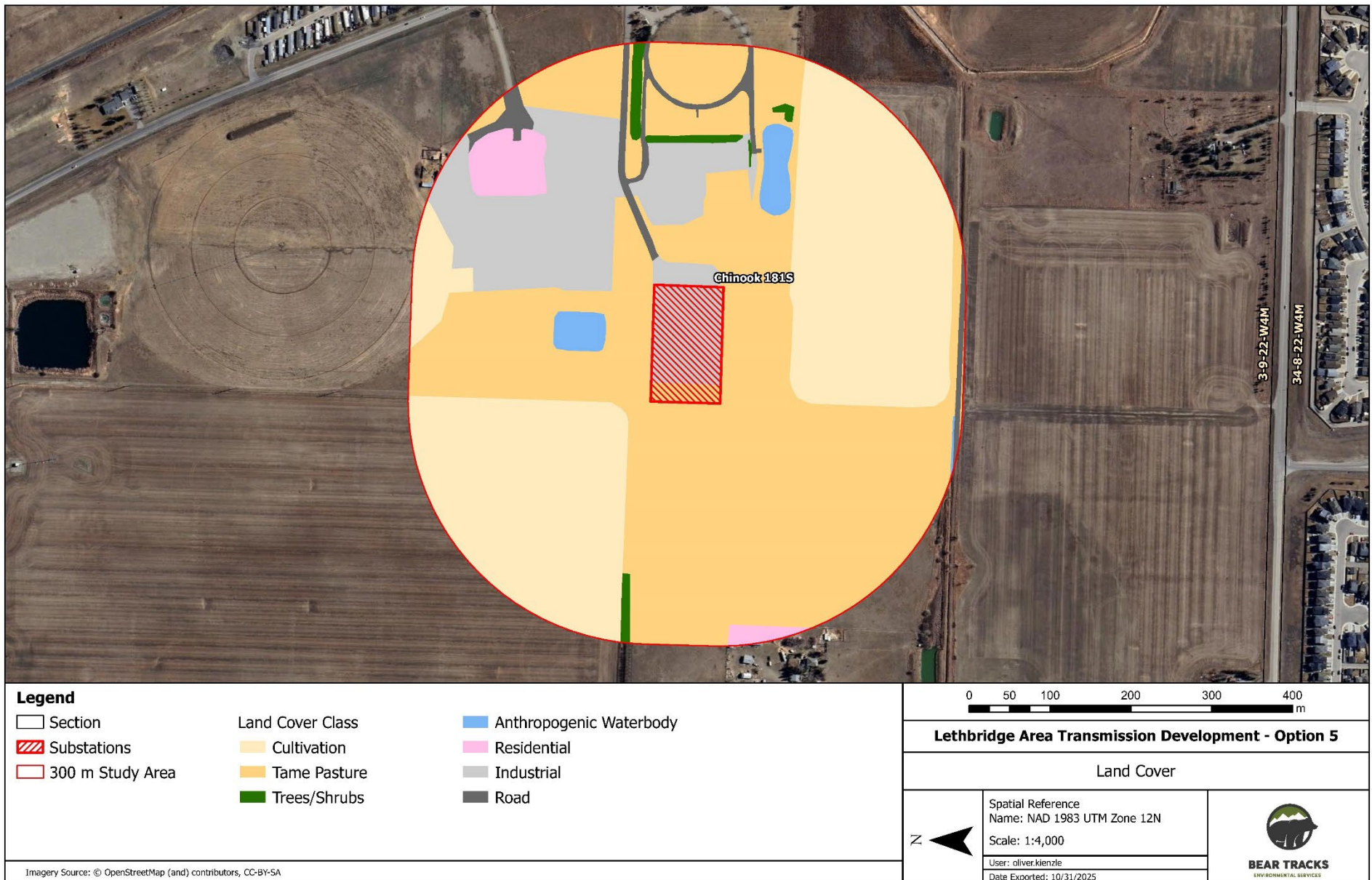


Figure 14. Landcover within 300 m of the Option 5b footprint.

4.6.2 Soils and Landforms

Soils and landscape information identified in the Alberta Soil Information Viewer database for the lands included in the Option 5b footprint is listed in Table 14. The results of the soil information indicate that the polygons which the option footprint intercepts have high clay content, which increase their potential to compaction. However, the risk of soil compaction will only occur in the new footprint expansion, which is approximately 0.08 ha.

Table 14. Soil polygon information for the Option 5b footprint.

Unit Name	LEWN5/U1h
Landform	U1h - undulating - high relief
LSRS Rating (Spring Grains)	3M(10)
	3: Moderate limitations M: Water holding capacity
	(10): Proportion of Area (100%)
Landscape Description	Orthic Dark Brown Chernozem on medium textured (L, SiL) sediments deposited by wind and water (LET). Orthic Dark Brown Chernozem on medium textured (L, SiCL, CL) materials over medium (L, CL) or fine (C) textured till (WNY). The polygon includes soils that are finer textured than the dominant or co-dominant soils (5). Undulating, high relief landform with a limiting slope of 4% (U1h).

4.6.3 Rare Plants

The review of the ACIMS database revealed two sensitive element occurrences of vascular plants, both of soapweed (*Yucca glauca*), previously documented within the 300 m setback of the Option 5b footprint. The Project does not fall within any rare plant ranges as identified through FWIMT. Results of the ACIMS search are provided in Appendix B – Background Information Review Search Results.

The results of the GBIF data search or research-grade iNaturalist observations indicated no rare plants identified within 300 m of the Option 5b footprint. There is no suitable habitat for soapweed visible within 300 m of the location.

4.6.4 Wildlife

Based on the FWIMT search results, the Project study area is located within the ranges of six sensitive wildlife species or groups (Appendix B – Background Information Review Search Results). The sensitive species ranges that overlap the Project study area include: ferruginous hawk, golden eagle, prairie falcon, sharp-tailed grouse, sensitive snake habitat, and sensitive amphibian range. The FWIMT search also indicated one wildlife species of management concern (i.e., sora) that have been historically observed within one kilometer of the Project study area boundary.

