

# LOGAN LANDING

# BIOPHYSICAL IMPACT

# ASSESSMENT

*Final Report*

**LOC2020-0100**

**PREPARED FOR**

Genesis Land Development Corp.

This report is prepared for the sole use of Genesis Land Development Corp. and his designated consultants. No representations of any kind are made by Urban Systems Ltd. or its employees to any party with whom Urban Systems Ltd. does not have a contract. © 2023 URBANSYSTEMS®

**CONTACT**

Terri Duret, Environnemental Consultant  
t. 403.350.4505  
e. tduret@urbansystems.ca

Suite 101 – 134 11 Avenue SE  
Calgary, AB, T2G 0X5  
www.urbansystems.ca

# TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY.....</b>	<b>IV</b>
<b>1 INTRODUCTION.....</b>	<b>1</b>
1.1 Purpose.....	1
1.2 Project Description and Background.....	1
<b>2 RELATED DOCUMENTS, PLANS AND POLICY .....</b>	<b>5</b>
<b>3 METHODS.....</b>	<b>6</b>
3.1 Historical Review.....	6
3.2 Heritage Resources.....	7
3.3 Landforms Soils and Hydrology.....	7
3.4 Vegetation and Habitat Types.....	8
3.5 Fish and Wildlife.....	9
3.6 Wetlands, Watercourses, and Waterbodies.....	10
3.7 Field Surveys.....	11
3.8 Environmentally Significant Areas.....	11
3.9 Identification of Impacts and Mitigation Measures.....	12
3.10 Cumulative Effects Assessment.....	13
<b>4 EXISTING CONDITIONS.....</b>	<b>15</b>
4.1 Natural Region.....	15
4.2 Landform and Soils.....	15
4.2.1 Slopes.....	18
4.3 Historical Review.....	21
4.4 Heritage Resources.....	22
4.5 Vegetation and Habitat Types.....	22
4.5.1 Habitat Types.....	23
4.5.2 Weeds.....	25
4.6 Hydrology.....	26
4.7 Wetlands, Watercourses and Waterbodies.....	29
4.7.1 Wetlands.....	29
4.7.2 Watercourses and Overland Flow Paths.....	32
4.7.3 Public Lands Review.....	32
4.8 Fish and Wildlife.....	34

**5 ENVIRONMENTALLY SIGNIFICANT AREAS ..... 43**

**6 IMPACTS AND MITIGATION MEASURES ..... 47**

6.1 Project Impacts..... 47

6.1.1 *Rational for Unavoidable Impacts to Wetlands 28 and 30* ..... 47

6.2 Mitigation Measures ..... 49

**7 CUMULATIVE EFFECTS ..... 66**

**8 REGULATORY FRAMEWORK ..... 67**

**9 DISCUSSION..... 70**

**10 CORPORATE AUTHORIZATION ..... 72**

**11 REFERENCES ..... 73**

## APPENDICIES

APPENDIX A Historical Aerial Imagery

APPENDIX B AGRASID Database Results

APPENDIX C Historical Resources Act Results

APPENDIX D Vegetation Plot Data

APPENDIX E ACIMS Database Results

APPENDIX F Wetland Data

APPENDIX G Public Lands Response

APPENDIX H FWMIS Database Results

APPENDIX I Potential Wildlife Species

APPENDIX J eBird Results

APPENDIX K Point Count Data

APPENDIX L Stantec Data

APPENDIX M Engineering Technical Memorandum

APPENDIX N WEST Mitigation and Monitoring Reports

## TABLE OF FIGURES

Figure 1: Project Location.....	3
Figure 2: Outline Plan.....	4
Figure 3: Project Area Slopes .....	16
Figure 4: Grassland Vegetation Inventory .....	19
Figure 5: Soil Pit, Vegetation Plots and Habitat Types.....	20
Figure 6: Wetland Catchments .....	28
Figure 7: Wetlands and Waterbodies .....	33
Figure 8a: Wildlife Surveys.....	41
Figure 8b: Stantec Wildlife Surveys .....	42
Figure 9: Environmentally Significant Area.....	46
Figure 10: Drainage and Slope Setbacks.....	65

## TABLE OF TABLES

Table 4-1: Soil Pit Data .....	18
Table 4-2: Historical Observations .....	21
Table 4-3: Habitat Types and Descriptions .....	25
Table 4-4: Non-Native and Weed Species List .....	26
Table 4-5: Wetland Class, Value and Area .....	29
Table 4-6: Wildlife Species Observed.....	34
Table 5-1: ESA Assessment .....	43
Table 6-1: Impacts and Mitigation Measures .....	49
Table 8-1: Regulatory Framework .....	67



# EXECUTIVE SUMMARY

Urban Systems Ltd. (USL) has been retained by the landowner Genesis Land Development (Genesis) to prepare a Biophysical Impact Assessment for the proposed residential development of the middle property (Project Area) of the greater Ricardo Ranch Area Structure Plan (ASP). The Project Area spans across 145.52 ha within the NW-10-22-29 W4, SW-10-22-29W4 and NW-3-22-29W4 along the southern municipal boundary of the City of Calgary on the north bank of the Bow River. This scoped BIA follows The City of Calgary's *Biophysical Impact Assessment Framework 2010*.

In 2018, Stantec Consulting Ltd., completed an Ecological Inventory in support of the ASP. There are three different owners of the ASP lands and include: Brookfield Residential, Genesis Land Development and Jayman/Telsec. This BIA is specific to the lands owned by Genesis. The Ecological Inventory was approved by The City of Calgary (The City) in 2019.

The purpose of the BIA is to characterize and classify environmental features of the proposed Project Area for land use, outline plan, and subsequent development permit application approval through the City of Calgary development process. This scoped BIA will follow the requirements outlined in City of Calgary Biophysical Impact Assessment Framework 2010. This report identifies impacts and mitigation measures based on the proposed development concept plan.

The objectives of the BIA are to:

- Describe existing environmental conditions within the Project Area.
- Identify and predict potential impacts.
- Inform the retention/reconstruction/removal of Environmentally Significant Area(s) (ESA).
- Provide information for future restoration of Environmental Reserve.
- Recommend mitigation measures based on identified impacts; and
- Identify and address cumulative effects of the proposed development.

The ASP is bound by Deerfoot Trail SE to the west, 88 Street SE to the east, 212 Ave SE to the north, and the Bow River to the south. The south boundary of the ASP is defined by the City of Calgary municipal city limits on the shore of the Bow River with Foothills County located across the Bow River to the south. The proposed development is a residential community with a mix of single, semi and multi-use detached, clustered and town homes. Infrastructure such as stormponds, along with integrated pathways, corridors and municipal and environmental reserve (ER) are included in the outline plan. The development will respect and maintain setbacks from the floodway with ER designation as well as meeting the development expectations set out in the ASP.

## LANDFORMS, SOILS AND VEGETATION

The Project Area is located near the boundary of the Foothills Fescue Subregion and the Foothills Parkland Subregion. The Project Area exhibits topographical, aquatic, and terrestrial habitat characteristics to both the Foothills Fescue and Parkland Subregions.

On a regional scale the Project Area is located on the south facing slopes of the Bow River Valley as it travels east from Calgary into the prairies. The uplands to the north of the valley escarpment are gently undulating and is populated by several prairie pothole wetlands, with overall aspect gently sloping to the southeast. The

escarpment in this area is widely terraced and features several ephemeral watercourses that have formed thin breaks along the valley walls. Groundwater springs have caused terracing and erosion features throughout the escarpment. The valley bottom has been formed by erosion and deposition caused by flooding of the Bow River and material wasting from the escarpment, with deposits of gravel and sand present on the surface, or just below shallow layers of undeveloped soils.

Local geology is described in the *Rangeview Area Structure Plan Hydrogeology Study* as stratigraphic units of Crossfield glacial till overlaying Paskapoo formation sandstone. Sediments on valley terraces and within the valley bottom are described as “*Quaternary post-glacial undivided fluvial gravel channel deposits*”. The *Ricardo Ranch - Bow River Morphology Study* describes the bank stability and erosional forces and trends that have and will continue to have an impact on the landscape.

A database search of the Agricultural Region of Alberta Soil Inventory Database’s (AGRISID) soil information viewer was conducted on June 26, 2019 to identify the dominant soils and landforms within the Project Area. The Project Area falls within two mapped soil polygons. Soil Polygon 11255 represents the soils found in the uplands north of the crest of the valley. The soil is described as “*Orthic Black Chernozem on medium textured till*”. The landform is described as undulating, high relief, with a limiting slope of 4% and featuring areas of poorly drained soils. Soil polygon 11678 represents the soils and landforms within the Bow River valley including the valley slopes, terraces, and floodplains. The landform is described as valley with terraces with side slopes up to 35%, and terrace slopes varied between 1% and 5%.

Soils on the Plateau were highly impacted by cattle and burrowing animal activity. The result is admixing of the A and B horizon. Dry xeric soils were observed along the south facing slopes of the escarpment. Erosion and cattle have impacted these areas resulting in thin poorly developed topsoil horizons. Soils within the floodplain and flood fringe areas of the Project Area are limited to thin layers of poorly developed loam on fluvial deposits of large, rounded cobbles and gravels. In areas these gravel deposits remain exposed with little or no soil, specifically in areas around the recently formed side channel.

A total of ten (10) habitat types were identified within the Project Area. Where possible the habitats were delineated using the Government of Alberta *Range Plant Communities and Range Health Assessment Guidelines for the Foothills Fescue Natural Subregion of Alberta*. Areas that did not fall within this system are classified using the City *Natural Areas Management Plan* classification. Habitat types within the Project Area are not spatially uniform and frequent variation in vegetation community density and distribution was observed. This is particularly true of the Native Grassland, Non-native grassland, and Low shrub communities on the plateau, and on the escarpment.

A total of seven (7) habitat polygons were identified within the Project Area:

- Kentucky Bluegrass – Fringed Sage FFB2 and Smooth Brome – Alfalfa FFB3
- Northern and Western Wheatgrass – Foothills Fescue FFA25
- Common Wild Rose / Kentucky Bluegrass / Dandelion FFC1 and Beaked Willow Sedge – Tufted Hair Grass FFC2
- Kentucky Bluegrass - Foothills Rough Fescue - FFA19
- Wetland
- Balsam Poplar Forest / Upland Tall Shrub
- Disturbed Anthropogenic – Rural

The Alberta Conservation Information Management System (ACIMS) database search resulted in two non-sensitive element of occurrences (EO), western false gromwell (*Lithospermum occidentale*) and blunt-leaved

watercress (*Rorippa curvipes*) within the Project Area. The Stantec EI recorded observations of the western false gromwell throughout the ASP area. No observations of blunt-leaved watercress were observed. Habitat preference for the Western False Gromwell is disturbed areas with exposed gravels. It is listed Provincially as S3 (vulnerable), nationally as NNR (unranked) and globally as G4G5 (apparently secure to secure). Higher densities of western false gromwell were observed in the Project Area along a recently formed side channel of the Bow River where gravel deposition and natural disturbance has occurred.

## HYDROLOGY AND WETLANDS

The report "*Preliminary Hydrogeological Assessment Ricardo Ranch Area Structure Plan Ricardo Ranch, In Southeast Calgary*" (Waterline Resources Inc., 2019) provides a conceptual model for groundwater systems affecting the hydrogeology within the Project Area.

The report identifies localized perched groundwater tables located on the plateau are likely recharged mainly by snowmelt and precipitation. These groundwater systems may contribute to deeper aquifers within the Crossfield Drift Formation. The Crossfield Drift glacial till formations at this location have a high clay content and reduced permeability. However, it is believed that inter-till glacial fluvial aquifers with higher hydraulic conductivity than the till formations are found deeper within the profile. These permeable units likely produce groundwater that is contributing to the water discharge into the slope wetlands on the middle and upper portions of the escarpment. The source of this water is likely a combination of existing groundwater inputs from the greater area upgradient in the Crossfield Drift and surface water infiltration. A regional to intermediate groundwater system is also documented within the underlying Paskapoo sandstone formations that are likely recharged by greater areas north of the Project Area. Freshwater springs at the base of the escarpment may receive water from these Paskapoo sandstone formations.

The morphology study by Golder in 2018 identifies that the overbank gravel deposit near the base of the escarpment where the new side channel was identified, indicates a high likelihood that the avulsion channel will continue to develop, and erosion will occur.

To support the wetland classification data and to meet the requirements under the *Alberta Wetland Identification and Delineation Directive (2015)* average annual precipitation levels for the region from 1955 to 2017 were considered to determine a normal, dry, and wet year. These were calculated using quartiles derived from local precipitation data to determine normal, dry, and wet years. The overall average annual precipitation is determined to be 438 mm. A dry year is precipitation levels below or at 395 mm and a wet year is levels at or above 479 mm.

USL wetland assessments and site surveys confirmed a total 9 natural wetland areas. The presence of approximately 15 Ephemeral Drainage areas were identified by Stantec along the valley escarpment and one man made (altered) waterbody (A01) was observed, this was confirmed in the field by USL in the summer of 2019.

**Wetland Class, Value and Area**

Wetland Name	Alberta Wetland Classification System	Stuart and Kantrud Classification	ABWRET-A Relative Wetland Value	Wetland Area (ha)
USL013	<i>Marsh Graminoid Temporary</i>	Class II Temporary	B	0.03
W19	<i>Marsh Graminoid Temporary</i>	Class II Temporary	B	0.92
W18	<i>Marsh Graminoid Temporary</i>	Class II Temporary	B	0.18
W20	<i>Marsh Graminoid Temporary</i>	Class II Temporary	B	0.34
W16	<i>Marsh Graminoid Temporary</i>	Class II Temporary	B	0.07
W17	<i>Marsh Graminoid Temporary</i>	Class II Temporary	B	0.13
W28S	<i>Marsh Graminoid Seasonal</i>	Class III Seasonal	C	0.30
W29S	<i>Marsh Graminoid Temporary</i>	Class II Temporary	B	0.62
W030	<i>Marsh Graminoid Seasonal</i>	Class III Seasonal	D	0.03
Waterbody A01	<i>Artificial Waterbody</i>	N/A	N/A	0.10

Waterbody A01 is an artificial depression created by historical gravel extraction and does not fall under the Alberta Wetland Classification System. The feature is highly disturbed and dominantly vegetated with native colonizing species and cannot adequately be described under the Stewart and Kantrud Classification System.

The marsh temporary wetlands located within pasture along the upper plateau have been impacted through agricultural practices, occasionally cultivated until the 1970's, and transitioned into pasture/grazing lands, as it is currently used today. Distribution of Stuart and Kantrud wetland zones (wet meadow and low prairie) are not well represented in these wetlands due to cattle impacts and dominance of invasive grass cover throughout. In general, low prairie and wet meadow zones are not clearly expressed. The average cover of non-native/invasive species throughout the plateau wetlands was 50%. The remaining wetlands (W28S, W29S and W030) along the escarpment are sloped marsh wetlands and are primarily spring fed. The impacts on these wetlands are the influence of cattle use (pugging – creating deep pockets within the wetland), weed dispersal is throughout and wetland zones are not well defined as is seen in typical prairie pothole marsh wetlands. Overall cover of non-native/invasive species throughout the wetlands ranged from 20-30%.

Vegetation structure within all wetlands was heavily impacted by cattle grazing and physical impacts of cattle presence. Invasive species such as quack grass (*Elymus repens*), creeping thistle (*Cirsium arvense*), and reed canary grass (*Phalarus arundinacea*) tend to dominate large areas of the wetlands, especially the transition to upland areas. “Pugging” of wetland soils from cattle has in most cases eliminated typical wetland zones. This has resulted in the uniform presence of micro habitats across each area where wetland species are present in wetter hoof depressions, and upland species are present on the higher and drier protrusions. The removal of cattle from these environments would likely allow for wetlands to revert to a more natural topographic state, however the existing establishment of invasive weeds and vegetation would likely persist long term.

An avulsion channel of the Bow River flows through the southern portion of the Project Area within the Valley bottom. This channel was established during the 2013 flood event on the Bow River. The channel is a series of riffle and run reaches flowing over a bed of cobbles and gravels. The riparian zone is dominated by exposed gravels, cobbles, and boulders. Patches of wetland vegetation have established with occurrences of western false gromwell (*Lithospermum occidentale*). Flowing surface water was present during the last field surveys at the end of August 2019. The channel and its riparian area will be avoided by the development.

## PUBLIC LANDS

In 2017 Stantec submitted a request to Public Lands to determine Crown ownership of the waterbodies within the Area Structure Plan area, including the avulsion channel (referred to then as the fluvial channel). The response from EPA (then AEP) indicated that the Crown does not claim any wetlands within the Project Area, or the avulsion channel (Stantec Consulting Ltd., 2018).

## WILDLIFE

The Bow River Valley is identified by the Fish and Wildlife Management Information system (FWMIS) database search as a “Key Wildlife and Biodiversity Zone” that extends from upstream of the Deerfoot Trail SE bridge west of the Project Area and continues down the valley beyond the confluence of the Highwood River Valley to the east. This classification recognizes the area as important ungulate overwintering habitat, and as an area likely to express higher biodiversity in association with riparian vegetation. The database identifies the Project Area and surrounding areas as Sensitive Raptor Range for species including the Golden Eagle (*Aquila chrysaetos*) and the Bald Eagle (*Haliaeetus leucocephalus*). It has also been identified by the database as a Sharp-tailed grouse (*Tympanuchus phasianellus*) survey area indicating that the area is a probable location for sharp tailed grouse habitat and recommends proponents to survey for Sharp-Tailed Grouse leks and observe appropriate setbacks where they occur. Both the Bald eagle and Golden eagle were observed within the Project Area, but no observations or indicators of Sharp-tailed grouse were recorded.

The potential species list included 195 birds, 41 mammals, 3 reptiles and 8 amphibians. The species list for an eBird Hotspot located on the south bank of the Bow River at the Policeman’s Flats boat launch included a total of 121 species. A total of 41 bird species were observed within the six (6) point count surveys conducted on June 10-11, 2019.

During field surveys USL made incidental observations of five (5) mammal species including Coyote (*Canis latrans*), Richardson’s Ground squirrel (*Urocyon richardsonii*), White-tailed Jack Rabbit (*Lepus townsendii*), mule deer (*Odocoileus hemionus*), and white tail deer (*Odocoileus virginianus*). Evidence of animal burrowing and foraging tunnels and cavities was observed throughout the plateau and escarpment areas. One (1) amphibian species was recorded within the plateau wetlands. Wetlands A01, W29S, and W19, resulted in recordings of the Boreal chorus frog (*Pseudacris maculate*).

The Stantec EI (Stantec Consulting Ltd., 2018) completed comprehensive wildlife surveys in 2017 within the greater Ricardo Ranch ASP area. These surveys included: Winter track count surveys, nocturnal forest owl surveys, nocturnal and diurnal amphibian surveys, snake hibernaculum survey, rail survey, breeding bird survey, tree nesting raptor and great blue heron survey, and acoustic bat survey. These surveys cover the entire Ricardo Ranch ASP area however the habitat types and expected wildlife use is generally continuous. Stantec completed a comprehensive desktop assessment for species with potential to occur within the Project Area and was used to determine species of management concern (SOMC) and their habitat within or near the Project Area.

A great blue heron (*Ardea herodias*) colony has been identified within the ASP boundary along the Bow River at the south end of the Project Area. This colony is protected under the Alberta Wildlife Act and the Government of Alberta recommends a setback distance of 1,000 meters from great blue heron colonies for high disturbance activities. Western EcoSystems Technology (WEST) has prepared the Ricardo Ranch Great Blue Heron Colony Mitigation Plan (2020) on behalf of Genesis, which outlines appropriate construction setbacks and mitigation measures for a relaxation of the 1,000 meter buffer. In summary these mitigation measures include:

#### Preconstruction Phase

- Consideration and pursuit of alternative locations greater than 1000m from the colony from the policeman's flats boat launch.
- Development of a colony specific monitoring plan.
- Preconstruction baseline monitoring of colony and submission of data to Environmental and Protected Areas (EPA) Fish and Wildlife Management Information System (FWMIS).

#### Construction Phase

- To the extent possible, conduct construction work within 1000m of the colony when the great blue herons are not present (approximately mid-August to mid-April).
- Weekly monitoring of the colony when work being done within 1500m or within the great blue heron breeding season (mid-April to mid-August).
- Should construction activity occurring within 1000m result in acoustic disturbance during the breeding season daily monitoring of the colony by a qualified wildlife biologist.
- Cessation of construction activity should unacceptable disturbance be noted by a qualified wildlife biologist. Resumption of construction activity will be determined by the biologist and may include additional mitigation measures dictated by Genesis, The City, or EPA.
- Submit data collected to EPA and FWMIS
- Designation by the City of Calgary for all undeveloped lands within a >750m buffer as an environmental reserve (ER) of municipal reserve.
- Constructing a fence and signage restricting public access to the ER and providing interpretive information to the public about the importance of protecting the colony.
- Retention of all trees with a diameter of greater than 6 inches within the >750m buffer.
- Planting of trees between the colony and the develop to increase a natural barrier.
- Installation of a 24-hour wildlife monitoring camera. Filled of view will consist only of the colony and footage will be publicly accessible.

- Development of community manual with educational information pertaining to the ER and heron colony.

Postconstruction Phase

- Biannual monitoring of the colony for minimum of 5 years and submit data collected to the EPA and FWMIS.

Correspondence and review of the Great Blue Heron Colony Mitigation Plan from Brett Boukall, Senior Wildlife Biologist with Alberta Environment has agreed to accept the plan for implementation for construction.

Observations of the Bank swallows and nests were observed along the avulsion channel connecting to the Bow River. With consideration of the *Recovery Strategy for the Bank Swallow (Riparia riparia) in Canada [proposed] 2021*, it is recognized that suitable nesting areas for this species should be conserved where possible.

Development as proposed in the plan is set back is a minimum of 50m from the avulsion channel, corresponding with common best management practices and federal guidelines.

## ENVIRONMENTAL SIGNIFICANT AREAS

As per the *Open Space Plan* (The City of Calgary Parks, 2003) habitat areas were evaluated and rated based on a low, medium or high by USL to determine whether they met the City’s criteria as Environmentally Significant Areas (ESA). The City of Calgary ESA Criteria considers the value of a natural area based on the following criteria: quality biotic community, ecological function, distinctive and/or unusual landform, and uniqueness. Where a criterion is ranked high, the habitat has been designated as an ESA.

Habitat Type	Quality of Biotic Community (minimal Disturbance)	Ecological Function – Natural	Distinctive and/or Unusual landform	Uniqueness	Rating
<b>Marsh Wetlands</b>	Low	Med	Low	Low	Low
<b>Sloped Spring-fed Wetlands</b>	High	High	High	High	High
<b>Upper Escarpment</b>	Med	High	High	Med	High
<b>Lower Escarpment</b>	Low	Med	High	Med	Med-High
<b>Native/Mixed Grassland</b>	Med	High	Med	High	Med - High
<b>Fluvial Avulsion Channel</b>	High	High	High	Low	High
<b>Habitat FFB2 and FFB3</b>	Med	Med	Low	Low	Med

Habitat Type	Quality of Biotic Community (minimal Disturbance)	Ecological Function – Natural	Distinctive and/or Unusual landform	Uniqueness	Rating
<b>Balsam Poplar/Tall Shrub</b>	High	High	Med	Med	High
<b>Anthropogenic Disturbed</b>	Low	Low	Low	Low	Low
<b>Bow River Valley</b>	Med-High	Med-High	High	High	High

The marsh wetlands are specific to the wetlands that were identified along the upper plateau of the Project Area. They have seen a higher rate of impacts from both cultivation and grazing over the past 100 years. The vegetation is neither diverse, rare, or unique and the wetlands are not expected to be groundwater fed. Due to the lack of diversity of the vegetation and common nature of these types of wetlands, this habitat type does not meet the criteria of an ESA.

The escarpment and spring fed slope wetlands provide a high degree of resources, cover, and movement for a wide range of birds, insects, and terrestrial species within the Bow River corridor. Freshwater springs and associated groundwater along the escarpment support vigorous native vegetation growth beyond the wetland boundaries throughout the growing season. Due to the slope position of these wetlands, they have not been subjected to the same degenerative anthropogenic disturbance such as plowing, herbicide, pesticides, and fertilizers as many of the other wetlands in the region. These spring fed wetlands are unique and uncommon in this region and have been rated high for an ESA designation.

The escarpment exhibits an undulating and terraced landscape with thin breaks, several ephemeral drainages, and three (3) spring fed slope wetlands. The native grassland communities are mainly found along the top half of the escarpment. The upper half of the escarpment (mixed grassland/upland low shrub) provides a greater diversity of native vegetation such as Columbia needle grass (*Achnatherum nelsonii ssp. dorei*), gamma grass (*Bouteloua gracilis*), and June grass (*Koeleria macrantha*) than the plateau. The upper and lower sections of the escarpment have greater than 15% slope and contains a higher diversity of native species than the other habitat types. The upper escarpment is rated high and the lower escarpment as med-high as distinctive landforms, but is not unique to the river valley landscape. Both the upper and lower escarpment were assigned a higher ESA score based on the relative percentage of native grasses, reduced disturbance, presence of spring fed wetlands and steep slopes.

Native/mixed grassland areas are patchy throughout the sloped wetlands, along the escarpment, and along the south end of the Project Area. The native species provide diversity, soil stability and staging areas for several bird species. Grassland habitat is on a decline, and this habitat has been degraded/influenced by agricultural practices and non-native and invasive species. Based on these impacts the ranking is a med-high for ESA.

The active avulsed side channel of the Bow River provides quality habitat for many aquatic and terrestrial species. Along the north bank of the channel, several active bank swallow nests were observed, and the substrate of gravels and cobbles provide fish spawning habitat with connectivity to the Bow River. Additionally, multiple observations of the rare plant Western false gromwell were observed along the gravel banks of the channel. The quality of the habitat and ecological function rate high for an ESA.



Habitat FFB2 and FFB3 are rated as medium as these habitat areas exhibit a high percentage of non-native species, and long term grazing impacts. However, native vegetation species are present throughout and the habitat does provide foraging, breeding and rearing conditions for a wide range of wildlife.

Balsam poplar habitat is found within the flood plain of the Bow River Valley. It is rated as a significant habitat due to its relatively undisturbed condition with a mostly native shrub and grassland understory and high value habitat for wildlife.

