ENVIRO MAK Inc. Environmental Management Consultants

Via Email

September 27, 2024 *EnviroMak File Reference #16-07-04*

MPE Engineering
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Edmonton AB T5S 1H8
Email: ikagoro@mpe.ca

Attention: Mr. Ivan Kagoro

**RE: DRAFT ENVIRONMENTAL SCREENING AND DELINEATION OF WETLANDS TO INFORM EVALUATION OF FEASIBILITY OF BLACKFOOT WASTEWATER TREATMENT EFFLUENT DISPOSAL IN PARTS OF SE12-50-2-W4M IN COUNTY OF VERMILLION RIVER, ALBERTA**

## *1.0 Introduction & Background*

EnviroMak Inc. Environmental Management Consultants (EnviroMak Inc.) was retained by MPE Engineering on behalf of the Vermillion River County to complete an environmental and wetland in SE12-50-2-W4M near the Hamlet of Blackfoot in the County of Vermillion River, Alberta to inform planning and evaluation of Blackfoot wastewater treatment effluent disposal options.

## *2.0 Objective*

The specific objective was to conduct an environmental existing information review including comprehensive historical aerial photograph interpretation and field reconnaissance for delineation of potential wetlands and key environmental features to inform project planning.

## *3.0 Location and Assessment Area*

The assessment area (AA) consisted of the entire quarter section of SE12-50-2-W4M (~65 ha) located near the Hamlet of Blackfoot in the County of Vermillion River, Alberta. The AA is bordered to the east by Range Road 20 and is approximately 1.6 km north of Highway 16 (Yellowhead Highway) (Figures 3.1 – 3.4). Approximately one third of the AA was covered by wetlands and waterbodies. A small section of the AA contained tree stands (~2.23 ha) and an additional small area was developed/disturbed by roads, landscaped trees and house remnants (~2.30 ha). The remaining area within the AA was agriculture and pastureland.

