

775998 Alberta Ltd.

NE-27-83-23, W5M in the Municipal District of Peace No. 135

Wetland Assessment Report

SURFACE LOCATION OF: NE-27-83-23 W5M

REFERENCE NUMBER: B-0241-16



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1.0 INTRODUCTION

1.1 BACKGROUND

775998 Alberta Ltd. is proposing to develop a residential subdivision on a section of land west of Peace River, Alberta (the Project). The development consists of two phases: phase 1 and phase 2. Phase 1 is located in the southeast portion of the property, is approximately 11.29 hectares (ha) and consists of Lots 2, 3 and 4. Phase 2 is approximately 37.39 ha in size and consists of Lots 5 to 17 and approximately 1.4 km of roadway. Construction on Phase 1 has already begun, however construction on Phase 2 will not begin until all approvals are in place.

Basin Environmental Ltd. (Basin) was retained by Greg Alexander of 775998 Alberta Ltd. to prepare a wetland impact assessment of the property within the Municipal District of Peace River (No. 135), Alberta. The development of the Project will potentially impact three wetlands, as such; an Approval under the *Water Act* (RSA 2000, c W-3) must be obtained for all activities that will impact a wetland. A Wetland Assessment and Impact Report (WAIR), including a Wetland Mitigation Plan must be completed and submitted as part of the regulatory application.

This report provides details on the methods used to classify, map, and describe wetlands within the Project area, including an analysis of historical aerial photographs and desktop review. Potential impacts to wetlands by the proposed project are identified along with associated avoidance and mitigation measures.

2.0 STUDY AREA

The Project is located in the White Area of Alberta, on private lands within the Municipal District of Peace River, No, 135. The study area is 48.68 ha, located in NE 27-83-23-5 with Highway 2 running along the north boundary and range road 232 along the east boundary (Figure 1).

The topography is very flat within the study area and land use to the east, north and south is primarily agriculture with forests to the south and west. Most of the study area is undeveloped forest consisting of mature mix-wood stands of poplar, spruce and willow, with the exception of the north/north east portion which has been previously cleared. There is a dugout located at the north boundary of the property in Lot 1, and a small intermittent watercourse (unnamed) located in the southwest corner of the property that flows to the southeast. The watercourse will not be impacted by the development as a 45 m buffer will be established. The watercourse is considered a Class D watercourse with no Restricted Activity Period as per the Code of Practice Peace River Management Area Map (Alberta Environment and Sustainable Resource Development [AESRD] 2006). Fish sampling was not conducted at this watercourse, as it is considered to have limited potential for fish habitat due to shallow conditions, and limited connectivity to downstream habitats.

The property is located entirely within the Upper Peace River watershed, which has a catchment area of 17,554 km² (AEP 2015b). During high water events, flow from the waterbodies moves southeast into depressions which feed tributaries of the Peace River. Excluding, major flood events, water remains confined within wetland catchment basins.

Three wetlands were identified within the Project area (Figure 2). The areas and catchment areas for the three wetlands are estimated as follows:

- Wetland 1: 0.037 ha
- Wetland 2: 0.1271 ha
- Wetland 3: 0.028 ha

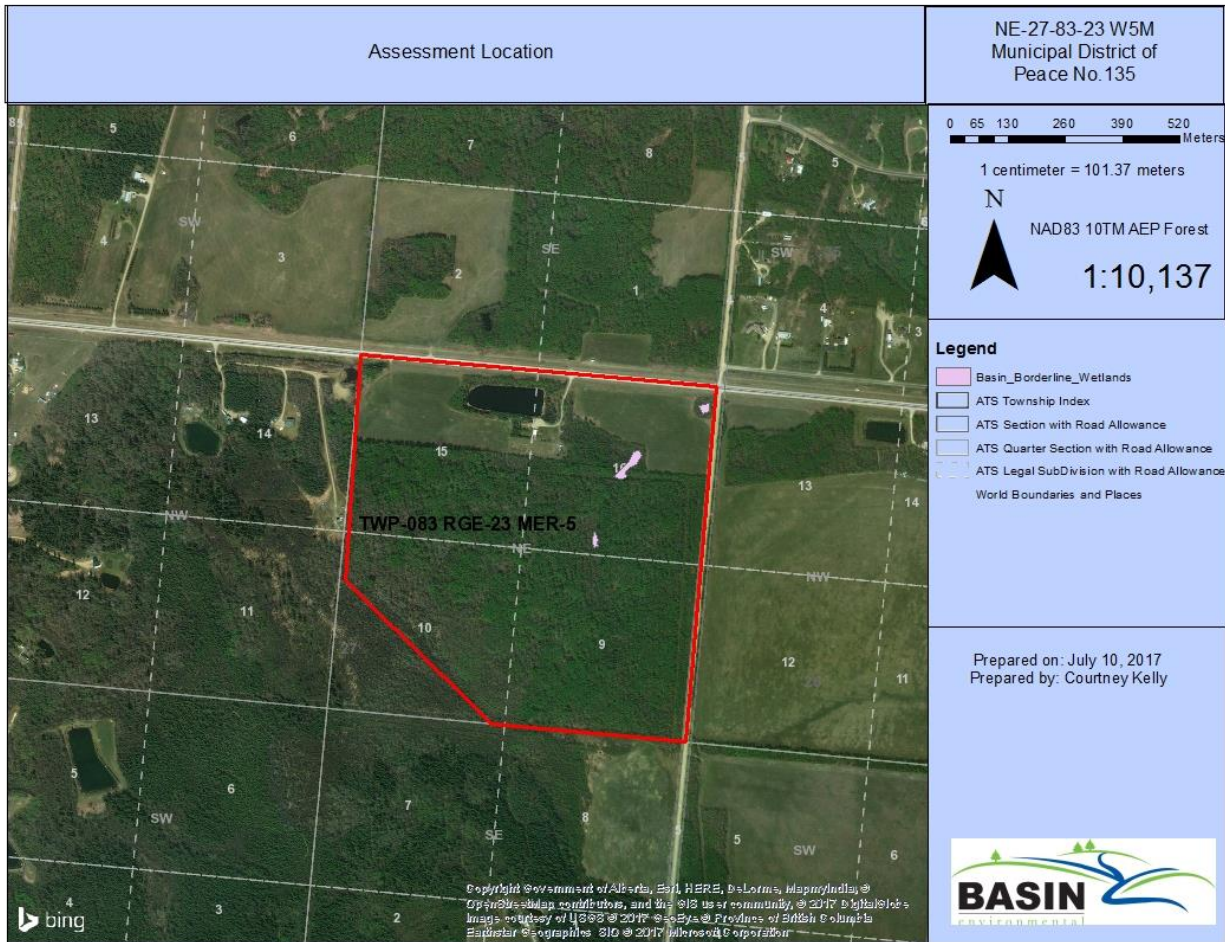


FIGURE 1 OVERVIEW MAP OF THE STUDY AREA

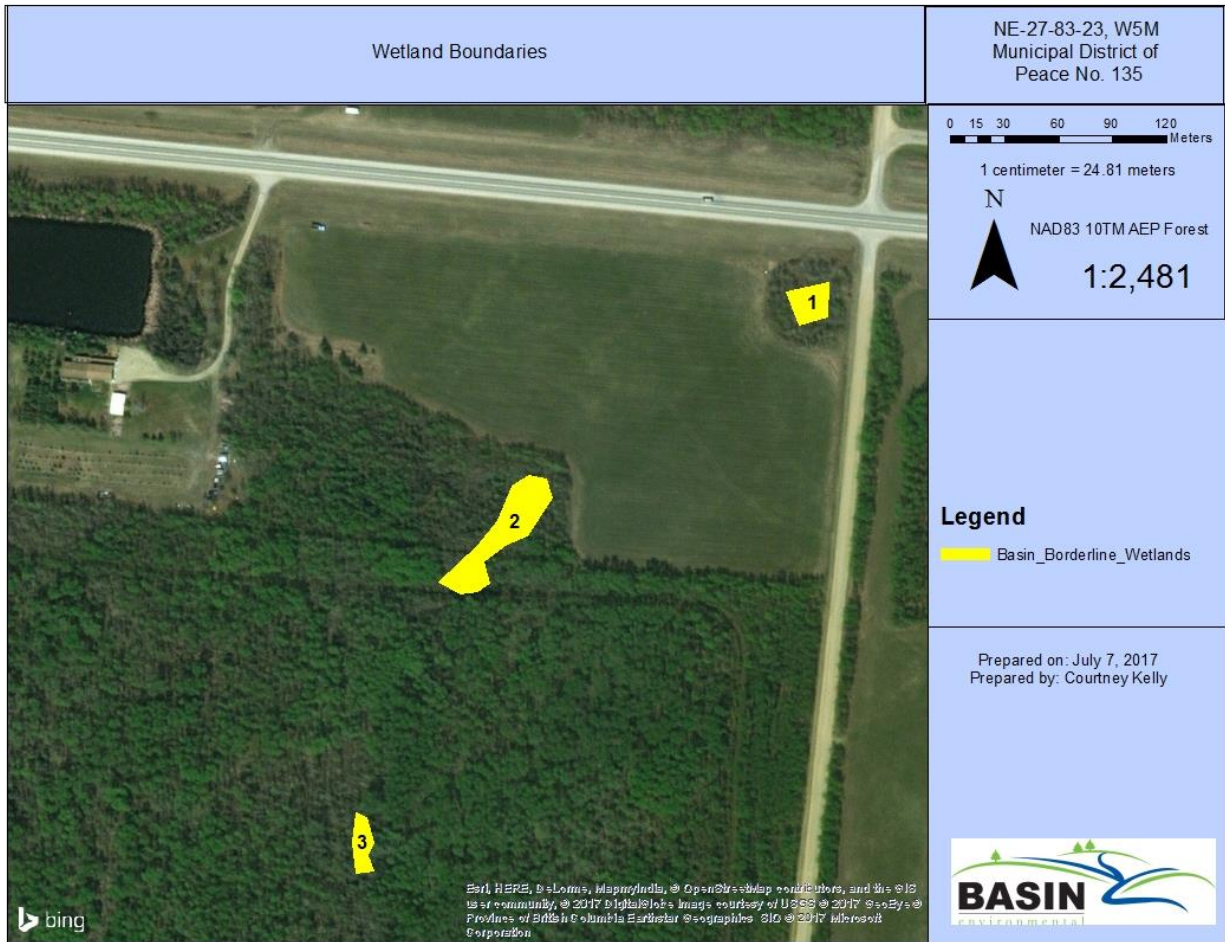


FIGURE 2 DELINEATION OF WETLANDS

3.0 METHODS

3.1 WETLAND DELINEATION AND CLASSIFICATION

A wetland is an ecosite dominated by hydrophytic vegetation where soils are water-saturated for a sufficient length of time such. As a result, excess water and resulting low soil oxygen levels are principal determinants of vegetation and soil development (MacKenzie and Moran 2004).

Wetlands were initially identified using available aerial photographs (Appendix A) as described in the guide for Assessing Permanence of Wetland Basins (Government of Alberta 2016).

Delineation of wetlands was done in accordance with the Alberta Wetland Identification and Delineation Directive (Government of Alberta 2015a).

Wetlands were classified in accordance to the Alberta Wetland Classification System (AWCS) (Government of Alberta 2015b). The AWCS was developed and implemented by the Government of Alberta in 2015 and is specifically tailored to wetlands in Alberta. There are five classes of wetlands under the AWCS: bogs, fens, marshes, shallow open water, and swamps. These classes align with the Canadian Wetland Classification System (1997). The five wetland classes are further divided into “forms” based on vegetation structure and these forms are further subdivided into “types” based on the length of time surface water is at or above surface level.

Table 1 summarizes the breakdown of wetland classes, forms and types in Alberta.

TABLE 1 ALBERTA WETLAND CLASSIFICATION SYSTEM

Class	Form	Type		
		Salinity	Water Permanence ¹	Acidity-alkalinity
Bog [B]	Wooded, coniferous [Wc], Shrubby [S], Graminoid [G]	Freshwater [f]	-	Acidic [a]
Fen [F]	Wooded, coniferous [Wc], Shrubby [S], Graminoid [G]	Freshwater [f] --to slightly brackish [sb] -	-	Poor [p] Moderate rich [mr] Extremely rich [er]
Marsh [M]	Graminoid [G]	Freshwater [f]	Temporary [II]	-
		Freshwater [f]	Seasonal [III]	-
		Freshwater [f] to slightly brackish [sb]	Semi-permanent [IV]	-
Shallow Open Water [W]	Submersed and/or aquatic vegetation [A] or bare [B]	Freshwater [f] to moderately brackish [mb]	Seasonal [III]	-
		Freshwater [f] to sub-saline [ss]	Semi-permanent [IV]	-

Class	Form	Type		
		Salinity	Water Permanence ¹	Acidity-alkalinity
		Slightly brackish [sb] to subsaline [ss]	Permanent [V]	-
	[A]	Saline [s]	Intermittent [VI]	-
Swamp [S]	Wooded coniferous [Wc], wooded mixedwood [Wm], wooded deciduous [Wd], Shrubby [S]	Freshwater [f] to slightly brackish [sb] ²	Temporary [II] ²	-
		Freshwater [f] to slightly brackish [sb] ²	Seasonal [III] ²	-
		Moderately brackish [mb] to sub-saline [ss] ²	Seasonal [III] ²	-

3.2 WETLAND BOUNDARIES MAPPING

The wetlands were delineated according to Pathway 3 of the Alberta Wetland Identification and Delineation Directive (Government of Alberta 2017a). Wetlands were identified and delineated based on the observations of the following biophysical features:

- the occurrence and visible extent of wetland vegetation, where the wetland boundary is defined by the point where the abundant plant species are made up of less than 50% of facultative or obligate wetland species;
- presence of hydric soils;
- hydrology including the occurrence and visible extent of seasonal flooding; and,
- observed changes in grade from lowland to upland.

3.3 AERIAL IMAGERY INTERPRETATION

Historical aerial photography (Appendix A), at various scales, was used to develop a long-term (1952-2016) account of wetland presence and calculate wetland coverage within the study area. Initial wetland classification was premised upon aerial imagery interpretation, and was later used in support of the field information to document occurrence and approximate the extent of wetland boundaries.

Photos were selected to provide a range of seasons in both wet and dry years to ensure a complete picture of the conditions on the property. A selection of wet/dry/normal years was used

in conjunction with historical weather data referenced from Alberta Climate and Atlas Maps (AAF 2017). An analysis of historical aerial photos provides a record of changing land use and conditions over time. Appendix A summarizes the historical aerial photographs obtained from the Airphoto Library in Edmonton and from Bing Maps. In order to determine the permanence of the wetlands observed on the property and determine whether they require a *Public Lands Act* and/or a *Water Act* Approval, the wetlands were assessed using the guidelines outlined in the Assessing Permanence of Wetland Basins (Government of Alberta 2016).

3.4 BACKGROUND REVIEW

- A desktop review was conducted on the following databases in order to identify potential environmental sensitivities and/or areas of operational constraints that may apply to the project. Agricultural Regions of Alberta Soil Inventory Database (AGRASID)
- Landscape Analysis Tool (LAT)
- Fisheries and Wildlife Management Information System (FWMIS)
- Alberta Conservation Information Management System (ACIMS)

3.5 FIELD SURVEY

A field survey was conducted by Darcy O'Brien, B.Sc., RPF, of Basin on September 29, 2016. Soils, vegetation, hydrology and water chemistry were examined to document, classify and delineate wetlands. Delineation of the wetlands was done using a handheld GPS and verifying a number of representative points.

Soils were examined to a depth of 30 cm, within the unsaturated outer zone of the wetland. Depth, horizon, texture, colour (Munsell colour chart), and presence of redox features were all recorded. The location of all soil pits was noted and pictures of soils were taken.

Vegetation was sampled using 1 m by 1 m plots. Each plot assessed percent cover for all species at each stratum (i.e., ground, shrub and tree). Percent cover of dominant vascular species and percent cover of total vascular species, litter, bare ground and open water were also recorded.

Topography of the site and evidence of ponding were used as evidence to assess hydrology. Depth of water and water chemistry was taken at all wetlands with water present using a handheld water quality meter. Water chemistry readings included; pH, conductivity and temperature.

4.0 RESULTS

4.1 AERIAL IMAGERY INTERPRETATION

Twelve historical aerial photos spanning from 1952 to 2016 were used in the analysis and were obtained from the Airphoto Library and Bing Imagery. The wetlands are identified by a yellow outline on each of the historical aerial photos which are located in Appendix A.

The wetland margins were difficult to distinguish on the aerial photos due to the surrounding woody vegetation. Wetlands 1 and 2 have undergone significant changes historically between 1974 and 1979 due to the clearing of vegetation from within the wetlands. As such, the vegetation removal has significant impacts to the hydrology and classification of Wetland 1 and 2. Impacts to Wetland 3 are not evident from 1952 to 2016, remaining undisturbed throughout the historical record.

4.2 DATABASE QUERIES

4.2.1 AGRICULTURAL REGIONS OF ALBERTA SOIL INVENTORY DATABASE (AGRASID)

The project area is located within soil polygon identified as No. 24081. The landscape is described as inclined plain or low relief with a limiting slope of 2%. Soils for this polygon are described as Dark Grey Luvisol on gravelly and stony medium texture (L, CL). This polygon contains poorly drained soils (AEP 2015).

4.2.2 LANDSCAPE ANALYSIS TOOL (LAT)

A desktop review using the Landscape Analysis Tool (LAT) was completed July 2017 (Government of Alberta 2017b). The report identified that the Project is located in the game bird provincial sanctuary, zone 2.

4.2.3 ALBERTA CONSERVATION INFORMATION MANAGEMENT SYSTEM (ACIMS)

A search of ACIMS revealed no sensitive plant species within the project area (AEP 2011).

4.2.4 FISH AND WILDLIFE MANAGEMENT (FWMIS)

A FWMIS search was completed with a 1 km search radius of the project. The search revealed no sensitive wildlife species within the project area (AEP 2017).

4.3 WILDLIFE SURVEY

During the field reconnaissance, a wildlife survey was conducted using a standard point count method along line transects in the different habitat types throughout the study area. Each line transect was walked in a steady, quiet manner at approximately 2 kilometers per hour (km/hr), and all observed (auditory and visual) wildlife species were recorded within 200 m of either side of the transect. Species specific surveys were not conducted. No sensitive, rare or endangered species were observed during the survey. No species of concern were identified during the site reconnaissance. It should be noted that the survey was conducted outside of the breeding bird and amphibian seasons.