The floodplain and flood fringe areas south of the side channel on the Bow River are a mix of native and non-native grassland, and native low shrub communities. The proximity to the Bow River and connectivity to the Bow River Valley give this area a high ecological value for wildlife habitat and connectivity. The quality of the habitat and ecological function also rate high for an ESA.

Anthropogenic disturbance is identified as the access road to the homestead and the homestead area. The highest rates of non-native/invasive species are found along the gravel access road to the homestead site. The homestead site is the hub of storage and maintenance for agricultural machinery, manicured grass and non-native or ornamental species have been planted such as caragana.

The different features and ecological areas of the Project Area were assessed under the City's ESA criteria independently by USL based on the field surveys conducted. The Bow River Valley as whole is considered a valued ecological component both locally in the context of the ASP area, and regionally within the context of the Southeast Planning Area Regional Policy Plan. Different habitats and communities within the Bow River Valley and within the Project Area boundaries exhibit different levels of disturbance from past and current land use.

## IMPACTS AND MITIGATION MEASURES

The potential impacts of the proposed development were identified based on a combination of the outline plan development footprint, the Ricardo Ranch ASP area, and residual impacts to ecological, social, and physical impacts on Bow River Valley. Impacts are assessed with consideration of;

- Displacement or disturbance of environmentally significant areas and other natural areas
- Alteration of natural surface water and groundwater impacts due to increased impermeable surfaces, and the build out of roads and stormwater infrastructure
- Required regulatory design criteria
- Construction activities
- Changes to land use

Avoidance and minimization options were considered in several iterations of a draft outline plan. The Outline Plan shows avoidance of the majority of features that are ESA including the avulsion channel, escarpments, ephemeral drainages, riparian and flood fringe areas.

Impacts to areas that qualify as ESA include:

- The upper catchments of the ephemeral drainages will be displaced or diverted by stormwater infrastructure and the natural water flow frequency and volume will be reduced.
- The natural hydroperiod for most wetlands on the Project Area on the upper bench are dependent on surface flow and would not be able to be naturally maintained. Most or all of the catchment area have been or will be removed.

- Loss or disturbance to portions of native grassland
- A segment of the escarpment will be altered, and loss of three groundwater fed wetlands, WL28S (Class III), WL029S (Class II) and WL030 (Class III) that qualify as ESA.

The entirety of the Bow River Valley is considered an ESA as directed by the City of Calgary and is estimated to be approximately 83 ha. Individual habitat types within the Project Site were then assessed and given ESA rankings based on ecological conditions and resulted in an area of 46.8 ha.

To understand the loss within the Bow River Valley as a whole, the area of the Valley within the Project Area is approximately 83 ha, of which 46.6 ha (or 56%) will be dedicated as ER.

Various components of the development were reviewed to determine location and access to the lower bench. Many iterations of the plan were arranged to try to avoid wetlands, and/or the ephemeral drainage overland flow paths along the escarpment. Further assessment on groundwater conditions, slopes, road designs, utilities and stormwater were conducted.

## SPECIES OF MANAGEMENT CONCERN

The great blue heron (*Ardea herodias*) colony identified is protected under the Alberta Wildlife Act and the Government of Alberta recommends a setback distance of 1,000 meters from great blue heron colonies for high disturbance activities. Western EcoSystems Technology (WEST) has prepared the Ricardo Ranch Great Blue Heron Colony Mitigation Plan (2020) on behalf of Genesis, which outlines appropriate construction setbacks and mitigation measures for a relaxation of the 1,000 meter buffer. In summary these mitigation measures include:

### Preconstruction Phase

- Consideration and pursuit of alternative locations greater than 1000m from the colony from the policeman's flats boat launch.
- Development of a colony specific monitoring plan.
- Preconstruction baseline monitoring of colony and submission of data to Environmental and Protected Areas (EPA) Fish and Wildlife Management Information System (FWMIS).

### Construction Phase

- To the extent possible, conduct construction work within 1000m of the colony when the great blue herons are not present (approximately mid-August to mid-April).
- Weekly monitoring of the colony when work being done within 1500m or within the great blue heron breeding season (mid-April to mid-August).
- Should construction activity occurring within 1000m result in acoustic disturbance during the breeding season daily monitoring of the colony by a qualified wildlife biologist.
- Cessation of construction activity should unacceptable disturbance be noted by a qualified wildlife biologist. Resumption of construction activity will be determined by the biologist and may include additional mitigation measures dictated by Genesis, The City, or EPA.
- Submit data collected to EPA and FWMIS
- Designation by the City of Calgary for all undeveloped lands within a >750m buffer as an environmental reserve (ER) of municipal reserve.

- Constructing a fence and signage restricting public access to the ER and providing interpretive information to the public about the importance of protecting the colony.
- Retention of all trees with a diameter of greater than 6 inches within the >750m buffer.
- Planting of trees between the colony and the develop to increase a natural barrier.
- Installation of a 24-hour wildlife monitoring camera. Filled of view will consist only of the colony and footage will be publicly accessible.
- Development of community manual with educational information pertaining to the ER and heron colony.

#### Postconstruction Phase

- Biannual monitoring of the colony for minimum of 5 years and submit data collected to the EPA and FWMIS.

Correspondence and review of the Great Blue Heron Colony Mitigation Plan from Brett Boukall, Senior Wildlife Biologist with Alberta Environment has agreed to accept the plan for implementation for construction.

## CUMULATIVE EFFECTS

A cumulative effects assessment is a description of the potential positive and negative environmental, social, economic, and cultural impacts of a proposed project, and includes cumulative, regional, temporal, and spatial considerations. The elements of a cumulative effects assessment include issues and Valued Ecosystem Components (VECs) identification, spatial and temporal scales as well as past, existing, and proposed projects; impact characterization; and significance evaluation and determination (City of Calgary Parks, 2010). VEC's of the Project Area and the associated cumulative effects are described below.

### BOW RIVER VALLEY

The Bow River valley has been recognized in the Southeast Planning Area Regional Policy Plan as having regional significance, serving as a natural corridor from both a regional and project specific perspective (City of Calgary, 2004). As such, cumulative impacts on the Bow River Valley have been considered on both a local and regional scale.

Located in the Bow River Valley, the Project Area is within a Key Wildlife and Biodiversity Zone (KWBZ), providing winter ungulate habitat and has a wide range of species diversity. Extensive development currently exists surrounding and within the Bow River Valley within the City of Calgary. Further development within the Bow River Valley is likely to result in increased habitat fragmentation and loss, with upstream connectivity already significantly disrupted. While the downstream Bow River Valley is mostly undeveloped with a few exceptions between the Project Area and the confluence of the Bow and Highwood Rivers, adjacent developments may be proposed/approved within the adjacent municipal districts. This will result in further ecological loss, increased recreational pressures, and greater cumulative effects over time.

KWBZ's play a key role in maintaining ungulate populations on a regional level and development within the area may impact breeding and movement within the corridor. As future developments occur within the Bow River Valley, increased habitat loss and stressors are anticipated to impact wildlife populations in the area, further exasperating the cumulative effects.

Great blue heron colonies within proximity to the City of Calgary boundary have been in decline over the last several decades, highlighting the importance of conservation and successful implementation of the mitigation

measures. On a regional scale, the occurrence of the great blue heron colony is significant, and while the rookery is not being removed by the Project footprint, indirect residual impacts may occur to the colony. Residual impacts are likely to be the result of increased recreational pressures within the Bow River Valley and habitat disruption resulting in species stressors. Additional proposed developments in the adjacent lands will further increase cumulative effects and potential residual impacts. Strong public education, signage, and appropriate setbacks are crucial to ensure the longevity of the colony as development expands in the area and within the Bow River Valley as a whole.

The occurrence of bank swallow nesting sites within the avulsion channel of the Bow River Valley in proximity to the Project Area is significant. The nesting sites and associated habitat will be maintained with appropriate setbacks, and no direct impacts to the nesting sites are anticipated. Indirect residual impacts may occur to species populations as a result of increased recreation in the area and surrounding changes in land use. Successful implementation of all mitigation measures is crucial to minimize residual impacts and ensure the nesting can continue to occur as development expands in the area.

## WETLANDS

Wetland loss and surface water degradation within the region is extensive, with an estimated 90% of pre-settlement wetlands within the City of Calgary having been lost to development (The City of Calgary, 2004). Wetland loss within the Project Area will result in cumulative effects on a local and regional level. Wetlands within the Project Area of lower ecological value will not be retained and those of higher ecological value will be lost due to the impact of the groundwater system from meeting design and infrastructure requirements. These impacts will be mitigated through the provincial Water Act approval process. Other important water resources such as the avulsion channel, overland flow paths and the mapped flood plain of the Project Area will be avoided and maintained with appropriate setbacks.

## NATIVE GRASSLANDS

Native grasslands have experienced significant loss in Canada. Nature Canada estimates there is approximately 25% of native grasslands remaining (Nature Canada, 2023). The Project Area exhibits native grassland species intertwined with non-native and weedy species impacted through extensive long-term grazing. Most of the Project Area has native grassland species throughout, and the area with the largest area of high valued and intact native grassland species are being retained within the setback from the Heron colony.

On a regional and local scale, the overall footprint of the proposed concept does result in a cumulative loss of native ecological areas, function and habitat. Cumulative effects and losses in the area may be further exacerbated as adjacent developments occur. Adaptive management strategies may be required as development expands in the area in order to ensure the longevity of VEC's and minimize residual effects. Approval of the ASP allows for development within this region and through careful planning considerations, technical studies, and implementation of mitigation measures (pre and post construction), significant residual impacts can be reduced.

## DISCUSSION

The areas designated as ER include most of the lower escarpment with associated overland flow paths, a small portion of the upper escarpment, native grasslands/low shrub habitat to the south, the avulsion channel, and a setback from the Bow River, which includes the great blue heron colony and bank swallow habitat. The total

developable Project Area is approximately 142.7 ha. Based on the outline plan 46.6 ha or approximately 33% of the developable area is planned for ER dedication.

The entirety of the Bow River Valley is considered an ESA as directed by the City of Calgary and is estimated to be approximately 83 ha. Within the Bow River Valley ESA the individual habitat types with the highest ESA ranking (based species composition and intactness) cover a total of 46.8 ha. The highest ranked ESA's are similar in size and area to the Environmental Open Space Study Area identified in the ASP.

To understand the loss within the Bow River Valley as a whole, the area of the Valley within the Project Area is approximately 83 ha, of which 46.6 ha (or 56%) will be dedicated as ER.

Multiple mitigation measures have been identified to minimize the impact throughout construction and post development, which include measures such as monitoring, setbacks and designation of ER. To further minimize the loss of native grassland and other native species, areas designated as municipal reserve will be landscaped to include transplant of annual/perennial species. The preparation of a community or landowner manual with historical and educational information of the preserved and enhanced areas will help to promote a sense of pride and value for the community. Education signage and fencing will be set in place for community members and the public to respect and protect the natural preserved ER areas of the Bow River Valley. Access restrictions related to the heron colony and public with information and data on natural areas will ensure the designated ER will be a valuable amenity to the public while fostering conservation.

Evaluation of the site-specific constraints and broader project context determined that Wetlands W28S, W29S and W30 would not be retained but removed and compensated through the provincial Water Act. Wetlands W28S, W29S and W30 are a sloped wetlands, W28S and W30 are classified as Class III seasonal and W29S is a Class II temporary wetland. They are fed by a perched groundwater table and their viability is dependant on maintaining the predevelopment groundwater flow.

After hydrogeological analysis and a detailed review of possible site grades and developability, it was determined that development of the Project Area was impossible without negatively impacting the area groundwater. This combined with the removal of catchment areas, will likely result in drying out W28S, W29S and W30 and negatively impact their current value and function.

It was further determined that, to maintain the safety and integrity of nearby infrastructure and development, it was not possible to reliably maintain these wetlands in a post development condition (Urban Systems Ltd., 2021). A significant number of sloped groundwater fed wetlands and overland flow paths are being preserved across the broader Ricardo Ranch ASP area.

Marsh wetlands on the upper plateau are temporary in nature and the catchments have been or will be fully removed by development and would not likely sustain function post development. Retention would require augmented water sources, significant setbacks, and challenging design constraints that would not be able to meet planning, transportation, or development requirements. Under the City of Calgary Wetland Policy, they do not qualify as ER.

Cumulative effects are expected based on both local and regional scales. Various mitigation measures have been identified in preparation for construction and post construction activities to reduce or eliminate residual effects. Mitigations include avoidance of sensitive areas within the Valley portion of the Project Site with appropriate setbacks, post construction monitoring and a multi-year monitoring plan for the heron colony (currently underway), post development planning and educational tools and incorporating historical cultural resources.

# 1 INTRODUCTION

Urban Systems Ltd. (USL) has been retained by the landowner Genesis Land Development Corp (Genesis) to prepare a Biophysical Impact Assessment for the proposed residential development of the central portion (Project Area) of the greater Ricardo Ranch Area Structure Plan (ASP). The Project Area spans across 145.52 ha within the ATS's NW-10-22-29 W4, SW-10-22-29W4 and NW-3-22-29W4 along the southern municipal boundary of the City of Calgary and on the north bank of the Bow River (**Figure 1**). This scoped BIA follows The City of Calgary's Biophysical Impact Assessment Framework 2010.

In 2018, Stantec Consulting Ltd., completed an Ecological Inventory (EI) in support of the ASP (Stantec Consulting Ltd., 2018). There are three different owners of the ASP lands and include: Brookfield Residential, Genesis Land Development Corp and Jayman/Telsec. This BIA is specific to the lands owned by Genesis. The Ecological Inventory was approved by The City of Calgary (The City) in 2019.

## 1.1 PURPOSE

The purpose of the BIA is to characterize and classify environmental features of the proposed Project Area for land use, outline plan, and subsequent development permit application approval through the City of Calgary development process. This scoped BIA will follow the requirements outlined in *City of Calgary Biophysical Impact Assessment Framework 2010* (City of Calgary Parks, 2010) with reference to the approved Stantec EI report and a meeting with Parks on June 14, 2019. Parks did not require surveys such as rare plant, bat, owl, or snake hibernacula surveys as they had already been conducted as part of the EI. The objectives of the BIA are to:

- Describe existing environmental conditions within the Project Area.
- Identify and predict potential impacts.
- Inform the retention/reconstruction/removal of Environmentally Significant Area(s) (ESA), focusing on the Environmental Open Space Study Area, including sites that meet the criteria of Environmental Reserve. Environmental Reserve (ER) is municipally designated land set aside to preserve natural land features, prevent pollution, ensure public access, and prevent the development of land that is subject to flooding or is unstable.
- Provide information for future restoration of ER.
- Recommend mitigation measures based on identified impacts; and
- Identify and address cumulative effects of the proposed development.

This BIA identifies impacts and mitigation measures based on expected outcomes of the proposed residential development.

## 1.2 PROJECT DESCRIPTION AND BACKGROUND

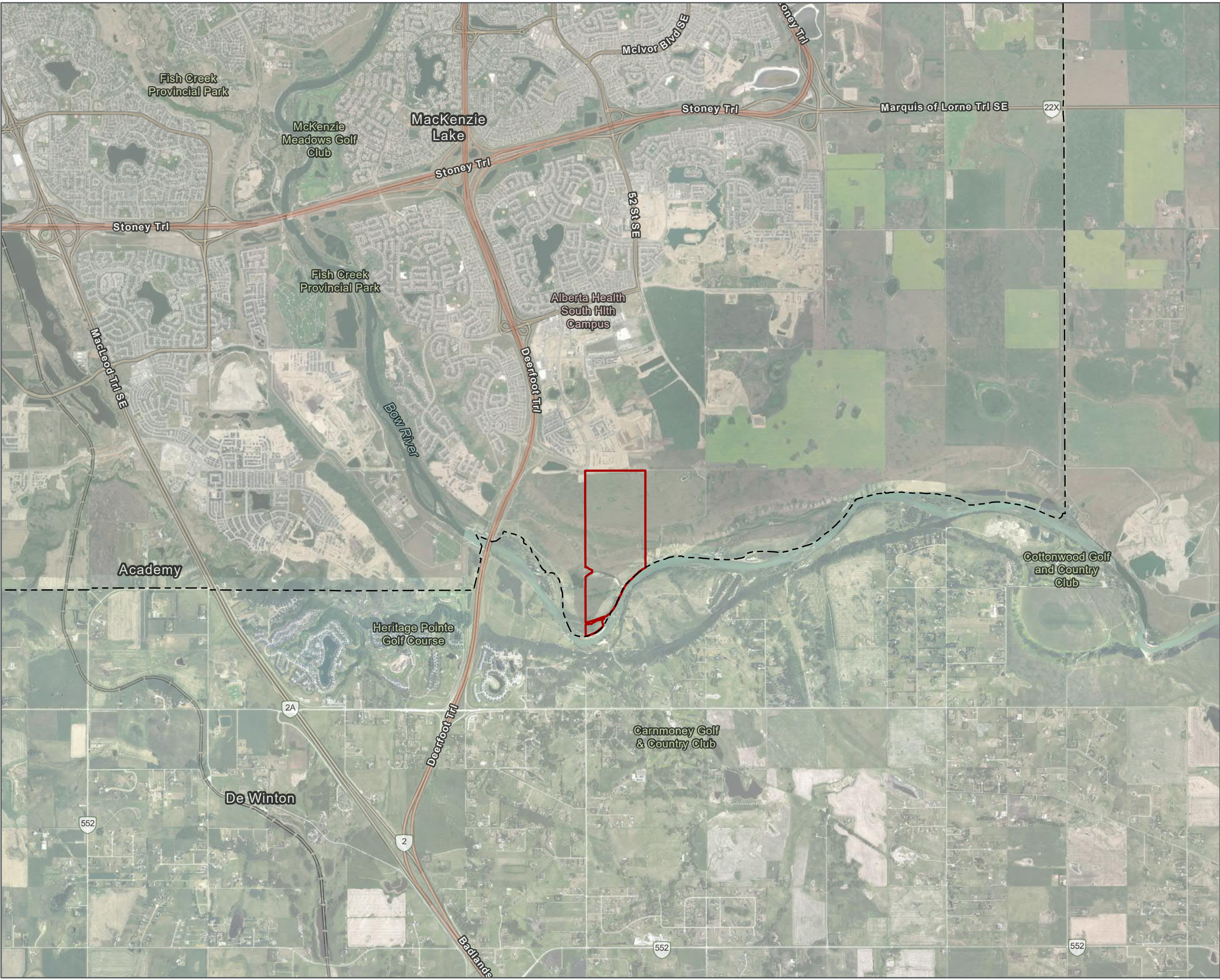
The ASP is bound by Deerfoot Trail SE to the west, 88 Street SE to the east, the community of Seton to the north, and the Bow River to the south. The south boundary of the ASP is defined by the City of Calgary municipal limits on the bank of the Bow River with the Foothills County located across the Bow River to the south. The Genesis lands described in this report consist of the middle portion of the ASP with lands by Brookfield Residential to the west, and by Jayman/Telsec to the East.

The Ricardo Ranch was established in 1888 and has been an operating cattle ranch since its establishment. Aerial imagery indicates that suitable areas have been cultivated or used for hay production, however recent imagery indicates that the land has been primarily used as tame pasture for cattle grazing.

The proposed development is a residential community with a mix of single, semi and multi-use detached, clustered and town homes. Infrastructure such as stormponds, along with integrated pathways, corridors and municipal and environmental reserve (ER) are included in the outline plan (**Figure 2**). The development will respect and maintain setbacks from the floodway with ER designation as well as meeting the development expectations set out in the ASP.



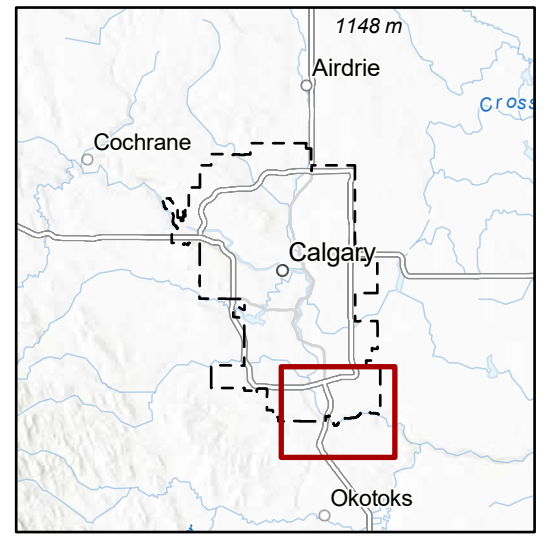
Last updated by SdeBoerFuller on January 10, 2023 at 12:16 PM  
 Last exported by SdeBoerFuller on January 10, 2023 at 12:16 PM  
 Last printed by SdeBoerFuller on July 14, 2020 at 4:30 PM



## Logan Landing Biophysical Impact Assessment Project Location

NW Sec 10 - Twp 022 - Rge 29 - Mer 4  
 SW Sec 10 - Twp 022 - Rge 29 - Mer 4  
 NW Sec 03 - Twp 022 - Rge 29 - Mer 4

- Calgary Municipal Boundary
- Project Area



The accuracy & completeness of information shown on this drawing is not guaranteed. It will be the responsibility of the user of the information shown on this drawing to locate & establish the precise location of all existing information whether shown or not.

0 500 1,000 1,500  
 Meters

**Coordinate System:** NAD 1983 3TM 114  
**Scale:** 1:50,000 (When plotted at 11"x17")

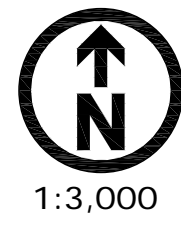
**Data Sources:**  
 - Aerial imagery provided by Esri  
 - Calgary municipal boundary provided by the city of Calgary

Project #: 2197.0009.02  
 Author: SDF  
 Checked: TD  
 Status: **FINAL**  
 Revision: A  
 Date: 2023 / 1 / 10

**FIGURE 1**

\\us1.urban-systems.com\projects\Projects\_CAL\2197\0009\02\Design\GIS\Projects\Pro\_Projects\Genesis\_Ricardo\_Environmental\_Inspection\20200604\_aprx\Genesis\_Fig1\_Project\_Location\_20202018





**prime consultant:**  
**B&A Planning Group**  
 600, 215 - 9<sup>th</sup> Ave SW  
 Calgary, Alberta T2P 1K3 | bapgp.ca  
 t: 403 269 4733 f: 403 262 4480

**copyright:**  
 Any reproduction or distribution for any purpose other than authorized by B&A Planning Group is forbidden. Written dimensions shall have precedence over scaled dimensions. Contractors shall verify and be responsible for all dimensions and conditions shown on the drawing.