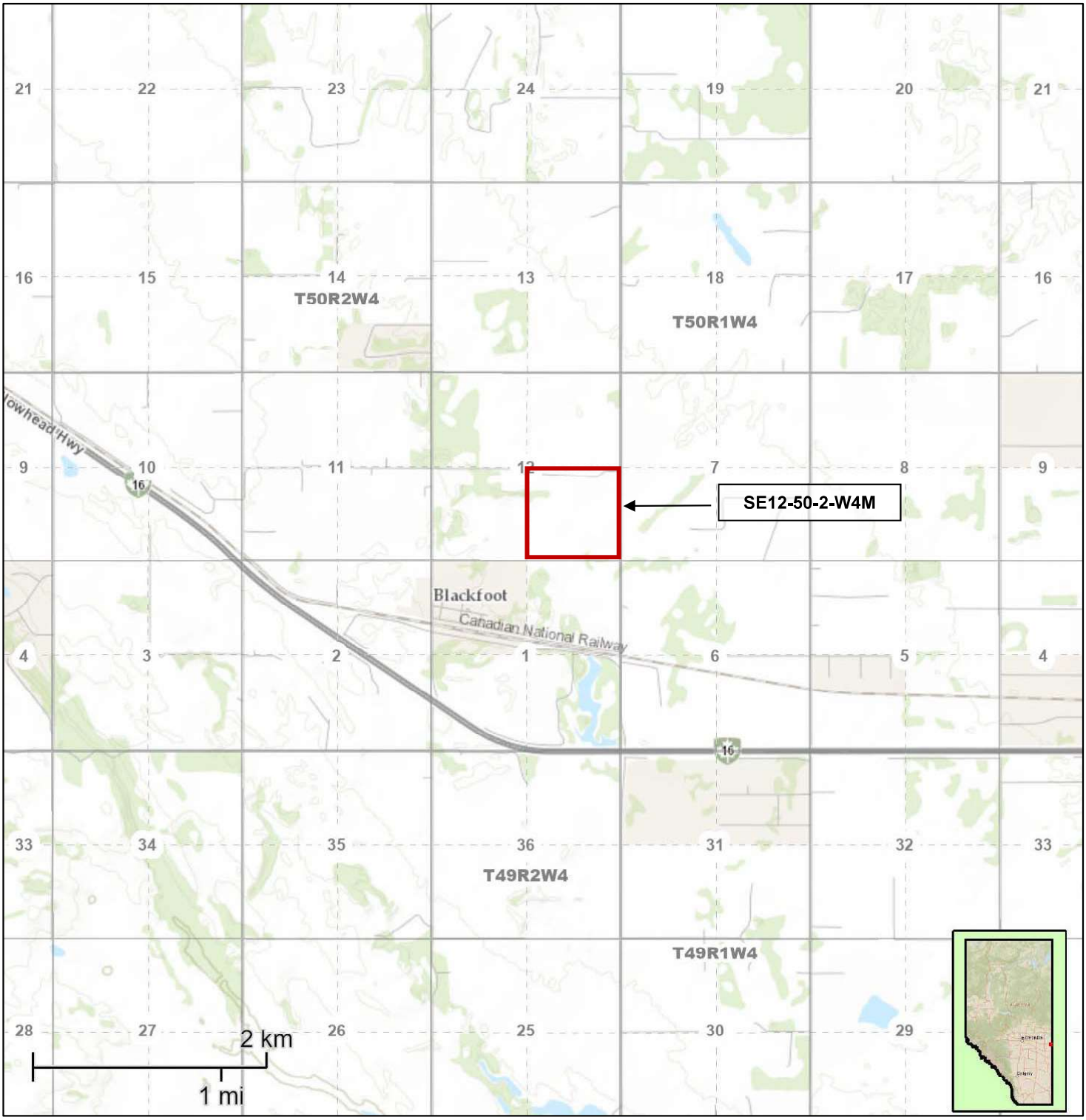



**Figure 3.1.** Quarter section SE12-50-2-W4M (approximately outlined in red) (Alberta Agriculture and Forestry 2024).

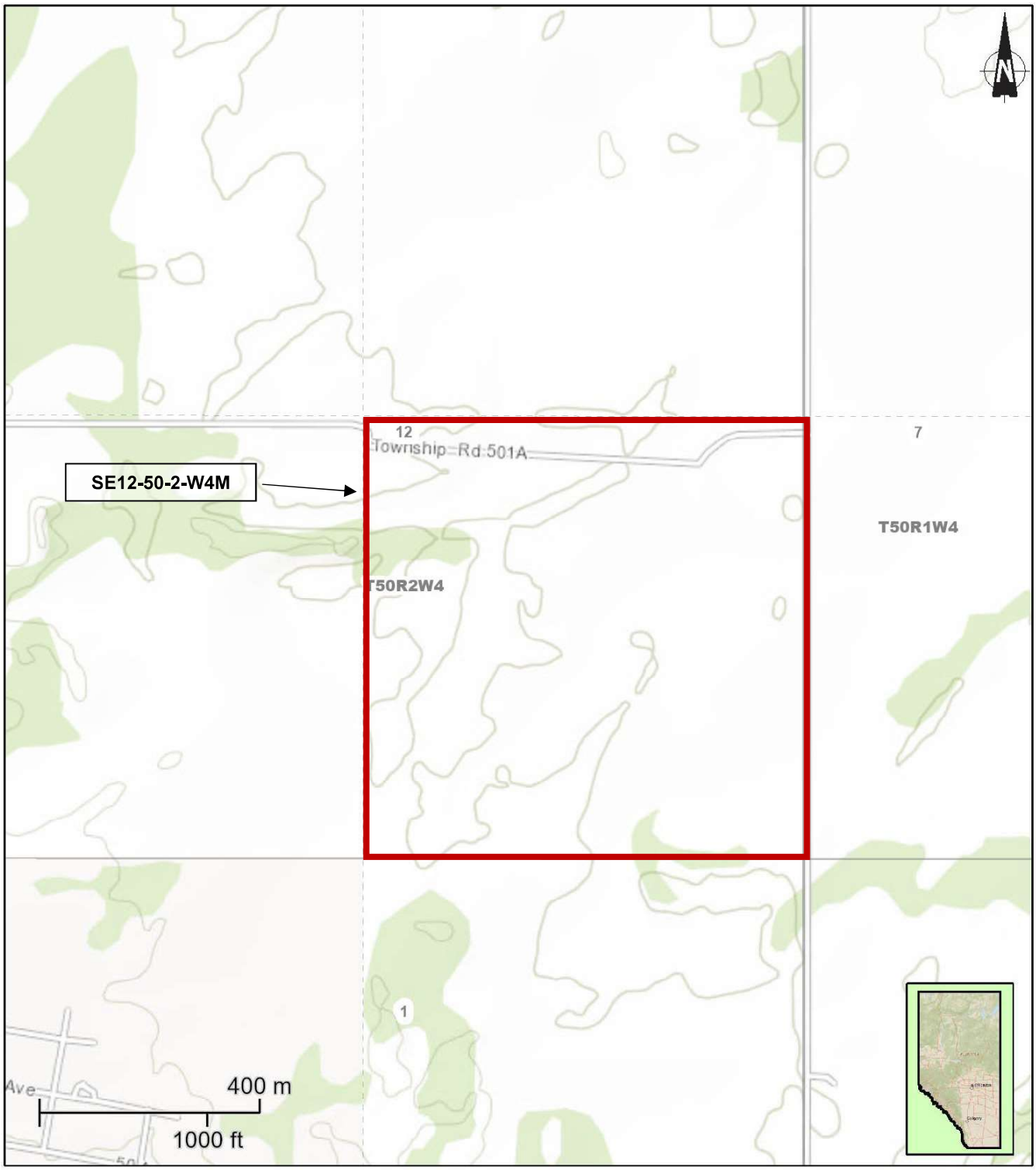



**Figure 3.2.** Quarter section SE12-50-2-W4M (approximately outlined in red) (Alberta Agriculture and Forestry 2024).

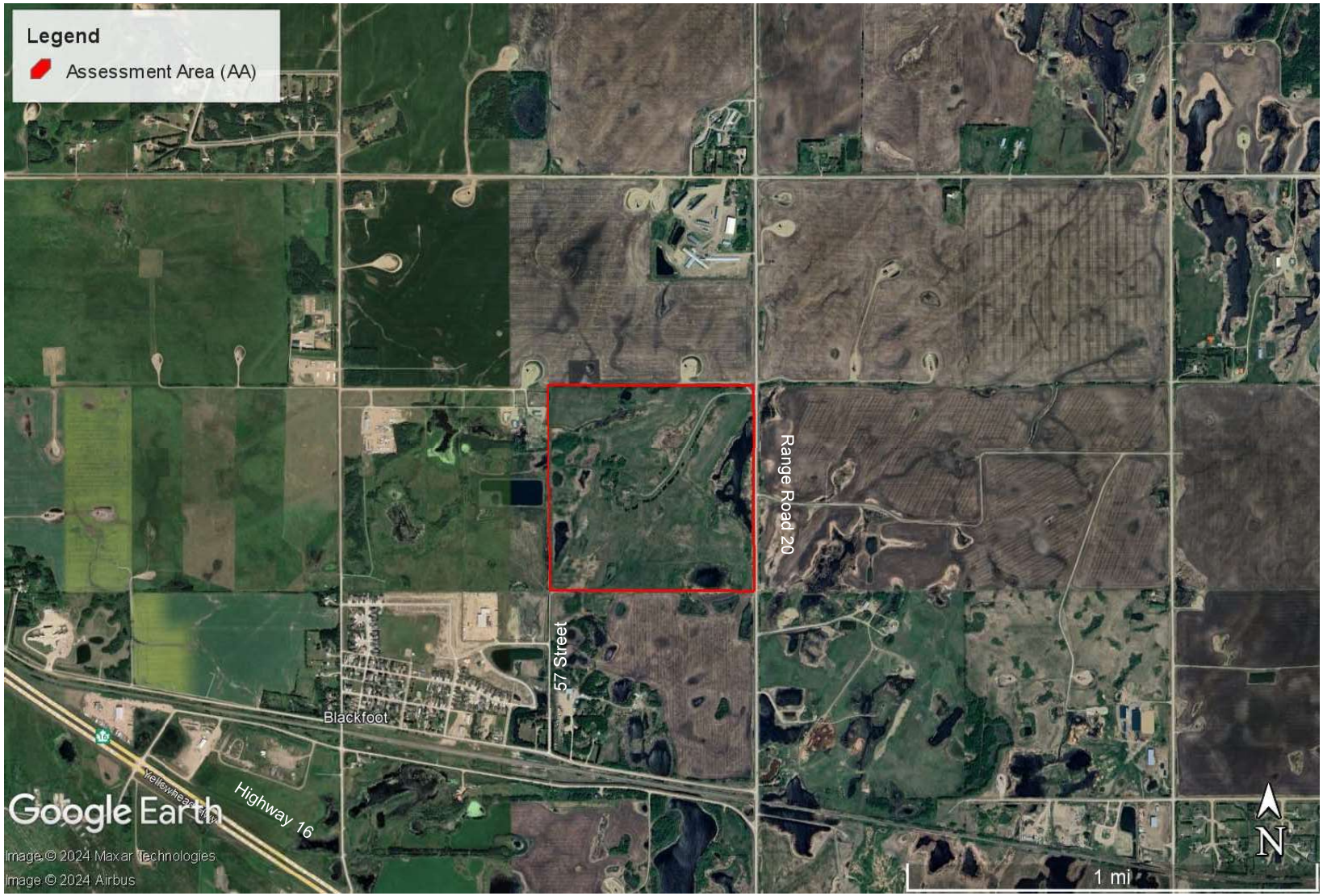



**Figure 3.3.** Aerial image of SE12-50-2-W4M (outlined in red) (Imagery Date May 31, 2022; Google Earth Pro 2024).


**Figure 3.4.** Aerial image of SE12-50-2-W4M (outlined in red) (Imagery Date May 31, 2022; Google Earth Pro 2024).

The following provides a description of the adjoining lands:

- North & East**:** Agricultural (cultivated) crop lands were located directly to the north, along with rural low-density residential. Similar land use extended further north and east from the AA.
- West: A storage pond was located directly west of the AA. Agricultural (cultivated) crop land and potential wetlands appeared to be primary land use further west.
- South: Agricultural (cultivated) crop lands were apparent to the south of the AA. The Hamlet of Blackfoot was located to the southwest of the AA. Located south of the Hamlet of Blackfoot is a railroad and Highway 16.

## *4.0 Methodology*

The desktop existing information review utilized existing ecological resources including, as available and applicable, map and aerial photography interpretation and comparative examination, existing database queries, previous environmental assessments and/or geotechnical investigations, preliminary engineering design and/or conceptual plans, environmental report research, and interviews with landowners, stakeholders, regulators, proponent and others.

Valued ecosystem components (VECs) were identified from existing information including consideration of Elements-At-Risk which were collected from a variety of sources. Elements-At-Risk include plants and animals considered at risk due to being restricted to a small portion of their former range or extent based on a combination of Alberta Conservation Information Management System (ACIMS 2024) tracking and watch lists, federal endangered species lists (COSEWIC 2024), provincial at risk and may be at risk species list (Government of Alberta 2020), Fish and Wildlife Management Information System (FWMIS 2024) and other sources.

The Landscape Analysis Tool (LAT) report (EPA/AER 2024) was used to identify location specific features (Crown ownership, municipality, sensitive wildlife features, provincial sanctuaries, watercourses, etc.) that aid in mitigation planning for a variety of construction activities. The LAT generates a report that provides approval standards and operating conditions based on the features identified within the selected area.

The Alberta Wetland Identification and Delineation Directive (Government of Alberta 2015b) was followed where applicable. Aerial photography from a variety of seasons and over a specified time period were procured and interpreted as per the procedures and methods set forth in the 2015 document. Potential wetlands were preliminarily classified, with limitations. Field reconnaissance for wetland delineation of a portion of the quarter section was undertaken by EnviroMak in June 2023. This information was incorporated into this environmental screening as applicable. The field reconnaissance in 2023 did not

cover the entire quarter section. In September 2024, growing season field reconnaissance was conducted for the entire quarter section.

## 5.0 Results

### 5.1. Climate

Climate data was gathered from the Alberta Climate Information Service (ACIS) Interpolated Weather Data (Government of Alberta 2024). Since 1950 the Township of T050 R02 W4 has had a mean annual temperature of 1.8 ºC with a ten year mean annual temperature of 2.5 ºC from 2023 - 2014 (Government of Alberta 2024).

Precipitation data was also reviewed for the area of SE12-50-2-W4M, as was collected by Alberta Agriculture and Forestry through Alberta Climate Information Service (Alberta Agriculture and Forestry 2024, Government of Alberta 2024). The calculated average total accumulated precipitation in June, July and August between the years 1950-2023 was approximately 77.9 mm, 76.1mm and 58.6 mm (Government of Alberta 2024). Mean annual precipitation between 1950-2023 was 403.45 mm (Government of Alberta 2024).

### 5.2. Ecoregion

The assessment area is within the Parkland Natural Region, Central Parkland subregion (Government of Alberta 2005; Table 5.1). The Central Parkland subregion is a broad natural region that is principally characterized by undulating till plains and hummocky uplands (Government of Alberta 2005, Alberta Parks 2015). Much of the area is cultivated and heavily populated, with some remnant native parkland vegetation. Central Parkland is generally intermediate in terms of precipitation, temperature and growing season characteristics (Government of Alberta 2005, Alberta Parks 2015).

### 5.3. Topography, Soils and Terrain

According to the existing information, the majority of the AA exhibits an undulating, high relief landform with a limiting slope of 4%. In the southeast of the AA there is hummocky, low relief landforms with a limiting slope of 6% (Alberta Agriculture and Forestry 2024). Generally, the overall topography of the area collected from Google Earth Pro (2024) indicates relatively flat topography with gentle slopes.

The AA is within the Thin Black Soil Zone of East-Central Alberta (Soil Correlation Area 7; Agroclimate 2H) (Alberta Soil Information Centre 2016). The Alberta Agriculture and Forestry's (2024) Alberta Soil Information Viewer describes the landform and soils within the AA as Orthic Black Chernozem on medium textured till. The area includes poorly drained soils. Orthic Black Chernozem soils typically occur in mesophotic grasses and forbs or with mixed grasses and tree cover, have an A horizon with a color value darker than 3.5 wet and dry, and an eluvial horizon or horizons at least 2 cm thick which is usually underlain

by weakly to moderately developed illuvial clay horizon (Canadia Soil Classification Working Group 1998). Descriptions of the soils, landforms, landscape model and agricultural LSRs observed within and surrounding the assessment area are provided in Figure 5.1.

### *5.4. Agriculture*

The Government of Alberta's Land Suitability Rating (LSR) system outlines the procedure for evaluating the suitability of land for agricultural production based on climate, soil and landscape. According to the Alberta Agriculture and Forestry's (2024) Alberta Soil Information Viewer, the AA intersects two Land Suitability Rating (LSR) polygons per the below.

- Northeast Portion of AA (Dominant Area): Land Suitability Rating (LSR) of (Spring Grains) 2H(6) - 3M(2) - 5W(2): Indicating that 60% of the area has slight limitations from inadequate heat units for optimal growth; 20% of the area is moderately limited by water holding capacity of the soil; 20% of the area is very severely limited by excess water (not due to inundation) (Alberta Agriculture and Forestry 2024).
- Southeast Portion of AA (Marginal Area): Land Suitability Rating (LSR) of 2HT(6) - 3MT(2) - 5W(2): Indicating that 60% of the area is slightly limited by inadequate heat units needed for optimal growth and slope conditions; 20% of the area is moderately limited by water holding capacity of the soil and slope conditions; 20% of the area is very severely limited by excess water (not due to inundation) (Alberta Agriculture and Forestry 2024).

Based on aerial photography review, the area has been consistently used for agricultural cropland purposes outside of prominent wetland features.

### *5.5. Surficial Geology and Hydrogeology*

The primary bedrock geology underlying the AA can be classified as part of the Lea Park Formation which can be described as Upper Cretaceous "medium to dark grey mudstone; thin stringers of fine-grained, tan siltstone to fine-grained sandstone; thin-bedded, light grey bentonite; sideritic concretions; calcite veining common; intertongues with shallow to marginal-marine sandstone of the lower Belly River Group in east-central Alberta; mudstone tongues in ascending stratigraphic order: Shandro, Vanesti, Grizzly Bear, and Mulga; marine" (Prior et al. 2013). The surficial geology of the AA can be classified as Fluted Moraine which can be described as "Glacially streamlined sediments, mainly till; terrain varies from alternating furrows and ridges to elongated smoothed hills which parallel the inferred local ice-flow direction; includes flutes, drumlins, and drumlinoids." (Fenton et al. 2013).

The Government of Alberta's (2024e) Water Well Map Viewer produced 1 drilling report within the AA within parts of SE12-50-2-W4M. The test well, drilled on April 19, 1979, on behalf of the Hamlet of Blackfoot, had a static water level of 42 m (GOA 2024e).

### *5.6. Historical Resource Listing, Historic Places and Heritage Sites*

The Listing of Historic Resources (Alberta Historic Resources Management Branch 2023) did not assign a Historic Resource Value (HRV) to SE12-50-2-W4M (Table 5.1). Land that has been identified to contain potential historic resources are assigned a Historic Resource Value (HRV) which indicates the level of protection given to those lands. HRV 1 is awarded the highest level of protection and HRV 5 the lowest. Additionally, lands are categorized alphabetically to describe the primary historic resource category of concern (a: archaeological; c: cultural; gl: geological; h: historic period; n: natural; p: paleontological) (Alberta Historic Resources Management Branch 2024).

According to the Government of Alberta's (2024b) Heritage Resources Management Information System (HeRMIS) Alberta Register of Historic Places, no provincial historic places were designated within the immediate assessment area. No national or world heritage sites were located within the AA.