The query of the FWMIS database also resulted in a sora observation. In addition to this species, bullsnake was recorded within the iNaturalist research grade observations from the GBIF dataset (Table 15, Figure 15).

Table 15. Species of management concern historically observed within proximity (1 km) of the Option 5b footprint.

Common Name	Latin Name	Species Status				Data Source
		AB General Status ¹	WA ²	COSEWIC ³	SARA ⁴	
Birds						
Sora	<i>Porzana carolina</i>	Sensitive	-	-	-	FWIMT; FWIMIS
Reptiles						
Bullsnake	<i>Pituophis catenifer</i>	Sensitive	-		Special Concern	GBIF

1 – (Government of Alberta 2022)

2 – (Province of Alberta 1997)

3 – (Government of Canada 2025)

4 – (Government of Canada 2002)

4.6.5 Environmental Management Areas

Environmentally Significant Areas (ESA)

The quarter section which the Option 5b footprint is within has an ESA value of 0.046 and does not exceed the limit to be considered an ESA (Figure 16).

Protected Areas

No municipal parks, provincial or federal parks, protected areas (e.g., ecological reserves, natural areas, wilderness areas), or wildlife sanctuaries are within the option footprint or surrounding area.



Figure 15. Historically observed species of management concern within 1,000 m of Option 5b footprint.

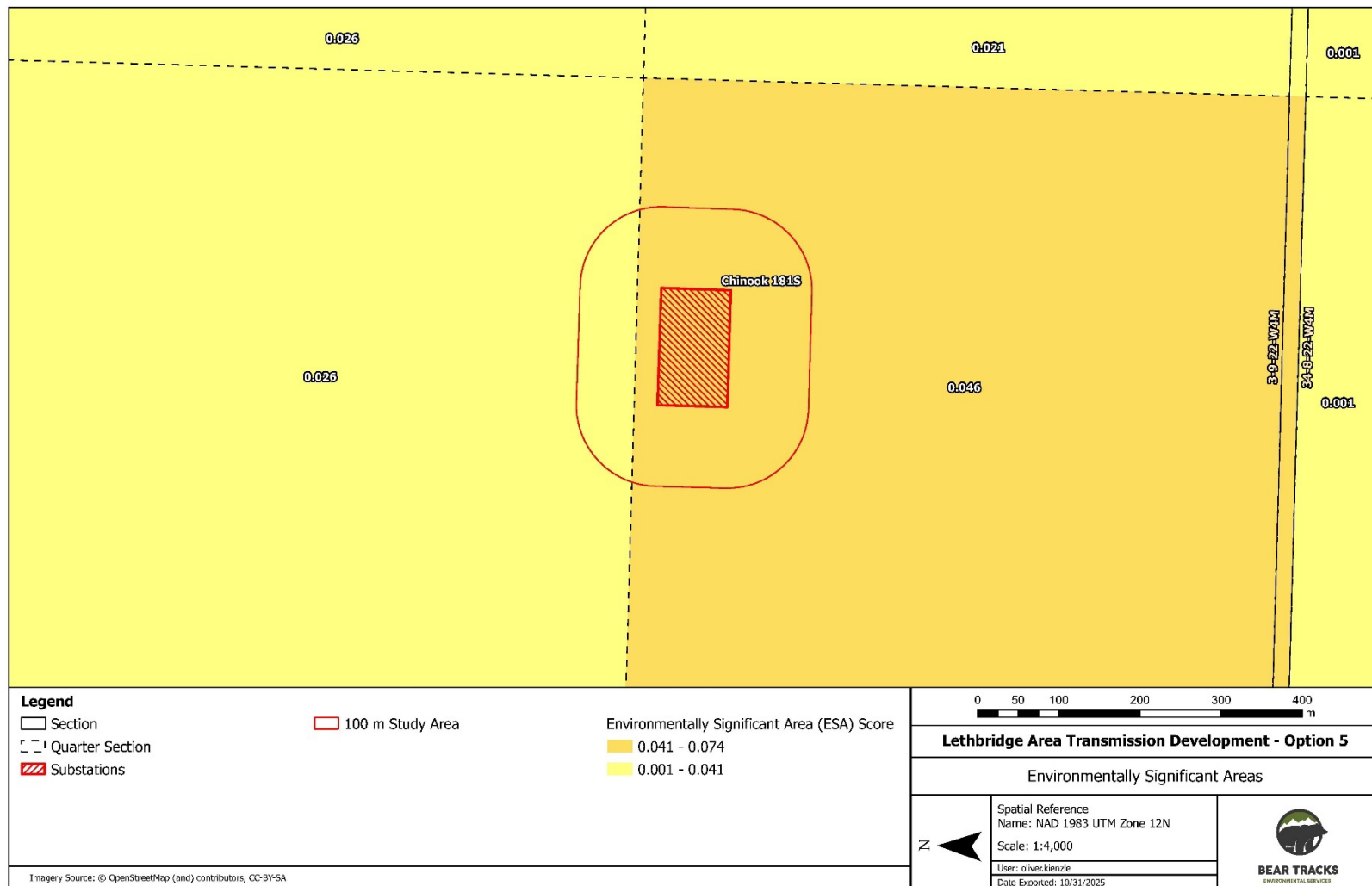


Figure 16. Environmentally Significant Areas (ESA's) and protected areas within the Option 5b footprint.

4.6.6 Wetlands and Waterbodies

No wetlands are visible within 100 m of the Option 5b footprint. However, a formal field assessment following the Alberta Wetland Classification System (ESRD 2015) would be required to verify there are no wetlands. One dugout/anthropogenic water feature within 100 m occurs directly north of the existing substation.

4.6.7 Historical and Cultural Resources

A search for listings of historical resources was conducted through the Alberta Historic Resources and Management Branch (Government of Alberta 2024a) indicates that Option 5b does not have known Historic Resource Value (HRV) as illustrated in Appendix A. Therefore, no historical resource application is required for this option.