**client:**  
**GENESIS**

**sub-consultant:**  
**URBAN**

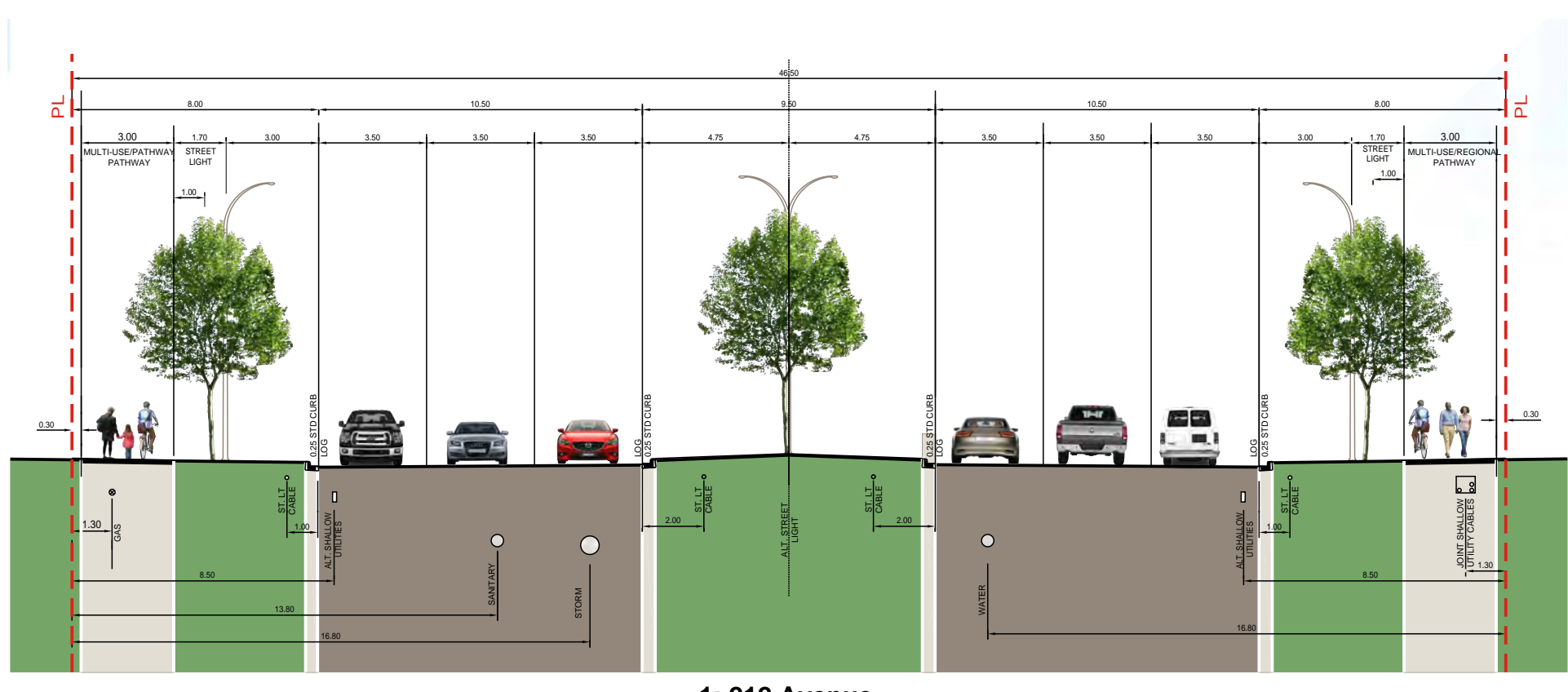
**revisions:**

no.	date	description
1	15 July 2020	Submission
2	15 Aug 2022	Draw 1
3	23 Dec 2022	Draw 2
4	10 Mar 2023	Street names/sec
5		
6		
7		
8		
9		

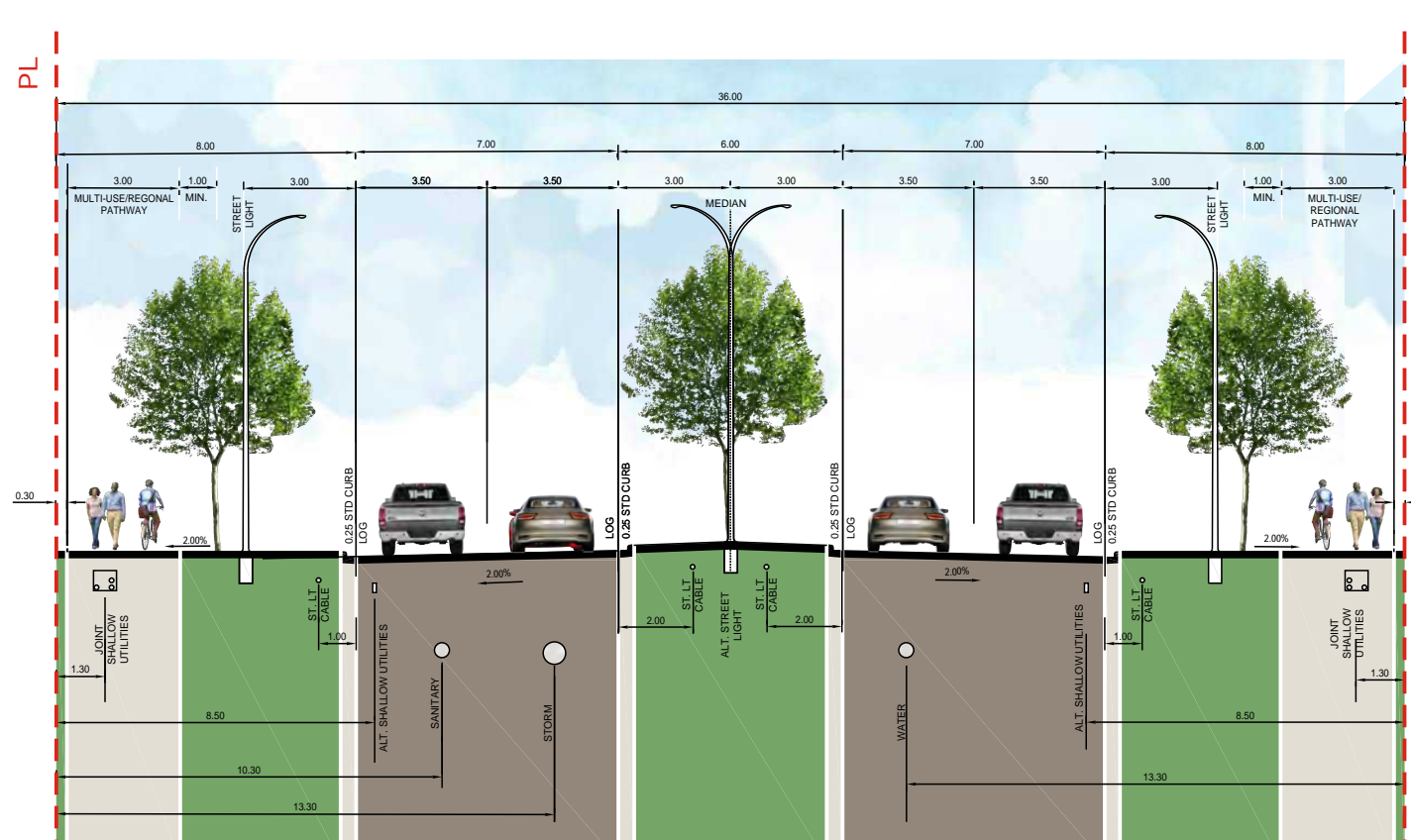
- legend:**
- Outline Plan Boundary
  - Contour Interval 0.5m
  - 1.5m Mono Sidewalk
  - 2.0m Mono Sidewalk
  - 1.5m Separate Sidewalk
  - 2.0m Separate Sidewalk
  - 3.0m Regional Pathway
  - 2.5m/3.0m Multi-Use Pathway
  - Green Corridor (3.0m Asphalt Path)
  - 2.5m Local Pathway
  - Transit Bus Stop
  - ML Top of Slope
  - 200 Year Meander
  - Left Bank
  - Slope Modified Setback
  - Avulsion Channel
  - 50m River Setback

- Deep Services - Proposed**
- Storm Sewer/Manhole
  - Sanitary Sewer/Manhole
  - Water Main/Hydrant

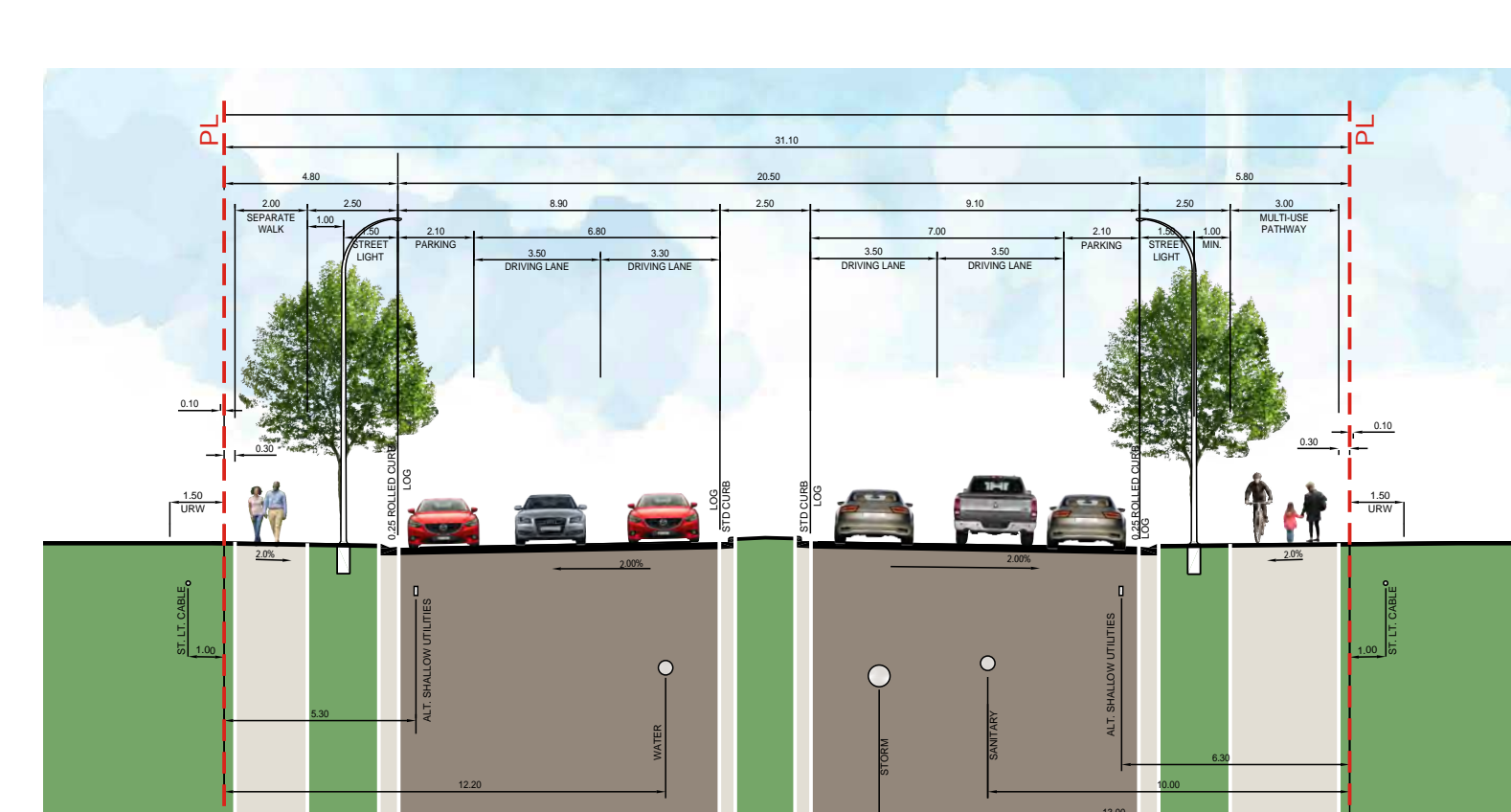
**Notes:**  
 Residential streets: Street (8.0m/16.0m) or Residential "M" Street (8.5m/16.0m) unless otherwise noted.  
 All lanes and 7.0m wide unless otherwise noted.  
 Maximum Grades of Walkways, Lanes and Roads are 12% on the maximum grade as noted in the City of Calgary ODES.  
 Pathway widths noted are typical unless customized with cross-sections. Cross-section widths will apply.



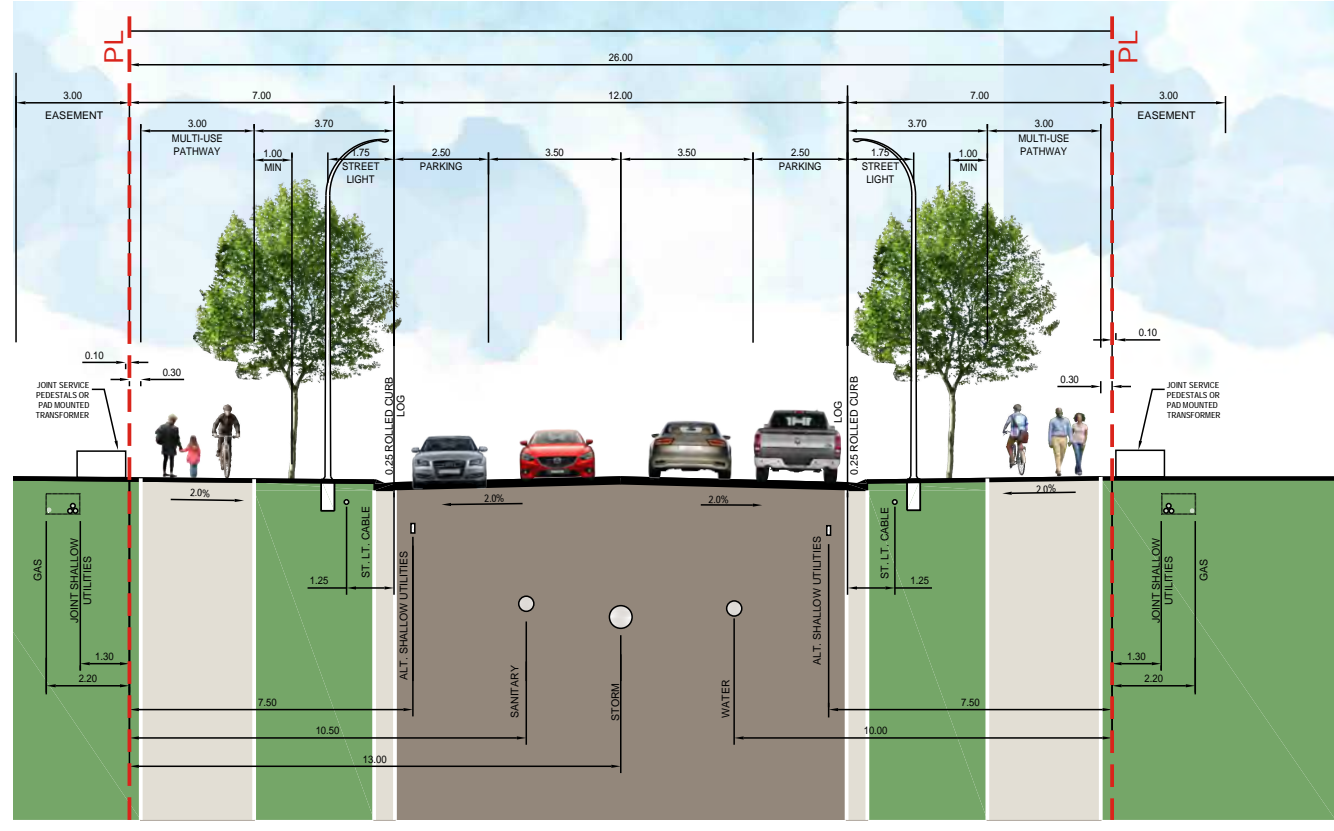
**1: 212 Avenue**  
 Arterial - (2x10.5m / 46.5m) 6 Lanes 1:200



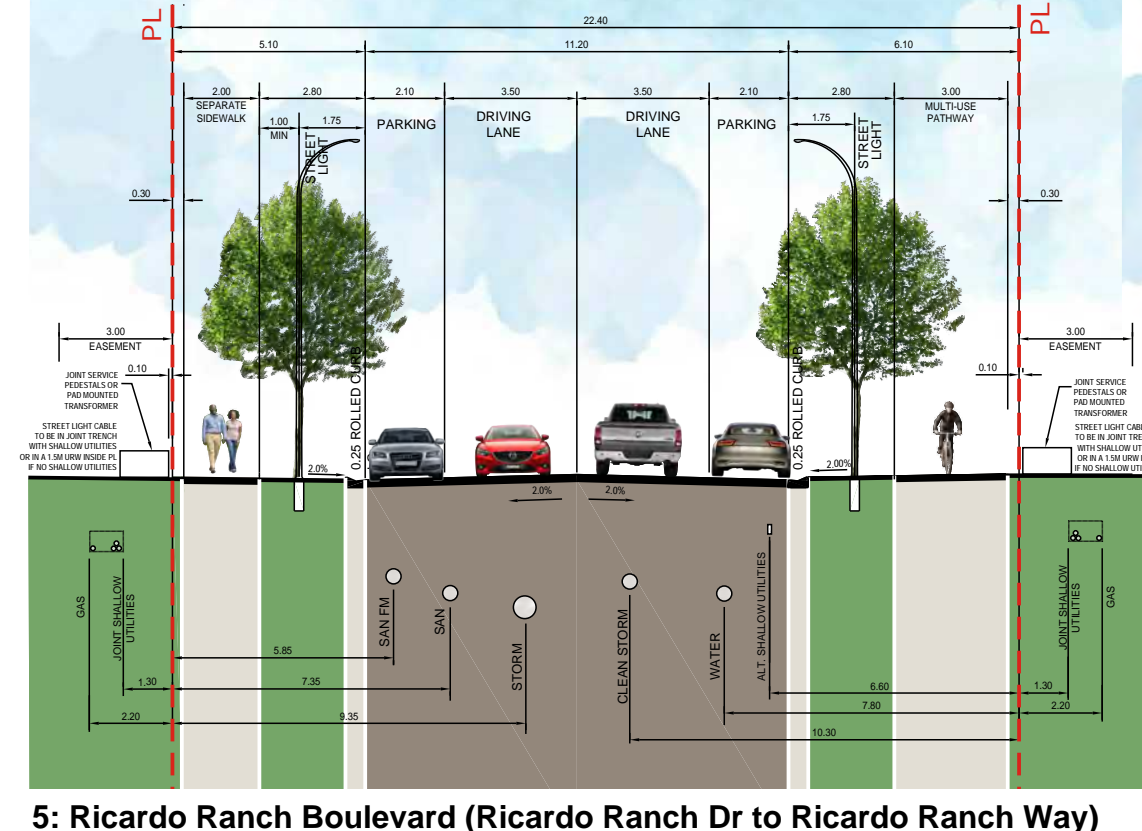
**2: Ricardo Ranch Boulevard (212 Ave to Ricardo Ranch Ave)**  
 Arterial - (2x7.0m / 36.0m) 3.0m Multi-Use Pathway Both Sides, No Parking 1:200



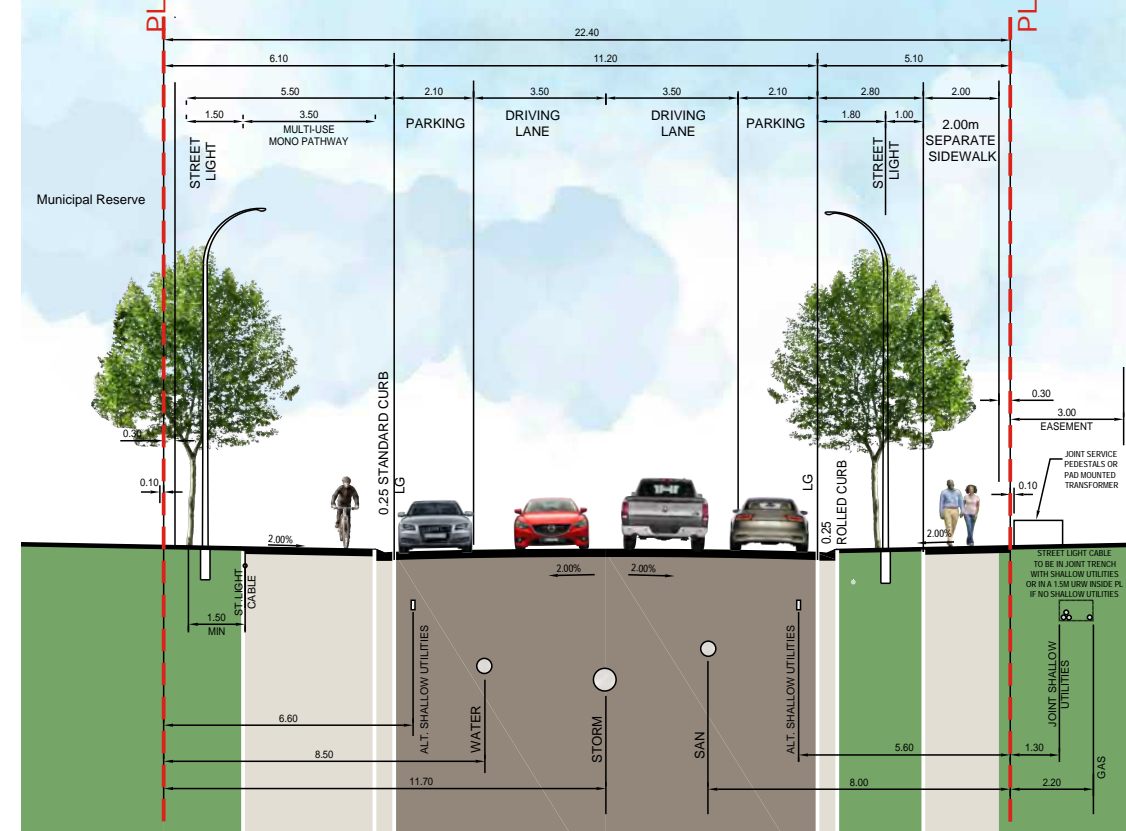
**3: Wild Rose Way (212 Ave to Ricardo Ranch Ave)**  
 Mod. Primary Collector Street - (8.9m & 9.1m/31.10m) Multi-Use Pathway One Side 1:200



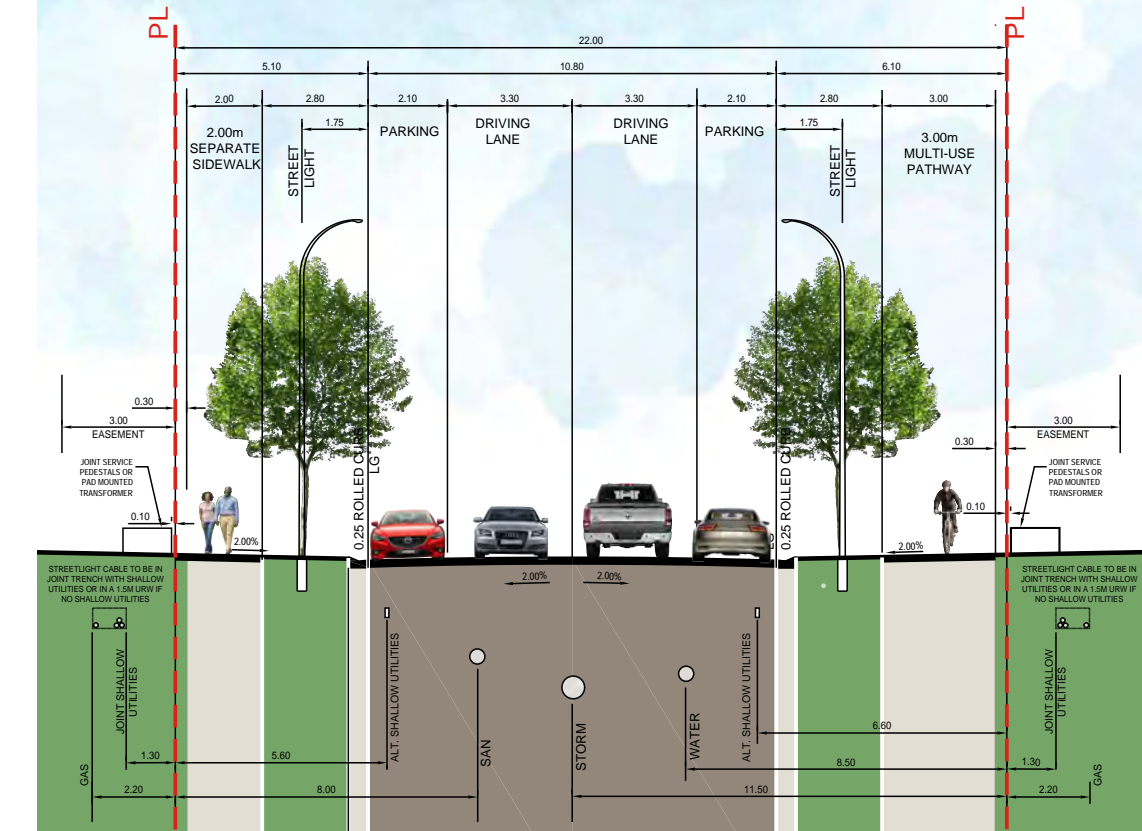
**4: Ricardo Ranch Boulevard (Ricardo Ranch Ave to Ricardo Ranch DR)**  
 Mod. Collector Street - (12.0m / 26.0m) Multi-Use Pathway Both Sides 1:200



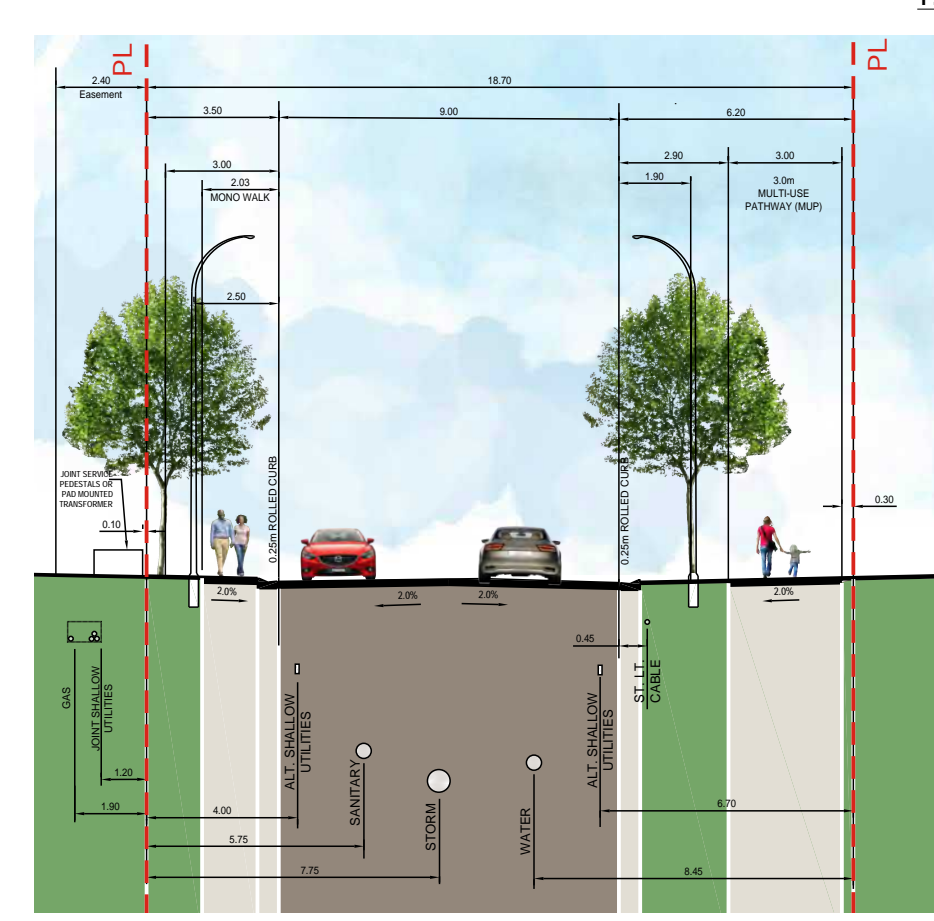
**5: Ricardo Ranch Boulevard (Ricardo Ranch Dr to Ricardo Ranch Way)**  
 Mod. Collector Street - (11.2m / 22.4m) MUP & 2.0m Separate Sidewalk, Parking Both Sides 1:200



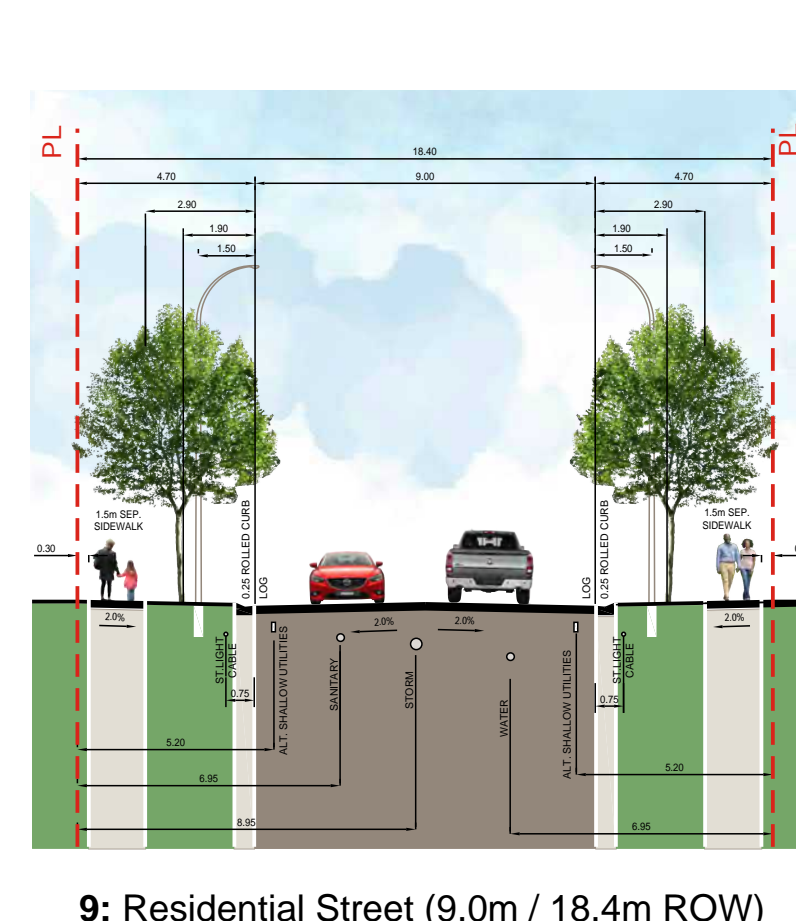
**6: Ricardo Ranch Drive and Wild Rose Way (Adjacent to School Site)**  
 Mod. Collector Street - (11.2m / 22.4m) MUP & 2.0m Separate Sidewalk, Parking Both Sides 1:200