### *5.7. Environmentally Significant, Protected and Sensitive Areas and Ranges*

As per the Government of Alberta's Environmentally Significant Areas Map (Government of Alberta 2014), the quarter section containing the AA was not designated a Provincial or National environmentally significant area (ESA) (Table 5.1; Figure 5.2). The polygon containing the AA scored an ESA sum of 0.07 consisting of:

Criteria Sum 1 (CR1): Areas that contain focal species, species groups, or their habitats = 0

Criteria Sum 2 (CR2): Areas that contain rare, unique, or focal habitat = 0

Criteria Sum 3 (CR3): Areas with ecological integrity = 0.07

Criteria Sum 4 (CR4): Areas that contribute to water quality and quantity = 0

The area did not score greater than a sum of 0.189, which is the threshold score for ESA designation (Government of Alberta 2014).

The Government of Alberta's Fish and Wildlife Management Information System (FWMIS 2024) and Landscape Analysis Tool (AEP/AER 2024) were accessed to identify additional sensitivities (Table 5.1). It was determined that the site was located within the following sensitive areas/or management ranges: Central Parkland, Grassland and Parkland Natural Region, and Sharp-tailed Grouse Survey Area (EPA/AER 2024).

The assessment area is not located within any additional provincial or national protected areas and/or management ranges (e.g. Park, Ecological Reserve, Wildlife Sanctuary, Wilderness/Natural Area, etc.) (EPA/AER 2024).

### *5.8. Hydrology and Watershed*

SE12-50-2-W4M is located in the lower portion of the North Saskatchewan River basin (Government of Alberta 2024c). Per FWMIS (2024), no watercourses or lakes were mapped within or overlapping the AA.

Review of aerial photograph imagery was conducted to further identify unmapped wetlands, other waterbodies and hydrological features as possible. The results of this review are provided in report sections that follow.

**Table 5.1.** Desktop limited environmental screening review results for assessment area (AA) covering SE12-50-2-W4M.

| Descriptor | Specific Location |
|---|---|
| Legal Land Description | SE12-50-2-W4M |
| [7]Green/White Management Area | White |
| [10] Ecoregion | Parkland – Central Parkland |
| [3] Municipality | County of Vermilion River |
| [6] Nearest Town/City | City of Lloydminster and Hamlet of Blackfoot |
| [5] Historical Resource Value (HRV) Listing | None |
| Protected Parks and/or ESAs ([4] Provincial and/or National) | Provincial and National – No ESA or Protected Parks overlap AA. |
| [3,7] Wildlife Sensitive Ranges and/or Management Areas | Central Parkland<br>Grassland and Parkland Natural Region<br>Sharp-tailed Grouse Survey Area |
| Wildlife Documented Occurrences | No documented occurrences of SARA listed wildlife species within 2 km of AA.<br>Some sensitive species occurrences noted. |
| [6] Watershed | North Saskatchewan River Basin |
| [1] Soil Correlation Area | 7 |
| [3] First Nations Land | None as per FWMIS |
| [3] Mapped Watercourses or Waterbodies and Known Crown Claimed Bed and Shore | None mapped within or overlapping AA.<br>Water Boundaries determination of Crown-claimed bed and shore not undertaken but none anticipated to be within or overlapping AA. |
| [6] Wetlands and Waterbodies | Yes, wetlands and/or waterbodies overlap AA. |
| Fish and Fish Habitat | None anticipated to be within or overlapping AA. |
| [8] Aquatic Species at Risk (SAR) Ranges | None |
| [8] Aquatic Species at Risk (SAR) Critical Habitat | None |
| [9] Rare or Sensitive Plants | None |

[1]Alberta Soil Information Centre 2016 [3]FWMIS 2024 [4]Government of Alberta 2014b – ESA Maps
[5]Alberta Historic Resources Management Branch (Spring 2024 Listing) [6]Google Earth Pro 2024
[7]EPA/AER 2024 – LAT Report [8]DFO 2024 [9]ACIMS 2024 ESA – Environmentally Significant Area

### *5.9. Fish and Fish Habitat*

The Fish and Wildlife Management Information System (FWMIS 2024) did not have any documented occurrences of fish directly within the AA (Figure 5.3). Previous fishing effort was undertaken within the AA by EnviroMak in May 2016 within wetlands of borderline or sufficient depth of water to support fish. No fish were observed or captured in any of the five wetlands fished via minnow trapping at that time (EnviroMak 2016).

No documented occurrences of fish were noted for Lloydminster Lake (WBID 7015) located to the south of the AA. Rainbow Trout (*Oncorhynchus mykiss*) are known to be stocked in a recreational waterbody known as Lloydminster Pond (WBID 6760) located southeast of the AA (FWMIS 2024).

As per the Department of Fisheries and Oceans (DFO) Aquatic Species at Risk Map (2024), no federally listed aquatic species within Schedule 1 of the *Species at Risk Act* and no mapped critical aquatic habitat for aquatic Species at Risk were noted within or overlapping the AA (Figure 5.4). Per FWMIS (2024), SE12-50-2-W4M falls into the White Zone (Low Risk) of the Aquatic Invasive Species (AIS) Decontamination Zone/Risk Level; however, this is only applicable to activities within fish-bearing watercourses/waterbodies.

On September 5, 2024, minnow traps were set within two dugouts contained within Wetland 4 which was previously identified as potentially containing sufficient water to support fish presence. In total, one wetland with two dugouts on the property had minnow traps set within them (Table 5.1b). After a total of 192 hours of minnow trapping effort, no fish were observed nor caught within any of the dugouts. No spawning activities, eggs, or minnows were observed within any of the wetlands.

On September 5, 2024, dissolved oxygen (mg/L) measurements were collected at the dugouts (Table 5.1c). Measurements were taken from the edges of the dugouts where accessible.

**Table 5.1b.** Summary of fishing effort at SE12-50-2-W4M on September 5 and 6, 2024.

| Location[1] | Electrofishing | | | Minnow Trapping | | All Methods - Total Fish Caught |
|---|---|---|---|---|---|---|
| | Area ($m^2$) | Effort/ Time (sec) | Number & Species of Fish Caught | Effort/ Time (hrs) | Number & Species of Fish Caught | |
| Wetland 4 North Dugout | - | - | - | 96 | 0 | **0** |
| Wetland 4 South Dugout | - | - | - | 96 | 0 | **0** |
| **Total** | | | | **192** | **0** | **0** |

**Table 5.1c**. Dissolved Oxygen levels (mg/L) with dugouts in Wetland 4 on September 5, 2024.

| Location | Dissolved Oxygen (mg/L) |
|---|---|
| Wetland 4 North Dugout | 1.42 |
| Wetland 4 South Dugout | 9.58 |

### *5.10. Wildlife (Mammals, Birds, Amphibians and Reptiles)*

A data search of the Fish and Wildlife Management Information System (FWMIS 2024) indicated the presence of three documented occurrences of a wildlife species within a 2 km radius of the AA (Table 5.2). The Black Tern (*Chlidonias niger*), Horned Grebe (*Podiceps auratus*) and Sora (*Porzana Carolina*) are listed as 'Sensitive' within the province of Alberta. Federally, the Horned Grebe is listed as 'Special Concern' within the *Species at Risk Act* and of 'Special Concern' per the Committee on the Status of Endangered Species of Canada (COSEWIC).

**Table 5.2.** Wildlife species of concern which have been documented to occur within a 2 km radius of SE12-50-2-W4M according to the FWMIS (2024).

| Common Name | Scientific Name | Provincial Status[1,2] | | Federal Status[3,4] | |
|---|---|---|---|---|---|
| | | General Status Listing[1] | Wildlife Act[2] | SARA[3] | COSEWIC[4] |
| Black Tern | *Chlidonias niger* | Sensitive | Not Listed | Not Listed | Not at Risk |
| Horned Grebe | *Podiceps auritus* | Sensitive | Not Listed | Special Concern | Special Concern |
| Sora | *Porzana Carolina* | Sensitive | Not Listed | Not Listed | Not Listed |

[1]Government of Alberta 2020 (Updated 2022) – Wild Species Status Search
[2]Province of Alberta 1997 – Alberta *Wildlife Act*
[3]Govenment of Canada 2002 – *Species at Risk Act* (SARA)
[4]Government of Canada 2024b – Species Search; Species at Risk Public Registry

Wildlife likely to be found with the AA include large terrestrial mammals such as White-tailed Deer (*Odocoileus virginianus*) and Moose (*Alces alces*), medium terrestrial mammals such as Coyote (*Canis latrans*), Common Porcupine (*Erethizon dorsatum*) and Snowshoe Hare (*Lepus americanus*) and small terrestrial mammals such as Red Squirrel (*Tamiasciurus hudsonicus*) and various small rodent species. Amphibians potentially located within the AA include the Wood Frog (*Lithobates sylvatica*) and Boreal Chorus Frog (*Pseudacris maculate*). Various avian species likely to occur within the AA include birds-of-prey such as Red-tailed Hawk (*Buteo jamaicensis*) and Merlin (*Falco collumbarius*), Waterfowl such Mallard (*Anas platyrhynchos*), Northern Shoveler (*Spatula clypeata*) and American Coot (*Fulica americana*) and other various birds including American Robin (*Turdus migratorius*), Black-capped Chickadee (*Poecile atricapillus*), Yellow Warbler (*Densroica petechia*) and Song Sparrow (*Melospiza melodia*).

In 2015, EnviroMak conducted field reconnaissance of the AA during which time in mid-November, there were limited signs of wildlife indicating the presence of deer (*Odocoileus* sp.), common porcupine (*Erethizon dorsatum*), pocket gophers (*Thomomys talpoides*), numerous shrews/voles, muskrat (*Ondatra zibethicus*), coyote (*Canis latrans*) and beaver (*Castor canadensis*). Five species of bird were observed and/or heard within the study area, including Black-capped Chickadees (*Poecile atricapillus*), American Goldfinches (*Spinus tristis*), Black-billed Magpie (*Pica hudsonia*), Downy Woodpecker (*Picoides pubescens)* and Common Raven (*Corvus corax*). Old nesting signs indicated that vireo (*Vireo* sp.) found suitable habitat within the property for breeding. No Sharp-tailed Grouse leks were observed, and, as the area was mostly heavily disturbed grassland (repeated cattle grazing) and has been historically cultivated and used for hay, it is unlikely that leks and/or Sharp-tailed Grouse nesting would be present in this area.

On September 5 and 6, 2024, a wildlife survey of the AA was conducted. Results are presented in Figure 5.8.

### *5.11. Existing Vegetation Information*

With respect to vegetation, the Alberta Conservation Information Management System (ACIMS 2024) database did not contain sensitive or non-sensitive element occurrences for within or immediately surrounding the assessment area (Figure 5.5). No federally listed vegetation species within Schedule 1 of the *Species at Risk Act* were documented within the area of SE12-50-2-W4M. A lack of records does not necessarily mean that there are no rare elements within the area; however, it may indicate that no inventory has been undertaken.

The AA appears to be predominantly cultivated and tame pasture. Wetland vegetation likely to be observed within the wetlands located in the AA include common cattail (*Typha latifolia*), reed canary grass (*Phalaris arundinacea*), Willows (*Salix* sp.), Siberian peashrub (*Caragana arborescens*), sedges (*Carex* sp.), Slough Grass (*Beckmannia syzigachne*) and rushes. Vegetation within the tree stands located within the AA potentially include Trembling Aspen (*Populus tremuloides*), Balsam Poplar (*Populus balsamifera*), Red-osier Dogwood (*Cornus stolonifera*).