5 Discussion and Evaluation

The desktop environmental evaluation identified varying levels of risk among the six proposed transmission development options near Lethbridge. Options 2a, 2c, and 2e, which involve construction of either new substations, new transmission lines, or both, present the highest potential for environmental impact, each having 7 areas of constraint within the analysis (Table 16). While these options overlap extensive areas of cultivation, they also have a larger area within proximity (300 m) to more sensitive or vulnerable habitats such as native grassland and wetlands, due to their larger footprint. An Osprey nest, active in the 2025 nesting season, is located adjacent to the footprint of all three Options. The MSSC recommends a 750 m setback buffer from high disturbance (April 1st to August 31st) for active Osprey nests (GOA 2024). However, because the nest was constructed directly adjacent to a substation, the breeding pair of Osprey is likely conditioned to a level of human disturbance. If the nest is still active in the season leading up to construction for these three options, it would be recommended to avoid construction activities within the buffer during the sensitive period (active nesting and breeding season) for Osprey (April 1st to August 31st) (GOA 2024). Collectively, these factors contribute to a relatively high number of environmental constraints and a need for multiple bio-physical pre-construction surveys, including raptor, sharp-tailed grouse, bird migration, snake hibernacula, wetland, and amphibian surveys. Based on survey results additional mitigation measures to reduce potential bird collisions with power lines and electrocution, such as bird flight diverters, line markers or bird electrocution insulators, may be warranted.

These options also occur in areas of higher soil compaction potential and would require *Historical Resources Act* clearance due to the presence of Historical Resource Values (HRVs = 5). Projects with new disturbance may also require pre-disturbance soil assessments (PDSA) be conducted to identify potential limitations in respect to soil within new footprints and to determine appropriate mitigation. Additionally, *Water Act* approvals may be required for any work that will directly impact wetlands. Refer to Table 16 for a list of recommended surveys for each Option.

In contrast, Options 4a and 4b, both located at the existing Coalbanks 111S substation, have substantially smaller footprints and consequently lower spatial disturbance. Both of these are primarily surrounded by sensitive habitat (58% native grassland) within the Oldman River valley coulee system. Due to the new footprint proposed within the city's river valley, these options would fall under the scope outlined under the River Valley Area Development Plan for the City of Lethbridge, which intends to protect and enhance resources such as environmentally sensitive lands, unique natural features, plant and animal diversity preservation, and regulation of redevelopment in order to protect the area. While the new disturbance will include a relatively small footprint (approximately 0.08 ha) that will be directly adjacent to the previous infrastructure, there is potential for additional analysis to be warranted under the plan, such as an Environmental Assessment Analysis (City of Lethbridge 2004). Other factors which reduce constraints include

avoidance of wetlands and a lower overall risk of soil and habitat disruption. These options still require historical resource applications and wildlife surveys but are considered to have moderate environmental impact relative to Options 2a, 2c, and 2e.

Option 5b, which involves minor voltage support additions at Chinook 181S, represents the lowest environmental risk among the six options, with 2 constraints compared to the other options (Table 16). The footprint lies within a previously disturbed industrial area and expansion of the footprint is on a less sensitive habitat (tame pasture) compared to Options 4a and 4b, which expand into native grassland. Additionally, it does not intersect or lie adjacent to wetlands and would not trigger additional historical or environmental approvals beyond standard mitigation.

Overall, based on the desktop constraint analysis, Options 2a, 2c, and 2e have the greatest environmental impact potential, Options 4a and 4b have moderate potential, and Option 5b is the preferred alternative due to its minimal new disturbance and limited environmental sensitivities. It is important to note that results of the analysis are based on historical information and datasets that were accessible either via public access or through the government. Field reconnaissance and dedicated surveys would be recommended to determine site-specific constraints that are the most current and up to date for the final option that is chosen. If required to support option selection, a high-level estimate of costs can be provided.

Table 16. Constraint evaluation results for the Project options.

Option	Land cover impacted within 300 m (ha)	Is footprint directly impacting Native Grassland?	Are historical Rare Plant observations within 300 m?	Are Historical Wildlife Species of Management Concern within 1,000 m?	Are Historical Sensitive Wildlife Features within Associated Setback?	Total area of Wetlands and Watercourses within 100 m (ha)	Are any soils impacted at high risk of compaction?	Is the site within an ESA or Protected Area?	Will disturbance trigger the need for a Historical Resource Application?	Total Constraints	Future Surveys that May Be Required
2a	840.29	No	No	Yes	Yes	23.47	Yes	No	Yes	6	Raptor Survey Sharp-tailed Grouse Survey Snake Hibernacula Survey Sensitive Amphibian Survey Bird Migration Survey Wetland Survey PDSA
2c	840.29	No	No	Yes	Yes	23.47	Yes	No	Yes	6	Raptor Survey Sharp-tailed Grouse Survey Snake Hibernacula Survey Sensitive Amphibian Survey Bird Migration Survey Wetland Survey PDSA
2e	690.54	No	No	Yes	Yes	19.95	Yes	No	Yes	6	Raptor Survey Sharp-tailed Grouse Survey Snake Hibernacula Survey Sensitive Amphibian Survey Bird Migration Survey Wetland Survey PDSA
4a	35.45	No	No	Yes	No	0.03	No	Yes	Yes	3	Raptor Survey Snake Hibernacula Survey Wetland Survey Rare Plant Survey PDSA
4b	35.45	No	No	Yes	No	0.03	No	Yes	Yes	3	Raptor Survey Snake Hibernacula Survey Wetland Survey Rare Plant Survey PDSA
5b	43.29	No	No	Yes	No	0	Yes	No	No	2	Raptor Survey Sharp-tailed Grouse Survey

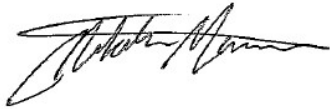
6 Signature

The undersigned has not personally inspected the subject property but has considered relevant factors and influences pertinent within the scope of the assessment.

The undersigned has no past, present, or contemplated interest in the assessed property.

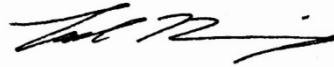
I have reviewed the information as submitted and completed this report in conformity with the Code of Ethics and the Duties of Professional Biologists.

Respectfully Submitted:



Natalie Mercer, B.Sc., P.Biol.
Wildlife Biologist
Bear Tracks Environmental Services
(2015) Ltd.