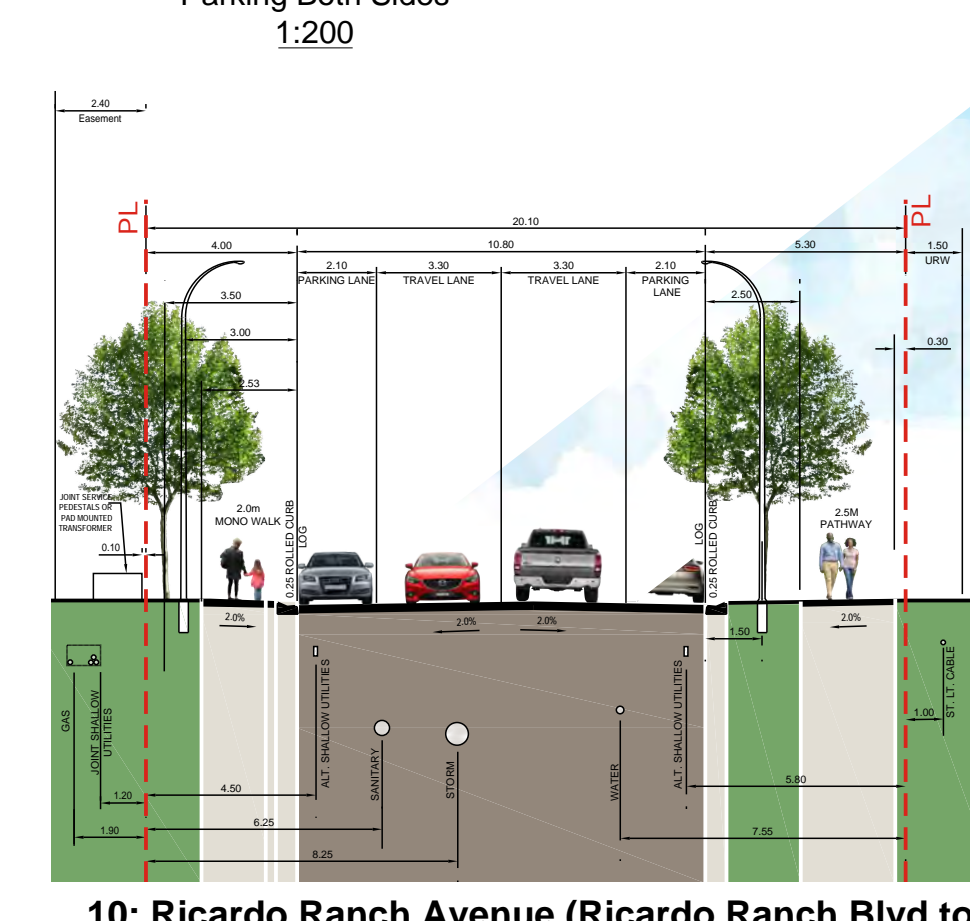
**7: Ricardo Ranch Way**  
 Mod. Collector Street - (10.8m / 22.0m) MUP & 2.0m Separate Sidewalk, Parking Both Sides 1:200



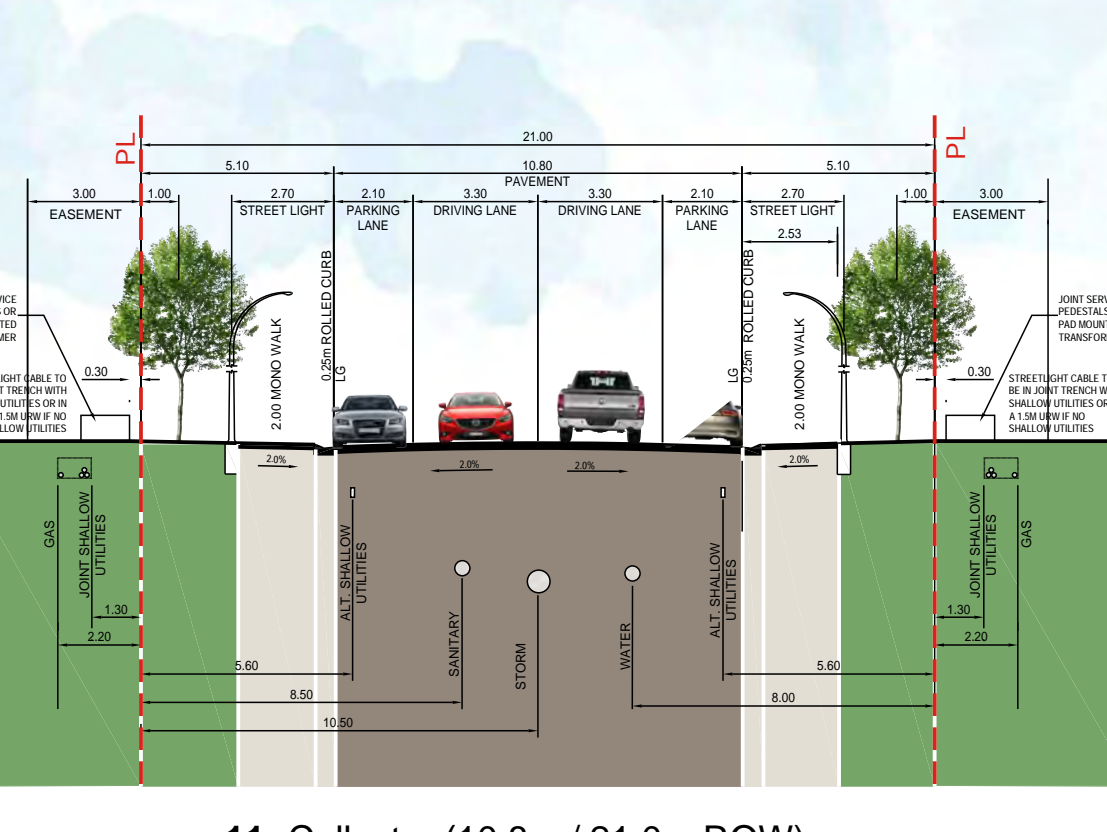
**8: Coyote Common**  
 Mod. Residential Street (9.0m / 18.70m ROW) Multi-Use Pathway & Monowalk 1:200



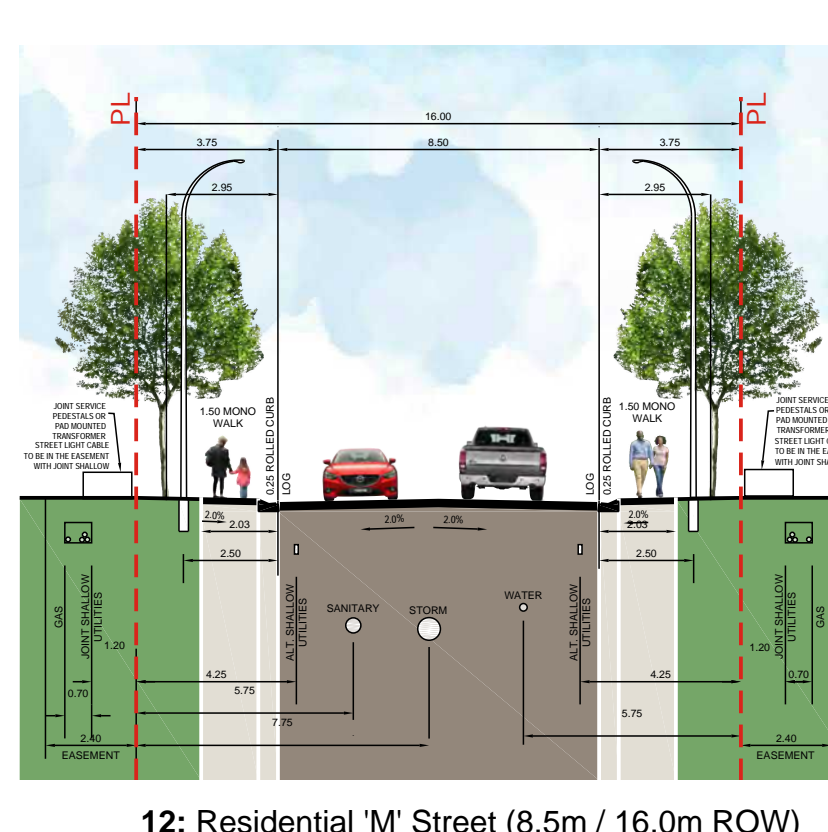
**9: Residential Street (9.0m / 18.4m ROW)**  
 Separate Walk Both Sides 1:200



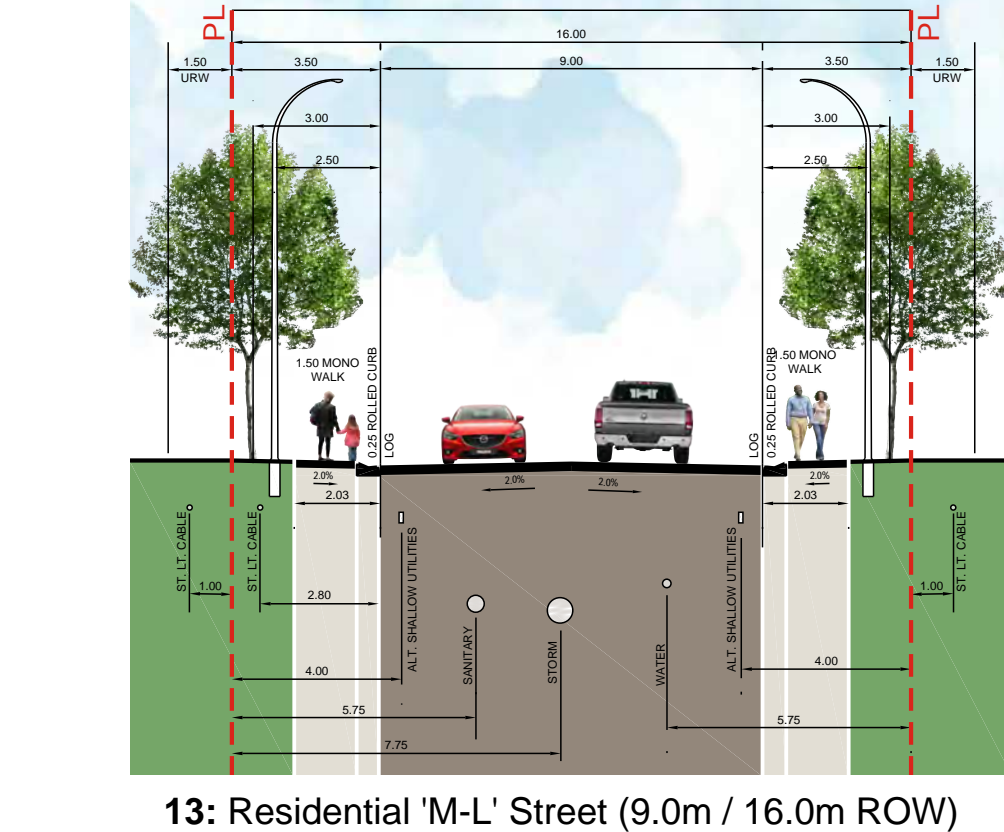
**10: Ricardo Ranch Avenue (Ricardo Ranch Blvd to Wild Rose Way)**  
 Mod. Collector (10.8m / 20.10m ROW) 2.0m sidewalk & 2.5m Walkway 1:200



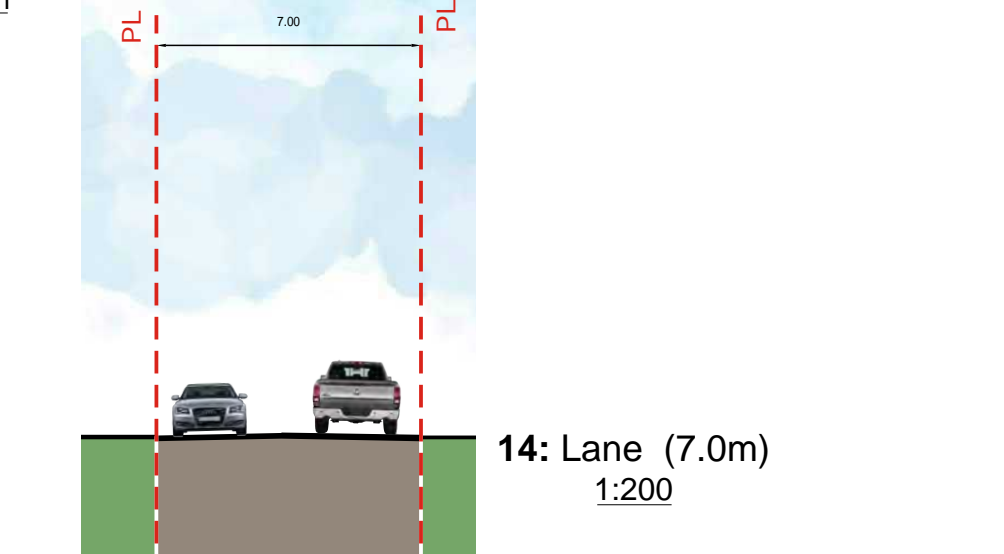
**11: Collector (10.8m / 21.0m ROW)**  
 2.0m Mono sidewalk both sides 1:200



**12: Residential 'M' Street (8.5m / 16.0m ROW)**  
 1:200

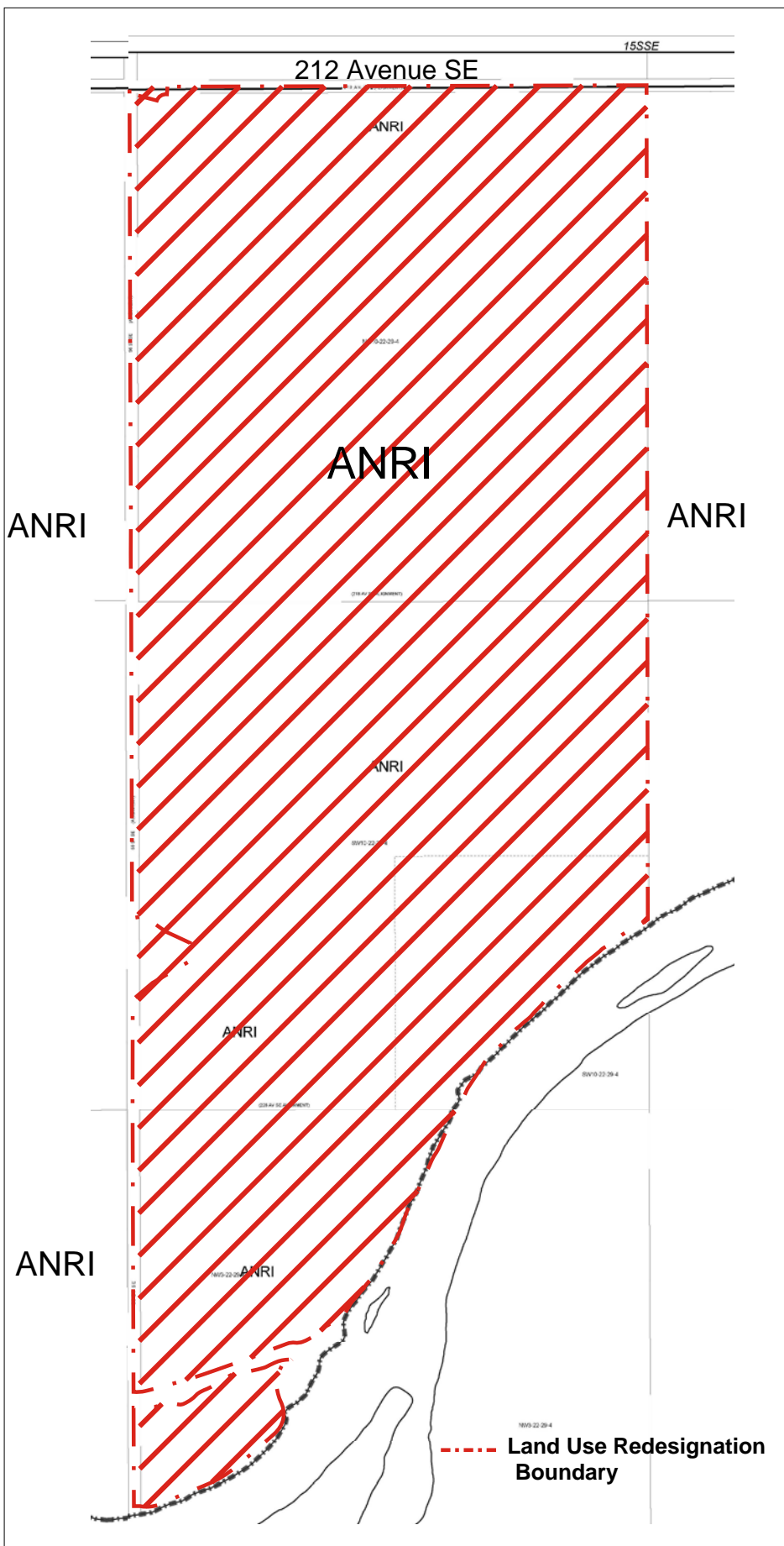


**13: Residential 'M-L' Street (9.0m / 16.0m ROW)**  
 1:200



**14: Lane (7.0m)**  
 1:200

Note: to be used only on residential streets that have no rear lanes and contain no sideyards adjacent to the street for the entire length between intersections.



**Existing Land Use**



**Proposed Land Use**

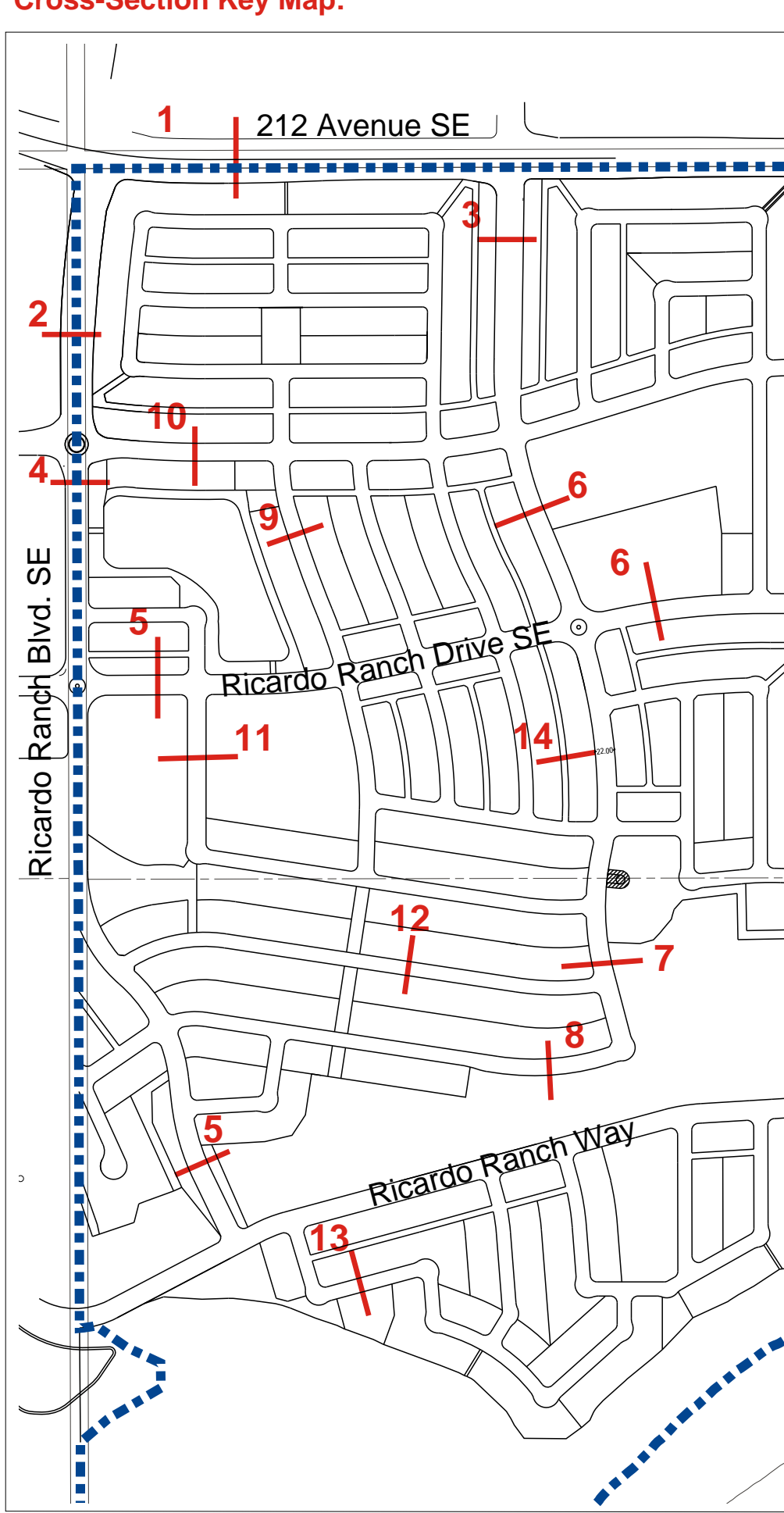
- R-G Residential - Low Density Mixed Housing
- R-Gm Residential - Low Density Mixed Housing (Street-oriented Townhouses)
- DCR-Gm Residential - Low Density Mixed Housing (Street-oriented Townhouses)
- M-1 Multi-Residential - Low Profile District
- M-2 Multi-Residential - Low Profile District
- C-62 Commercial - Neighbourhood
- S-SPR Special Purpose - School, Park and Community Reserve District
- S-LIN Special Purpose - Urban Nature District
- S-CRI Special Purpose - Stormpond, Inlet / Outlet & Wet Setback

**LAND USE REDESIGNATION STATISTICS**

Land Use	Land Use	Hectares	Acres
ANRI	to R-G	60.88	150.43
ANRI	to R-Gm	11.37	28.10
ANRI	to DCR-Gm	3.10	7.66
ANRI	to M-2	3.09	7.64
ANRI	to C-N2	2.59	6.40
ANRI	to S-SPR	11.97	29.58
ANRI	to S-LIN	48.53	119.92
ANRI	to S-CRI	3.16	7.81
<b>Total</b>		<b>144.69</b>	<b>357.52</b>

**OUTLINE PLAN STATISTICS**

Category	Lot width / units per acre	Frontage	Hectares	Acres	Number of lots/units	% of GDA
<b>GENESIS OWNERSHIP</b>						
Genesis Ownership			144.69	357.52		100%
<b>GROSS DEVELOPABLE AREA (GDA)</b>						
Residential			60.21	148.43		66.2%
Multi-Family			6.21	15.38		4.3%
Public			1.10	2.70		0.8%
Other			77.27	190.01		53.7%
<b>RESIDENTIAL</b>						
Low Density Residential (General) - Landless R-G	48	14.60	2427.91	599	23.95	100%
Low Density Residential (Move-up) - Landless R-G	36	11.00	3981	14.97	36.90	361.60%
Low Density Residential (Front Drive) - Landless R-G	32	9.75	2488	6.36	22.15	255.86%
Low Density Residential (Street) - Landless R-G	36	7.82	2921	10.11	24.97	369.60%
Low Density Mixed Housing (See Simple Street Towns) - Landless R-Gm	20	6.10	2020	0.84	16.91	331.60%
Low Density Mixed Housing (See Simple Street Towns) - Landless DCR-Gm	20	6.10	706	1.44	3.57	115.86%
<b>Total Frontage</b>			<b>14543.91</b>		<b>1556</b>	
<b>Multi-Family</b>						
Multi-Residential - Medium Density District M-2	148	60	3.19	7.89	477	3%
<b>Total Number of Units</b>					<b>2073</b>	
<b>DENSITY</b>						
Residential Density			0.97	24.39		10.06%
Special Purpose - School & Park			0.87	24.39		
School S-SPR (M2)			4.90	12.01		
Park S-SPR (M2)			0.01	0.26		
Commercial - Neighbourhood 2 District			2.05	5.08		3.1%
Public			2.00	5.00		
<b>SPECIAL PURPOSE - CITY AND REGIONAL INFRASTRUCTURE DISTRICT</b>						
Stormwater Pond			2.05	5.08		3.26%
Well catchment			0.04	0.11		
<b>ROADWAY, LANES AND DEVELOPING</b>			<b>2.73</b>	<b>6.83</b>		<b>24.6%</b>
Proposed Residential 40.0m (212 Ave SE)			1.13	2.79		
Arterial 24.0m (212 Ave SE)			0.75	1.85		
Mod. Primary Collector Street 9.0m & 9.1m / 31.10m			0.86	2.13		
Mod. Primary Collector Street 9.0m / 18.70m			0.37	0.91		
Mod. Collector Street (11.20m / 22.40m)			3.88	9.55		
Mod. Collector Street (10.80m / 22.00m)			2.96	7.31		
Mod. Collector Street (10.80m / 20.10m)			0.02	0.26		
Mod. Res. Street (8.50m / 16.00m)			0.21	0.51		
Collector Street 10.8m / 21.0m			0.38	0.94		
Residential Street 8.5m & 9.1m / 16.0m			1.08	2.66		
Residential Street 8.5m & 9.1m / 16.0m			12.84	31.73		
Lane 7.0m			2.89	7.14		



**Cross-Section Key Map:**



**location map:**

**scale:**  
 0 50 100 150 200  
 SCALE 1:3000

**municipal address:**  
 2120 56 Street SE, 21820 56 Street SE and 22720 56 Street SE

**legal description:**  
 Plan 191 0908, Block 4 & 5, Lot 1 & NW1/4 Sec 10 Twp22-Rge29-W4M

**file description:**  
 pre-app: --  
 LOC: --  
 bylaw no.: --

**file info:**  
 project no.: 1906-17  
 drawn by: es  
 start date: January 03, 2020  
 current date: Mar 10, 2023

**Logan Landing**

**sheet title:**  
 Outline Plan & Land Use Redesignation

**exhibit no.:**  
**1.0**



## 2 RELATED DOCUMENTS, PLANS AND POLICY

The following documents were reviewed and referenced for this BIA:

- The City of Calgary Ricardo Ranch Area Structure Plan 2019 (The City of Calgary, 2019)
- Ricardo Ranch Area Structure Plan Ecological Inventory (Stantec Consulting Ltd., 2018)
- The City of Calgary Environmental Reserve Setback Policy (City of Calgary, 2007)
- Calgary Parks and Recreation Natural Area Management Plan (City of Calgary, 1994)
- The City of Calgary Parks Open Spaces Plan (City of Calgary, 2003)
- Ricardo Ranch Flood Fringe Study (O2 Planning + Design, 2020)
- Preliminary Hydrogeological Assessment Ricardo Ranch Area Structure Plan Ricardo Ranch, In Southeast Calgary, Alberta (Waterline Resources Inc., 2019)
- Rangeview Area Structure Plan Hydrogeology Study (Golder Associates Ltd., 2014)
- Grasslands Vegetation Inventory (GVI) Specifications (ASRD, 2011)
- Wetland Identification and Delineation Directive, (Government of Alberta, 2015)
- Listing of Historic Resources (Culture, Multiculturalism and Status of Women, 2019)
- Non-Permanent Streams: Supplementary User Guide and Data Descriptions (City of Calgary, 2019).
- Technical Memorandum "*Ricardo Ranch Great Blue Heron Colony Mitigation Plan*" (WEST, 2020)

## 3 METHODS

The following sections address the desktop study and field assessment methodology for the Project Area. Information collected and reviewed was used to understand the Project Area and surrounding lands to better understand the potential impacts of the development on a local and regional level.