Field reconnaissance conducted by EnviroMak in November 2015 indicated that the AA was predominately used for agricultural purposes (cattle grazing). Interspersed through the property was a variety of vegetation, including noxious weeds. Overall vegetation was composed of mixed grassland with wetland areas and tree stands containing primarily mixed-age stands of various species. Two species of noxious weed, Canada Thistle (*Cirsium arvense*) and Common Tansy (*Tanacetum vulgare*), were observed throughout the project area. Due to seasonal conditions, identification of vegetation, particularly down to the species level, was limited.

## 5.12. Species at Risk

There were no documented occurrences of federally listed Species at Risk as listed under Schedule 1 of the *Species at Risk Act* (excluding species of Special Concern for which prohibitions do not apply) within the AA.

No aquatic Species at Risk and no mapped critical aquatic habitat for aquatic Species at Risk were found within the assessment area or within a 3 km radius around the AA per the Department of Fisheries and Oceans Aquatic Species at Risk Map (Figure 5.5).

## 5.13. Wetland Inventory and Delineation

### 5.13.1. Potential Wetland Inventory (AMWII)

A search of the Alberta Merged Wetland Inventory Index on the Government of Alberta's (2024d) GeoDiscover Map Viewer indicated the potential presence of a marsh wetland overlapping the AA (Figure 5.6). The wetland database is not complete and is not expected to capture all wetlands located on a specific parcel of land. Further, in some cases, wetlands that appear present in the database may not be present in actuality. The Alberta Wetland Rapid Evaluation Tool – Estimate of Relative Wetland Value by Section Index, accessed via the Government of Alberta's (2024d) GeoDiscover Map Viewer, is a dataset that provides a summary of all wetlands that are captured within the Alberta Merged Wetland Inventory and then provides both the estimated area of total wetlands within a section and the estimated class. Classes range from A-D; A being the highest valued wetlands and D being the lowest. It is estimated that there may be a total of 29 hectares of wetlands within 12-50-2-W4M, consisting of 9 hectares of class D wetlands, and 19 hectares of class C wetlands (Government of Alberta 2024d). Abundance and class of wetlands within the AA are similar in comparison to surrounding areas and in general, marsh wetlands were of greatest abundance within and surrounding the AA. The estimate is based on desktop-identified features (i.e. spatial data, historical aerial/ satellite imagery) and has not been field truthed.

### 5.13.2. Wetland Delineation (Desktop Evaluation with Growing Season Field Reconnaissance)

As per the Alberta Wetland Identification and Delineation Directive (Government of Alberta 2015b), identification of wetlands within an area that may be impacted require, at minimum, a desktop evaluation to determine the likely presence of wetlands. Aerial and ground level photographs of the area were collected, interpreted and compared in order to determine the historical land use of the area, as well as help to determine whether there were potential wetlands and/or waterbodies within the assessment area (Appendix 9.1; Figure 5.7). The aerial photography was obtained from Google Earth Pro (2024). Historical aerial photography from Alberta Environment and Protected Areas (EPA) were also obtained to complete the record. The 2016 Biophysical Assessment conducted by EnviroMak was resourced for previous field

data. The descriptive summary of historical aerial photography is provided in Table 5.3 and potential classification of wetlands is provided in Table 5.4.

Field reconnaissance was conducted in September 2024 including field level wetland delineation. This information will be detailed in a future report; however, wetland information captured in the figures and tables of this report reflect field verified information.

### *5.14. Human Use, Recreation and Aesthetics*

Considerable evidence of historic and current human use of the AA was indicated in the historical aerial photograph review (Table 5.3). This use was primarily associated with agricultural cultivation and cattle grazing with the exception of wetland areas that appeared consistently avoided throughout the years. Recreational activities and recreational use of the AA appeared to be very low. However, planted trees alongside a road in the AA are likely for aesthetic and/or agricultural (shelterbelt) use.

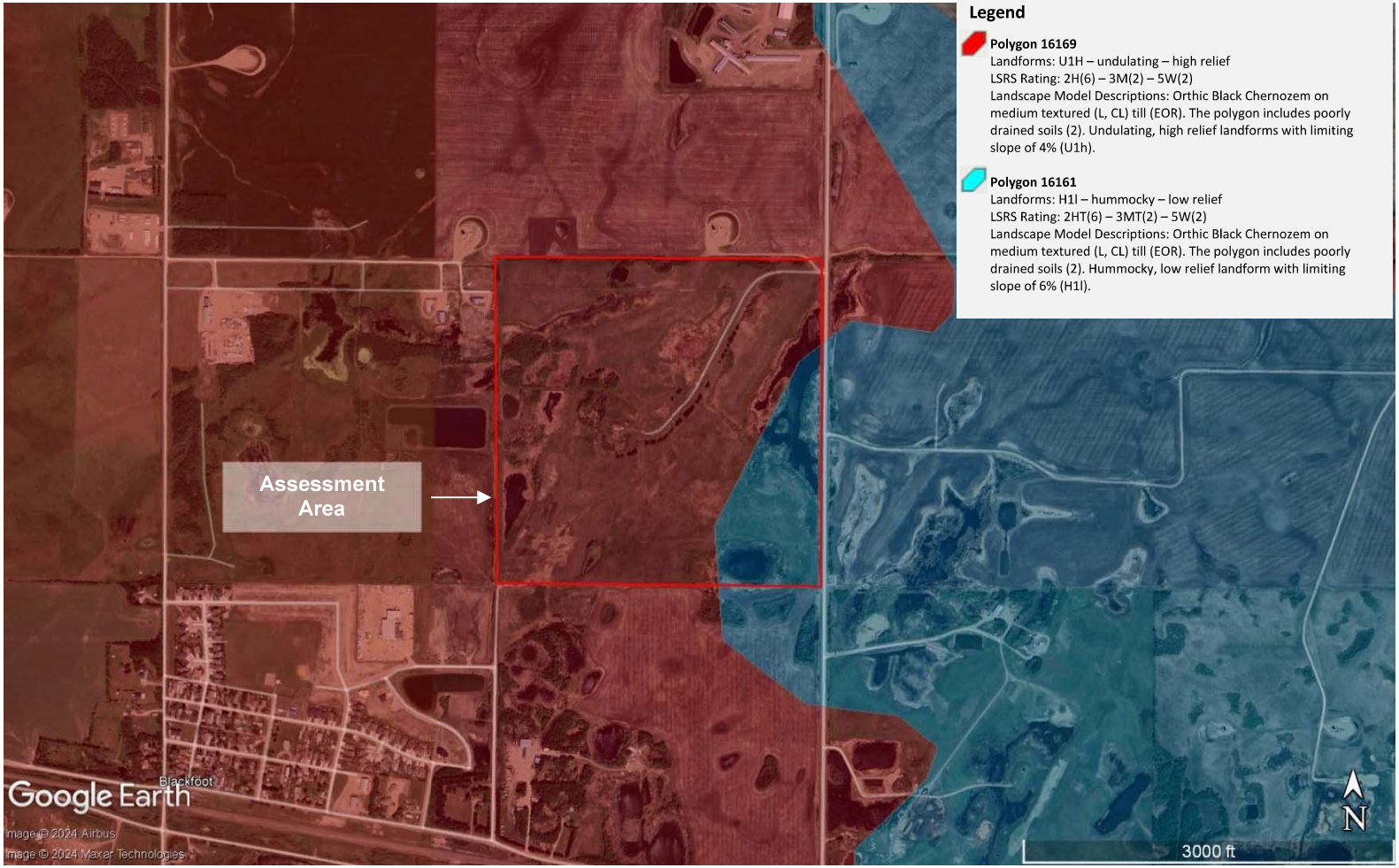



**Figure 5.1.** General landscape and soil information within and surrounding the assessment area (outlined in red) in SE12-50-2-W4M (reproduced from Alberta Agriculture and Forestry 2024; Online Alberta Soil Information Viewer).


**Figure 5.2**. Overview imagery of the Environmentally Significant Area (ESA) presence within and surrounding the assessment area in parts of SE12-50-2-W4M (reproduced from GOA 2014b; ESA Maps). ESAs are outlined and shaded in red if present.

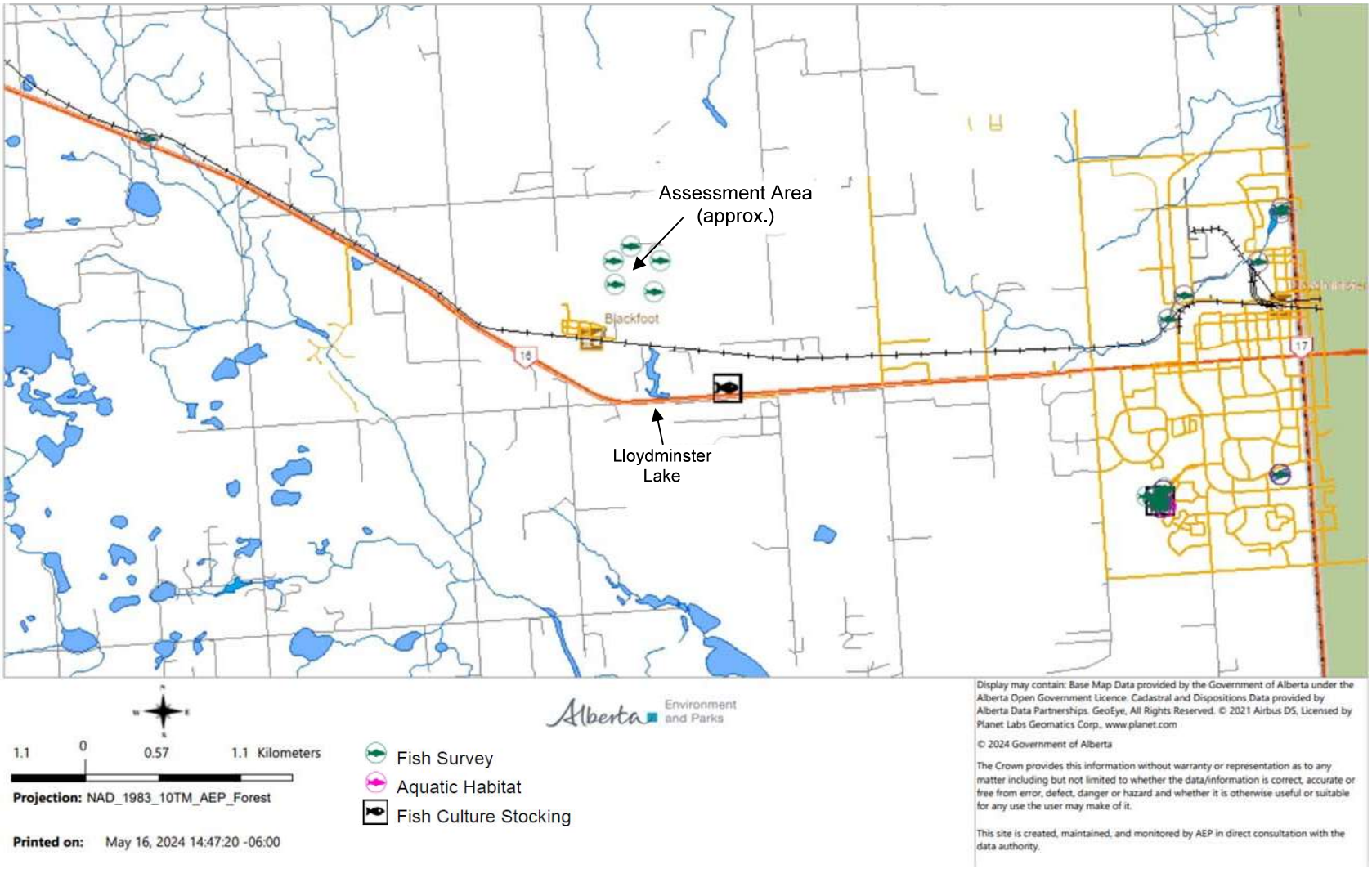



**Figure 5.3.** Fish surveys and aquatic habitat locations as noted within Government of Alberta's Fish and Wildlife Management Information System (FWMIS 2024) online map viewer; SE12-50-2-W4M, mapped hydrology features are in blue and labelled.