4.4 WETLAND CLASSIFICATION RESULTS

All wetlands within the proposed project disposition area were identified and assessed (Table 2). At the time of the assessment, all of the wetlands were inundated with water (Table 3). The three wetlands within the study area were classified as seasonal-slightly brackish marshes with graminoid vegetation (MGsb[III]) Appendix B.

TABLE 2 FIELD INDICATORS USED TO IDENTIFY AND DELINEATE WETLANDS

Wetland ID	Wetland Class	Stratum	Plot Technique (m)	Location	Common Name	Scientific Name	Facultative or Obligate Species (Y/N)	Percent Cover
Wetland 1	MG sb[III] (Seasonal Marsh)	Ground	1 x1	11U 6232098 467031 UTM	arrow-leaved coltsfoot	<i>Petasites sagittatus</i>	Y	5
					aster sp.	<i>Aster sp.</i>	N	Trace
					northern gooseberry	<i>Ribes oxyacanthoides</i>	N	Trace
					bluejoint	<i>Calamagrostis canadensis</i>	Y	70
					purple avens	<i>Geum rivale</i>	N	5
					red-osier dogwood	<i>Cornus sericea</i>	Y	5
					willow	<i>Salix sp.</i>	Y	10
Wetland 2	MG sb[III] (Seasonal Marsh)	Ground	1 x1	11U 6231959 466875 UTM	arrow-leaved coltsfoot	<i>Petasites sagittatus</i>	Y	Trace
					awned sedge	<i>Carex atherodes</i>	Y	90
					balsam poplar	<i>Populus balsamifera</i>	N	Trace
					bluejoint	<i>Calamagrostis canadensis</i>	Y	5
					willow sp.	<i>Salix sp.</i>	Y	Trace
Wetland 2	MG sb[III] (Seasonal Marsh)	Ground	1x1	11U 6231777 466808	awned sedge	<i>Carex atherodes</i>	Y	30
					balsam poplar	<i>Populus balsamifera</i>	N	5

Wetland ID	Wetland Class	Stratum	Plot Technique (m)	Location	Common Name	Scientific Name	Facultative or Obligate Species (Y/N)	Percent Cover
				UTM	common cattail	<i>Typha latifolia</i>	Y	20
					bluejoint	<i>Calamagrostis canadensis</i>	Y	30
					trembling aspen	<i>Populus tremuloides</i>	N	5
					willow sp.	<i>Salix sp.</i>	Y	10

TABLE 3 INFORMATION AND EVIDENCE TO CLASSIFY WETLANDS

Wetland ID	Location	Classification	Soil Characteristics	Hydrologic Characteristics	Vegetation Characteristics	Indicator Species
Wetland 1	11U 6232098 467031 UTM	MG sb[III] (Seasonal Marsh)	LFH (0-8cm)- L B-horizon (8-30cm)- CL mottles and gleying evident	pH-8.5 Conductivity: 1800 µS Depth: 0.5m	Vegetation consistent with characteristic seasonal marsh species	1. <i>Petasites sagittatus</i> 2. <i>Calamagrosti s canadensis</i>
Wetland 2	11U 6231959 466875 UTM	MG sb[III] (Seasonal Marsh)	LFH (0-10cm)- L B-horizon (10-30cm)- LS Mottles evident	pH-7.8 Conductivity: 1855 µS Depth: 0.5m	Vegetation consistent with characteristic seasonal marsh species	1. <i>Carex atherodes</i> 2. <i>Calamagrosti s canadensis</i>
Wetland 3	11U 6231777 466808 UTM	MG sb[III] (Seasonal Marsh)	LFH (0-12cm)- L B-horizon (12-30cm)- CL Mottles evident	pH-7.5 Conductivity: 1870 µS Depth: 0.2m	Vegetation consistent with temporary marsh species	1. <i>Carex atherodes</i> 2. <i>Typha latifolia</i>

4.5 DETERMINATION OF CROWN OWNERSHIP

The crown may claim ownership of the bed and shore of a wetland only if the following criteria are met (Sec. 3, *Public Lands Act*):

1. The wetland must be a body of water that has character and depth that supports open water and aquatic vegetation growth;
2. The wetland must be natural occurring, must be of geomorphic origin and not a man-made landscape feature; and,
3. The wetland must be permanent and have a persistent inundation period but do not need to be perpetually or continuously inundated.

A report will be submitted to Public Lands to determine crown ownership of the wetlands.

5.0 WETLAND AVOIDANCE

Avoiding impacts to wetlands is the highest priority for wetland mitigation, as identified in the Alberta Wetland Mitigation Directive (Government of Alberta 2017c). Reasonable effort must be demonstrated by the applicant that proposed alternative designs or construction modifications have been implemented in order to avoid impacting the wetlands.

While all efforts were made to avoid impacting the wetlands, as part of project planning, it was not possible to avoid all of the wetlands. Wetland 2 will be impacted by the proposed development. Wetlands 1 and 3 will be avoided during construction of the development; however, this could change once the Lots are sold to individual buyers.

6.0 IMPACTS TO WETLANDS

Phase 2 of the proposed development plan includes the construction of roadways and the development of 13 proposed lots. Wetland 1 is located in Lot 6, Wetland 2 is located in Lot 10/11 and across a proposed roadway, and Wetland 3 is located in the northeast corner of Lot 11 (Figure 3).

Construction of the proposed roadway which is planned off of range road 232 will result in the partial or complete infill of Wetland 2. Where possible, impacts to the wetlands will be minimized, however the extent of the efforts to minimize impacts is unknown. No known impacts will occur to wetlands 1 and 3, however, once the Lots are purchased, the new owner(s) may have alternative plans for their property. Date of Project construction is unknown at this time and will depend on pending regulatory approvals.

A disruption to the natural flow of water in a wetland can result in drastic changes to wetland vegetation including decreased biodiversity, death of surrounding woody vegetation, and establishment of weedy and undesirable plant species. To mitigate these impacts and to avoid future changes to wetland vegetation potentially from proposed construction activities, the natural hydrology of the overall wetland complex should be maintained. Maintaining the hydrology will allow for re-establishment of native wetland vegetation and surrounding woody vegetation, and ultimately promote biodiversity.

The total footprint area of the assessed wetlands was determined to be 0.19 hectares (ha).

The number of wetlands assessed was three. The footprint area was 0.037 ha for Wetland 1, 0.1271 ha for Wetland 2, and 0.028 ha for Wetland 3.

The total area of Wetland 2 that will be completely or partially infilled due to the proposed construction is unknown at this time. Potential impacts resulting from the loss of Wetland 2 include:

- Loss of water storage and groundwater recharge
- Loss or reduced ability to trap and store suspended sediments
- Change in morphology, water movement from meltwater and high precipitation events
- Loss of forage, nesting and cover habitat for birds, mammals, amphibians

There are no expected adverse effects to humans, First Nations, public health and safety, or human use. Cumulative effects to the watershed, or the broader environment will not be significant.

6.1 IMPACT MINIMIZATION

During construction of the roadway through Wetland 2, where feasible, the best management practices will be followed (Gillies 2011; Partington and Gillies 2012; Badiou and Page 2014).

To minimize further impacts to wetlands when undertaking construction activities, best management practices for working in and around water will be followed to minimize impacts to the wetlands. Surface flows to the wetlands will be considered during Lot development and grading, and a grading plan will be developed to ensure minimal hydrologic impacts to the wetlands that will remain intact.

The following measures will be taken during construction to minimize the indirect impacts to the wetland, where possible:

- Perform construction in a manner that minimizes soil compaction, rutting and sedimentation. This will include the use of appropriate isolation techniques to isolate the work site such as silt fence and silt curtain, as required.
- Avoid impacts to migratory birds and their nests in accordance with the federal *Migratory Birds Convention Act* by avoiding wetland impacts during the restricted activity period (May 1 to August 30). Should work proceed during this time period, a nest search of the area should be undertaken by a qualified Professional Biologist. All listed wildlife species identified in the *Alberta Wildlife Act* (Government of Alberta 2012), *Migratory Bird Convention Act* (Government of Alberta 2016b) and the *Species at Risk Act* (Government of Canada 2014) encountered will be conserved; and,
- Minimize establishment of weed species by ensuring all equipment is cleaned prior to arriving on site and use native seed mixes including wetland dependent species to revegetate any disturbed areas.