### 3.1 HISTORICAL REVIEW

Historical aerial photographs were obtained from the Alberta Environment and Parks (AEP) Aerial Photographic Records System (APRS) and Google Earth. (Maxar Technologies, 2022) Historical photographs were reviewed to identify changes in land use and environmental conditions within the Project Area.

The following historical aerial photographs were reviewed:

- 1950 – AS 2827 057
- September 20, 1962 – AS 83362
- June 13, 1974 – AS 1315 Line 13 303
- July 25, 1982 – AS 2570 Line 4 83
- May 25, 1996 – AS 4696 Line 9E 53
- July 7, 2001 – AS 5166B Line 3 30
- September 13, 2008 – Google Earth Imagery
- August 31, 2011 – Google Earth Imagery
- July 28, 2014 – Google Earth Imagery
- April 30, 2016 - Google Earth Imagery
- July 6, 2017 – Google Earth Imagery

As part of the historical review process described in the Wetland Identification and Delineation Directive (the Directive), (Government of Alberta, 2015), precipitation data is required to correlate with the available historical photographs to aid in determining wetland permanence and class. Precipitation data was downloaded from the Alberta Agriculture and Forestry Interpolated Weather website (Alberta Agriculture and Forestry, 2018). Precipitation data was compiled to document the total amount of precipitation relative to each day, month, and year that historical aerial photographs were available. To determine whether each year of historical photographs was either a dry, average, or wet year, the upper and lower 25% quartile was calculated. Historical images are provided in **Appendix A**.

## 3.2 HERITAGE RESOURCES

As required by the City BIA Framework and the *Alberta Historical Resources Act (HRA)*, the *Listing of Historic Resources (Culture, Multiculturalism and Status of Women, 2019)* was searched on February 14, 2020 to identify the potential presence of historical resources within the Project Area. The listing helps to determine if a proposed development may affect known or potential historic resources. The primary historic resources for an identified site are assigned one or more of the following descriptive letter values:

- a - archaeological
- c - cultural
- gl - geological
- h - historic period
- n - natural
- p - paleontological

A Historic Resource Value (HRV) for known and potential sites is listed to the Legal Subdivision (LSD) location level. HRV's are defined on a scale from 1 to 5:

- HRV 1: designated under the HRA as a Provincial Historic Resource
- HRV 2: designated under the HRA as a Registered Historic Resource
- HRV 3: contains a significant historic resource that will likely require avoidance
- HRV 4: contains a historic resource that may require avoidance
- HRV 5: high potential to contain a historic resource

If locations within the Project Area are assigned an HRV, an Historic Resources Application for approval under the HRA is required. If it is determined that the activity is likely to result in damage, alteration, or destruction of historic resources, mitigation or avoidance may be required, or an Historic Resources Impact Assessment (HRIA) conducted by a qualified historic resource consultant may be required to obtain HRA approval.

As identified in the ASP, all heritage resources within open space network should be left undisturbed and preservation/celebration is encouraged in accordance with the Cultural Landscapes Strategic Plan. Indigenous heritage sites, in the form of archeological resources, exist within the outline plan area, some of which fall wholly or partially within ER lands. Preservation, in-situ, is the preferred approach for managing these resources within Parks and Open Space. A section of the Natural Area Management Plan will be developed in collaboration with the Cultural Landscape Portfolio to include long term avoidance strategies of sensitive areas contained within Environmental Reserve Lands. Disturbances within the ER, including but not limited to, pathways, fencing, grading and planting will be field fit to avoid impact to heritage resources as part of the Engineering/Landscape Construction Design undertaken at Subdivision stage and reviewed/approved by appropriate Parks and Open Space staff. All site activities will be undertaken will continue pursuant to any Historic Resources Act requirements and in collaboration with the City of Calgary.

## 3.3 LANDFORMS SOILS AND HYDROLOGY

A database search of the Agricultural Region of Alberta Soil Inventory Database's (AGRISID) soil information viewer was conducted on June 26, 2019, to identify the dominant soils and landforms within the Project Area.

The Grassland Vegetation Inventory (GVI) has been developed by Alberta Sustainable Resources Development to help assess changes in native vegetation characteristics over time in Alberta's prairie region. This database provides general land classifications based on provincial database biophysical and anthropogenic land use data. It generally relies on soil information to distinguish characteristics of natural/native vegetation habitat while relying on general land information to assume characteristics of non-native vegetation. Polygon descriptions within the "*Grassland Vegetation Inventory (GVI) Specifications*" (ASRD, 2011) were referenced for all identified polygons within the Project Area and were confirmed and compared with field observations.

The *Urban Systems Rangeview Area Structure Plan Hydrogeology Study* (Golder Associates Ltd., 2014) and the *Ricardo Ranch Area Structure Plan Ecological Inventory* (Stantec Consulting Ltd., 2018) were reviewed for relevant soil and physical landscape characteristics. Soil pit observations were conducted to confirm soil conditions aligned with previous reports and database soil maps. Soil pits were excavated with a shovel to a depth of approximately 30 cm. Soil color and horizon depth was recorded. Soil color was referenced to the *Munsell Soil Color Book* (Munsell, 2009).

Groundwater and hydrology characteristics of the Project Area were identified by referencing the report "*Preliminary Hydrogeological Assessment Ricardo Ranch Area Structure Plan Ricardo Ranch, In Southeast Calgary*" (Waterline Resources Inc., 2019). The "*Ricardo Ranch – Bow River Morphology Study*" (Golder Associates, 2018) describes the historic and projected future trends of the Bow River morphology.

The slope values are derived from the digital elevation model (DEM) dataset. This is a raster (pixel or cell) based file format that assigns an elevation value to each cell. The slope calculation is based on a 3x3 moving window around each cell to compute the final gradient value. We calculated this as a percent rise that ranges from 0 to, essentially, infinity. Once a slope percent value has been assigned to each cell, the raster dataset is reclassified to group values from 0% - 15%, 15.00001% - 32.99999%, and  $\geq 33\%$ .

The information reviewed and collected was used to understand the current landforms and surficial/subsurface hydrology of the Project Area, and to help identify and mitigate the likely impacts of the Project works.

### 3.4 VEGETATION AND HABITAT TYPES

The Alberta Conservation Information Management Systems (ACIMS) is a resource that provides biodiversity information on Alberta species and ecological community sites. It provides the location, condition, and status of selected elements. An ACIMS search was conducted on May 8, 2019, to determine whether any previous observations of known element of occurrences have been identified within the Project Area.

USL conducted plant community surveys to characterize and map vegetation communities by habitat types. Grasslands are classified according to Government of Alberta *Range Plant Communities and Range Health Assessment Guidelines for the Foothills Fescue Natural Subregion of Alberta* (Adams, Ehlert, Moisey, & McNeil, 2003). Areas within the Project Area that are not native grasslands (forested and tall shrub) are classified using the City of Calgary Natural Area Management Plan (NAMP) (Calgary Parks and Recreation, 1994).

A total of ten 5 m x 5 m sample plots were surveyed. Survey point locations are selected to document typical vegetation habitat characteristics within each identified habitat type. Sample plots record the observed vegetation common names, scientific names, and the percent cover of vegetation within each plot. Percent cover is the percent of the ground covered by a "birds eye view" of the foliage onto the ground surface. Incidental plant observations were also recorded during the surveys.

### 3.5 FISH AND WILDLIFE

The Alberta Government Fish and Wildlife Management Information System (FWMIS) is a provincial database that provides information on fish and wildlife observations and can generate reports and maps of observed species within a specified area or polygon. The database also provides key wildlife sensitivity and biodiversity zones. A FWMIS database search was conducted using the Fish and Wildlife Internet Mapping Tool (FWIMT) to determine whether any previous observations of known element occurrences have been registered within a 2 km radius of the Project Area.

A list of wildlife species with potential to occur within the Project Area was prepared using available habitat. The list considers species that may use the available habitat for activities such as foraging, hunting, nesting, and migration. During all field surveys incidental wildlife and wildlife sign observations were recorded.

Amphibian surveys were conducted in accordance with the Alberta Governments Environment and Sustainable Resource Development (ESRD) "*Sensitive Species Inventory Guidelines*" Section 1, "*Amphibians: Auditory Survey Guideline*" (ESRD, 2013). Surveys were conducted between mid-April and mid-June when weather conditions were favorable. Upon arrival to each site the surveyor remained still and quiet for 3 minutes prior to beginning the count. A 3-minute auditory survey was then conducted. The surveyor recorded the species, estimated number of individuals, and call frequency was observed.

The eBird database was referenced to identify locally observed species. eBird is an online database managed by the Cornell Lab of Ornithology, where the public can submit observations of the avian wildlife identified at a specific location. An eBird "Hotspot" is a location frequently surveyed by birders that has a relatively high number of species observed. The species list for an eBird Hotspot located on the south bank of the Bow River at the Policeman's Flats boat launch was downloaded and reviewed (Cornell Lab of Ornithology, 2020).

Breeding bird surveys were conducted to describe species presence and habitat used by species within the Project Area. A modified point count survey was conducted, based off the Sensitive Species Inventory Guidelines (ESRD, 2013) and within the active breeding and calling period for the region (Government of Canada, 2018). The point count surveys were conducted on June 10-11, 2019, beginning at 5:30 am and finishing at 8:00 am. The survey points were spaced approximately 400 m apart across the Project Area or chosen based on avoiding overlap of previous surveys conducted by Stantec (Figure 8, page 88 of pdf). A total of 6 survey points was visited. At each location, the temperature, wind, and cloud cover and point count position were recorded.

Two surveyors were present for each survey with one observer and one recorder. A five (5) minute cooldown period was practiced before the survey began to minimize disturbance caused by the approach. A three (3) minute passive survey was performed from a clear vantage point, away from vehicles or other deterrents. All birds seen or heard within a 100m radius during the three minutes was recorded for the point count survey. Individuals observed before or after the survey period were recorded as incidental observations. Surveys were conducted in favorable conditions with temperatures ranging between 8 and 12 degrees Celsius and winds recorded at less than 2 on the Beaufort Scale. Surveys along the south tip (near Bow River) of the Project Area were not conducted due to the level of assessment conducted by Stantec (Stantec Consulting Ltd., 2018) (Stations, A, I, R, P and Q) along with further monitoring and studies of a heron colony conducted by Western Ecological Surveys (WEST).

### 3.6 WETLANDS, WATERCOURSES, AND WATERBODIES

Several wetlands within the Project Area were identified by Stantec Consulting Ltd. in the *Ricardo Ranch Area Structure Plan Ecological Inventory* (Stantec Consulting Ltd., 2018). The wetland boundaries of previously identified wetlands were confirmed or adjusted through a combination of soils, vegetation, topography, historical and precipitation data following pathway 5 of the *Wetland Identification and Delineation Directive 2015* (the Directive) (Government of Alberta, 2015).

As per the Directive, prior to conducting field surveys the potential wetlands, waterbodies and watercourses were identified using previous environmental reports completed on the area, the historical imagery review, and available database searches. The Alberta Merged Wetland Inventory (AMWI) was referenced on May 13, 2019, to review the province's wetland inventory within the Project Area. The FWMIS database reports accessed was also used to reference mapped watercourses and waterbodies.

As part of the 2013 Alberta Wetland Policy, the province created the Alberta Wetland Rapid Evaluation Tool – Actual (ABWRET-A) to assess the natural functions for all wetland types. This tool generates a wetland functional score. Once a score is generated, the province assigns a value category to the wetland (A, B, C, or D) (Government of Alberta, 2015).

Each wetland was assessed using the ABWRET-A functional assessment during the 2019 growing season. The site visits along with recent and historical photographs, historical precipitation data, soils and vegetation provided information to complete the form and classify the wetlands. An Appendix 7 Field Form assessment was completed for each wetland boundary documenting vegetation and/or soil data as per the *Wetland Identification and Delineation Directive 2015*. Each wetland was then classified under the *Alberta Wetland Classification System 2015* (Alberta Environment and Sustainable Resources Development, 2015). The ABWRET-A form was submitted to AEP to determine the relative wetland values.

To inform the City of Calgary *Environmental Reserve Setback Guidelines* (City of Calgary, 2007) wetlands are also classified using the Stewart and Kantrud Classification System (Stewart, 1971). To facilitate future Water Act approvals associated with the Project wetlands were also classified using the Alberta Wetland Classification System (Alberta Environment and Sustainable Resources Development, 2015).

#### **Watercourses**

A desktop review of the City of Calgary non-permanent stream layer (City of Calgary, 2021) was completed for the Project Area. The Stantec inventory identified and classified several ephemeral drainages within the Project Area, mainly within the thin breaks of the valley escarpment. Classification of the drainages followed the City of Calgary *Non-Permanent Streams: Supplementary User Guide and Data Descriptions* (City of Calgary, 2019). The classification system classifies streams and drainages based on observable hydrology, topography, soils, and vegetation. USL referenced these descriptions and site survey observations to verify the classifications.



**Image 1: Desktop Review of City of Calgary Non Permanent Streams**

### 3.7 FIELD SURVEYS

Field Surveys were conducted throughout the growing season in 2019. The following provides a list of the surveys and the dates they were conducted:

- Amphibian call surveys on May 9<sup>th</sup>, 10<sup>th</sup>, and 11<sup>th</sup>;
- Wetland surveys, vegetation plot surveys, and soil surveys on, July 23<sup>rd</sup> and August 15<sup>th</sup>, 28<sup>th</sup>, 30<sup>th</sup>; and.
- Bird point counts were conducted on June 10<sup>th</sup> and 11<sup>th</sup>.

### 3.8 ENVIRONMENTALLY SIGNIFICANT AREAS

The *Environmentally Significant Areas in Alberta: 2014 Update Final Report* (Fiera Biological Consulting Ltd., 2014) and the associated ESA) maps are resources intended to be referenced by stakeholders such as industry, government, and academic bodies. ESA's can be useful for planners to understand the potential impacts of development on rare environmental elements or species of conservation concern. The Alberta Environment and Parks ESA shapefiles were overlaid on the Project Area.

The *City of Calgary Open Space Plan 2003* (City of Calgary, 2003) is a policy guidance document developed by The City of Calgary Parks to help guide decision makers follow policy framework and meet the City of Calgary conservation and recreation objectives. The document "*Appendix C Environmental Assessments*" outlines four main criteria to assess habitat and natural areas and determine their environmental significance. These criteria were used to assess and rank areas within the Project Area boundary as ESA's under the City's Open Space Plan. A site is listed as an ESA on the basis of meeting all or one of the listed criteria.

The following criteria and definitions are from the City's Open Space Plan:



- 1) **Quality of Biotic Community**
  - Biotic Communities of high quality and/or diversity for a specific habitat type.
- 2) **Ecological Function – Natural**
  - The area is important for the healthy maintenance of a natural system beyond its boundaries by maintaining biodiversity and/or acting as a staging area or corridor for wildlife within the system.
- 3) **Distinctive and/or unusual landform**
  - The area possesses a distinctive and/or unique landform.
- 4) **Uniqueness**
  - The habitat or ecosystem component has limited representation within the municipality and/or the area provides representative habitat for wildlife of recognized importance.

Each criterion below was assessed and designated a low, medium, or high rating of different habitat types to determine whether it is considered an ESA. Only features with a high rating have been designated as an ESA. A site is ranked as an ESA on the basis of meeting all or one of the following criteria.

#### **High:**

- Native vegetation is dominant with minimal disturbance and introduced species
- High biodiversity providing complex habitat
- Habitat for numerous lifecycle functions for a variety of species, such as staging areas, breeding, and foraging
- Critical wildlife corridors and connectivity in an area susceptible to further habitat fragmentation and development
- Habitat features are uncommon (rare and/or unique) in the region (i.e.: sloped wetlands)

#### **Medium**

- Native vegetation is present with increased weedy/non-native species
- Simple habitat
- Habitat for some lifecycle functions, such as staging areas, and foraging
- Wildlife corridors and connectivity with reduced biodiversity, and existing impacts/disturbances
- Anthropogenic impacts observed through pasture (grazing and cattle)

#### **Low**

- Greater than 50% of the site is weedy/non-native species
- Low biodiversity providing simple habitat
- Limited habitat and lifecycle functions, such as foraging
- Anthropogenic impacts (continual crop production, disturbed seed bank, pugging, road networks, development, and fragmentation)

Habitat was assessed using the above ranking system, and values assigned following ESA guidelines from the Open Space Plan and professional opinion. Rationale for habitat ranking is discussed in **Section 5**.

## **3.9 IDENTIFICATION OF IMPACTS AND MITIGATION MEASURES**

The impact assessment of the Project Area's ecological features was guided by the Phase 3: Scoped Biophysical Impact Assessment Framework 2010. The spatial extent of the assessment considers the direct impacts of the development of the Logan Landing Project Area, the Ricardo Ranch ASP area, and broader regional considerations related to the development within the Bow River Valley. The assessment was approached

though a combination of the review of technical studies, previous biophysical assessments, ground truthing and the findings of this report.

This report considers both the direct and indirect impacts to physical and ecological components during and after construction as well as the long-term impacts of changes to the landscape and land use on both a local and regional scale. Consideration of impacts were assessed for hydrology, wildlife habitat and connectivity within the Bow River Valley, vegetation and animal biodiversity, natural water resources such as wetlands and the effects of increased human presence on the landscape. All impacts were assessed from a regional context, following that of the Southeast Planning Area Regional Policy Plan (City of Calgary, 2004). When impacts and or losses were deemed to be unavoidable, rationale regarding the loss has been provided (**Section 6.1** and **Section 7**). Habitat types were classified and assessed for significance using specific criteria from the Open Space Plan based on low, medium, or high value (City of Calgary Parks, 2010).

- High: Project interactions with a high significance rating are considered to result in severe alteration to the environmental elements such as re-contour of an escarpment, or open cut operation for deep utility installation through a ravine or wetland, or loss of critical habitat for species at risk wildlife;
- Medium: Project interactions with a medium significance rating are considered to result in moderate impacts to the environmental elements such as removal of a small portion of vegetation within a large ESA designated land; and
- Low: Project interactions with a low significance rating are considered to result in minimal or negligible impacts to the environmental elements such as Regional Pathway construction within Municipal Reserve lands 50 m away from an ESA land.

Mitigation measures were identified to reduce the direct and indirect impacts of the Project to local wildlife use, protection for species of management concern, retain and protect native vegetation, historical resources, and water resources. This was done with consideration of both the outline plan design and impacts during and post construction throughout the Project life cycle. Measures were determined based not only on-site conditions but also following applicable municipal, provincial, and federal Acts, regulations, policy, guidelines, and best management practices. The direct and indirect residual impacts which were assessed include, but are not limited to, habitat/feature reduction, loss and potential longer-term impacts such as habitat loss, increased human presence in retained habitat, and sensory disturbances.

This document will be used to guide environmental protection planning for the build out of the Project Area as well as for the long-term impacts of increased human presence in natural areas.

### 3.10 CUMULATIVE EFFECTS ASSESSMENT

The Canadian Environmental Assessment Agency defines cumulative environmental effects as the “effect on the environment which results from effects of a project when combined with those of other past, existing, and imminent projects and activities” (Canadian Environmental Assessment Agency, 2019).

Cumulative effects are reviewed based on valued ecosystem components (VEC's) found within the Project Area and how residential development contributes to local and regional cumulative effects. This includes the anticipated interactions between natural process and human land use that can negatively or positively affect ecosystem processes in both space and time.

The significance of the effects of the Project was considered against existing and proposed development in the City, and against the scale and complexity of the Bow River Valley and its significance as a whole. From a regional perspective the scale of the cumulative effects review was based on the area in the Southeast

Planning Area Regional Policy Plan. Environmentally Significant Area(s) (ESA's) and ecological components within the ASP area are considered for the proposed outline plan, to understand the scale of potential loss of each, and to compare areas that are to be protected and retained. Impacts on components determined as environmentally significant areas are the focus of the cumulative effects assessment.

## 4 EXISTING CONDITIONS

### 4.1 NATURAL REGION

The Project Area is located within the Grassland Natural Region, in the Foothills Fescue Subregion of the province. This Subregion is characterized by mountain rough fescue, parry oat grass and bluebunch fescue. Moist, moderately well drained sites often support silverberry, buckbrush, prickly rose, and saskatoon shrub communities. Along watercourses and waterbodies, balsam poplar, aspen, and plains cottonwood stands occur (Natural Regions Committee, 2006).

The Project Area is located near the boundary of the Foothills Fescue Subregion and the Foothills Parkland Subregion. The Project Area exhibits topographical, aquatic, and terrestrial characteristics similar to both the Foothills Fescue and Parkland Subregions. Characteristics of the Foothills Parkland Subregion are influenced by topography and relatively short and cool growing seasons, warmer winters, and higher precipitation than neighboring regions. Well drained south and west facing slopes may support fescue grassland communities, while moister slopes of the same aspect can support diverse herb and wetland communities. North facing slopes and areas with a greater moister content can support aspen groves with a shrubby and herbaceous understory.

### 4.2 LANDFORM AND SOILS

On a regional scale the Project Area is located on the south facing slopes of the Bow River Valley as it travels east from Calgary into the prairies. The uplands to the north of the valley escarpment are gently undulating and is populated by several prairie pothole wetlands, with overall aspect gently sloping to the southeast. The escarpment in this area is steep, terraced, and features several ephemeral watercourses that have formed thin breaks along the valley walls (ravines). Groundwater springs have caused terracing and erosion features throughout the escarpment. The valley bottom has been formed by erosion and deposition caused by flooding of the Bow River and material wasting from the escarpment, with deposits of gravel and sand present on the surface, or just below shallow layers of undeveloped soils. Project Area slopes are presented with slope % ranges of 0-15%, 15-33%, and >33% in **Figure 3**.

The ephemeral temporary streams that fall within a ravine, which is defined by the City of Calgary as valley-like features, which are almost always associated with current (continuous or intermittent) or historical water course and are characterized by steeply sloping sides.

Local geology is described in the *Rangeview Area Structure Plan Hydrogeology Study* as stratigraphic units of Crossfield glacial till overlaying Paskapoo formation sandstone. Sediments on valley terraces and within the valley bottom are described as “*Quaternary post-glacial undivided fluvial gravel channel deposits*” (Golder Associates Ltd., 2014).

The *Ricardo Ranch - Bow River Morphology Study* (Golder Associates, 2018) describes the bank stability and erosional forces and trends that have and will continue to have an impact on the landscape. This report also describes a channel avulsion event during the local 2013 flood event, which resulted in the establishment of a side channel that now passes through the southern portion of the Project Area.










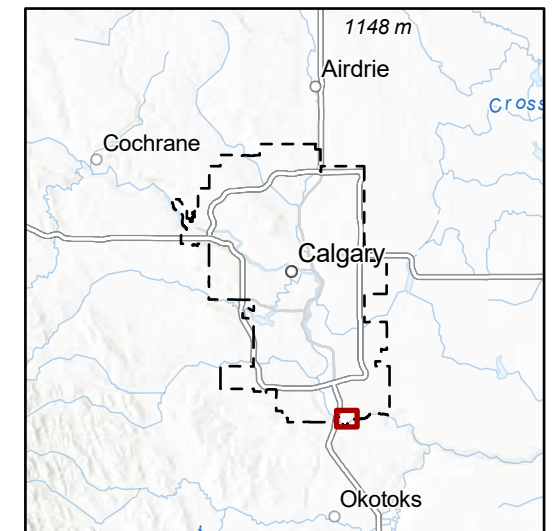
# GENESIS

## Logan Landing Biophysical Impact Assessment

### Slope Analysis

NW Sec 10 - Twp 022 - Rge 29 - Mer 4  
SW Sec 10 - Twp 022 - Rge 29 - Mer 4  
NW Sec 03 - Twp 022 - Rge 29 - Mer 4

-  Project Area
-  Calgary Municipal Boundary
- Slope (% Rise)
  -  0 - 15%
  -  15% - 33%
  -  Geater than or equal to 33%



The accuracy & completeness of information shown on this drawing is not guaranteed. It will be the responsibility of the user of the information shown on this drawing to locate & establish the precise location of all existing information whether shown or not.