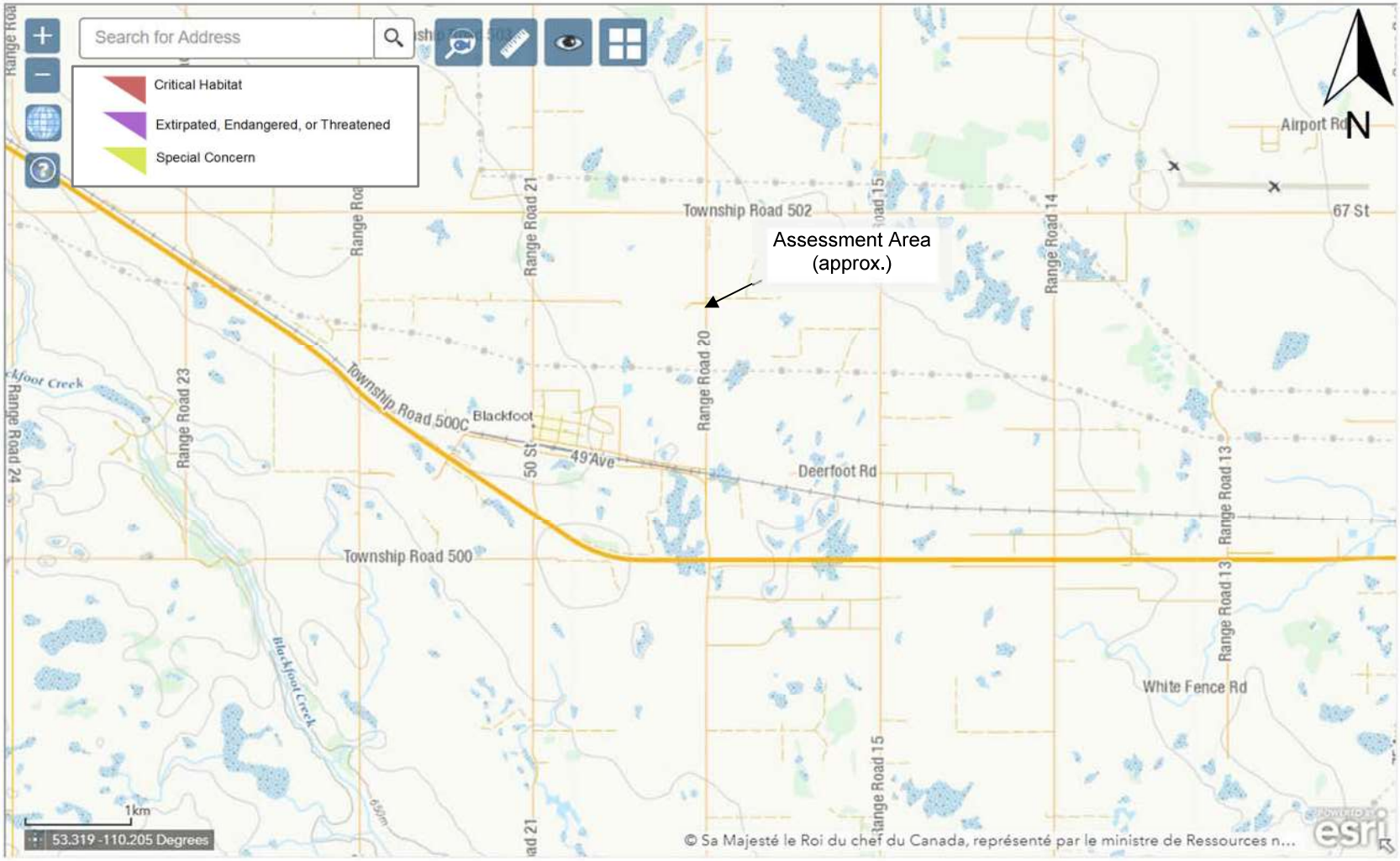



**Figure 5.4.** Overview imagery of the Aquatic Species at Risk Map (reproduced from DFO 2024a) which provides the distribution of aquatic Species at Risk and the presence of their critical habitat. No aquatic Species at Risk are documented in or near SE12-50-2-W4M (DFO 2024a).

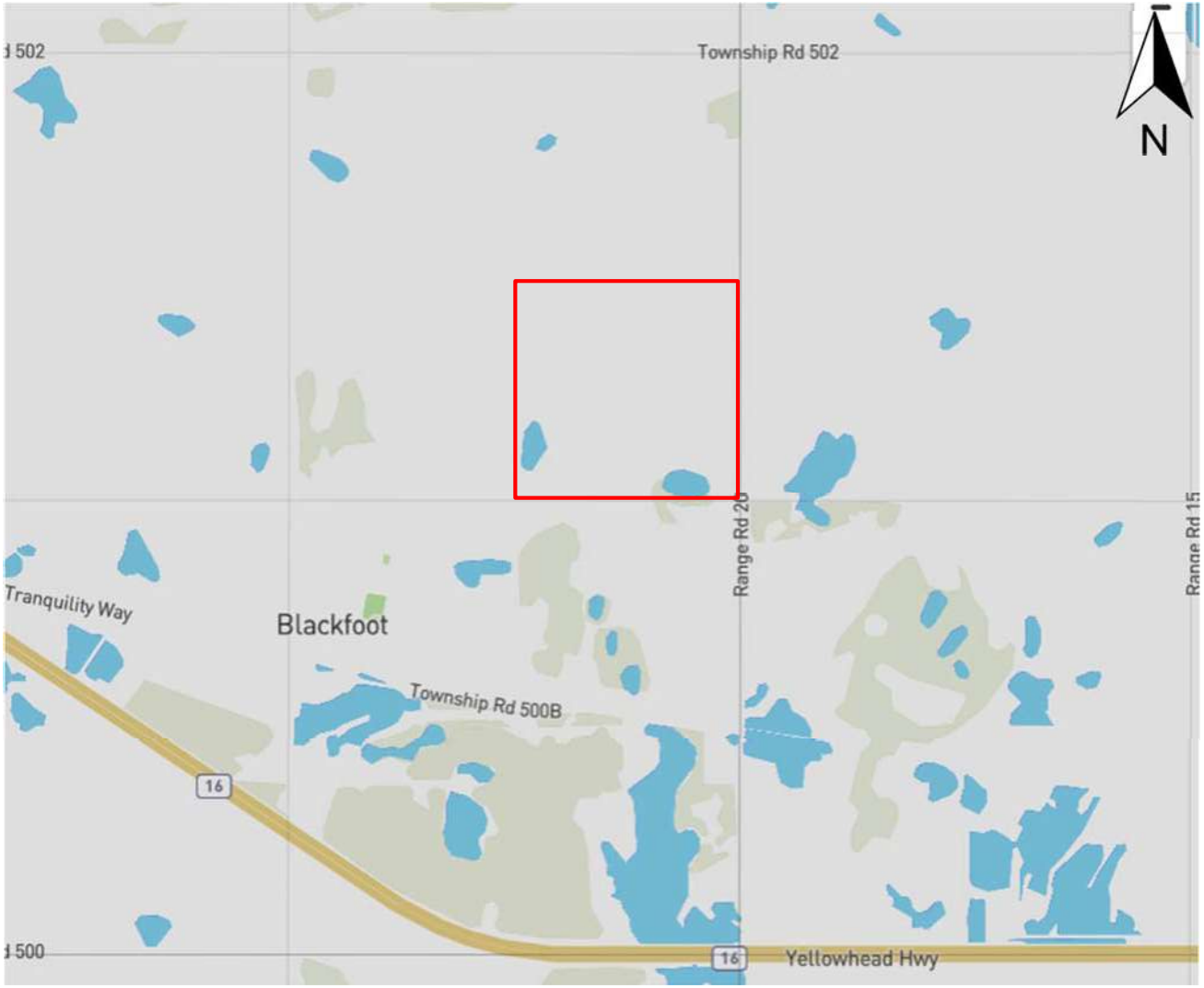



**Figure 5.5.** Overview imagery of the non-sensitive element occurrences (reproduced from ACIMS 2024; Online Mapping Portal). No sensitive element occurrences were mapped or documented for within SE12-50-2-W4M (outlined in red).