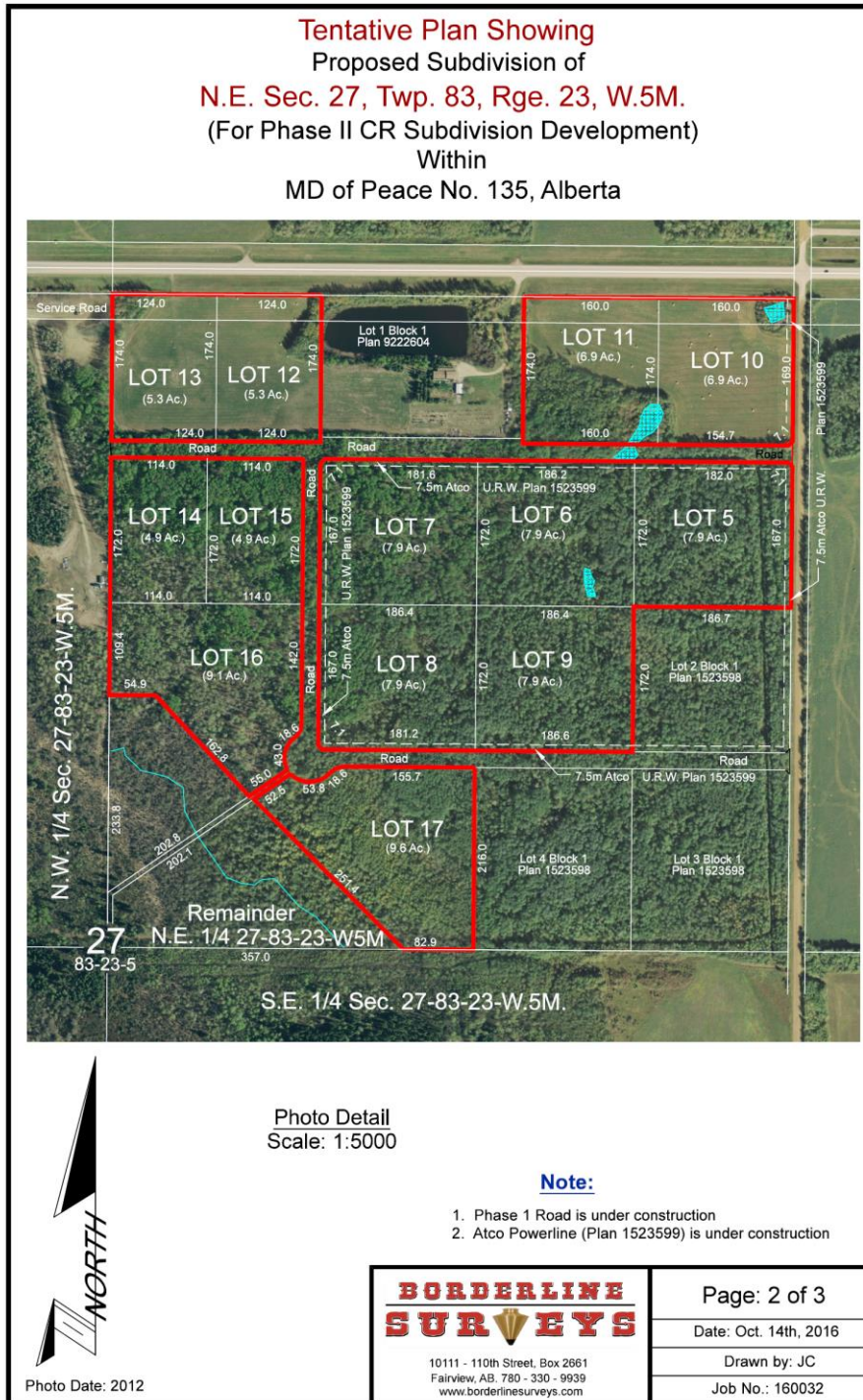


FIGURE 3 PROPOSED DEVELOPMENT PLAN

7.0 WETLAND REPLACEMENT PROPOSAL

This section will be completed once the wetland values have been issued by AEP. Each value will be used to determine the in-lieu fee owing to a recognized replacement agency from 775998 Alberta Ltd. as a result of wetland impacts.

8.0 CONCLUSION

Phase 2 of the proposed residential development within the study area includes the construction of 12 lots (Lots 5 to 17) and approximately 1.4 km of roadway within an area of 37.39 ha. The study area consists of forests, cleared land, one intermittent watercourse and three seasonal graminoid marshes.

Avoidance of all of the wetlands was not possible, however, Wetlands 1 and 3 will not be disturbed prior to the lots being sold; impacts afterwards are unknown. Wetland 2 will be impacted from the construction of the roadway and possibly the development of Lots 10 and 11. It is unknown at this time if the entire wetland will be infilled or partially infilled. It is recommended that the Best Management Practices be followed to minimize the impacts on the wetlands during road and lot construction.

8.1 CLOSURE

If you have any questions, or require additional details, please contact the undersigned.

Sincerely,

Basin Environmental Ltd.

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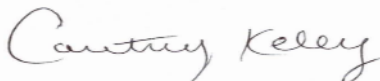


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10.0 APPENDICES

APPENDIX A

RESULTS OF HISTORICAL AERIAL PHOTOGRAPH ASSESSMENT

TABLE 4 HISTORICAL AERIAL PHOTO ASSESSMENT FOR OPEN WETLAND 1

Wetland No.	Photo Date	Photo ID (roll)	Photo Number	Resolution	Season ¹	AWCS Class	Precipitation Year ²	Precipitation Month ²	Open Water Visible ³	Photo Notes	Permanence
1	September 22, 1952	AS260	38	1: 15,840	Fall	MGsb[III]	N/A	Unknown	DVI	Indistinguishable wetland boundaries; wetland vegetated	N
1	May 17, 1974	AS1452	97	1: 24,000	Spring	MGsb[III]	W	D	D	Vegetation cleared, impacts to hydrology	Y
1	August 1, 1979	AS1916	21	1: 25,000	Summer	MGsb[III]	N	D	D	Vegetation cleared	Y
1	June 24, 1990	AS3922	26	1: 20,000	Spring	MGsb[III]	D	W	DVI	Indistinguishable wetland boundaries; wetland vegetated	N
1	September 24, 1994	AS4577	23	1:20,000	Fall	MGsb[III]	D	N	DVI	Indistinguishable wetland boundaries; wetland vegetated	N
1	May 13, 1997	AS4796	262	1:20,000	Spring	MGsb[III]	W	W	W	Partially wet	Y

Wetland No.	Photo Date	Photo ID (roll)	Photo Number	Resolution	Season ¹	AWCS Class	Precipitation Year ²	Precipitation Month ²	Open Water Visible ³	Photo Notes	Permanence
1	August 3, 1999	AS5070	181	1: 30,000	Summer	MGsb[III]	D	D	DVI	Indistinguishable wetland boundaries; wetland vegetated	N
1	June 2016	Bing Imagery	N/A	N/A	Spring	MGsb[III]	N/A	unknown	DVI	Indistinguishable wetland boundaries; wetland vegetated	N

Notes: 1 Spring = April to June; Summer = June to September; Fall = September to November
 2 D=Drier; N=Normal; W=Wet; N/A=Not available
 3 W=Water; D=Dry; DV= Dry vegetated; DVI= Dry, vegetated, indistinguishable

TABLE 5 HISTORICAL AERIAL PHOTOS ASSESSMENT FOR WETLAND 2

Wetland No.	Photo Date	Photo ID (roll)	Photo Number	Resolution	Season ¹	AWCS Class	Precipitation Year ²	Precipitation Month ²	Open Water Visible ³	Photo Notes	Permanence
2	September 22, 1952	AS260	38	1: 15,840	Fall	MG sb[III]	N/A	Unknown	DVI	Indistinguishable wetland boundaries; wetland vegetated	N
2	May 17, 1974	AS1452	97	1: 24,000	Spring	MG sb[III]	W	D	D	Vegetation partially cleared, impacts to hydrology	Y
2	August 1, 1979	AS1916	21	1: 25,000	Summer	MG sb[III]	N	D	W	Vegetation partially cleared; Wet	Y
2	June 24, 1990	AS3922	26	1: 20,000	Spring	MG sb[III]	D	W	W	Partially wet	Y
2	September 24, 1994	AS4577	23	1:20,000	Fall	MG sb[III]	D	N	DV	Wetland margins evident	Y
2	May 13, 1997	AS4796	262	1:20,000	Spring	MG sb[III]	W	W	W	Partially wet	Y
2	August 3, 1999	AS5070	181	1: 30,000	Summer	MG sb[III]	D	D	W	Partially wet	Y

Wetland No.	Photo Date	Photo ID (roll)	Photo Number	Resolution	Season ¹	AWCS Class	Precipitation Year ²	Precipitation Month ²	Open Water Visible ³	Photo Notes	Permanence
2	June 2016	Bing Imagery	N/A	N/A	Spring	MGsb[III]	N/A	unknown	DVI	Indistinguishable wetland boundaries; wetland vegetated	N

Notes: 1 Spring = April to June; Summer = June to September; Fall = September to November
 2 D=Drier; N=Normal; W=Wet; N/A=Not available
 3 W=Water; D=Dry; DV= Dry vegetated; DVI= Dry, vegetated, indistinguishable

TABLE 6 HISTORICAL AERIAL PHOTOS ASSESSMENT FOR WETLAND 3

Wetland No.	Photo Date	Photo ID (roll)	Photo Number	Resolution	Season ¹	AWCS Class	Precipitation Year ²	Precipitation Month ²	Open Water Visible ³	Photo Notes	Permanence
3	September 22, 1952	AS260	38	1: 15,840	Fall	MGsb[III]	N/A	Unknown	DVI	Indistinguishable wetland boundaries; wetland vegetated	N
3	May 17, 1974	AS1452	97	1: 24,000	Spring	MGsb[III]	W	D	DVI	Indistinguishable wetland boundaries; wetland vegetated	N
3	August 1, 1979	AS1916	21	1: 25,000	Summer	MGsb[III]	N	D	DVI	Indistinguishable wetland boundaries; wetland vegetated	N
3	June 24, 1990	AS3922	26	1: 20,000	Spring	MGsb[III]	D	W	W	Partially wet	Y
3	September 24, 1994	AS4577	23	1:20,000	Fall	MGsb[III]	D	N	DV	Wetland margins evident	Y
3	May 13, 1997	AS4796	262	1:20,000	Spring	MGsb[III]	W	W	DVI	Indistinguishable wetland	N