**Coordinate System:** NAD 1983 3TM 114  
**Scale:** 1:9,000  
(When plotted at 11"x17")

**Data Sources:**  
- Aerial imagery provided by Esri  
- Wetlands and waterbodies boundaries obtained by field data collection and desktop review

Project #: 2197.0009.02  
Author: SDF  
Checked: TD  
Status: **FINAL**  
Revision: A  
Date: 2023 / 1 / 10



**FIGURE 3**



The Project is located within two AGRASID soil polygons that split the Project Area north and south along the crest of the Bow River Valley (Government of Alberta, 2020). AGRASID soil maps are provided in **Appendix B**.

Soil Polygon 11255 represents the soils found in the uplands north of the crest of the valley. The soil is described as “Orthic Black Chernozem on medium textured till”. The landform is described as undulating, high relief, with a limiting slope of 4% and featuring areas of poorly drained soils.

Soli polygon 11678 represents the soils and landforms within the Bow River valley including the valley slopes, terraces, and floodplains. The landform is described as valley with terraces with side slopes up to 35%, and terrace slopes varied between 1% and 5%. Two soil types are identified within the polygon: “Orthic Black Chernozem on gravel or gravelly coarse textured undifferentiated materials” and “Rego Black Chernozem on very coarse textured sediments deposited by wind or water”. The area is also reported to contain poorly drained soils.

The GVI data set classifies 8 distinct polygons including 13 descriptors within the Project Area (**Figure 4**). Descriptors are defined below.

- **Tame Pasture or Hay (Non-Irrigated)** - described as areas of grasses, legumes, or a mixture of both planted for livestock grazing or hay.
- **Overflow** - accumulated sediment, soil and gravel materials generally found in valley bottoms at the toe of steep slopes and terraces. These sites tend to be dry, and susceptible to erosion and transport in flood conditions.
- **Loamy** - fine textures soils.
- **Limy** - eroded or immature soils found on eroded slopes of glacial till with free lime (CaCO<sub>3</sub>) near the surface.
- **Sand** - loamy sand and sandy soils associated with glaciofluvial landforms and windblown eolian landforms.
- **Sandy** - sandy-loam textured soils.
- **Gravel** - exposed cobbles and gravel with a maximum of 20cm of sand or loam, not associated with active lotic riparian zones.
- **Shallow to Gravel** - 20 to 50cm of sands or sandy loam above cobbles and gravel associated with valley bottoms and terraces.
- **Lotic (Herbaceous)** - lotic sites typically vegetated with grass and forb cover.
- **Lotic (Deciduous)** - deciduous trees other than Manitoba Maple and Aspen Poplar
- **Lotic (shrub) gravel** – willow (*Salix ssp.*) with combined canopy cover of more than 10%.
- **Thin Breaks** -thin eroded soils in slope areas associated with the transition zone between glacial till, Limy soft, or hard bedrock associated with badlands formations.
- **Rural** - refers to an altered and inhabited landscape in an area of low population density.

Three soil pit observations were conducted in the Project Area (**Figure 5**). One soil pit on the plateau one on the escarpment, and one on the flood plain. Many additional soil pits were documented throughout the Project Area during the wetland delineation surveys, that were 5 m away from the wetland boundary to confirm upland conditions that generally expressed results consistent with the AGRASID and GVI soil polygons (**Appendix B**). Additional soil information from wetland assessments is referenced in **Section 4.7.1** below.

Soil pit characteristics are provided in **Table 4-1**. Soil data collected to support wetland delineations are provided in section **4.7** below.

**Table 4-1: Soil Pit Data**

Location	Horizon	Depth (cm)	Hue	Value	Chroma
<b>SP5</b>	Ah	0-20	10YR	2	1
	B	20-30	10YR	4	3
<i>Orthic Black chernozem over silty clay</i>					
<b>SP13</b>	Ah	0-18	10YR	2	2
	B	18-30	7.5YR	2.5	2
<i>Orthic Black chernozem over cobbles</i>					
<b>SP14</b>	A	0-15	10YR	3	2
	B	15-30	2.5YR	3	2

*Sandy soil over mottled silty layer*

Due to cattle disturbance, erosion and deposition from wind and water, and burrowing mammal activity, the soils within the Project Area have been subject to considerable erosion and admixing. Soil horizon definition is highly variable from site to site with some areas expressing little to no topsoil near areas with deep well-developed soils. For the report we have generalized soil descriptions for the Project Area to represent the three main landforms: plateau, escarpment, and floodplain.

Soils on the plateau were highly impacted by cattle and burrowing animal activity. The result is admixing of the A and B horizon. In general, the A horizon in these areas tended to express darker colors typical of regional agricultural lands with depths of 10-25cm. Low ephemeral and wetland areas with poor drainage expressed relatively thicker and more developed A-horizons, accumulation of organic material at the surface, and in some cases the development of hydric soils.

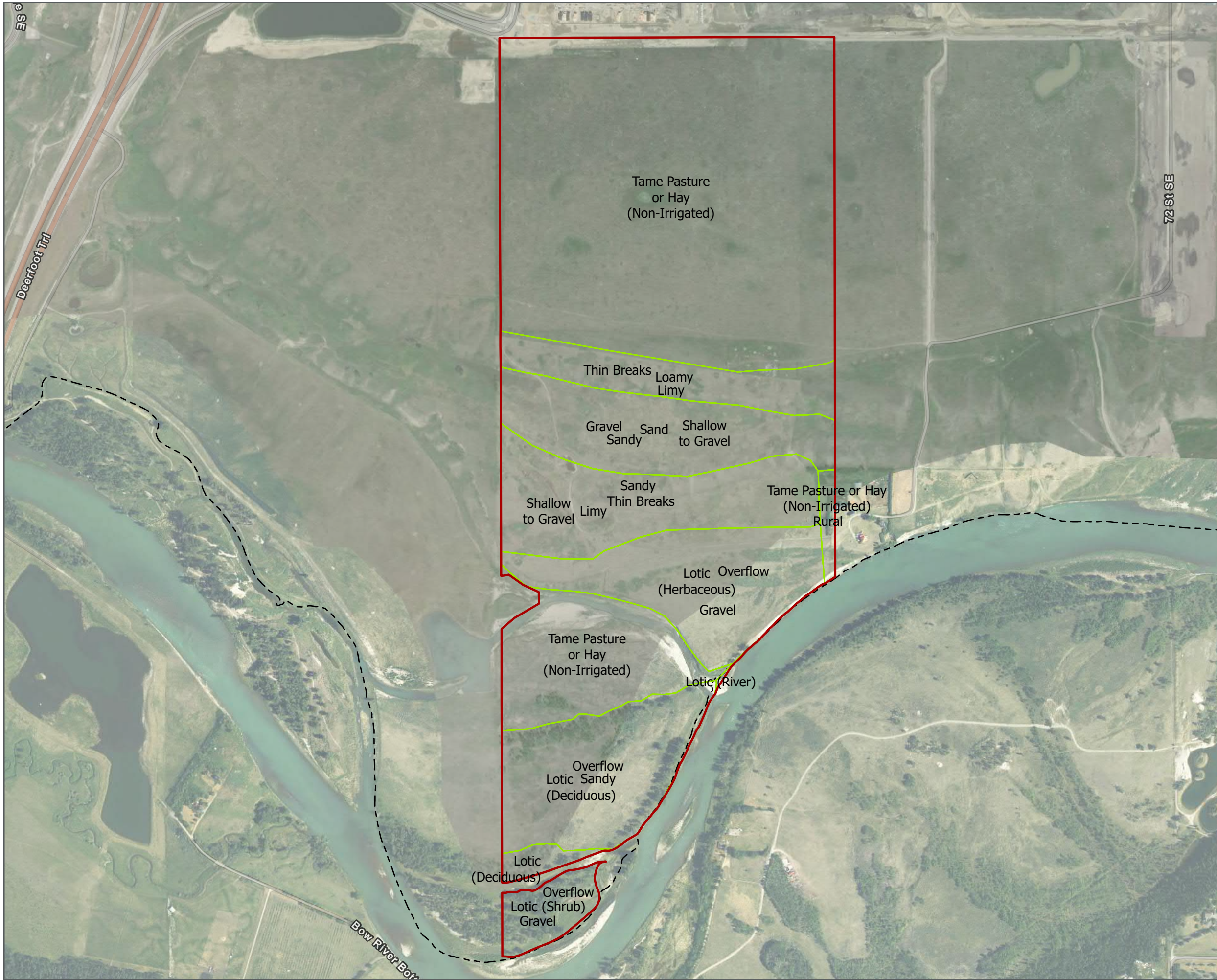
Dry xeric soils were observed along the higher elevations of the south facing slopes of the escarpment. Erosion and cattle have impacted these areas resulting in thin poorly developed topsoil horizons. Areas of the escarpment where low and tall shrub communities are established, particularly near the moister areas around the slope wetlands, typically expressed thicker topsoil layers with increased organic material.

Soils within the floodplain and flood fringe areas of the Project Area are limited to thin layers of poorly developed loam on fluvial deposits of large, rounded cobbles and gravels. In areas these gravel deposits remain exposed with little or no soil, specifically in areas around a recently formed side channel.

### 4.2.1 Slopes

The Project Area has a range of slopes from relatively flat at 1% to greater than 30%. Along the plateau elevations range from 0-5%. The upper and lower escarpments slopes range from 5-33%. Along the floodplain between the lower escarpment and the Bow River, slopes are relatively flat except for a narrow slope near the avulsion channel that ranges from 15-33%. Project Area slopes are presented at ranges of 0-15%, 15-33%, and >33% in **Figure 3**.

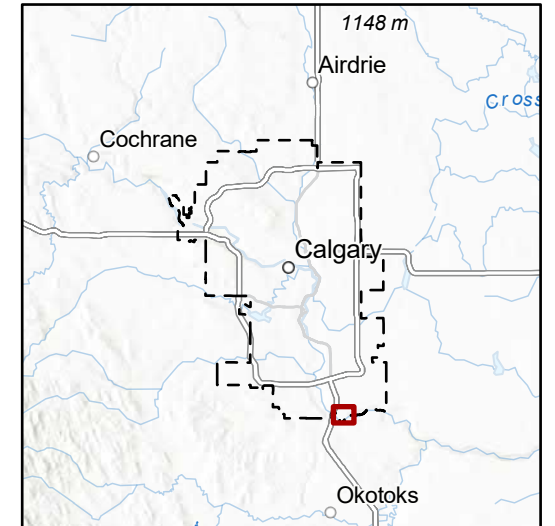




## Logan Landing Biophysical Impact Assessment Grassland Vegetation Inventory

NW Sec 10 - Twp 022 - Rge 29 - Mer 4  
 SW Sec 10 - Twp 022 - Rge 29 - Mer 4  
 NW Sec 03 - Twp 022 - Rge 29 - Mer 4

- Grassland Vegetation Inventory
- Project Area
- Calgary Municipal Boundary



The accuracy & completeness of information shown on this drawing is not guaranteed. It will be the responsibility of the user of the information shown on this drawing to locate & establish the precise location of all existing information whether shown or not.

0 100 200 300  
 Meters

**Coordinate System:** NAD 1983 3TM 114  
**Scale:** 1:9,000  
 (When plotted at 11"x17")

**Data Sources:**  
 - Aerial imagery provided by Esri  
 - Calgary municipal boundary provided by the city of Calgary  
 - Concept plan provided by USL

Project #: 2197.0009.02  
 Author: SDF  
 Checked: TD  
 Status: **FINAL**  
 Revision: A  
 Date: 2023 / 1 / 10

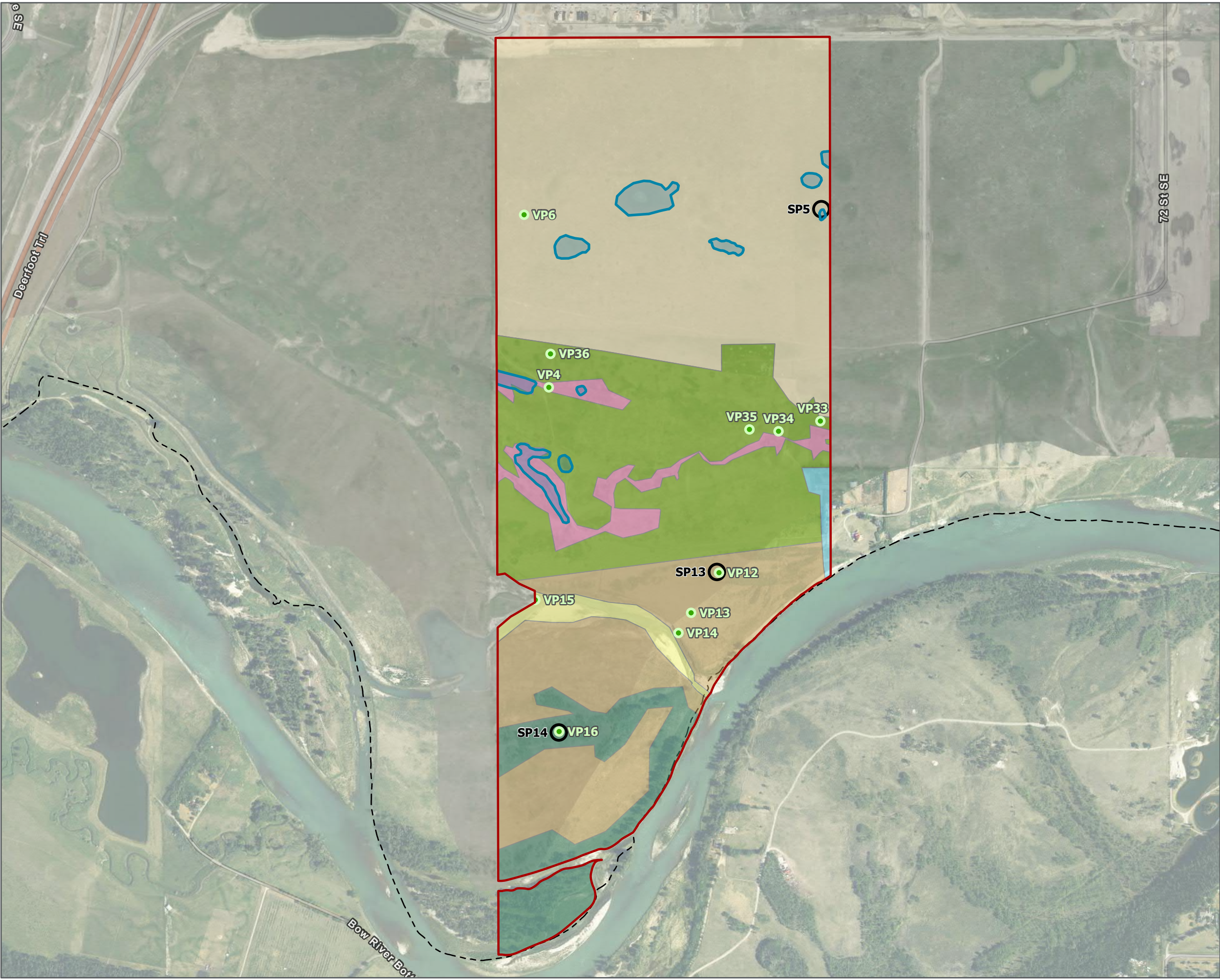


**FIGURE 4**



Last updated by SdeBoerFuller on January 10, 2023 at 12:18 PM  
 Last exported by SdeBoerFuller on January 10, 2023 12:18 PM  
 Last printed by SdeBoerFuller on July 14, 2020 4:35 PM

\\usl.urban-systems.com\projects\Projects\_CAL\2197\0009\02\ID-Design\GIS\Projects\Pro\_Projects\Genesis\_Ricardo\_Environmental\_Inspection\20200604 aprx\Genesis\_Fig5\_Soil\_Veg\_VegComm\_20200218

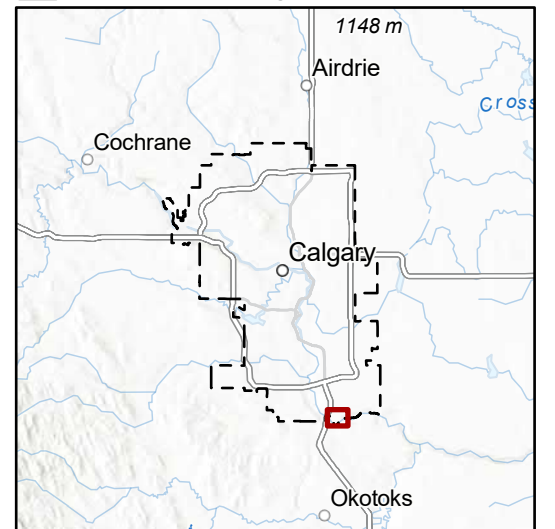


# GENESIS

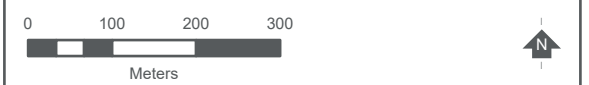
## Logan Landing Biophysical Impact Assessment Habitat Types, Soil Plots, and Vegetation Plots

NW Sec 10 - Twp 022 - Rge 29 - Mer 4  
 SW Sec 10 - Twp 022 - Rge 29 - Mer 4  
 NW Sec 03 - Twp 022 - Rge 29 - Mer 4

- Vegetation Plots
- Soil Plots
- Wetlands
- Project Area
- Calgary Municipal Boundary
- Anthropogenic Disturbed
- Avulsion Channel
- Balsam Poplar/Tall Shrub
- Beaked Willow Sedge – Tufted Hair Grass FFC2
- Kentucky Bluegrass - Foothills Rough Fescue - FFA19
- Kentucky Bluegrass - Fringed Sage FFB2 / Smooth Brome Alfalfa
- Northern and Western Wheatgrass – Foothills Fescue FFA25



The accuracy & completeness of information shown on this drawing is not guaranteed. It will be the responsibility of the user of the information shown on this drawing to locate & establish the precise location of all existing information whether shown or not.



**Coordinate System:** NAD 1983 3TM 114  
**Scale:** 1:9,000 (When plotted at 11"x17")

**Data Sources:**  
 - Aerial imagery provided by Esri  
 - Soil and vegetation plots obtained by field data collection

Project #: 2197.0009.02  
 Author: SDF  
 Checked: TD  
 Status: **FINAL**  
 Revision: A  
 Date: 2023 / 1 / 10



**FIGURE 5**



### 4.3 HISTORICAL REVIEW

Historical aerial photographs obtained from Alberta Environment and Parks and Google Earth (**Appendix A**) were reviewed to document changes in land use within and adjacent to the Project Area. Changes to ecological features such as wetlands and watercourses, and land use changes and precipitation data were reviewed to aid in wetland classification and characterization of the Project Area. **Table 4-2** describes the historical changes of the Project Area and provides daily and monthly precipitation data related to each photo date.

**Table 4-2: Historical Observations**

DATE (YYYY-MM-DD)	OBSERVATIONS	Precipitation 30 Days Prior to Image (mm)	Precipitation Daily Data 10 Days Previous and Daily (mm)
1950-04-30	<ul style="list-style-type: none"> <li>The upper plateau and the flood plain/overflow appear to be cultivated</li> <li>Wetlands show surface water</li> <li>Trails are established throughout the Project Area</li> <li>Evidence of disturbance along west edge of the homestead yard, and around the artificial waterbody A01 on the escarpment.</li> </ul>	<ul style="list-style-type: none"> <li>Unavailable</li> </ul>	<ul style="list-style-type: none"> <li>Unavailable</li> </ul>
1962-09-20	<ul style="list-style-type: none"> <li>No visible surface water in wetlands</li> <li>Wetlands on the upper plateau appear to be cultivated through</li> </ul>	<ul style="list-style-type: none"> <li>47.7</li> </ul>	<ul style="list-style-type: none"> <li>0 (1.1 in previous 10 days)</li> </ul>
1974-06-13	<ul style="list-style-type: none"> <li>Surface water visible in most wetlands</li> <li>Project Area shows land use as pasture</li> </ul>	<ul style="list-style-type: none"> <li>57.6</li> </ul>	<ul style="list-style-type: none"> <li>0 (13.4 in previous 10 days)</li> </ul>
1982-07-25	<ul style="list-style-type: none"> <li>Surface water visible in most wetlands</li> <li>Appearance of fenced yard and buildings on the plateau near the escarpment on the east side of the Project Area</li> </ul>	<ul style="list-style-type: none"> <li>94.2</li> </ul>	<ul style="list-style-type: none"> <li>0 (4.2 in previous 10 days)</li> </ul>
1996-05-25	<ul style="list-style-type: none"> <li>Surface water visible in most wetlands</li> </ul>	<ul style="list-style-type: none"> <li>42.6</li> </ul>	<ul style="list-style-type: none"> <li>1.25 (5.6 in previous 10 days)</li> </ul>
2001-07-07	<ul style="list-style-type: none"> <li>All areas appear to be pasture/hay</li> <li>No visible surface water in wetlands</li> </ul>	<ul style="list-style-type: none"> <li>55.0</li> </ul>	<ul style="list-style-type: none"> <li>0 (6.1 in previous 10 days)</li> </ul>
2008-09-13	<ul style="list-style-type: none"> <li>No visible surface water in wetlands.</li> <li>Stock yard appears on west side of access road on the north boundary of the Project Area</li> </ul>	<ul style="list-style-type: none"> <li>74.1</li> </ul>	<ul style="list-style-type: none"> <li>0 (25.2 in previous 10 days)</li> </ul>

DATE (YYYY-MM-DD)	OBSERVATIONS	Precipitation 30 Days Prior to Image (mm)	Precipitation Daily Data 10 Days Previous and Daily (mm)
2011-08-31	<ul style="list-style-type: none"> <li>No visible surface water in wetlands.</li> </ul>	<ul style="list-style-type: none"> <li>58.9</li> </ul>	<ul style="list-style-type: none"> <li>27.4 (42.3 in previous 10 days)</li> </ul>
2014-07-28	<ul style="list-style-type: none"> <li>2013 Flood event has scoured the floodplain/overflow area</li> <li>Side channel established through the flood fringe area at the bottom of the escarpment</li> </ul>	<ul style="list-style-type: none"> <li>18.7</li> </ul>	<ul style="list-style-type: none"> <li>0 (5.3 in previous 10 days)</li> </ul>
2016-04-30	<ul style="list-style-type: none"> <li>No visible surface water in wetlands.</li> </ul>	<ul style="list-style-type: none"> <li>8.0</li> </ul>	<ul style="list-style-type: none"> <li>0 (5.8 in previous 10 days)</li> </ul>
2017-06-06	<ul style="list-style-type: none"> <li>No visible surface water in wetlands.</li> </ul>	<ul style="list-style-type: none"> <li>45.6</li> </ul>	<ul style="list-style-type: none"> <li>0 (2.1 in previous 10 days)</li> </ul>

#### 4.4 HERITAGE RESOURCES

The Listing of Historic Resources assigns portions of the Project Area an HRV category 4 a (archeological sites), and p (paleontological sites). An Historical Resources Application was submitted by Stantec to determine the level of assessment required for the Project Area. The signed HRA response from Alberta Culture and Tourism identifies ten previously recorded pre contact sites within the greater Ricardo Ranch ASP area and required a Historical Resources Impact Assessment be conducted on behalf of the proponent. The HRA response was received on August 28, 2017, and is included in **Appendix C**.

As per specific requirements issued in 2018 by the Historic Resources Management Branch (HRMB) of Alberta Culture, a Historical Resources Impact Assessment (HRIA) of the Logan Landing project was completed in 2020. During the HRIA, multiple historical resource sites of significance were identified. As a result of the HRIA, the HRMB issued a Historical Resources Approval with Conditions document (June 2022) containing specific follow-up requirements for the avoidance and/or mitigation of impacts to all significant historical resource sites within the Logan Landing development. As per the Approval with Conditions, significant historical resources have been avoided where possible. In other cases, impact mitigation of significant historical resources is necessary. In 2022, fieldwork activities toward the completion of all historical resources impact mitigation studies in the Logan Landing project were undertaken. These studies are currently ongoing. Upon completion of all follow-up studies, an application for final Historical Resources Act approval for the construction of the Logan Landing development will be submitted to the HRMB. The Natural Area Management Plan will be developed in collaboration with the Cultural Landscape Portfolio to include long term avoidance strategies of sensitive areas. Disturbances within the ER, including but not limited to, pathways, fencing, grading and planting will be field fit as part of the engineering/landscape construction design undertaken at subdivision stage. All site activities will be undertaken will continue pursuant to any Historic Resources Act requirements.

#### 4.5 VEGETATION AND HABITAT TYPES

Vegetative characteristics of the Foothills Fescue Subregion have largely been reduced by grazing and cultivation of the flatter plateau areas of the Project Area. Small patches of fescue grasses and other species typical to the subregion can be found along gentle slopes along the top of the valley. A description of each of the vegetation habitat types is below.

#### 4.5.1 Habitat Types

Undulating terrain, natural and anthropogenic disturbance, and the unique hydrology of the valley escarpment provides a patchwork of micro habitats. Ten vegetation plot surveys were conducted throughout the Project Area, survey data is provided in **Appendix D**. These vegetation plots provide species occurrence and abundance information to classify habitats.

A total of ten (10) habitat types were identified within the Project Area. Habitat types within the Project Area are not spatially uniform and frequent variation in vegetation community density and distribution was observed. This is particularly true of the Native Grassland, Non-native grassland, and Low shrub communities on the plateau, and on the escarpment. This report has divided the Project Area into seven (7) polygons that may share more than one habitat type as described below and in **(Table 4-3)**.

Many large patches of buckbrush (*Symphoricarpos occidentalis*) are present throughout the Project Area. These patches often very dense and were not specifically surveyed during vegetation surveys in order to focus on the graminoid and forb communities. Occurrence of buckbrush is documented where they are more representative of the overall sites.

The ACIMS database search resulted in two non-sensitive element of occurrences (EO), western false gromwell (*Lithospermum occidentale*) and blunt-leaved watercress (*Rorippa curvipes*) within the Project Area. The Stantec EI recorded observations of the western false gromwell throughout the ASP area. No observations of blunt-leaved watercress were observed by either Stantec or USL. Habitat preference for the Western False Gromwell is disturbed areas with exposed gravels (Stantec Consulting Ltd., 2018). It is listed Provincially as S3 (vulnerable), nationally as NNR (unranked) and globally as G4G5 (secure). ACIMS tracking status is to track all extant and selected historical EOs. ACIMS database search results are in **Appendix E**. Higher densities of western false gromwell were observed in the Project Area along a recently formed side channel of the Bow River where gravel deposition and natural disturbance has occurred.