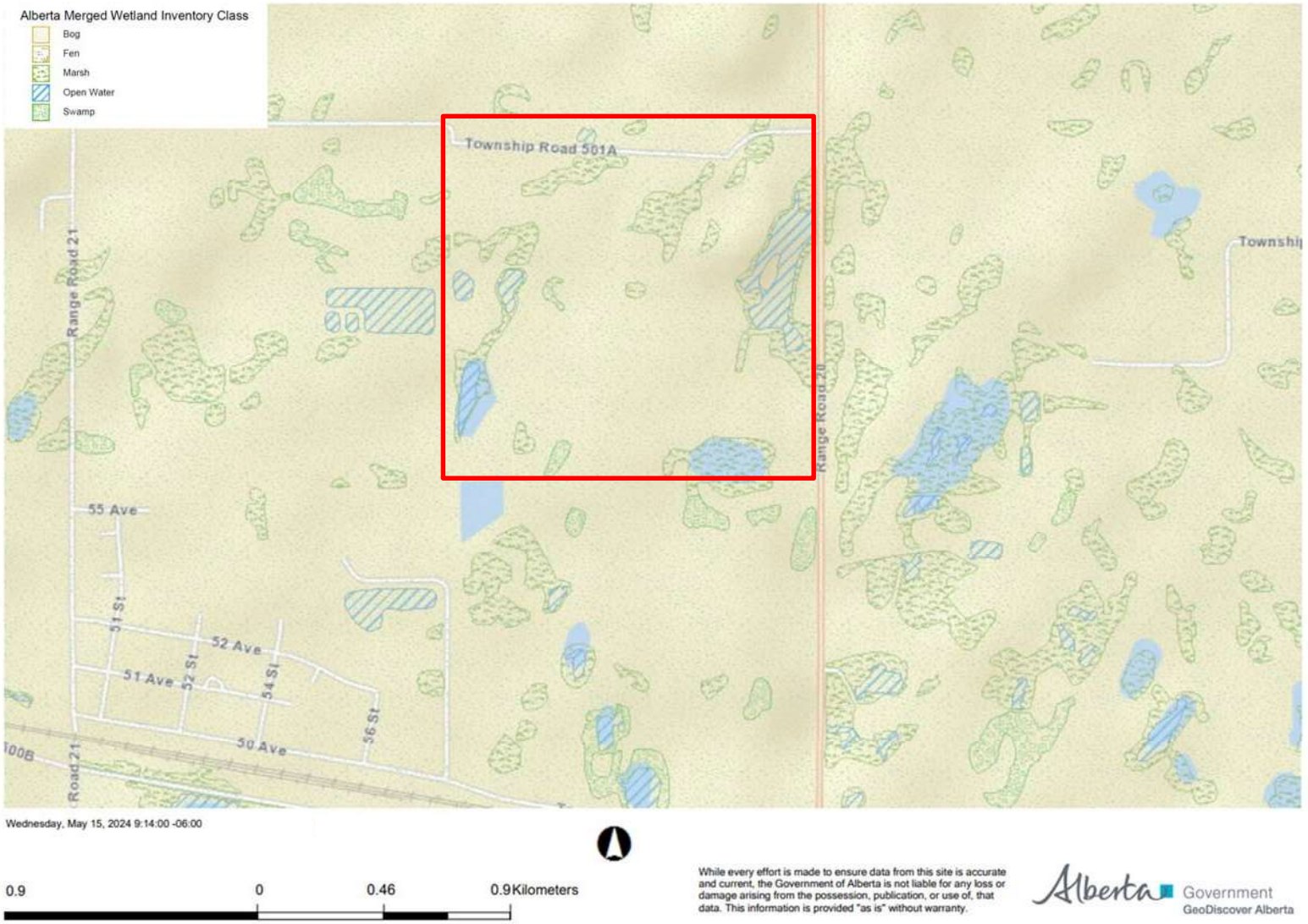



**Figure 5.6.** Alberta Merged Wetland Inventory Class reproduced from the Government of Alberta's GeoDiscover (GOA 2024a) online map viewer; SE12-50-2-W4M outlined in red.

**Table 5.3.** Historical aerial photograph interpretation summary for SE12-50-2-W4M.

| Imagery Date | Season[1] | Precip. Year Analysis[2] | Precip. Month Analysis[2] | Precip. Day Analysis[2] | Open Water/ Vegetation Signature[3] | Assessment of Permanence[4], | Photograph Description |
|---|---|---|---|---|---|---|---|
| 1949 | N/A | Normal | N/A | N/A | D (Wetlands 1, 2, 4, 5, 6, 7, 8)<br>DVI (Wetlands 3, 9, 10, 11, 12, 13) | | ▪ North of wetland 2 is a small structure visible<br>▪ Area adjacent to structure is agricultural crop land<br>▪ Only a small portion of the AA is cultivated while a majority has tree cover<br>▪ Wetlands 1 and 4 are covered by trees<br>▪ Wetland 5 appears to have no cover and is a lighter color indicating dry conditions<br>▪ Wetland 2 is not covered by trees and is a dark color but does not appear to have open water<br>▪ Wetlands 6 and 7 are partially represented by wetland in southwest of AA<br>▪ Wetlands 9 - 13 are not visible |
| July 7, 1966 | Summer | Wet | Dry | 1.46mm | D (Wetlands 1, 2, 3, 4, 5, 6, 8, 13)<br>DVI (Wetlands 7, 9, 10, 11, 12) | | ▪ The majority of the tree cover in the AA is cleared<br>▪ Manmade structure north of wetland 2 is gone<br>▪ Gravel road present transecting the AA<br>▪ Wetlands 7, 9 - 12 are not visible<br>▪ A wetland not connected to any of the others is present in the center of the AA<br>▪ First year wetland 13 is visible in aerial imagery |
| October 7, 1971 | Fall | Normal | Dry | 0mm | W (Wetland 4)<br>D (Wetlands 1, 2, 3,7, 8)<br>DVI (Wetlands 5, 6, 9, 10, 11, 12, 13) | | ▪ Minimal changes from previous imagery<br>▪ Wetland 1 appears more predominant on the landscape<br>▪ Significant number of wetlands not present<br>▪ Vegetation encroaching on road crossing wetland 4 |
| July 3, 1981 | Summer | Dry | Normal | 0mm | W (Wetland 4)<br>D (Wetlands 1, 2, 3, 6, 8)<br>DVI (Wetlands 5, 7, 9, 10, 11, 12, 13) | | ▪ Structures present northeast of wetlands 2 and 3<br>▪ Structures present east of wetland 4<br>▪ Two structures present west of wetland 1<br>▪ Structure north of wetland 1<br>▪ Road connecting structures visible<br>▪ Wetland 6 is visible on the landscape<br>▪ Wetland present in the center of the AA is not visible<br>▪ Wetland 4 extended to north boundary of AA |

| Imagery Date | Season[1] | Precip. Year Analysis[2] | Precip. Month Analysis[2] | Precip. Day Analysis[2] | Open Water/ Vegetation Signature[3] | Assessment of Permanence[4], | Photograph Description |
|---|---|---|---|---|---|---|---|
| June 10, 1991 | Spring/ Summer | Normal | Dry | 0mm | W (Wetlands 1, 2, 4, 6, 9)<br>D (Wetland 3)<br>DVI (Wetlands 5, 7, 8, 10, 11, 12, 13) | | ▪ Two structures from previous imagery north and west of wetland 1 are gone<br>▪ Structure from previous imagery northeast of wetland 2 is gone<br>▪ Wetlands 1 and 4 appear to have extended farther into the AA<br>▪ Wetland 4 appears to be extending farther north |
| August 17, 2004 | Summer | Wet | Normal | 0mm | W (Wetlands 1, 4)<br>D (Wetlands 2, 3)<br>DVI (Wetlands 5, 6, 7, 8, 9, 10, 11, 12, 13) | | ▪ A larger road connecting the northeast road directly to a residence east of wetland 4 and the previous road is visible<br>▪ Trees appear to have been planted along new road<br>▪ Wetland 4 disconnected from north wetland<br>▪ Majority of the wetlands are not visible |
| May 13, 2011 | Spring | Normal | Dry | 0mm | W (Wetland 1, 2, 4, 5, 6, 8, 11, 13)<br>D (Wetland 3, 9,10)<br>DVI (Wetland 7, 12) | | ▪ The large road the previous imagery appears to have impounded water causing open water in wetland 5<br>▪ All but wetland 3 have surface water visible<br>▪ Wetlands 7 and 12 are the only wetlands not visible<br>▪ Residence appears demolished |
| May 21, 2021 | Spring | Dry | Wet | 0mm | W (Wetland 1, 2, 3, 4, 11, 13)<br>D (Wetland 5, 6, 8, 9, 10)<br>DVI (Wetland 7, 12) | | ▪ Gravel pad east of wetland 4 from previous imagery is not visible<br>▪ Trees planted along road exiting the east side of AA<br>▪ Wetlands 1, 2, 3 and 4 appear to have open water<br>▪ Wetlands 1 and 4 appear to be extending north<br>▪ Wetlands 7 and 12 are not visible in the imagery |
| July 19, 2022 | Summer | Dry | Dry | 3.12mm | W (Wetland 1, 2, 4)<br>D (Wetland 3, 5, 6, 7, 8, 9, 10, 11)<br>DVI (12, 13) | | ▪ Minimal changes since previous imagery<br>▪ Wetlands 1, 2 and 4 appear to have open water<br>▪ All wetlands visible on the landscape except for wetlands 12 and 13 |
| **Number of Years Potential Wetland Areas Within Property Are Wet Over Number of Years in Photo Record:<br>Wetland 1 - 5/9 Wetland 2 - 4/9 Wetland 3 - 1/9 Wetland 4 - 6/9 Wetland 5 – 1/9 Wetland 6 – 2/9 Wetland 7 – 0/9 Wetland 8 – 1/9 Wetland 9 – 1/9 Wetland 10 – 0/9<br>Wetland 11 - 2/9 Wetland 12 - 0/9 Wetland 13 - 2/9** | | | | | | | |

[1] Spring (April – June); Summer (June to September); Fall (September to November)
[2] Data from AgroClimatic Information Services (Agriculture and Rural Development) at http://agriculture.alberta.ca/acis/township-data-viewer.jsp
[3] W=Water present/ inundated; D=Dry and Vegetated, consistent with wetland class; DVI=Dry, Vegetated, Indistinguishable from surrounding upland vegetation
[4] Y=Yes (Reasonably permanent, a Section 3 Public Lands Act body of water); N=No (Not permanent, but still a wetland regulated under the Water Act)


**Figure 5.7.** Wetland delineation within assessment area (Google Earth Pro 2024; Field assessment conducted September 5 and 6, 2024).

**Table 5.4.** Wetland classification of wetlands within SE12-50-2-W4M with data from 2015 and 2023 and growing season field data from 2024.

| Wetland Area (ha) Estimated | Potential Classification Codes[1]* | Soil Characteristics[2] | Hydrology Characteristics | Vegetation Indicator Species/ Communities | ABWRET-A Results[3] | Comments |
|---|---|---|---|---|---|---|
| Wetland 1 (5.58 ha) | Graminoid Marsh (81%; G-M-II), Shrubby Swamp (19%; S-S) | Hydric Soil - Depleted Below Dark Surface: 0-26cm Loam (100%; 10YR 3/1) 26-30cm Silt Loam (90%; 10YR 6/1, 10%; 2.5YR 5/8) | Primary characteristics: Algal mat or crust (B4), Water-stained leaves (B11)<br><br>Secondary characteristics: Saturation visible on Aerial (C9) | *Cirisium arvense*, *Mentha canadensis* | TBD | Wetland 1 is present in all the historical imagery indicating it has been present of the landscape in some form since ~1949. The wetland is only partially present in 1949 but is complete in the rest of the imagery. Surface water is present in imagery from 1991 and 2011 onward. |
| Wetland 2 (2.17 ha inside AA) | Shrubby Swamp (63%; S-S), Graminoid Marsh (37%; G-M-II) | Hydric Soil - Organic Surface Layer: 0-22cm Organic (100%; 10YR 2/1) 22-30cm Clay (100%; 10YR 2/1) | Primary characteristics: Water-stained leaves (B11)<br><br>Secondary characteristics: Saturation visible on Aerial (C9) | *Carex rostrata*, *Cirisium arvense* | TBD | Wetland 2 is present in all the historical imagery with a fluctuating size throughout these images. Surface water is present in the imagery from 1991, and 2011 onward. |
| Wetland 3 (0.34 ha) | Graminoid Marsh (60%; G-M-II), Shrubby Swamp (40%; S-S) | Hydric Soil - Depleted Below Dark Surface: 0-13cm Clay Loam (95%; 10YR 3/1, 5%; 10YR 5/6) 13-30cm Silty Clay Loam (100%; 10YR 5/1) | Secondary characteristics: Saturation visible on Aerial (C9) | *Salicaceae sp*, *Carex rostrata*, *Cirisium arvense* | TBD | Wetland 3 is present in all of the historical images from 1966 onward but is not discernable in the 1949 imagery. Surface water is only visibly present between 2011 & 2021 for wetland 3. |