Reviewed by:



Ted Nanninga, B.A.Env., P.Biol., R.P.Bio.
Senior Wildlife Biologist
Bear Tracks Environmental Services
(2015) Ltd.

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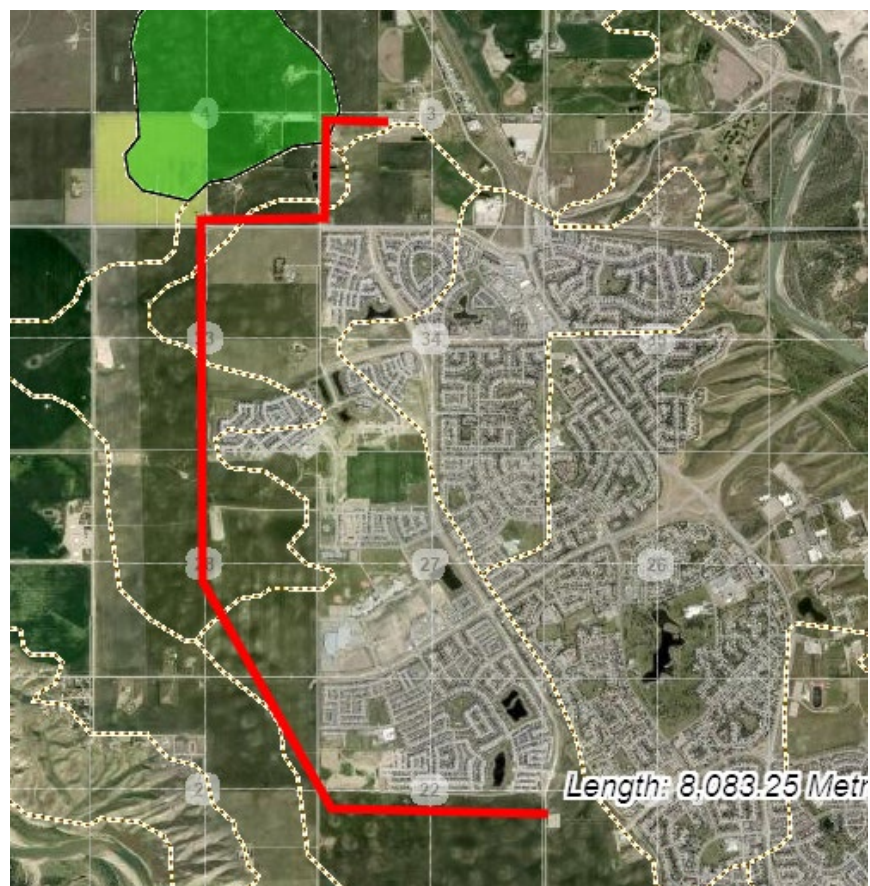
Appendix A – Background Information Review Search Results

Soil Polygon Search Areas:

Option 2a & 2c:



Option 2e:



Option 4a & 4b:



Option 5b:



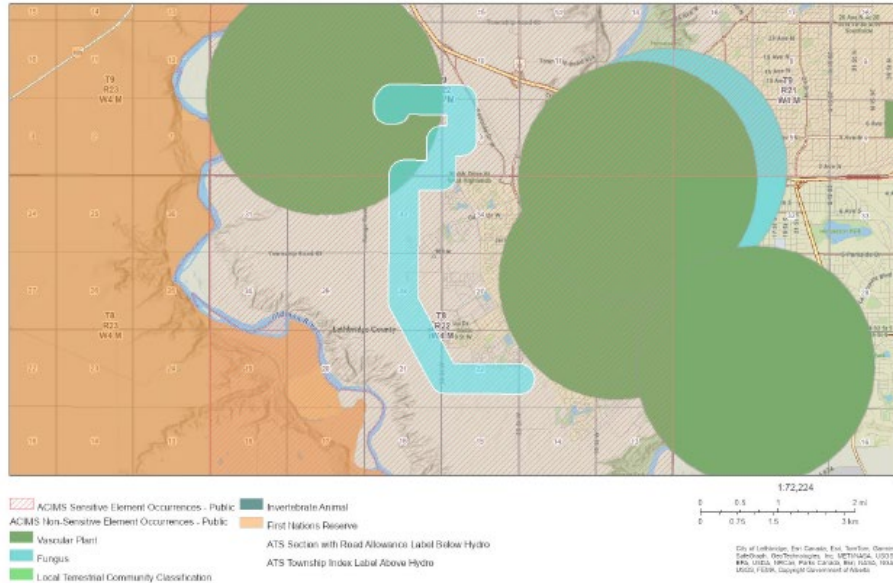
Rare Plant Search Reports:

Option 2a & Option 2c:

Area of Interest (AOI) Information

Area : 6,863,283.71 m²

Oct 21 2025 16:17:50 Mountain Daylight Time



Summary

Name	Count	Area(m ²)	Length(m)
Sensitive EO	4	13,726,567.55	N/A
Non Sensitive EO	1	1,356,414.13	N/A

Sensitive EO

#	ELCODE	EO ID	Species	Scientific Name	Last Obs. Date	S Rank	Perimeter (m)	Area(m ²)
1	IILEPP2011	27925	Monarch	Danaus plexippus plexippus	2021-08-02	S2B,SNRM	38,884.22	2,695,453.46
2	PMAGA0B0F0	11371	soapweed	Yucca glauca	2000-XX-XX	S1	38,884.22	2,695,453.46
3	IILEPP2011	27925	Monarch	Danaus plexippus plexippus	2021-08-02	S2B,SNRM	38,967.91	4,167,830.32
4	PMAGA0B0F0	11370	soapweed	Yucca glauca	2000-XX-XX	S1	38,967.91	4,167,830.32

Non Sensitive EO

#	ELCODE	EO ID	Name Category Desc.	Species	Scientific Name	Last Obs. Date	S Rank	Perimeter (m)	Area(m ²)
1	PDBRA270K0	8135	Vascular Plant	spreading yellow cress	Rorippa sinuata	1974-06-06	S2	15,686.87	1,356,414.13