Habitat types and observed dominant vegetation are described below.

**Kentucky Bluegrass – Fringed Sage FFB2 and Smooth Brome – Alfalfa FFB3** These areas have undergone long term grazing impacts with higher occurrence of grazing increasers like pasture sage (*Artemisia frigida*), Kentucky bluegrass (*Poa pratensis*), snowberry (*Symphoricarpos albus*), smooth brome (*Bromus inermis*), and alfalfa (*Medicago sativa*). Patches of habitat featuring June grass (*Koeleria macrantha*), Columbia needle grass (*Achnatherum nelsonii ssp. dorei*), gamma grass (*Bouteloua gracilis*) and slender wheatgrass (*Elymus trachycaulus*) are present along the dry upper slopes where the valley crest slopes away from the plateau.

**Northern and Western Wheatgrass – Foothills Fescue FFA25** Steep grassland slopes with exposed soils. Species observed include buckbrush (*Symphoricarpos occidentalis*), undifferentiated wheatgrass (*Agropyron spp.*), Kentucky bluegrass (*Poa pratensis*), June grass (*Koeleria macrantha*), and pasture sagewort (*Artemisia frigida*). Incidental occurrence of juniper (*Juniperus spp.*). These areas include a mixed canopy of balsam poplar (*Populus balsamifera*), and aspen (*Populus tremuloides*), with Upland Tall Shrub communities of willows (*Salix spp.*).

**Common Wild Rose / Kentucky Bluegrass / Dandelion FFC1 and Beaked Willow Sedge – Tufted Hair Grass FFC2** Communities are observed along the slopes of the escarpment. Non-native Grassland habitat is dominant

in this area including occurrence of smooth brome (*Bromus inermis*), and Kentucky bluegrass (*Poa pratensis*), mixed in with native grassland species such as slender wheatgrass (*Elymus trachycaulus*) and forbs including wild bergamot (*Monarda fistulosa*), tall goldenrod (*Solidago altissima*), and dotted blazingstar (*Liatris punctate*).

Upland low shrub habitat communities including dense colonies of snowberry (*Symphoricarpos albus*), buckbrush (*Symphoricarpos occidentalis*) and occasional shrubby cinquefoil (*Dasiphora fruticosa*). Communities of tall shrubs including willows (*Salix spp.*), river alder (*Alnus incana ssp. tenuifolia*), pin cherry (*Prunus pensylvanica*) with a diverse understory of forbs and grasses was often associated with areas adjacent to and down gradient of slope wetland areas.

**Kentucky Bluegrass - Foothills Rough Fescue - FFA19** Communities in this valley bottom area are densely vegetated with low shrubs such as shrubby cinquefoil (*Potentilla fruticosa*), buckbrush (*Symphoricarpos occidentalis*), and snowberry (*Symphoricarpos albus*). Open patches of grassland/forb communities include northern bedstraw (*Galium boreale*), common yarrow (*Achillea millefolium*), blue grama (*Bouteloua gracilis*), Kentucky bluegrass (*Poa pratensis*), bluebunch fescue (*Festuca idahoensis*), and June grass (*Koeleria macrantha*).

The area identified within this description north of the avulsion channel expressed similar species as above with a significantly decreased occurrence of shrubby species.

**Wetland** areas are described in two categories, Prairie Pothole Wetlands on the Upper Plateau, and the spring fed Slope Wetlands located along the escarpment. Details of wetland character and classification are described fully in Section 4.7 below. Prairie Pothole Wetlands in the Project Area typically are graminoid dominant with a mixture of sedge species (*Carex sp.*) and grasses such as fowl bluegrass (*Poa palustris*), wire rush (*Juncus balticus*), and common tall manna grass (*Glyceria grandis*).

Slope wetland areas are spring fed wetlands positioned along the escarpment. Although the slope wetlands have been heavily disturbed by cattle, they maintain diverse and dense colonies of wetland vegetation. Due to the slope position of these wetlands, they have not been subjected to the same degenerative anthropogenic disturbance such as plowing, herbicide, pesticides, and fertilizers as many of the other wetlands in the region. Amongst a diverse array of grasses and forbs, these areas host dense plots of wetland vegetation such as: awned sedge (*Carex atherodes*), water sedge (*Carex aquatilis*) fowl bluegrass (*Poa palustris*), wire rush (*Juncus balticus*), and common tall manna grass (*Glyceria grandis*). Areas adjacent to the slope wetlands often present *Raspberry-Rose/Kentucky Bluegrass - Dandelion FFC1* amongst low/tall shrub areas on the escarpment and often adjacent to shrubby wetland areas disturbed by grazing. The Area presents early seral colonizing species such as Kentucky bluegrass (*Poa pratensis*) common dandelion (*Taraxacum officinale*).

**Balsam Poplar Forest / Upland Tall Shrub** -These areas include a mixed canopy of balsam poplar (*Populus balsamifera*), and aspen (*Populus tremuloides*), with Upland Tall Shrub communities of willows (*Salix spp.*).

**Anthropogenic Disturbed** – rural habitat areas can be found near buildings, roads and fences in small patches are throughout the Project Area. These areas tend to have high densities of weedy species such as creeping thistle (*Cirsium arvense*), perennial sow-thistle (*Sonchus arvensis*), and common dandelion (*Taraxacum officinale*). Roadside areas, gate crossings, earthworks and farmyard stock yards and workspaces are typical disturbances with the Project Area. Disturbed Balsam Poplar / Manicured Grass habitat type are observed at the homestead and surrounding farmyard. Shelter belts of balsam poplar and manicured grasslands are also found in this area.

**Avulsion Channel** - Habitat disturbed by overland flow was observed within the flood plain in association with the fluvial side channel bisecting the southern portion of the Project Area. Gravels and soils have been exposed

by flood scouring in this area creating a disturbed area vegetated with pioneering species. Common burdock (*Arctium minus*), sandbar willow (*Salix interior*) and common mullein (*Verbascum thapsus*), are common in these areas.

Vegetation plots and habitat areas are provided on **Figure 5**.

**Table 4-3: Habitat Types and Descriptions**

Habitat Types	Dominant Plant Species	Area (ha)
<b>Anthropogenic Disturbed</b>	Kentucky bluegrass ( <i>Poa pratensis</i> ), smooth brome ( <i>Bromus inermis</i> ), creeping thistle ( <i>Cirsium arvense</i> ), perennial sow-thistle ( <i>Sonchus arvensis</i> ), and common dandelion ( <i>Taraxacum officinale</i> )	0.8
<b>Avulsion Channel</b>	common burdock ( <i>Arctium minus</i> ), sandbar willow ( <i>Salix interior</i> ) and common mullein ( <i>Verbascum Thapsus</i> )	2.6
<b>Balsam Poplar/Tall Shrub</b>	balsam poplar ( <i>Populus balsamifera</i> ), common wild rose ( <i>Rosa woodsia</i> ) aspen ( <i>Populus tremuloides</i> ) and willows ( <i>Salix spp.</i> )	11.3
<b>Common Wild Rose / Kentucky Bluegrass / Dandelion FFC1 and Beaked Willow Sedge – Tufted Hair Grass FFC2</b>	smooth brome ( <i>Bromus inermis</i> ), Kentucky bluegrass ( <i>Poa pratensis</i> ), wild bergamot ( <i>Monarda fistulosa</i> ), tall goldenrod ( <i>Solidago altissima</i> ), snowberry ( <i>Symphoricarpos albus</i> ), buckbrush ( <i>Symphoricarpos occidentalis</i> ) and willows ( <i>Salix sp.</i> )	5.7
<b>Kentucky Bluegrass - Foothills Rough Fescue - FFA19</b>	shrubby cinquefoil ( <i>Potentilla fruticosa</i> ), buckbrush ( <i>Symphoricarpos occidentalis</i> ), snowberry ( <i>Symphoricarpos albus</i> ), common yarrow ( <i>Achillea millefolium</i> ), blue grama ( <i>Bouteloua gracilis</i> ), and Kentucky bluegrass ( <i>Poa pratensis</i> )	26.6
<b>Kentucky Bluegrass - Fringed Sage FFB2 / Smooth and Smooth Brome - Alfalfa FFB3</b>	pasture sage ( <i>Artemisia frigida</i> ), Kentucky bluegrass ( <i>Poa pratensis</i> ), snowberry ( <i>Symphoricarpos albus</i> ), smooth brome ( <i>Bromus inermis</i> ), alfalfa ( <i>Medicago sativa</i> )	64.0
<b>Northern and Western Wheatgrass – Foothills Fescue FFA25</b>	undifferentiated wheatgrass ( <i>Agropyron spp.</i> ), Kentucky bluegrass ( <i>Poa pratensis</i> ), June grass ( <i>Koeleria macrantha</i> ), and pasture sagewort ( <i>Artemisia frigida</i> )	33.3

**4.5.2 Weeds**

The variety of natural and anthropogenic disturbances provide conditions favorable for establishment of pioneering weedy species. Small colonies and individual species listed under the Alberta Weed Control Act (Government of Alberta, 2020) were observed throughout the Project Area. Seven non-native/weed species with a Provincial listing of Noxious were observed throughout the Project Area. A list of non-native/weedy species and their provincial status are included in **Table 4-4**.

**Table 4-4: Non-Native and Weed Species List**

Common Name	Scientific Name	Alberta Weed Control Act Status
absinthe wormwood	<i>Artemisia absinthium</i>	Not listed
common dandelion	<i>Taraxacum officinale</i>	Not listed
creeping thistle	<i>Cirsium arvense</i>	<b>Noxious</b>
dalmatian toadflax	<i>Linaria dalmatica</i>	<b>Noxious</b>
great burdock	<i>Arctium lappa</i>	<b>Noxious</b>
common mullein	<i>Verbascum Thapsus</i>	<b>Noxious</b>
common goatsbeard	<i>Aruncus dioicus</i>	Not listed
common tansy	<i>Tanacetum vulgare</i>	<b>Noxious</b>
common toadflax	<i>Linaria vulgaris</i>	<b>Noxious</b>
perennial sow-thistle	<i>Sonchus arvensis</i>	<b>Noxious</b>
black medick	<i>Medicago lupulina</i>	Not listed

## 4.6 HYDROLOGY

The report “*Preliminary Hydrogeological Assessment Ricardo Ranch Area Structure Plan Ricardo Ranch, In Southeast Calgary*” (Waterline Resources Inc., 2019) provides a conceptual model for groundwater systems affecting the hydrogeology within the Project Area.

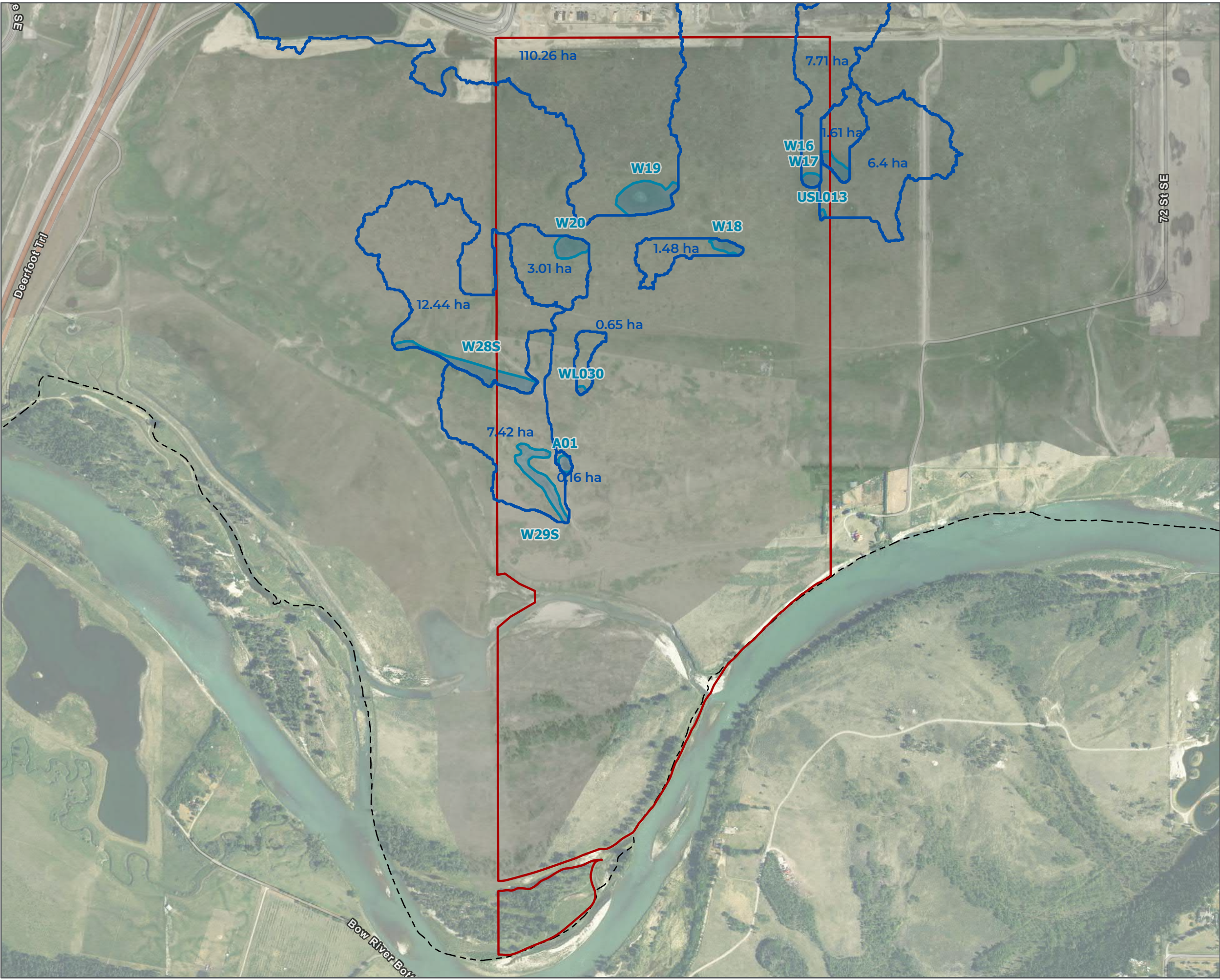
The report identifies that localized perched groundwater tables located on the plateau are likely recharged mainly by snowmelt and precipitation. These groundwater systems may contribute to deeper aquifers within the Crossfield Drift Formation. The Crossfield Drift glacial till formations at this location have a high clay content and reduced permeability. However, it is believed that inter-till glacial fluvial aquifers with higher hydraulic conductivity than the till formations are found deeper within the profile. These permeable units likely produce groundwater that is contributing to the water discharge into the slope wetlands on the middle and upper portions of the escarpment. The source of this water is likely a combination of existing groundwater inputs from the greater area upgradient in the Crossfield Drift and surface water infiltration. A regional to intermediate groundwater system is also documented within the underlying Paskapoo sandstone formations that are likely recharged by greater areas north of the Project Area. Freshwater springs at the base of the escarpment may receive water from these Paskapoo sandstone formations (Waterline Resources Inc., 2019).

The morphology study by Golder identifies that the overbank gravel deposit near the base of the escarpment where the new side channel was identified, indicates a high likelihood that the avulsion channel will continue to develop and erosion will occur (Golder Associates, 2018).

The catchment areas for each wetland based on surface water inputs were generated and are mapped in **Figure 6**. Average annual precipitation levels from 1955 to 2017 were calculated to be 438 mm. A dry year is precipitation levels below or at 395 mm and a wet year is levels at or above 479 mm.

Details on the predevelopment and post development designs can be found in the Ricardo Ranch Stormwater Master Drainage Plan 2020 prepared by USL.



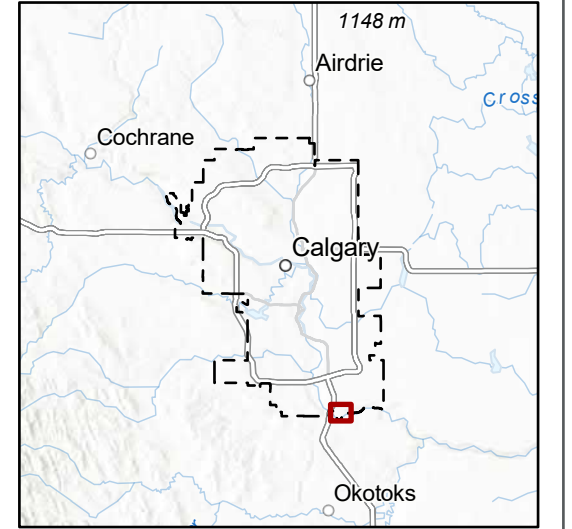


# GENESIS

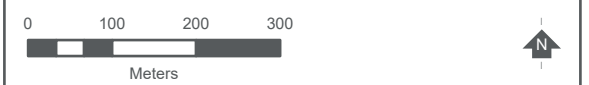
## Logan Landing Biophysical Impact Assessment Wetland Catchments

NW Sec 10 - Twp 022 - Rge 29 - Mer 4  
 SW Sec 10 - Twp 022 - Rge 29 - Mer 4  
 NW Sec 03 - Twp 022 - Rge 29 - Mer 4

- Wetlands
- Wetland Catchments
- Project Area
- Calgary Municipal Boundary



The accuracy & completeness of information shown on this drawing is not guaranteed. It will be the responsibility of the user of the information shown on this drawing to locate & establish the precise location of all existing information whether shown or not.



**Coordinate System:** NAD 1983 3TM 114  
**Scale:** 1:9,000 (When plotted at 11"x17")

**Data Sources:**  
 - Aerial imagery provided by Esri  
 - Wetlands and waterbodies boundaries obtained by field data collection and desktop review

Project #: 2197.0009.02  
 Author: SDF  
 Checked: TD  
 Status: **FINAL**  
 Revision: A  
 Date: 2023 / 1 / 10



**FIGURE 6**



## 4.7 WETLANDS, WATERCOURSES AND WATERBODIES

Results of available database searches, review of previous reporting, and historical aerial imagery, identified wetlands of varying classification and ephemeral drainages throughout the Project Area. USL wetland assessments and site surveys confirmed a total 9 wetland areas. The presence of approximately 15 Ephemeral Drainage areas identified by Stantec along the valley escarpment were confirmed, and one anthropogenic (altered) waterbody was observed.

**Figure 7** shows the location of mapped wetlands, watercourses, and waterbodies.

### 4.7.1 Wetlands

There is a total of 9 wetlands with a total area of 2.66 ha and one (1) anthropogenic waterbody with an area of 0.10 ha within the Project Area. **Table 4-5** lists the wetlands, classification, value, and total area. The ABWRET-A wetland functional scores generated are based on the provincial guidelines and wetland assessment process but are not used by the City of Calgary to determine wetland functionality or inform decisions for wetland retention.

**Table 4-5: Wetland Class, Value and Area**

Wetland Name	Alberta Wetland Classification System	Stuart and Kantrud Classification	ABWRET-A Relative Wetland Value	Wetland Area (ha)
USL013	<i>Marsh Graminoid Temporary</i>	Class II Temporary	B	0.03
W19	<i>Marsh Graminoid Temporary</i>	Class II Temporary	B	0.92
W18	<i>Marsh Graminoid Temporary</i>	Class II Temporary	B	0.18
W20	<i>Marsh Graminoid Temporary</i>	Class II Temporary	B	0.34
W16	<i>Marsh Graminoid Temporary</i>	Class II Temporary	B	0.07
W17	<i>Marsh Graminoid Temporary</i>	Class II Temporary	B	0.13
W28S	<i>Marsh Graminoid Seasonal</i>	Class III Seasonal	C	0.30
W29S	<i>Marsh Graminoid Temporary</i>	Class II Temporary	B	0.62
W030	<i>Marsh Graminoid Seasonal</i>	Class III Seasonal	D	0.03
A01	<i>Anthropogenic Waterbody</i>	N/A	N/A	0.10

The marsh temporary wetlands located within pasture along the upper plateau have been impacted through agricultural practices, occasionally cultivated until the 1970's, and transitioned into pasture/grazing lands, as it is currently used today. Distribution of Stuart and Kantrud wetland zones (wet meadow and low prairie) are not well represented in these wetlands due to cattle impacts and dominance of invasive grass cover throughout. In general, low prairie and wet meadow zones are not clearly expressed. The average cover of non-native/invasive species throughout the plateau wetlands was 50%.

USL013 was not identified in the Stantec EI in 2017 and was discovered by USL during field work in 2019. It is a class II temporary marsh within a shallow depression dominated by smooth brome (*Bromus inermis*) and Timothy (*Phleum pratense*) on the periphery, and wire rush (*Juncus balticus*), fowl bluegrass (*Poa palustris*) and reed canary grass (*Phalaris arundinacea*) increasing in representation towards the centre (deepest part) of the wetland.

W16 was identified as a class II temporary marsh by Stantec in 2017 and verified by USL in 2019. It is a shallow depression expressing hydric soils and dominated by reed canary grass (*Phalaris arundinacea*), fowl bluegrass (*Poa palustris*), and smooth brome (*Bromus inermis*) throughout.

W17 was identified as a class II temporary marsh by Stantec in 2017 and verified by USL in 2019. It is dominated throughout by reed canary grass (*Phalaris arundinacea*), with occurrence of wire rush (*Juncus balticus*), fowl bluegrass (*Poa palustris*), awned sedge (*Carex atherodes*) and water smartweed (*Polygonum amphibium*) distributed throughout the central portion of the wetland.

W18 was identified as a class II temporary marsh by Stantec in 2017 and verified by USL in 2019. It is characterized by the presence of awned sedge (*Carex atherodes*), graceful sedge (*Carex praegracilis*), Kentucky bluegrass (*Poa pratensis*) and facultative species such as fowl bluegrass (*Poa palustris*), and reed canary grass (*Phalaris arundinacea*).

W19 was identified as a class II temporary marsh by Stantec in 2017 and verified by USL in 2019. It is a shallow basin that shows a similar vegetation footprint to W17 and W18 with additional species recorded such as goosefoot (*Chenopodium sp.*), American golden dock (*Rumex fueginus*), hemp-nettle (*Galeopsis tetrahit*) and slough grass (*Bechmannia syzigachne*).

W20 was identified as a class II temporary marsh by Stantec in 2017 and verified by USL in 2019. It is a shallow basin with small patches of species such as graceful sedge (*Carex praegracilis*), yellow sedge (*Carex flava*), and facultative species such as fowl bluegrass (*Poa pratensis*), American golden dock (*Rumex feuginus*), grass species such Timothy (*Phleum pratense*), reed canary grass (*Phalaris arundinacea*) and smooth brome (*Bromus inermis*), along with tufted white prairie (*Symphyotrichum ericoides*) and common yarrow (*Achillea millefolium*).

The obligate wetland species found within the temporary wetlands are awned sedge (*Carex atherodes*), graceful sedge (*Carex praegracilis*) supported by facultative species such as wire rush (*Juncus balticus*), foxtail barley (*Hordeum jubatum*), and other non-native species such as alfalfa (*Medicago sativa*), quack grass (*Elymus repens*), creeping thistle (*Cirsium arvense*), and common dandelion (*Taraxacum officinale*). Observed wildlife using the habitat were mainly migratory songbirds such as meadow lark, robin, savanna and clay-coloured sparrows.

The remaining wetlands (W28S, W29S and WL030) along the escarpment are sloped marsh wetlands and are primarily spring fed. The impacts on these wetlands are the influence of cattle use (pugging – creating deep pockets within the wetland), weed dispersal is throughout and wetland zones are not well defined as is seen in

typical prairie pothole marsh wetlands. Overall cover of non-native/invasive species throughout the wetlands ranged from 20-30%.

W28S was identified as a class III seasonal slope marsh by Stantec in 2017 and verified by USL in 2019. Shrub and tree cover surrounding the wetland include river alder (*Alnus incana ssp. tenuifolia*), willow (various *Salix spp.*), dwarf birch (*Betula pumila*), buckbrush (*Symphoricarpos occidentalis*), silverberry (*Elaeagnus commutate*), with a few balsam poplar (*Populus balsamifera*) along the southwestern edge of the wetland. Wetland species include water sedge (*Carex aquatilis*), awned sedge (*Carex atherodes*), scouring rush (*Equisetum hyemale*), water parsnip (*Sium suave*), manna grass (*Glyceria grandis*), small bottle sedge (*Carex utriculata*), wild mint (*Mentha arvensis*) and northern green bog orchid (*Platanthera hyperborea var. huronensis*). The wetland provides shelter, foraging, and breeding habitat for a wide range of wildlife species; however, as they have not been observed to sustain open surface water beyond early season runoff, waterfowl would likely not be found using these wetland areas or limited to early season use for temporary shelter, and foraging. The wetland has experienced significant cattle pugging and erosion along the north boundary of the escarpment. Wetland zones or specific vegetated sedge communities are not clearly defined and weeds such as sow thistle, creeping thistle, and common dandelion are scattered throughout.

W29S was identified as a class III seasonal slope marsh by Stantec in 2017. Through historical review, field study in 2019, and the determination of the absence of any significant standing water beyond spring and vegetation footprint, USL has reclassified it as a class II temporary marsh. It is a spring fed temporary sloped groundwater wetland that spills south toward the floodplain. Wetland species include silverweed (*Argentina anserina*), wire rush (*Juncus balticus*), graceful sedge (*Carex praegracilis*), woolly sedge (*Carex pellita*) and long-styled rush (*Juncus longistylis*). Its boarder is lined with shrubs and grasses such as silverberry (*Elaeagnus commutate*), snowberry (*Symphoricarpos albus*), sandbar willow (*Salix interior*) and fowl bluegrass (*Poa palustris*). Signs of cattle use are evident within and around the wetland.

W30 was not identified by Stantec in 2017, however was discovered during a 2021 site visit and is classified as a class III seasonal marsh by USL in 2021. It is located at the base of the lower escarpment and is .03 ha in size and is expected to be predominantly fed through groundwater, based on the small (0.65 ha) overland catchment area. Impacts from cattle are not as pronounced along the base of the escarpment. Wetland zones are not clearly defined, and wetland vegetation is distributed throughout and include obligate species such as bog orchid (*Platanthera sp*), mint (*Mentha arvensis*), bottle sedge (*Carex utriculate*), water sedge (*Carex aquatilis*) and seaside arrow grass (*Triglochin maritima*). Non-native/weedy species are found throughout and include creeping thistle, sow thistle, smooth brome, and common dandelion.