Wetland No.	Photo Date	Photo ID (roll)	Photo Number	Resolution	Season ¹	AWCS Class	Precipitation Year ²	Precipitation Month ²	Open Water Visible ³	Photo Notes	Permanence
										boundaries; wetland vegetated	
3	August 3, 1999	AS5070	181	1: 30,000	Summer	MGsb[III]	D	D	DVI	Indistinguishable wetland boundaries; wetland vegetated	N
3	June 2016	Bing Imagery	N/A	N/A	Spring	MGsb[III]	N/A	unknown	DVI	Indistinguishable wetland boundaries; wetland vegetated	N

Notes: 1 Spring = April to June; Summer = June to September; Fall = September to November
 2 D=Drier; N=Normal; W=Wet; N/A=Not available
 3 W=Water; D=Dry; DV= Dry vegetated; DVI= Dry, vegetated, indistinguishable

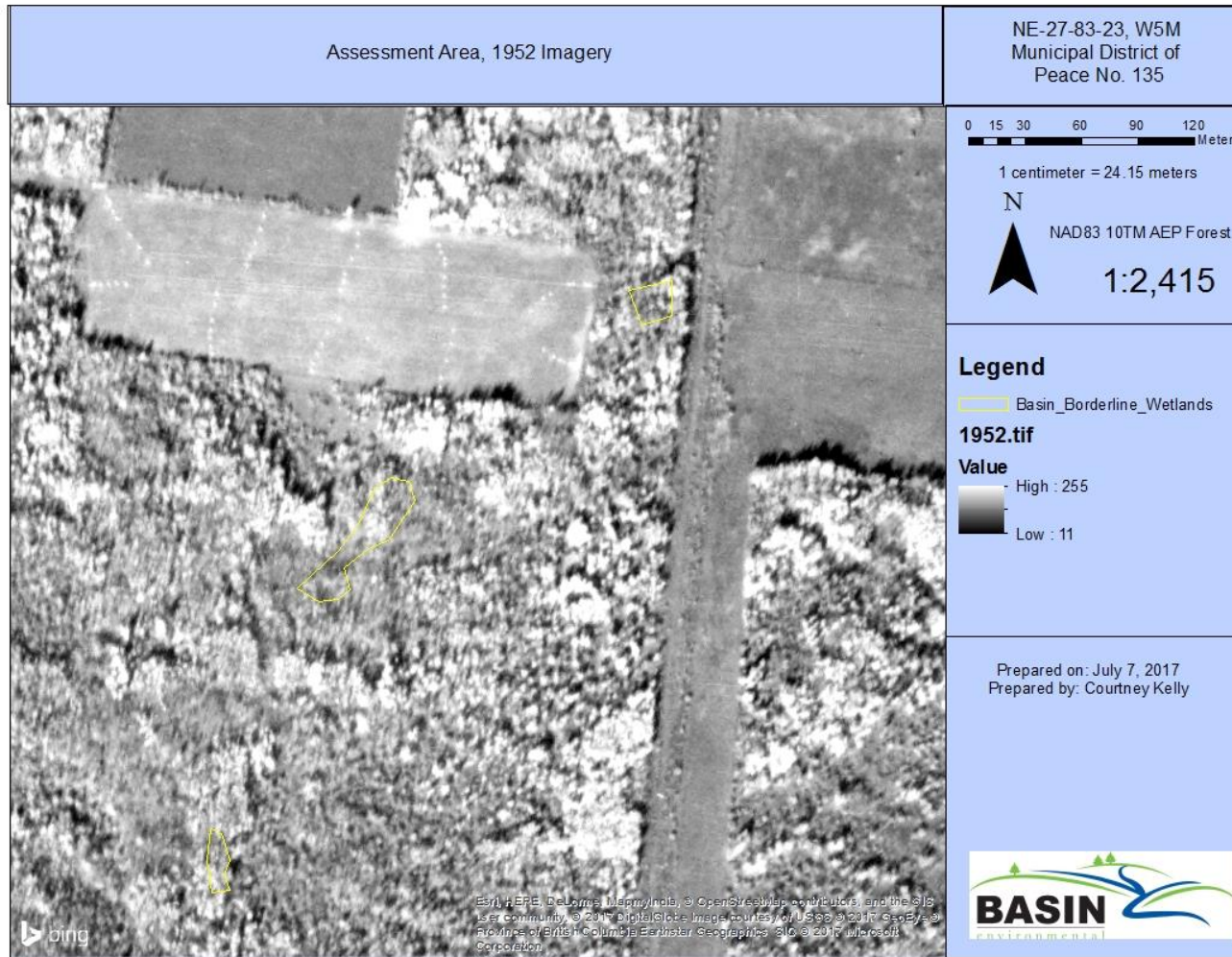


FIGURE 4 AERIAL PHOTO OF PROPOSED PROJECT AREA IN 1952

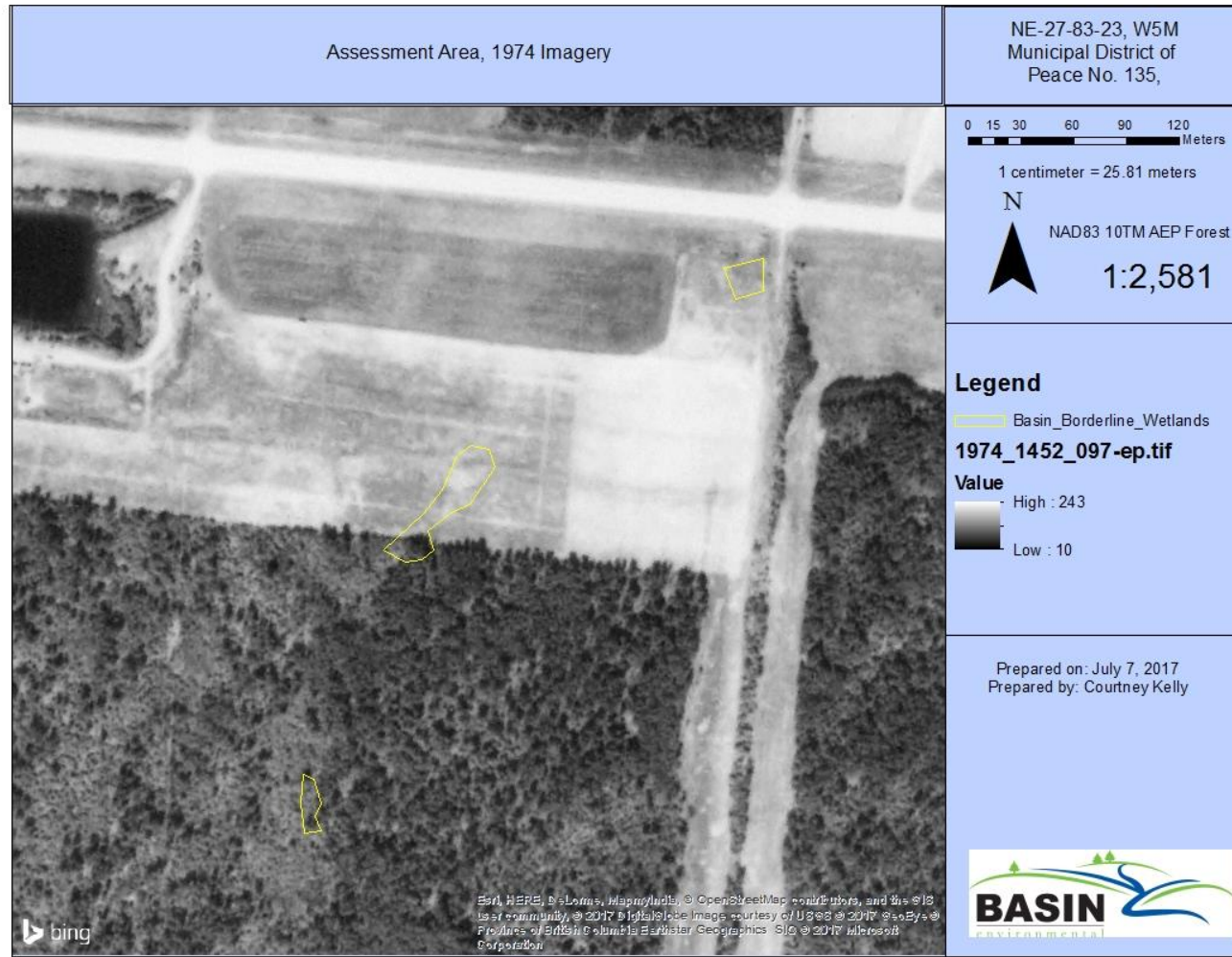


FIGURE 5 AERIAL PHOTO OF PROPOSED PROJECT AREA IN 1974

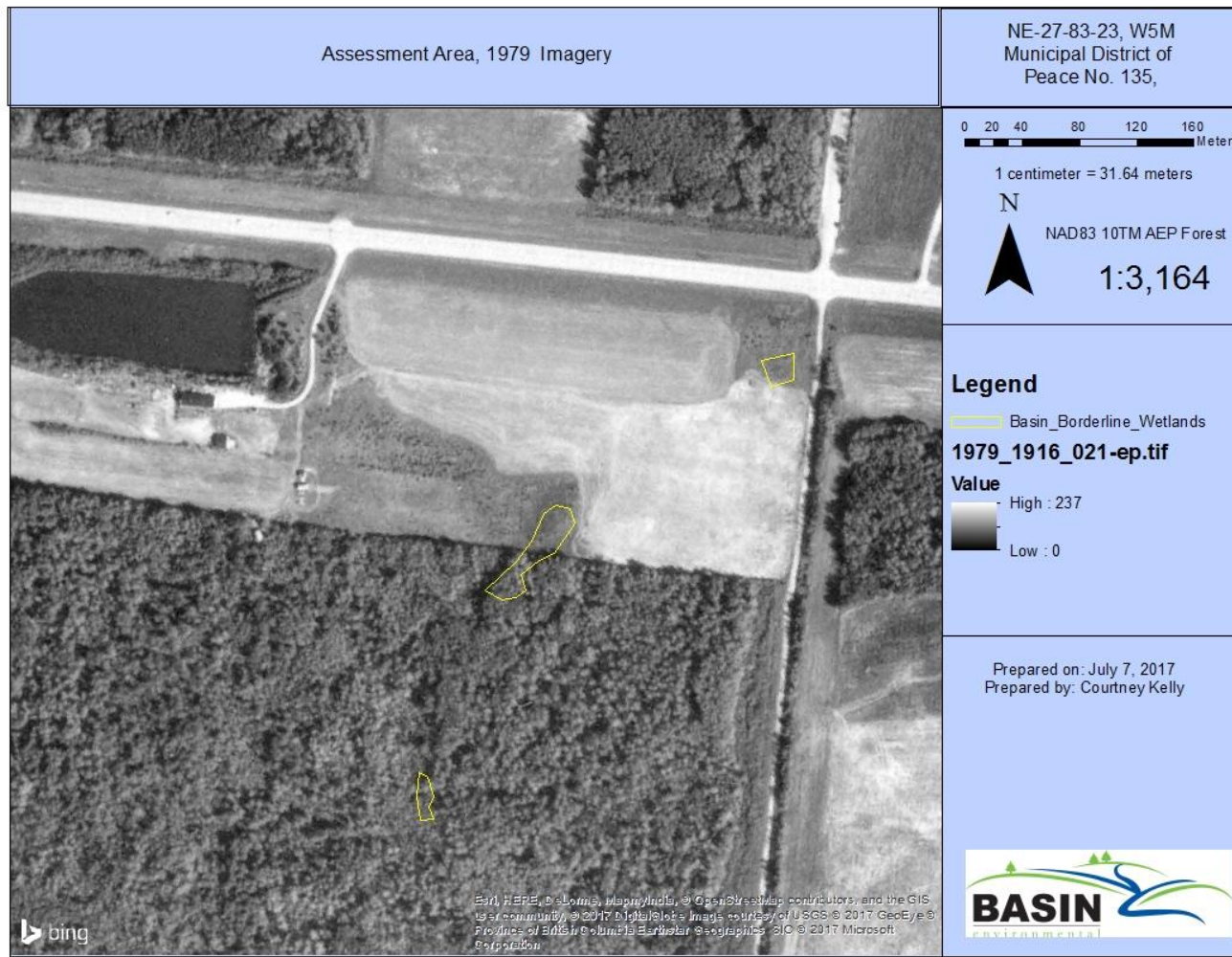


FIGURE 6 AERIAL PHOTO OF PROPOSED PROJECT AREA IN 1979

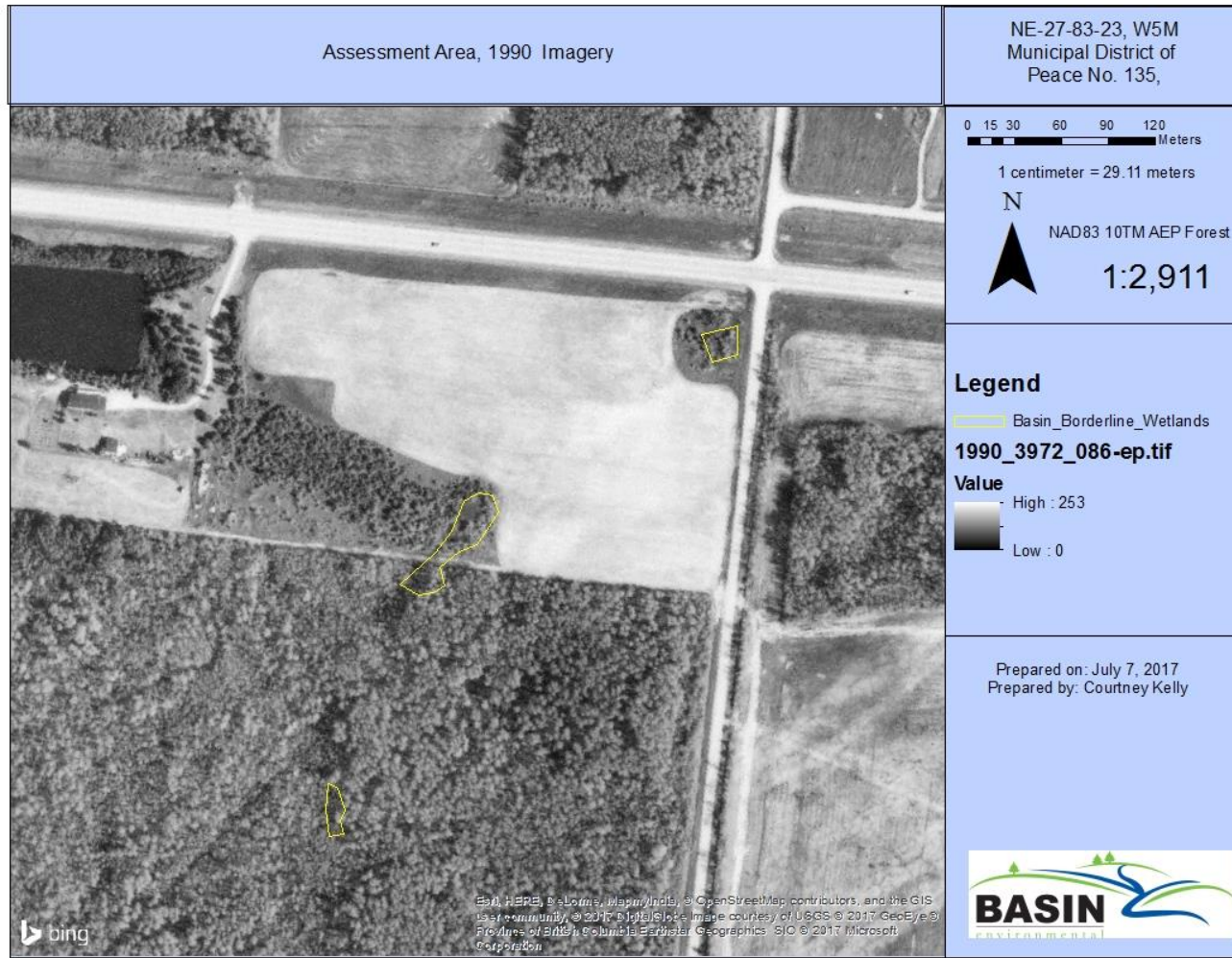


FIGURE 7 AERIAL PHOTO OF PROPOSED PROJECT AREA IN 1990

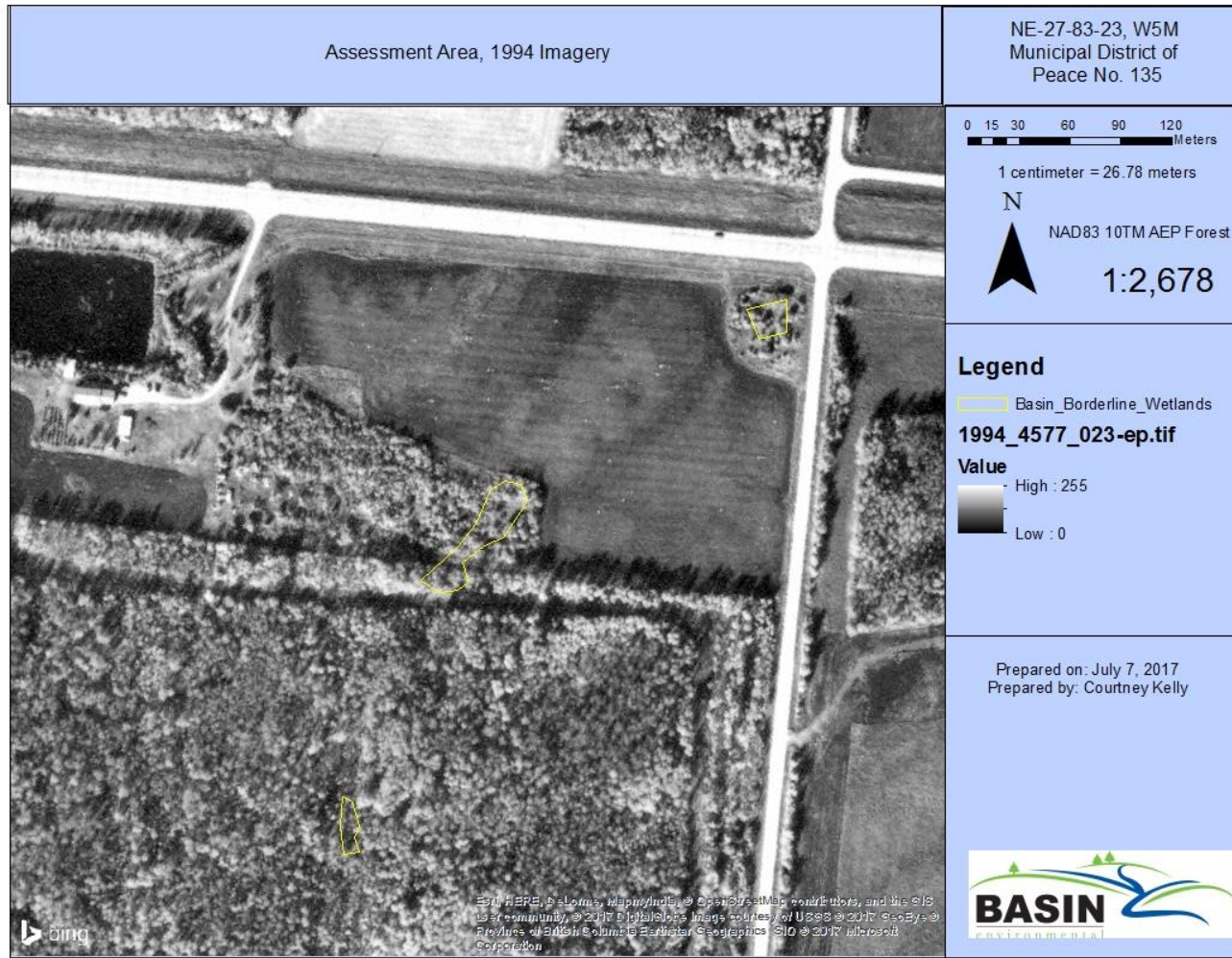