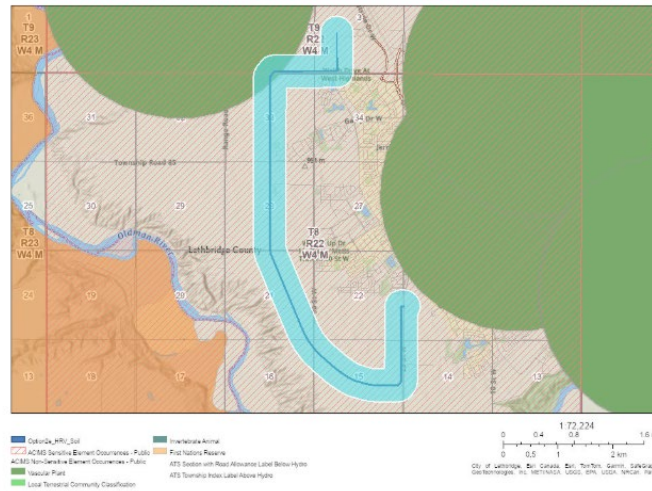
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Option 2e:

Area of Interest (AOI) Information

Area : 6,442,114.49 m²

Nov 3 2025 15:09:11 Mountain Standard Time



Summary

Name	Count	Area(m²)	Length(m)
Sensitive EO	4	12,884,228.97	N/A
Non Sensitive EO	1	276,583.46	N/A

Sensitive EO

#	ELCODE	EO ID	Species	Scientific Name	Last Obs. Date	S Rank	Perimeter (m)	Area(m²)
1	IILEPP2011	27925	Monarch	Danaus plexippus plexippus	2021-08-02	S2B,SNRM	38,884.22	958,920.91
2	PMAGA0B0F0	11371	soapweed	Yucca glauca	2000-XX-XX	S1	38,884.22	958,920.91
3	IILEPP2011	27925	Monarch	Danaus plexippus plexippus	2021-08-02	S2B,SNRM	38,967.91	5,483,193.58
4	PMAGA0B0F0	11370	soapweed	Yucca glauca	2000-XX-XX	S1	38,967.91	5,483,193.58

Non Sensitive EO

#	ELCODE	EO ID	Name Category Desc.	Species	Scientific Name	Last Obs. Date	S Rank	Perimeter (m)	Area(m²)
1	PDBRA270K0	8135	Vascular Plant	spreading yellow cress	Rorippa sinuata	1974-06-06	S2	15,686.87	276,583.46

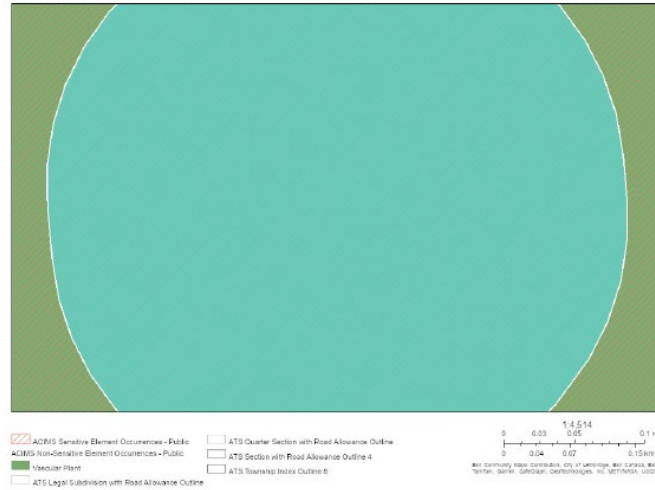
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Option 4a & 4b:

Area of Interest (AOI) Information

Area : 353,870.28 m²

Oct 28 2025 11:42:40 Mountain Daylight Time



Summary

Name	Count	Area(m ²)	Length(m)
Sensitive EO	2	707,740.57	N/A
Non Sensitive EO	2	707,740.57	N/A

Sensitive EO

#	ELCODE	EO ID	Species	Scientific Name	Last Obs. Date	S Rank	Perimeter (m)	Area(m ²)
1	IILEPP2011	27925	Monarch	Danaus plexippus plexippus	2021-08-02	S2B,SNRM	38,967.91	353,870.29
2	PMAGA0B0F0	11370	soapweed	Yucca glauca	2000-XX-XX	S1	38,967.91	353,870.29

Non Sensitive EO

#	ELCODE	EO ID	Name Category Desc.	Species	Scientific Name	Last Obs. Date	S Rank	Perimeter (m)	Area(m ²)
1	PDAST76010	7341	Vascular Plant	picradeniopsis	Picradeniopsis oppositifolia	1969-07-04	S1	15,686.88	353,870.29
2	PDLIN02130	26706	Vascular Plant	compact flax	Linum compactum	1951-08-09	SU	15,710.63	353,870.29

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Option 5b:



ACIMS Data Screening Report

Area of Interest (AOI) Information

Area : 428,850.34 m²

Nov 3 2025 15:12:43 Mountain Standard Time



Summary

Name	Count	Area(m ²)	Length(m)
Sensitive EO	2	857,700.69	N/A
Non Sensitive EO	0	0	N/A

Sensitive EO

#	ELCODE	EO ID	Species	Scientific Name	Last Obs. Date	S Rank	Perimeter (m)	Area(m ²)
1	IILEPP2011	27925	Monarch	Danaus plexippus plexippus	2021-08-02	S2B,SNRM	38,884.22	428,850.34
2	PMAGA0B0F0	11371	soapweed	Yucca glauca	2000-XX-XX	S1	38,884.22	428,850.34

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Historical Wildlife Search Reports:

Option 2a & Option 2c:



Fish and Wildlife Internet Mapping Tool (FWIMT)

(source database: Fish and Wildlife Management Information System (FWMIS))