| Wetland Area (ha) Estimated | Potential Classification Codes[1]* | Soil Characteristics[2] | Hydrology Characteristics | Vegetation Indicator Species/ Communities | ABWRET-A Results[3] | Comments |
|---|---|---|---|---|---|---|
| Wetland 4 (5.76 ha within AA) | Graminoid Marsh (79%; G-M-II), Shallow Open Water (5%, W-A-III), Shrubby Swamp (16%; S-S) | Hydric Soil – Redox Dark Surface: 0-30cm Clay Loam (85%; 10YR 2/1), (15%; 2.5YR 4/8) | Primary characteristics: Surface Water (A1), Saturation (A3), Water Marks (B1), Algal Mat/Crust (B4), Inundation on Aerial (B7), Aquatic Fauna (B13)<br><br>Secondary characteristics: Drainage Patterns (B10), Saturation visible on Aerial (C9) | *Juncus balticus*, *Carex rostrata* | TBD | Wetland 1 is present in all the historical imagery indicating it has been present on the landscape in some form since ~1949. Only sections are observable in 1949 but the majority of wetland 4 is visible in all the following imagery. The wetland was observed to have surface water in most of the historical photographs |
| Wetland 5 (1.75 ha) | Graminoid Marsh (90%; G-M-II), Shrubby Swamp (10%; S-S) | Hydric Soil – Redox Dark Surface: 0-30cm Clay Loam (80%; 10YR 3/1), (20%; 2.5YR 5/8) | Primary characteristics: Algal Mat/Crust (B4), Oxidized Rhizosphere along Living Roots (C3), Presence Reduced Iron (C4)<br><br>Secondary characteristics: Saturation visible on Aerial (C9) | *Typha latifolia*, *Carex rostrata, Muhlenbergia richardsonis* | TBD | Wetland 5 is present in most of the historical imagery but was absent in imagery between 1971 and 2004. The wetland lacks surface water in the aerial imagery when it is present except for 2011 |
| Wetland 6 (5.2 ha) (0.96 within AA) | Graminoid Marsh (82%; G-M-II), Shrubby Swamp (18%; S-S) | Hydric Soil – Redox Dark Surface: 0-30cm Clay Loam (80%; 10YR 3/1, 20%; 5YR 4/6) | Primary characteristics: Oxidized Rhizosphere along Living Roots (C3)<br><br>Secondary characteristics: Saturation visible on Aerial (C9) | *Carex sp. Juncus balticus*, *Salix farriae* | TBD | Wetland 6 is present in the imagery partially in 1949 but is totally present in 1966, 1981, 1991, and 2011 onward. The wetland lacks surface water in most of the imagery where it is present except 2011 & 2021. |

| Wetland Area (ha) Estimated | Potential Classification Codes[1]* | Soil Characteristics[2] | Hydrology Characteristics | Vegetation Indicator Species/ Communities | ABWRET-A Results[3] | Comments |
|---|---|---|---|---|---|---|
| Wetland 7 (0.048 ha) | Graminoid Marsh (40%; G-M-II), Shrubby Swamp (60%; S-S) | Hydric Soil – Depleted Matrix: 0-15cm Clay Loam (100%; 10YR 3/1), 15-30cm Clay (60%; 10YR 4/2, 40%; 2.5YR 4/8) | Primary characteristics: Water Marks (B1)<br><br>Secondary characteristics: N/A | *Salix farriae*<br>*Carex rostrata*<br>*Typha latifolia* | TBD | Wetland 7 is not identifiable in the majority of the historical imagery but is observable in 2021 & 1966. There also is no surface water visible for this wetland in any of the imagery. |
| Wetland 8 (0.41 ha) | Shrubby Swamp (70%; S-S), Graminoid Marsh (30%; G-M-II), | Hydric Soil – Depleted Below Dark Surface: 0-17cm Clay Loam (100%; 10YR 3/1), 17-30cm Clay (50%; 10YR 5/1, 50%; 2.5YR 5/8) | Primary characteristics: Oxidized Rhizosphere along Living Roots (C3)<br><br>Secondary characteristics: Saturation visible on Aerial (C9) | *Calamagrostis canadesnsis*<br>*Petasites frigidus* | TBD | Wetland 8 is absent in 2004 & 1991 but is observable in the rest of the imagery including the most recent imagery. There is no visible surface water in any of the imagery for this wetland. |
| Wetland 9 (0.15 ha) | Graminoid Marsh (80%; G-M-II), Shrubby Swamp (20%; S-S) | Hydric Soil – Depleted Matrix: 0-18cm Silty Clay Loam (100%; 10YR 2/1), 18-40cm Silty Clay Loam (70%; 10YR 5/1, 30%; 5YR 4/6) | Primary characteristics: Algal Mat/Crust (B4), Aquatic Fauna (B13), Presence Reduced Iron (C4)<br><br>Secondary characteristics: Saturation visible on Aerial (C9) | *Salix petiolaris*<br>*Carex atherodes* | TBD | Wetland 9 is only distinguishable in the imagery from 1991 & 2022 and is indistinguishable in the rest of the imagery. The wetland does not have surface water in either of the images where the wetland is present. |
| Wetland 10 (0.13 ha) | Graminoid Marsh (95%; G-M-II), Shrubby Swamp (5%; S-S) | Hydric Soil – Redox Dark Surface: 0-17cm Clay Loam (70%; 10YR 3/1, 30%; 2.5YR 4/8), 17-30cm Clay (70%; 10YR 4/2, 30%; 2.5YR 4/8) | Primary characteristics: Oxidized Rhizosphere along Living Roots (C3), Iron Deposits (B5)<br><br>Secondary characteristics: Saturation visible on Aerial (C9) | *Typha latifolia*, *Muhlenbergia richardsonis*<br>*Mentha canadensis* | TBD | Wetland 10 is partially present in 1991 and completely visible in the imagery from 1949, 1966, & 2011 onward. The rest of the imagery the wetland is indistinguishable. Surface water is only visible in the 2011 imagery for this wetland. |

| Wetland Area (ha) Estimated | Potential Classification Codes[1]* | Soil Characteristics[2] | Hydrology Characteristics | Vegetation Indicator Species/ Communities | ABWRET-A Results[3] | Comments |
|---|---|---|---|---|---|---|
| Wetland 11 (0.49 ha) | Graminoid Marsh (60%; G-M-II), Shrubby Swamp (40%; S-S) | Hydric Soil - Depleted Below Dark Surface: 0-7cm Sandy Clay Loam (100%; 10YR 2/2) 7-30cm Sandy Clay Loam (85%; 10YR 6/1, 15%; 10YR 6/8) | Primary characteristics: None<br><br>Secondary characteristics: None | *Salicaceae sp., Carex atherodes* | TBD | Highly disturbed due to cattle (feeding on vegetation and disturbed soil). Culvert connects wetland south and north of road. Powerline runs through wetland. Very dry conditions with no hydrological indicators observed during 2024 fieldwork. |
| Wetland 12 (0.0 ha; 443 $m^2$) | Graminoid Marsh (95%; G-M-II), Shrubby Swamp (5%; S-S)<br><br>(TBD) | Hydric Soil - Depleted Below Dark Surface: 0-25cm Loam (100%; 10YR 2/1), 25-30cm Loam (95%; 10YR 4/1, 5%; 7.5YR 6/8) | Primary characteristics: None<br><br>Secondary characteristics: None | *Cirisium arvense* | TBD | Wetland presence likely due to impoundment from road constructed directly west of wetland. Highly disturbed due to cattle (feeding on vegetation and disturbed soil). Very dry conditions with no hydrological indicators observed during 2024 fieldwork. |
| Wetland 13 (0.11 ha) | Graminoid Marsh (100%; G-M-II), | Hydric Soil - Depleted Below Dark Surface: 0-20cm Silt Loam (100%; 10YR 3/1) 20-30cm Silt Loam (90%; 10YR 6/2, 10%; 7.5YR 6/8) | Primary characteristics: None<br><br>Secondary characteristics: None | *Carex rostrata* | TBD | Very dry conditions with no hydrological indicators observed during 2024 fieldwork. Highly disturbed due to cattle (feeding on vegetation and disturbed soil). Lies Within a small gully. Does not have hydrophytic dominant vegetation. |

[1]Wetland Classification Codes from Alberta Wetland Classification System (2015)
Class: Swamp (S), Marsh (M), Bog (B), Fen (F), Shallow Open Water (W)
Forms: Wooded Deciduous (Wd), Shrubby (S), Graminoid (G), Wooded Coniferous (Wc), Submersed and/or Floating Aquatic Vegetation (A), Bare (B)
Types: Freshwater (f), Slightly brackish (sb), Temporary (II), Seasonal (III), Semi-permanent (IV), Permanent (V)
*Types not applicable to Wooded Swamps based off updated Alberta Wetland Classification System (2015) which does not require full determination and breakdown of water permanence within swamps. Water permanence where applicable based on field observations.
[2]Field Indicators of Hydric Soils in the United States Adapted for use in Alberta 2019 - (Adapted from US Army Corps of Engineers Wetland Determination Form for the Western Mountains, Valleys, and Coast Regional Supplement and modified for use in Alberta based on the Wetland Identification and Delineation Directive)
[3]ABWRET: Alberta Wetland Rapid Evaluation Tool as determined by Alberta Environment and Protected Areas (EPA)
TBD – To be determined AA – Assessment Area