FIGURE 8 AERIAL PHOTO OF PROPOSED PROJECT AREA IN 1994

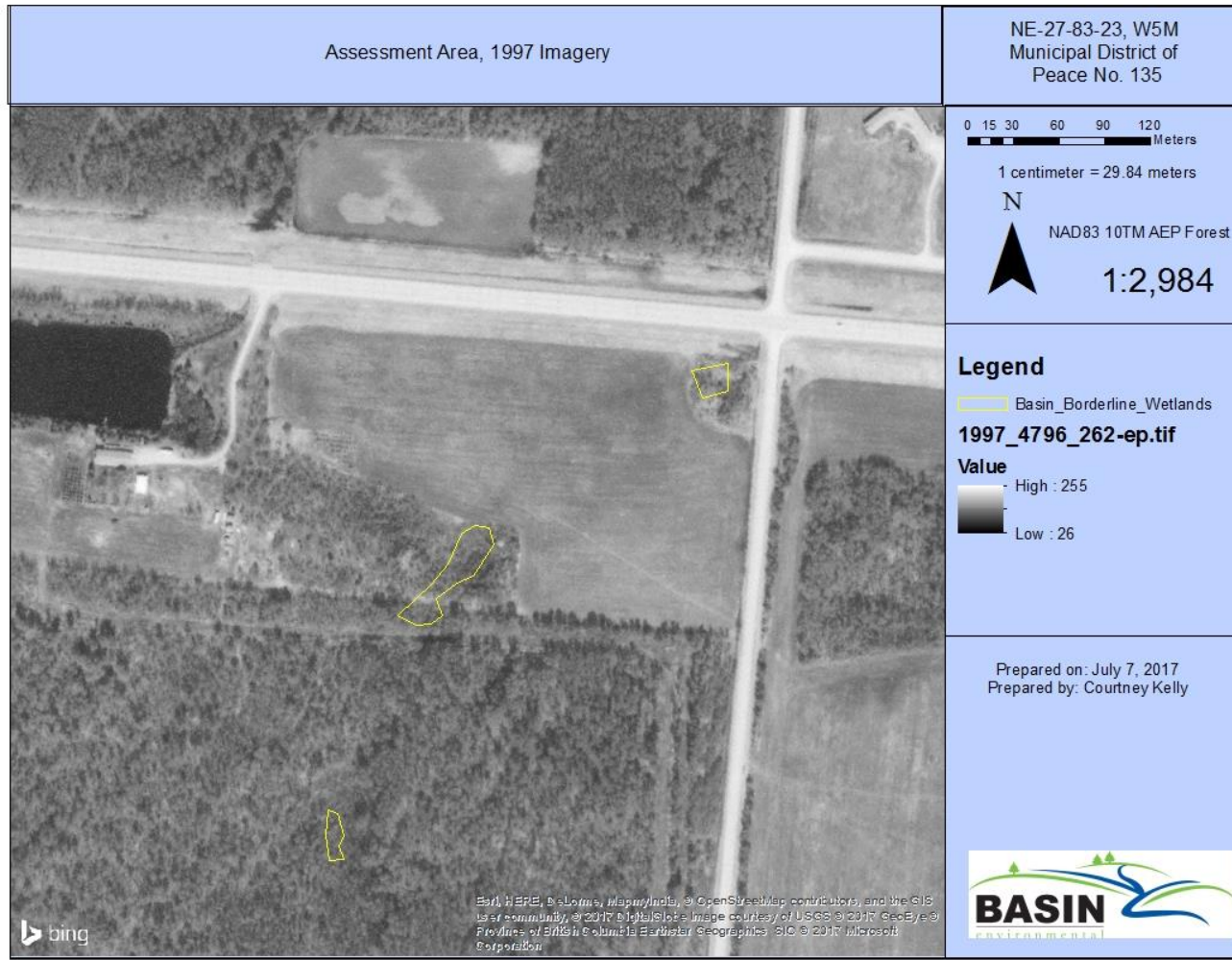


FIGURE 9 AERIAL PHOTO OF PROPOSED PROJECT AREA IN 1997

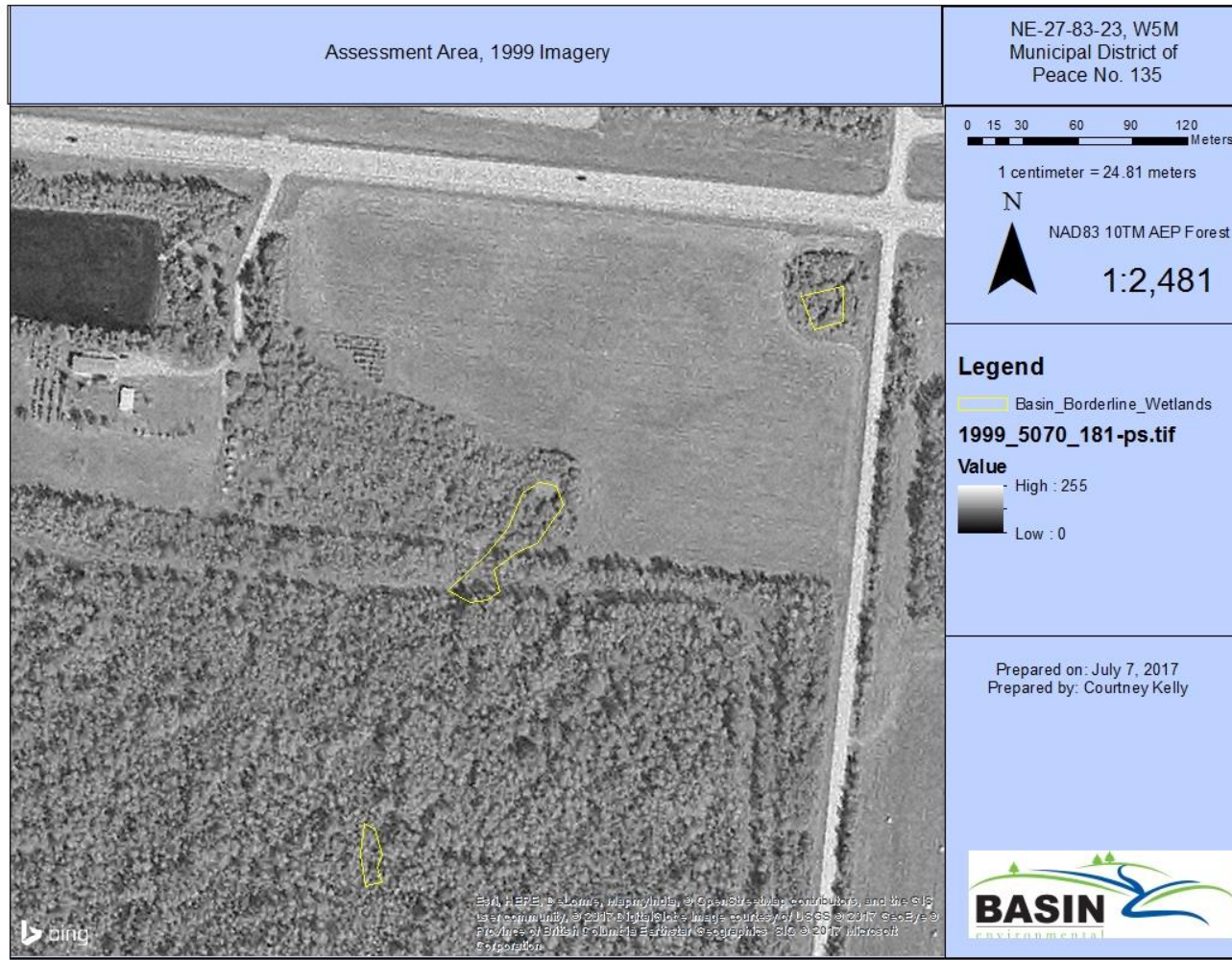


FIGURE 10 AERIAL PHOTO OF PROPOSED PROJECT AREA IN 1999

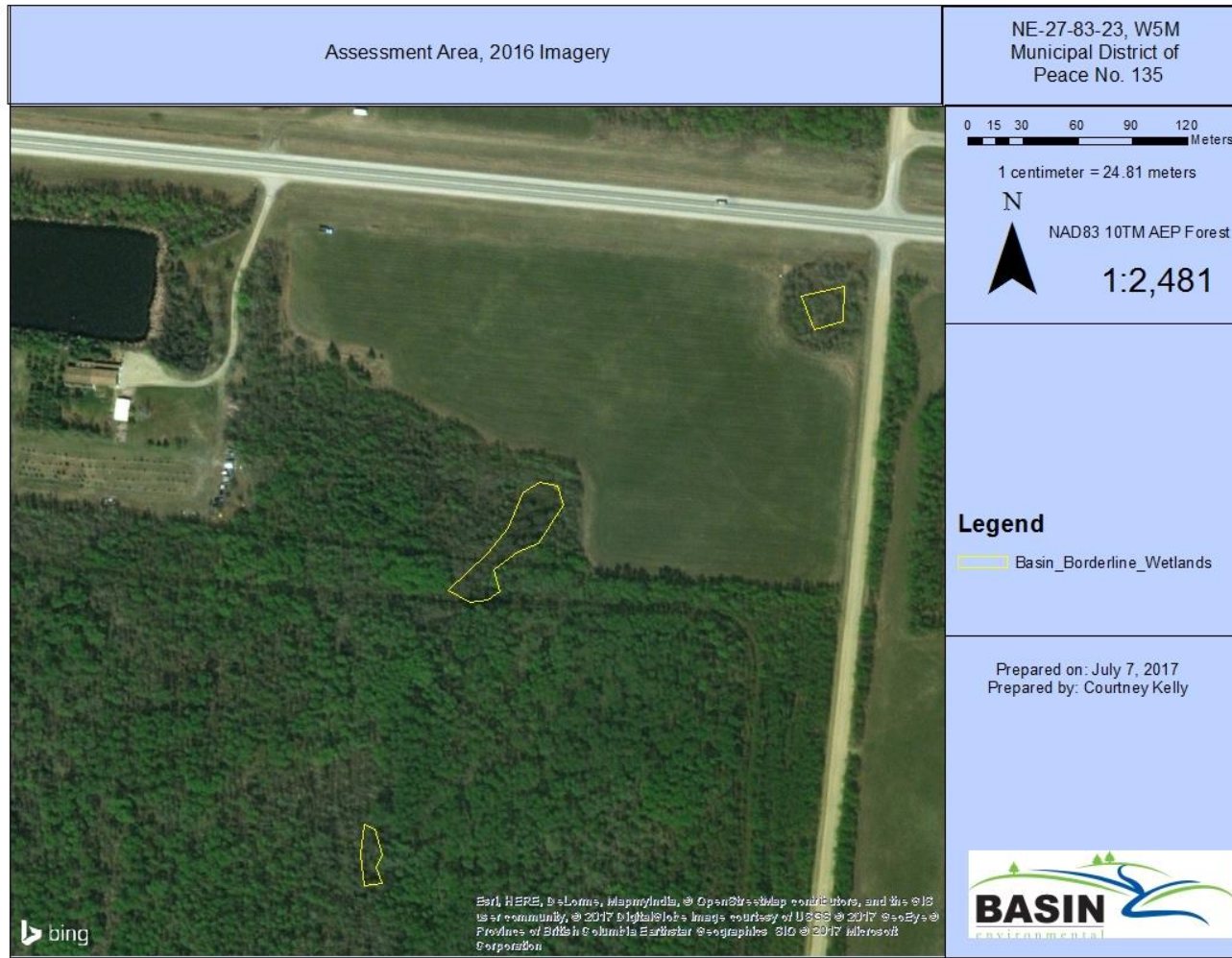


FIGURE 11 AERIAL PHOTO OF PROPOSED PROJECT AREA IN 2016

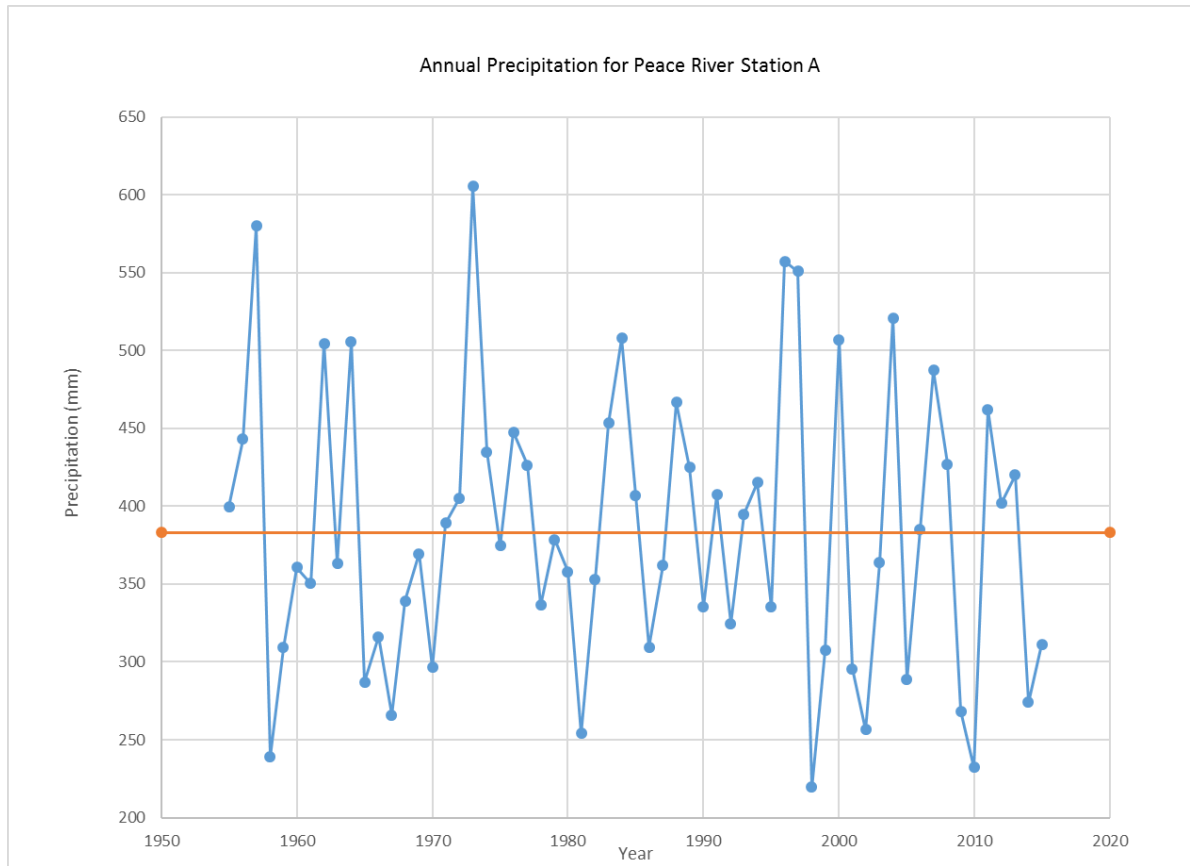


FIGURE 12 PRECIPITATION DATA FROM 1955 TO 2015 LOCATED AT PEACE RIVER WEATHER STATION A (AAF 2017)

APPENDIX B

SITE PHOTOGRAPHS

PHOTO 1: WETLAND 1

Date: September 29, 2016

Location of Photo:
11U 467028 6232091 UTM

Wetland Class:
MGsb [III]



PHOTO 2: WETLAND 1

Date: September 29, 2016

Location of Photo:
11U 467028 6232091 UTM

Wetland Class:
MGsb [III]



PHOTO 3: WETLAND 2

Date: September 29, 2016

Location of Photo:
11U 466878 6231957 UTM

Wetland Class:
MGsb [III]



PHOTO 4 WETLAND 3

Date: September 29, 2016

Location of Photo:
11U 466878 6231957 UTM

Wetland Class:
MGsb [III]



PHOTO 5 WETLAND 3

Date: September 29, 2016

**Location of Photo:
11U 466806 6231773 UTM**

**Wetland Class:
MGsb [III]**