Species Summary Report

Report Date: 21-Oct-2025 16:42

Species present within the current extent

Fish Inventory

FATHEAD MINNOW
GOLDFISH

Wildlife Inventory

BARN SWALLOW
PRAIRIE RATTLESNAKE
SORA

Stocked Inventory

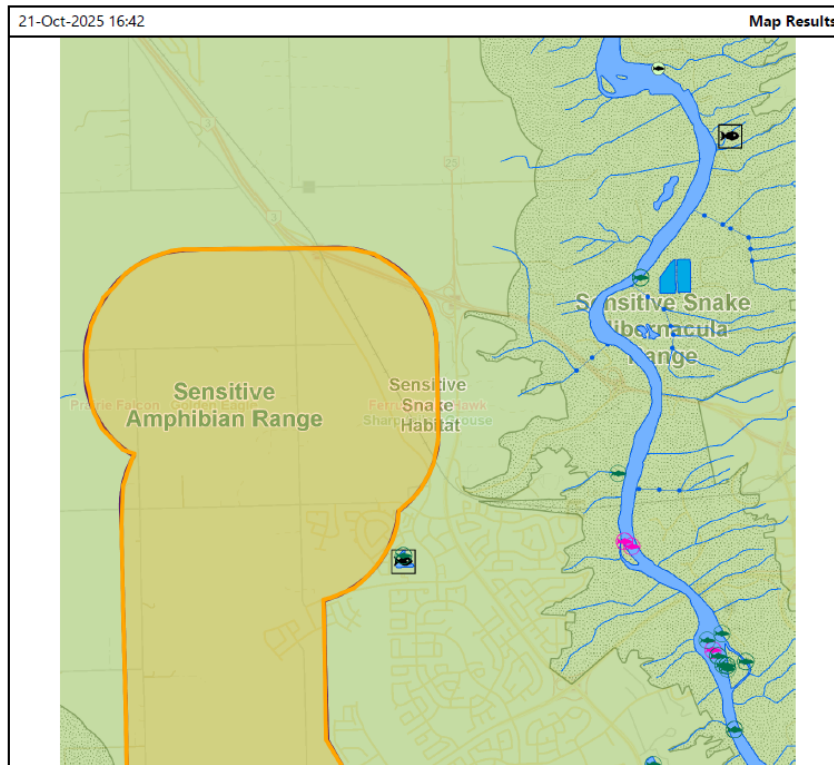
No Species Found in Search Extent

Buffer Extent

Centroid (X,Y)	Projection	Centroid (Qtr Sec Twp Rng Mer)	Radius or Dimensions
650634, 5503664	10-TM AEP Forest	SW 34 8 22 4	4930, 7849 meters

Contact Information

For contact information, please visit:
<https://www.alberta.ca/fisheries-and-wildlife-management-contacts.aspx>



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Option 2e:

Fish and Wildlife Internet Mapping Tool (FWIMT)

(source database: Fish and Wildlife Management Information System (FWMIS))

Species Summary Report

Report Date: 03-Nov-2025 10:37

Species present within the current extent

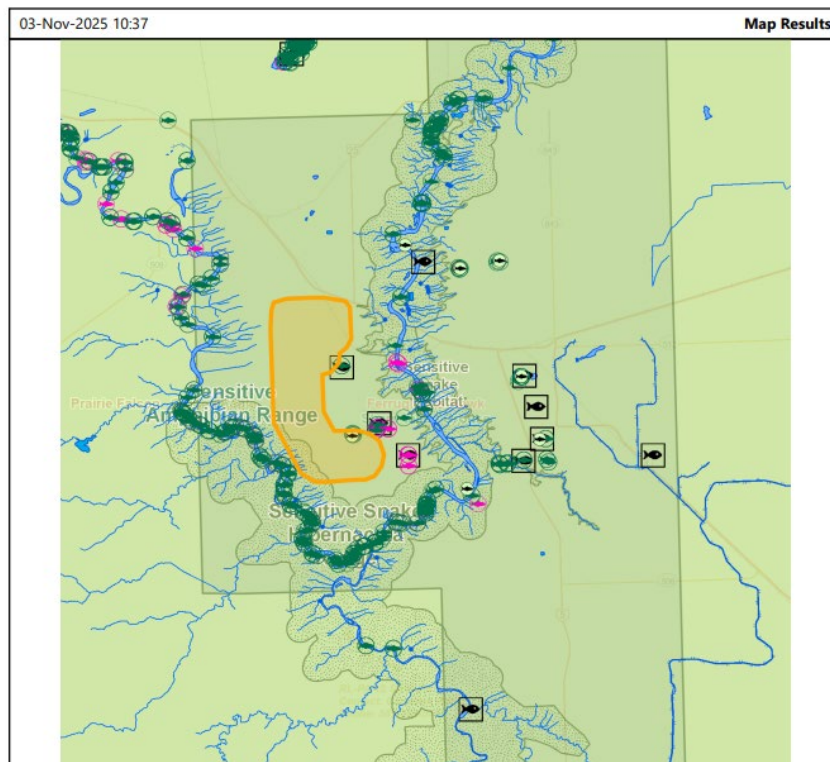
Fish Inventory	Wildlife Inventory	Stocked Inventory
FATHEAD MINNOW	BARN SWALLOW	No Species Found in Search Extent
GOLDFISH	PRAIRIE RATTLESNAKE	
	SORA	

Buffer Extent

Centroid (X,Y)	Projection	Centroid (Qtr Sec Twp Rng Mer)	Radius or Dimensions
650791, 5503479	10-TM AEP Forest	SW 34 8 22 4	4644, 7548 meters

Contact Information

For contact information, please visit:
<https://www.alberta.ca/fisheries-and-wildlife-management-contacts.aspx>



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Option 4a & Option 4b:

Fish and Wildlife Internet Mapping Tool (FWIMT)

(source database: Fish and Wildlife Management Information System (FWMIS))