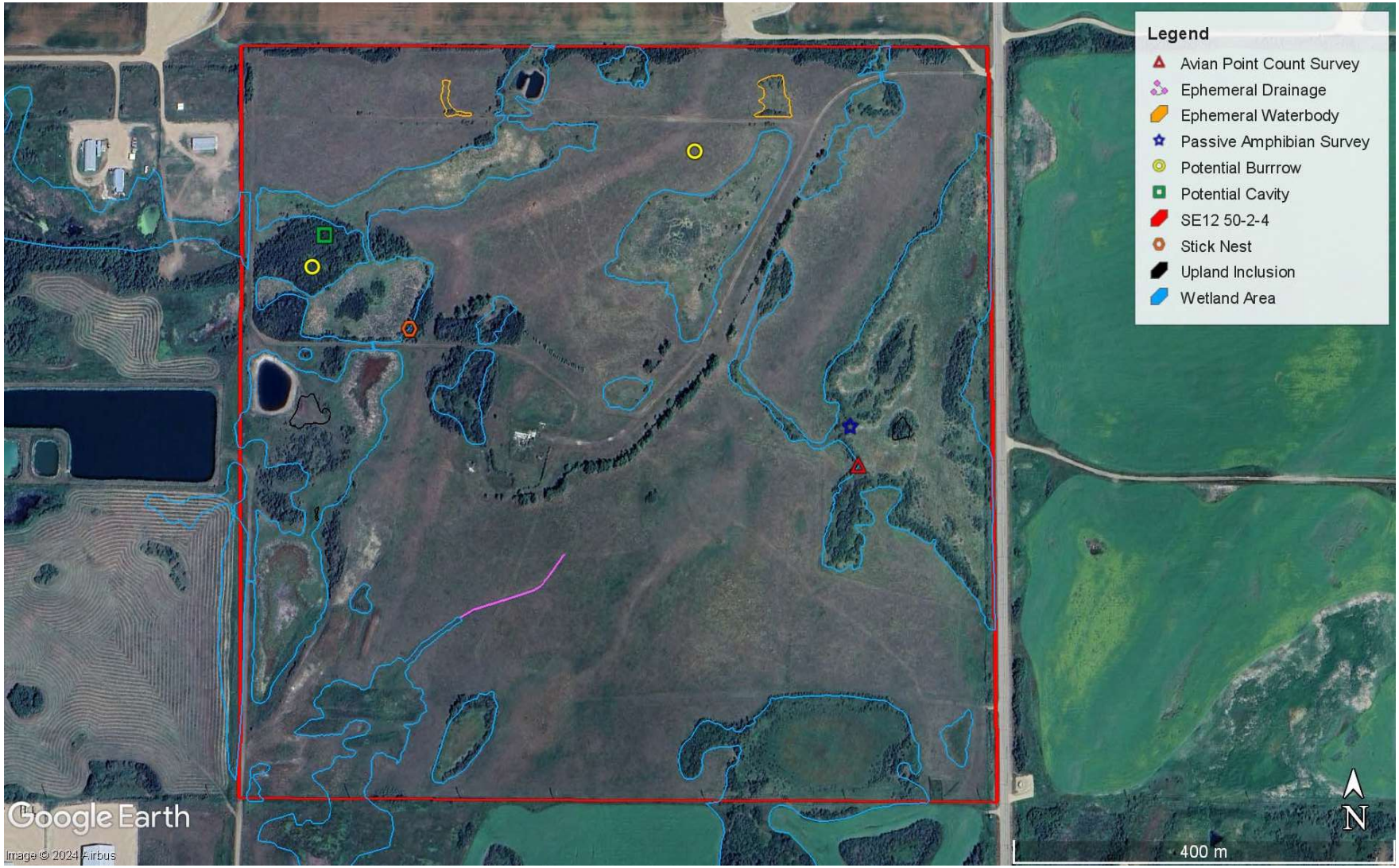



**Figure 5.7.** Key wildlife features within assessment area per field reconnaissance (Google Earth Pro 2024; Field assessment conducted September 2024).

## 6.0 DRAFT Conclusions & Recommendations

The following conclusions and recommendations are offered.

1. The information presented is intended to inform planning. Field level information was collected for a portion of this quarter section in 2023 and for the entire quarter section in September 2024. This report presents a portion of the results of the 2024 field assessment. This information will be detailed and updated in a subsequent report.

2. Regulatory approval and/or permitting under the *Alberta Water Act* for wetland alteration may be required should any naturally occurring ephemeral waterbodies or wetlands intend to be altered or impacted by the development or related activities. No naturally occurring ephemeral waterbodies or wetlands should be altered or impacted until relevant approvals are obtained.

3. Should wetland, tree and/or vegetation clearing be required, pre-disturbance wildlife sweep(s) conducted by a wildlife specialist should occur prior to disturbance/clearing if disturbance is to occur between approximately February 15 and August 31 of any given year. This period includes vulnerable breeding timing for amphibians. Further recommendations associated with wildlife will be provided in a subsequent report.

4. Some regulatory permitting may be required to permit development and/or activities. Scoping of regulatory requirements should occur in conjunction with field verification and planning.

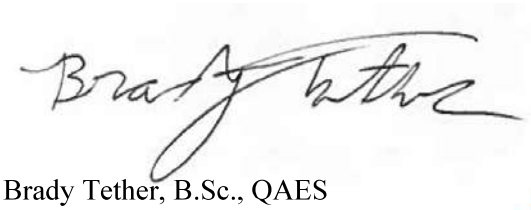
## 7.0 Limitations and Closure

In conducting the assessment and rendering our conclusions, EnviroMak Inc. gives the benefit of its best judgment based on its experience and in accordance with generally accepted professional standards for this type of assessment in present time. This report was submitted with the best information provided to date.

This is a DRAFT report prepared for interim use and discussion. This report should not be used to support Water Act Approval application for wetland alteration.

This report has been prepared for the exclusive use of the proponent/client for planning purposes only and not to be used for regulatory permitting. Any use which any other third party makes of this report, or any reliance on or decisions to be made on it, are the responsibility of such third parties. EnviroMak Inc. accepts no responsibility for damages, if any, suffered by any other third party as a result of decisions made or actions based on this report. Please contact EnviroMak Inc. by telephone at (780) 425-2461 (office) or email to kyla@enviromak.com with any questions or concerns.

Prepared by:



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*Attachments:* *Bibliography and Appendices*

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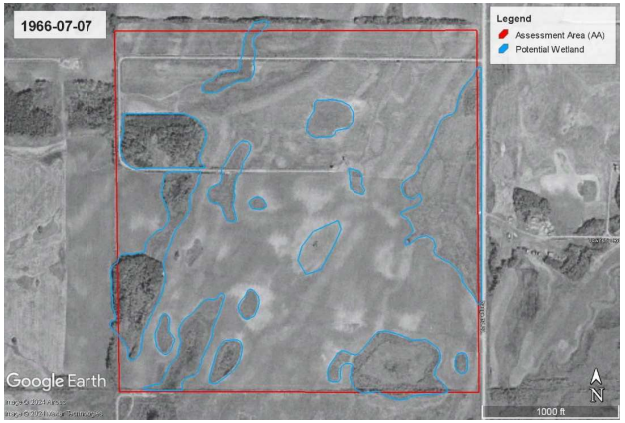
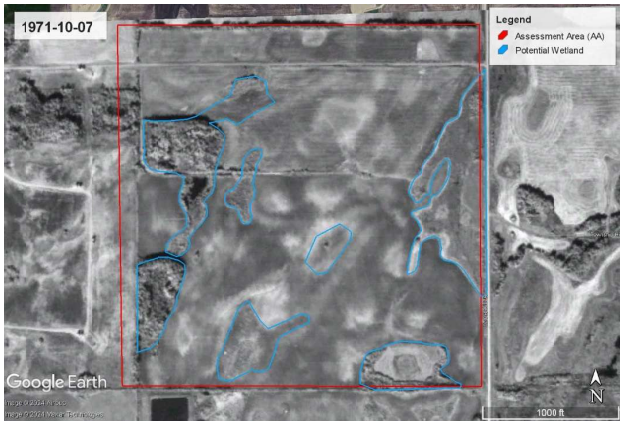
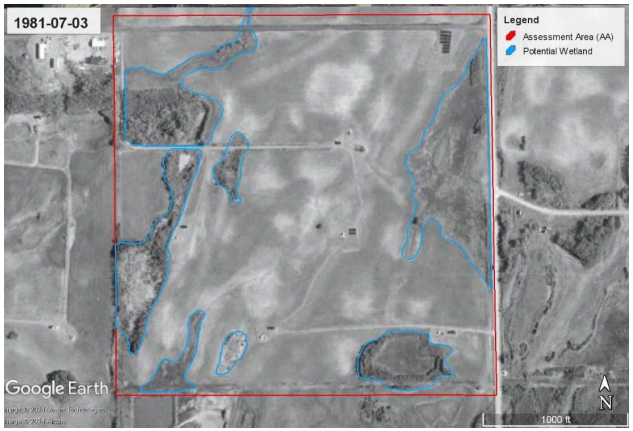
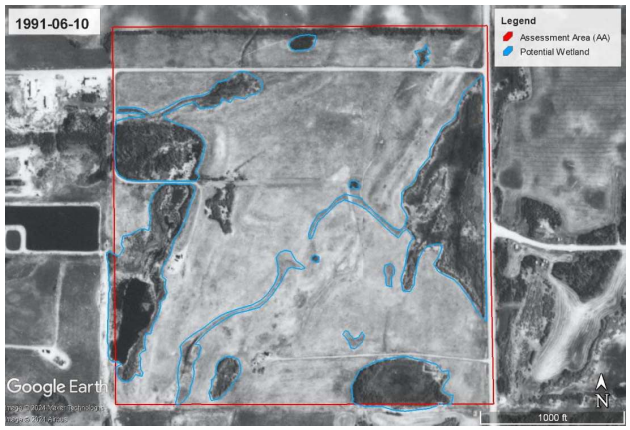
## *9.0 Appendices*

## *9.1. Historical Aerial Photographs*

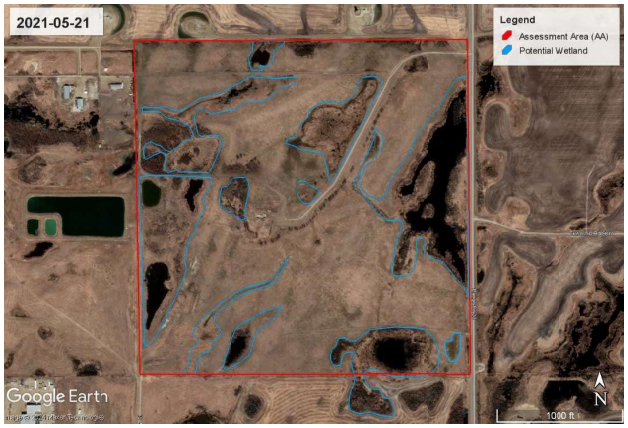



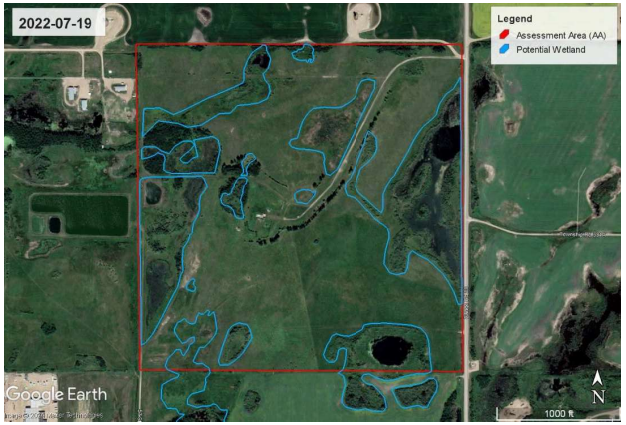

**HISTORICAL AERIAL IMAGERY**
**1949 – 2022**

| | |
|---|---|
| **SE12-50-2-W4M**<br>**County of Vermilion River, Alberta** | **Project No.**<br>**16-07-04** |


2004-08-17
Legend
Assessment Area (AA)
Potential Wetland
Google Earth
1000 ft
N


2011-05-13
Legend
Assessment Area (AA)
Potential Wetland
Google Earth
1000 ft
N


2021-05-21
Legend
Assessment Area (AA)
Potential Wetland
Google Earth
1000 ft
N


2022-07-19
Legend
Assessment Area (AA)
Potential Wetland
Google Earth
1000 ft
N