Species Summary Report

Report Date: 03-Nov-2025 11:39

Species present within the current extent

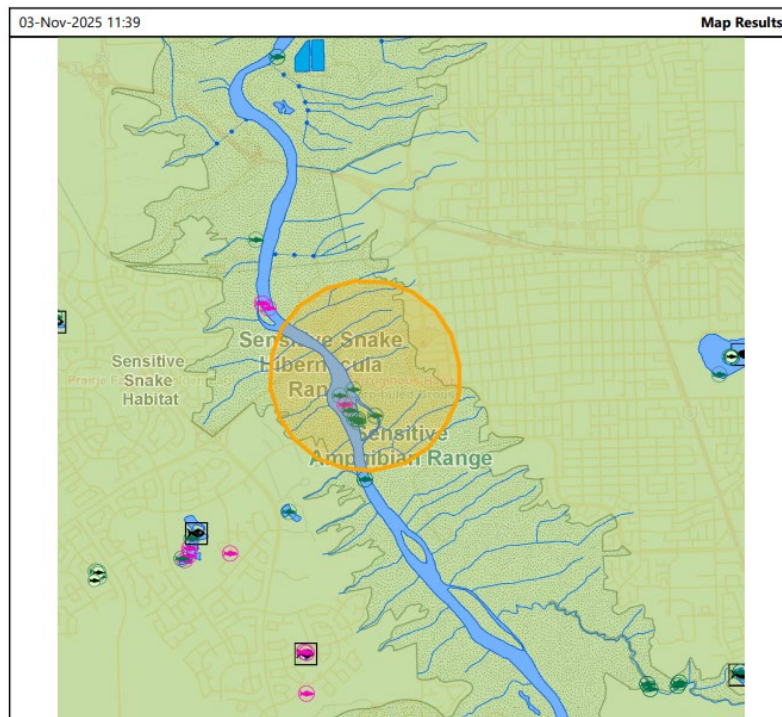
Fish Inventory	Wildlife Inventory	Stocked Inventory
BROWN TROUT	AMERICAN KESTREL	No Species Found in Search Extent
BURBOT	AMERICAN WHITE PELICAN	
EMERALD SHINER	BANK SWALLOW	
FATHEAD MINNOW	PILEATED WOODPECKER	
LAKE STURGEON	PRAIRIE RATTLESNAKE	
LONGNOSE DACE	TERRESTRIAL GARTER SNAKE	
LONGNOSE SUCKER		
MOUNTAIN WHITEFISH		
NORTHERN PIKE		
SHORTHEAD REDHORSE		
SPOTTAIL SHINER		
WALLEYE		
WHITE SUCKER		

Buffer Extent

Centroid (X,Y)	Projection	Centroid (Qtr Sec Twp Rng Mer)	Radius or Dimensions
654746, 5503821	10-TM AEP Forest	SE 36 8 22 4	2054, 2064 meters

Contact Information

For contact information, please visit:
<https://www.alberta.ca/fisheries-and-wildlife-management-contacts.aspx>



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Option 5b:

Alberta

Environment and Parks

Fish and Wildlife Internet Mapping Tool (FWIMT)
(source database: Fish and Wildlife Management Information System (FWMIS))

Species Summary Report

Report Date: 03-Nov-2025 13:58

Species present within the current extent

Fish Inventory
No Species Found in Search Extent

Wildlife Inventory
SORA

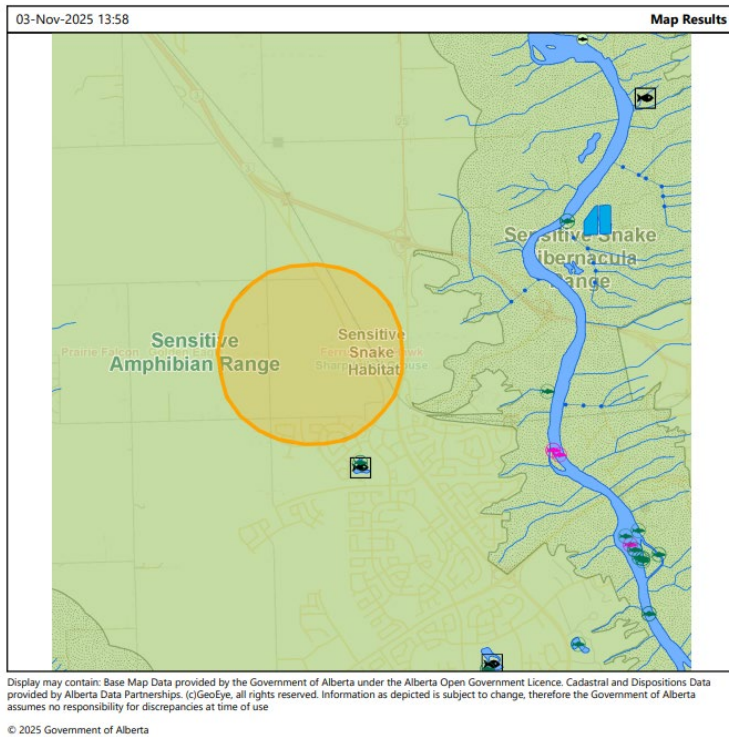
Stocked Inventory
No Species Found in Search Extent

Buffer Extent

Centroid (X,Y)	Projection	Centroid (Qtr Sec Twp Rng Mer)	Radius or Dimensions
650793, 5505732	10-TM AEP Forest	SW 3 9 22 4	2155, 2102 meters

Contact Information

For contact information, please visit:
<https://www.alberta.ca/fisheries-and-wildlife-management-contacts.aspx>



Historical Resource Search Reports:

Option 2a & 2c

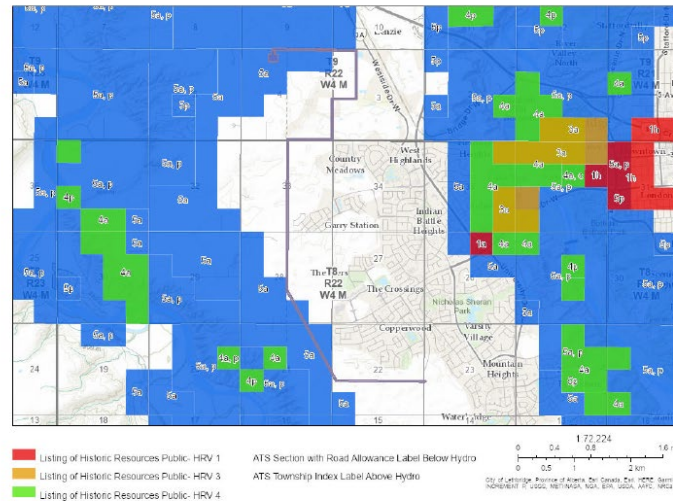


Listing of Historic Resources Screening Report

Area of Interest (AOI) Information

Area : 334,711.92 m²

Oct 22 2025 13:43:44 Mountain Daylight Time



Summary

Name	Count	Area(m ²)	Length(m)
HRV 1	0	0	N/A
HRV 3	0	0	N/A
HRV 4	0	0	N/A
HRV 5	4	100,846.67	N/A

HRV 5

#	ATS	HRV	CATEGORY	MER	RNG	TWN	SEC	LSD
1	LSD-1-16 Sec-09 Twp-009 Rge-22 Mer-4	5	a	4	22	9	9	1-16
2	LSD-2-6,12,13 Sec-28 Twp-008 Rge-22 Mer-4	5	a	4	22	8	28	2-6,12,13
3	LSD-1,8-10,13-16 Sec-21 Twp-008 Rge-22 Mer-4	5	a	4	22	8	21	1,8-10,13-16
4	LSD-5,11-16 Sec-04 Twp-009 Rge-22 Mer-4	5	a	4	22	9	4	5,11-16

#	RuleID	Override	Area(m ²)
1	5	No Data	2,915.75
2	5	No Data	15,205.04
3	5	No Data	29,341.49
4	5	No Data	53,384.38

Activities planned for lands not included in the Listing of Historic Resources may still require Historical Resources Act approval. The results of a Listing search MUST be used in conjunction with the information provided in the Instructions for Use of the Listing of Historic Resources.

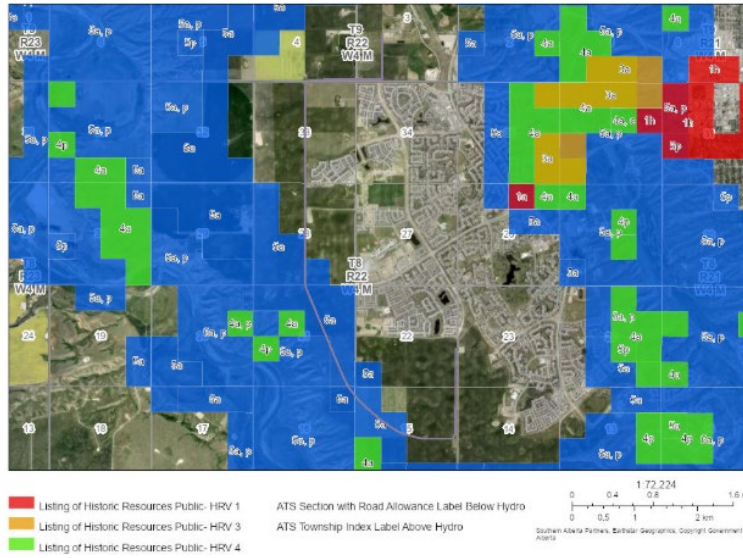
Option 2e:

Listing of Historic Resources Screening Report

Area of Interest (AOI) Information

Area : 103,653.99 m²

Nov 3 2025 14:41:10 Mountain Standard Time



Name	Count	Area(m ²)	Length(m)
HRV 1	0	0	N/A
HRV 3	0	0	N/A
HRV 4	0	0	N/A
HRV 5	5	33,993.22	N/A

HRV 5

#	ATS	HRV	CATEGORY	MER	RNG	TWN	SEC	LSD
1	LSD-2-7,11,12 Sec-21 Twp-008 Rge-22 Mer-4	5	a, p	4	22	8	21	2-7,11,12
2	LSD-16 Sec-16 Twp-008 Rge-22 Mer-4	5	a	4	22	8	16	16
3	LSD-2-6,12,13 Sec-28 Twp-008 Rge-22 Mer-4	5	a	4	22	8	28	2-6,12,13
4	LSD-1,2,6,11-13 Sec-15 Twp-008 Rge-22 Mer-4	5	a	4	22	8	15	1,2,6,11-13
5	LSD-1,8-10,13-16 Sec-21 Twp-008 Rge-22 Mer-4	5	a	4	22	8	21	1,8-10,13-16

#	RuleID	Override	Area(m ²)
1	5	No Data	1,448.49
2	5	No Data	1,670.04
3	5	No Data	4,327.55
4	5	No Data	10,466.28
5	5	No Data	16,080.86

Activities planned for lands not included in the Listing of Historic Resources may still require Historical Resources Act approval. The results of a Listing search MUST be used in conjunction with the information provided in the Instructions for Use of the Listing of Historic Resources.

Alberta Listing of Historic Resources Screening Report

Area : 3,324.84 m²

The map displays Section 36 T.8 R.22 W.4M, which is divided into four quarter sections. The map includes topographic features like the Snake River and Snake River Park, and labels for various landmarks such as the Snake River and Snake River Park. A legend at the bottom explains the symbols used: red for Historic Resources Public-HRV 1, orange for Historic Resources Public-HRV 3, green for Historic Resources Public-HRV 4, and white for ATO Legal SubDivision with Road Allowance Label Below Right. It also includes a scale bar from 0 to 0.2 miles and a north arrow.

Name	Count	Area(m²)	Length(m)
HRV 1	0	0	N/A
HRV 3	0	0	N/A
HRV 4	0	0	N/A
HRV 5	1	3,324.84	N/A

#	ATS	HRV	CATEGORY	MER	RNG	TWN	SEC	LSD
1	LSD-1-16 Sec-36 Twp-008 Rge-22 Mer-4	5	a, p	4	22	8	36	1-16

#	RuleID	Override	Area(m²)
1	5	No Data	3,324.84

69

Option 5b:

Alberta Listing of Historic Resources Screening Report

Area of Interest (AOI) Information

Area : 20,736.54 m²

Nov 3 2025 14:31:28 Mountain Standard Time



Summary

Name	Count	Area(m ²)	Length(m)
HRV 1	0	0	N/A
HRV 3	0	0	N/A
HRV 4	0	0	N/A
HRV 5	0	0	N/A

Activities planned for lands not included in the Listing of Historic Resources may still require Historical Resources Act approval. The results of a Listing search MUST be used in conjunction with the information provided in the Instructions for Use of the Listing of Historic Resources.