Waterbody A01 is an artificial depression created by historical gravel extraction and does not fall under the Alberta Wetland Classification System. The feature is highly disturbed and dominantly vegetated with native colonizing species and cannot adequately be described under the Stewart and Kantrud Classification System.

An area identified by Stantec in 2017 as wetland W42S, was determined not a wetland and vegetation was recorded as vegetation plot (VP33), which can be referenced in **Appendix D**.

Wetland data tables describing specific wetland vegetation species and soil observations and Alberta Wetland Policy Appendix 7 Field Form boundary confirmation data are provided in **Appendix F**. Vegetation structure within all wetlands was heavily impacted by cattle grazing and physical impacts of cattle presence. Invasive species such as quack grass (*Elymus repens*), creeping thistle (*Cirsium arvense*), and reed canary grass (*Phalarus arundinacea*) tend to dominate large areas of the wetlands, especially the transition to upland areas. "Pugging" of wetland soils from cattle has in most cases eliminated typical wetland zones. This has resulted in the uniform presence of micro habitats across each area where wetland species are present in wetter hoof depressions, and upland species are present on the higher and drier protrusions. The removal of cattle from

these environments would likely allow for wetlands to revert to a more natural topographic state, however the existing establishment of invasive weeds and vegetation would likely persist long term.

#### 4.7.2 Watercourses and Overland Flow Paths

Several overland flow paths and one temporary ephemeral flow path were identified in the City's inventory. Not all of the ephemeral overland flow paths identified in the inventory were confirmed and a some were identified and confirmed in the field that were not labeled in the City's inventory.

A total of 15 ephemeral overland flow paths were confirmed and classified within the Project Area by Stantec and are confirmed by USL and are found along the escarpment (**Figure 7**). The temporary ephemeral overland flow path identified in the City's inventory, which was identified associated with wetlands W28S and W29S was not confirmed.

An active avulsion channel of the Bow River flows through the southern portion of the Project Area within the Valley bottom. This channel was established during the 2013 flood event on the Bow River. The channel is a series of riffle and run reaches flowing over a bed of cobbles and gravels. The riparian zone is dominated by exposed gravels, cobbles, and boulders. Patches of wetland vegetation have established with occurrences of western false gromwell (*Lithospermum occidentale*). Flowing surface water was present during the last field surveys at the end of August 2019. The channel and its riparian area will be avoided by the development.

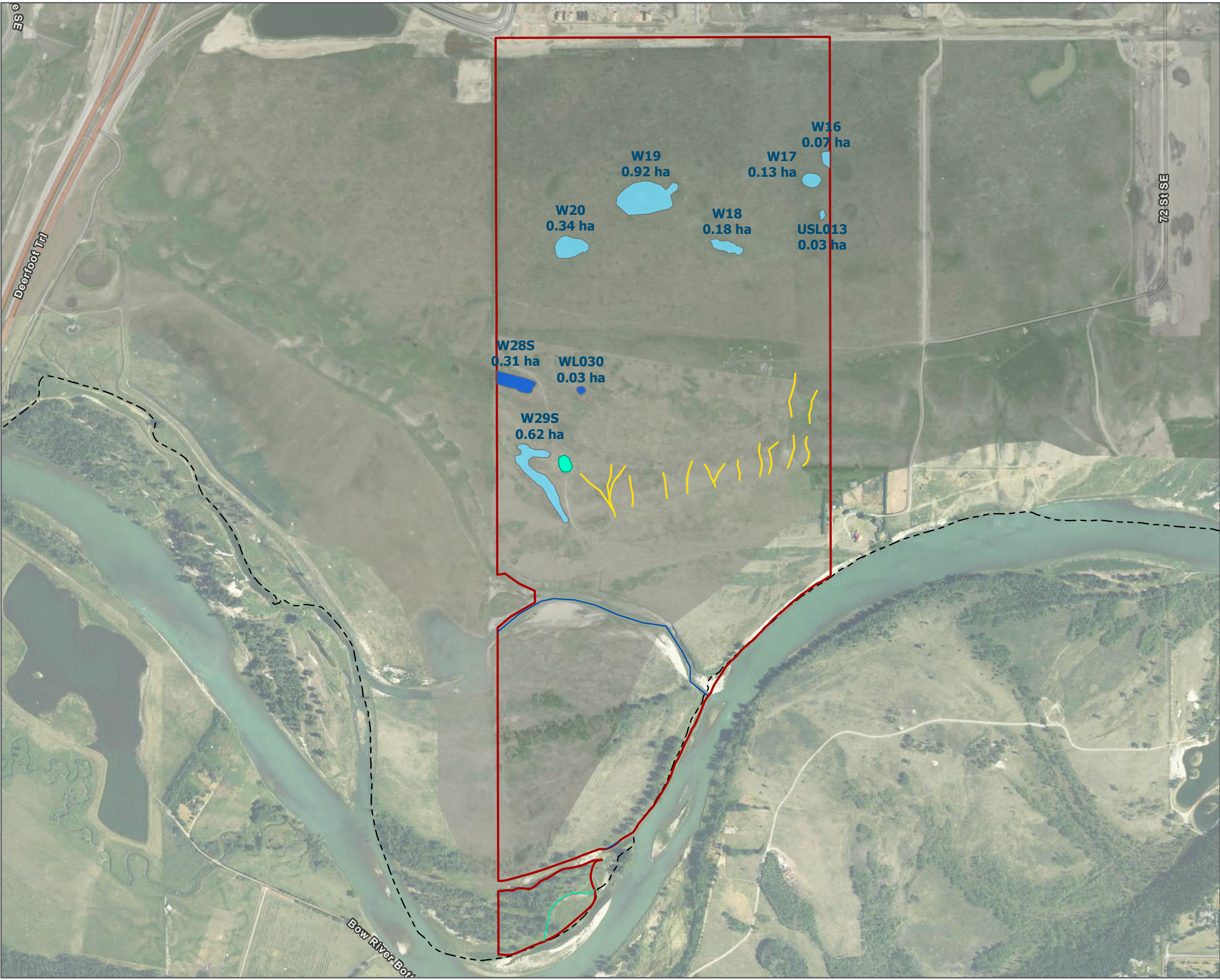
#### 4.7.3 Public Lands Review

In 2017, Stantec submitted a request to Public Lands to determine Crown ownership of the waterbodies within the Area Structure Plan area, including the avulsion channel (referred to then as the fluvial channel). The response from EPA (then AEP) indicated that the Crown does not claim any wetlands within the Project Area, or the avulsion channel (Stantec Consulting Ltd., 2018). Correspondence from Public Lands is provided in **Appendix G**.



Last updated by SideBoerFuller on March 15, 2023 at 9:10 AM  
 Last exported by SideBoerFuller on March 15, 2023 9:10 AM  
 Last printed by SideBoerFuller on July 14, 2020 4:41 PM

\\usl.urban-systems.com\projects\Projects\_CAL\2197\0009\02\ID-Design\GIS\Projects\Pro\_Projects\Genesis\Genesis\_Ricardo\_Environmental\_Inspection\20200604\_aprx\Genesis\_Fig7\_Wetlands\_Waterbodies\_20200218

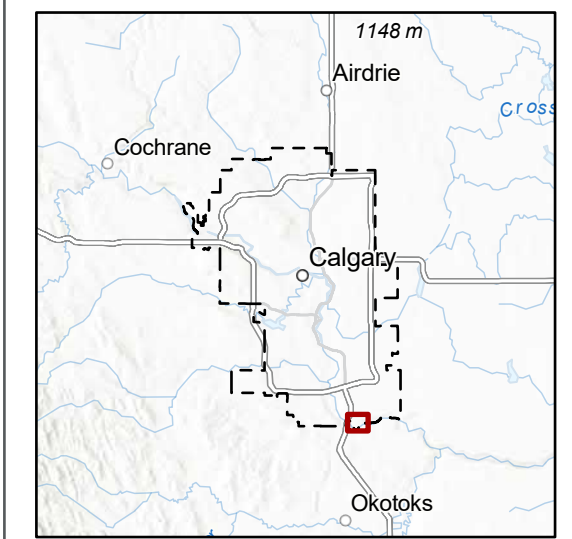


# GENESIS

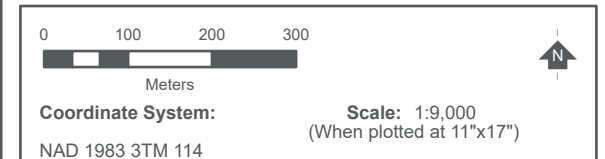
## Logan Landing Biophysical Impact Assessment Wetlands and Waterbodies

NW Sec 10 - Twp 022 - Rge 29 - Mer 4  
 SW Sec 10 - Twp 022 - Rge 29 - Mer 4  
 NW Sec 03 - Twp 022 - Rge 29 - Mer 4

- Avulsion Channels
  - Side Channel
  - Ephemeral Overland Flow Path
  - Project Area
  - Calgary Municipal Boundary
- Wetlands
- Class II - Marsh Graminoid Temporary
  - Class III - Marsh Graminoid Seasonal
  - Anthropogenic Waterbody



The accuracy & completeness of information shown on this drawing is not guaranteed. It will be the responsibility of the user of the information shown on this drawing to locate & establish the precise location of all existing information whether shown or not.



Data Sources:

- Aerial imagery provided by Esri
- Wetlands and waterbodies boundaries obtained by field data collection and desktop review
- Drainage stream and fluvial channel data provided by Stantec

Project #: 2197.0009.02  
 Author: SDF  
 Checked: TD  
 Status: **FINAL**  
 Revision: A  
 Date: 2023 / 3 / 15

**URBAN**  
systems

**FIGURE 7**



## 4.8 FISH AND WILDLIFE

The Bow River Valley is identified by the FWMIS database search as a “Key Wildlife and Biodiversity Zone” that extends from upstream of the Deerfoot Trail SE bridge west of the Project Area and continues down the valley beyond the confluence of the Highwood River Valley to the east. This classification recognizes the area as important ungulate overwintering habitat, and as an area likely to express higher biodiversity in association with riparian vegetation. The database identifies the Project Area and surrounding areas as Sensitive Raptor Range for species including the Golden Eagle (*Aquila chrysaetos*) and the Bald Eagle (*Haliaeetus leucocephalus*). It has also been identified by the database as a Sharp-tailed grouse (*Tympanuchus phasianellus*) survey area indicating that the area is a probable location for sharp tailed grouse habitat and recommends proponents to survey for leks and observe appropriate setbacks where they occur. Both the Bald eagle and Golden eagle were observed flying over the Project Area, but no observations or indicators of Sharp-tailed grouse were recorded. FWIMT maps presenting data from the FWMIS database are provided in **Appendix H**.

A potential species list was prepared for the Project Area based on the region and available habitat within the Project Area (**Appendix I**). The potential species list included 195 birds, 41 mammals, 3 reptiles and 8 amphibians.

The species list for an eBird Hotspot located on the south bank of the Bow River at the Policeman's Flats boat launch included a total of 121 species. A total of 41 bird species were observed within the six (6) point count surveys (**Figure 8a**). The eBird list is provided in **Appendix J** and point count observation tables are provided in **Appendix K**.

During field surveys USL made incidental observations of five (5) mammal species including Coyote (*Canis latrans*), Richardson's Ground squirrel (*Uroditellus richardsonii*), White-tailed Jack Rabbit (*Lepus townsendii*), mule deer (*Odocoileus hemionus*), and white tail deer (*Odocoileus virginianus*). Evidence of animal burrowing and foraging tunnels and cavities was observed throughout the plateau and escarpment areas. Wetlands W29S, W19, and waterbody A01 resulted in observations of the Boreal chorus frog (*Pseudacris maculate*). Species observed during field visits and surveys are listed in **Table 4-6**.

**Table 4-6: Wildlife Species Observed**

Common Name	Scientific Name	AB Status	COSEWIC	SARA	*Date Observed
American Crow	<i>Corvus brachyrhynchos</i>	S	-	-	2017/2019
American Robin	<i>Turdus migratorius</i>	S	-	-	2017/2019
American White Pelican	<i>Pelecanus erythrorhynchos</i>	SEN	Not at Risk	-	2017/2019
Baird's sparrow	<i>Ammodramus bairdii</i>	SEN	Special Concern	Special Concern	2017
bank swallow	<i>Riiparia riparia</i>	TH	TH	TH	2017/2019
bald eagle	<i>Haliaeetus leucocephalus</i>	SEN	Not at Risk	-	2017/2019
belted king fisher	<i>Megaceryle alcyon</i>	S	-	-	2017

Common Name	Scientific Name	AB Status	COSEWIC	SARA	*Date Observed
black-billed magpie	<i>Pica hudsonia</i>	S	-	-	2017/2019
black-capped chickadee	<i>Poecile atricapillus</i>	S	-	-	2017/2019
blue-winged Teal	<i>Anas discors</i>	S	-	-	2017/2019
Brewers Blackbird	<i>Euphagus cyanocephalus</i>	S	-	-	2019
brown-headed Cowbird	<i>Molothrus ater</i>	S	-	-	2017/2019
California Gull	<i>Larus californicus</i>	S	-	-	2019
clay-colored sparrow	<i>Spizella pallida</i>	S	-	-	2017/2019
common goldeneye	<i>Bucephala clangula</i>	S	-	-	2017/2019
common merganser	<i>Mergus merganser</i>	S	-	-	2017/2019
common raven	<i>Corvus corax</i>	S	-	-	2017/2019
common yellowthroat	<i>Geothlypis trichas</i>	SEN	-	-	2019
dark-eyed junco	<i>Junco hyemalis</i>	S	-	-	2019
downy woodpecker	<i>Picoides pubescens</i>	S	-	-	2017/2019
eastern kingbird	<i>Tyrannus tyrannus</i>	SEN	-	-	2017/2019
European Starling	<i>Sturnus vulgaris</i>	S	-	-	2017/2019
Franklin's Gull	<i>Leucophaeus pipixcan</i>	S	-	-	2017/2019
gray catbird	<i>Dumetella carolinensis</i>	S	-	-	2017
great blue heron	<i>Ardea herodias</i>	SEN	-	-	2017/2019
great horned owl	<i>Bubo virginianus</i>	S	-	-	2017/2019
golden eagle	<i>Aquila chrysaetos</i>	SEN	Not at Risk	-	2017/2019
goldfinch	<i>Spinus tristis</i>	S	-	-	2017
house wren	<i>Troglodytes aedon</i>	S	-	-	2017/2019
Le Conte's Sparrow	<i>Ammodramus leconteii</i>	S	-	-	2017/2019
mallard	<i>Anas platyrhynchos</i>	S	-	-	2017
northern flicker	<i>Colaptes auratus</i>	S	-	-	2017/2019



Common Name	Scientific Name	AB Status	COSEWIC	SARA	*Date Observed
northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>	S	-	--	2017
northern shoveler	<i>Anas clypeata</i>	S	-	-	2017/2019
osprey	<i>Pandion haliaetus</i>	SEN	-	-	2017/2019
red-winged blackbird	<i>Agelaius phoeniceus</i>	S	-	-	2017/2019
savannah sparrow	<i>Passerculus sandwichensis</i>	S	-	-	2017/2019
song sparrow	<i>Melospiza melodia</i>	S	-	-	2017/2019
spotted sandpiper	<i>Actitis macularius</i>	S	-	-	2017/2019
tree swallow	<i>Tachycineta bicolor</i>	S	-	-	2017 (nest)
vesper sparrow	<i>Pooecetes gramineus</i>	S	-	-	2017/2019
western meadowlark	<i>Sturnella neglecta</i>	S	-	-	2017/2019
western wood peewee	<i>Contopus sordidulus</i>	MBAR	-	-	2017
<b>Mammals</b>					
big brown bat	<i>Eptesicus fuscus</i>	S	-	-	2017
coyote	<i>Canis latrans</i>	S	-	-	2017/2019
hoary bat	<i>Lasiurus cinereus</i>	SEN	-	-	2017
little brown bat	<i>Myotis lucifugus</i>	MBAR	Endangered	Endangered	2017
silver-haired bat	<i>Lasionycteris noctivagans</i>	SEN	-	-	2017
red bat	<i>Lasiurus borealis</i>	SEN	-	-	2017
Richardson's Ground Squirrel	<i>Urocitellus richardsonii</i>	S	-	-	2017
western small-footed bat	<i>Myotis ciliolabrum</i>	SEN	-	-	2017
white-tailed jack rabbit	<i>Lepus townsendii</i>	S	-	-	2017/2019
mule deer	<i>Odocoileus hemionus</i>	S	-	-	2017/2019
white tail deer	<i>Odocoileus virginianus</i>	S	-	-	2017/2019
<b>Amphibians</b>					

Common Name	Scientific Name	AB Status	COSEWIC	SARA	*Date Observed
boreal Chorus Frog	<i>Pseudacris maculata</i>	S	-	-	2017/2019

S – Secure, SEN – Sensitive, MBAR – May be at Risk, TH – Threatened,  
 \* Date Observed - 2017 are from the Stantec EI

There are three species identified by USL within the Project Area or on FWMIS that are listed federally under SARA Schedule 1, Bairds sparrow (*Ammodrammus bairdii*) listed as Sensitive, Little brown bat (*Myotis lucifugus*) is listed as Endangered and Bank swallow listed as Threatened. The Alberta subspecies of the Great blue heron (*Ardea herodias*) is not listed on SARA. A description of the habitat for the species listed on FWMIS and species observed by USL that are either listed under Schedule 1 of the federal Species at Risk Act (SARA), (Government of Canada, 2019) and/or are listed under the Alberta Wildlife Act (Alberta Environment and Parks, 2019) are provided below. The Stantec EI recorded two occurrences of SARA listed species including a bank swallow (*Riparia riparia*) colony along the avulsion channel, and Baird’s sparrow (*Ammodrammus bairdii*).

The Stantec EI (Stantec Consulting Ltd., 2018) completed comprehensive wildlife surveys in 2017 within the greater Ricardo Ranch ASP area. Survey stations, wildlife features and species of conservation concern observations from the EI have been provided for discussion of relevant results are provided in **Figure 8b**. Raw data collected on species observations is attached in **Appendix L**. These surveys included: Winter track count surveys, nocturnal forest owl surveys, nocturnal and diurnal amphibian surveys, snake hibernaculum survey, rail survey, breeding bird survey, tree nesting raptor and great blue heron survey, and acoustic bat survey. These surveys cover the entire Ricardo Ranch ASP area however the habitat types and expected wildlife use is generally continuous. Stantec completed a comprehensive desktop assessment for species with potential to occur within the Project Area and was used to determine species of management concern (SOMC) and their habitat within or near the Project Area.

**Stantec Wildlife Surveys**

A brief summary of the Stantec survey methods and results as described within the Stantec Ricardo Ranch Area Structure Plan Ecological Inventory (Stantec Consulting Ltd., 2018) for each are provided below.

Nocturnal Forest Owl Surveys were conducted under research permit #18-298 using call playback and broadcasting calls conducted between 30 minutes after sunset and midnight, under seasonally average temperatures and winds under 20km/hr on April 25, 2018. The great-horned owl was detected (100 m northeast of Stantec Stn C). Although no other species were detected, habitat along the riparian zone of the Bow River provides suitable nesting habitat for many owl species.

Nocturnal and diurnal amphibian surveys were guided by the Sensitive Species Inventory Guidelines (Government of Alberta, April 2013). Two rounds of call surveys were conducted on May 3, 10, 18 and May 25, 26, and 30<sup>th</sup> 2017 under favorable conditions. Two species were detected, boreal chorus frog (*Pseudacris maculate*) and the wood frog (*Lithobates sylvaticus*). Diurnal surveys were conducted over two days (August 15 and 17, 2017) and resulted in 92 adult and 42 young of the year wood frogs, and one (1) boreal chorus frog and all observations were within lotic habitats (Stantec Stations A to K, **Figure 8b**).

Nocturnal rail call-broadcast surveys following the Sensitive Species Inventory Guidelines and conducted at 10 stations on June 1 and 2, 2017. Sora were observed at Station J and calls were detected approximately 200 m and 100 m from Stantec Stations E and D respectively.

Following the Sensitive Species Inventory Guidelines two rounds of breeding bird point count surveys were conducted on June 12, and 13, 2017 and on Jun 22 and 23, 2017, with a minimum of 300 m apart with a 100 m radius. Thirty-five species were detected and two federally listed species, the bank swallow (*Riparia riparia*) found along the avulsion channel, and the Bairds sparrow (*Ammodrammus bairdii*) Stations J and L within the Project Area.

Visual tree-nesting for raptor and great blue heron were visited, searched or scanned with binoculars, or spotting scope for signs of occupancy. The great blue heron colony is at the south tip of the Project Area where multiple active nests were observed. Several stick nests were observed throughout the Project Area and one was occupied by a red-tailed hawk during surveys. Surveys were conducted on May 8, 10 and 11 and June 12, 13, 22, and 23, 2017.

Passive acoustic bat surveys were conducted using the Handbook of Inventory Methods and Standard Protocols for Surveying Bats in Alberta. The survey was conducted to estimate relative abundance and presence of bat species. Surveys were conducted on between July 7-12, 2017 and four acoustic detectors were used for a total of 12 detector nights (3 detector nights per station). Stantec Station B was the 2<sup>nd</sup> most active acoustic station within the Project Area and resulted in recorded passes by the hoary bat (*Lasiurus cinereus*), big brown bat (*Eptesicus fuscus*), silver-haired bat (*Lasionycteris noctivagans*), eastern red bat (*Lasiurus borealis*), western small-footed myotis (*Myotis ciliolabrum*) and little brown myotis (*Myotis lucifugus*), the latter being the most abundant species detected.

Two snake hibernacula survey were conducted, one in the spring and one in the fall during favorable weather conditions on May 8, 10 and 11, 2017 and September 29, 2017. No snakes or suitable habitat were identified during surveys.

### **Species of Management Concern (SOMC)**

Sora (*Porzana calolina*) are commonly found in in densely vegetated graminoid marsh areas with high density cover. Sora are the most common rail species in North America, yet they are listed as sensitive in Alberta. Sora were not observed by USL during field studies however, habitat is available and the Stantec EI identified occurrences of sora within the Project Area and the greater ASP area (Stantec Consulting Ltd., 2018).

Bank Swallows (*Riparia riparia*) preferred habitat are aquatic environments along rivers, streams, and coastal areas where cliffs, bluffs, and eroding streambanks are present (The Cornell Lab of Ornithology, 2019). Human altered sites such as road cuts, sand, and gravel quarries are also areas of settlement for bank swallow communities and nesting.

Observations of the Bank swallows are recoded throughout valley and nests were observed along the avulsion channel connecting to the Bow River (**Figure 8a**). With consideration of the *Recovery Strategy for the Bank Swallow (Riparia riparia) in Canada [proposed] 2021* (Government of Canada, 2021), it is recognized that suitable nesting areas for this species should be conserved where possible. Development as proposed in the outline plan is set back at a minimum of 50m and greater in some areas from the avulsion channel, corresponding with common best management practices, federal guidelines, and correspondence from Paul Gregoire (Paul Gregoire per comm. Environment and Climate Change Canada, 2022).

Baird's Sparrow (*Centronyx bairdii*) is listed as Sensitive in Alberta. Baird's Sparrows prefer to inhabit grasslands but can also be found using pasture and hayfields (The Cornell Lab of Ornithology, 2019). The Stantec EI recorded the presence of Baird's sparrow.

Great blue heron (*Ardea herodias*) is listed as Sensitive in Alberta. Habitat of the great blue heron is generally near fresh or saltwater bodies. They have been observed foraging in grassland and agricultural areas in the vicinity of their breeding colonies (The Cornell Lab of Ornithology, 2019). Presence of great blue heron within the



Project Area was observed during all surveys. There is a heron colony identified along the riparian zone of the Bow River. During amphibian and breeding bird surveys there were approximately 30 active heron nests observed at the top of a community of mature poplar trees. The colony is located just outside of the Project Area at the south tip separated by a temporary channel.

A great blue heron (*Ardea herodias*) colony has been identified within the ASP boundary along the Bow River at the south end of the Project Area. This colony is protected under the Alberta Wildlife Act and the Government of Alberta recommends a setback distance of 1,000 meters from great blue heron colonies for high disturbance activities. Western EcoSystems Technology (WEST) has prepared the *Ricardo Ranch Great Blue Heron Colony Mitigation Plan* (WEST, 2020) on behalf of Genesis, which outlines appropriate construction setbacks and mitigation measures for a relaxation of the 1,000 meter buffer. Correspondence and review of the Great Blue Heron Colony Mitigation Plan from Brett Boukall, Senior Wildlife Biologist with Alberta Environment has agreed to accept the plan for implementation for construction (email correspondence December 7, 2020).

The American kestrel (*Falco sparverius*) is listed as Sensitive in Alberta. This species preferred habitat is grasslands with sparse tree cover for nesting in tree cavities. They are often found in other habitats such as deserts, parks, farm field and urban areas (The Cornell Lab of Ornithology, 2019). Although not recorded during USL breeding point counts, the Project Area does provide the habitat required for this species and confirmation of the presence of the American kestrel was documented in the *Ricardo Ranch Area Structure Plan Ecological Inventory* (Stantec Consulting Ltd., 2018).

Bald eagle (*Haliaeetus leucocephalus*) is listed as Sensitive in Alberta. The species typically nests and feeds in forested areas near water bodies but can be observed foraging in uplands and fields (The Cornell Lab of Ornithology, 2019). Presence of bald eagles within the Project Area was observed as a flyover by USL and was documented in the *Ricardo Ranch Area Structure Plan Ecological Inventory* (Stantec Consulting Ltd., 2018).

Golden eagle (*Aquila chrysaetos*) is listed as Sensitive in Alberta. Primarily they are found in mountains, canyons, river cliffs/bluffs and nest on cliffs and steep escarpments in grassland, shrub, forest, and native vegetated areas (Cornell Lab of Ornithology, 2020). Observation by USL recorded a flyover of the Project Area.

The Least Flycatcher (*Empidonax minimus*) is listed as Sensitive in Alberta. Primary habitat of the Least Flycatcher is semi-open deciduous and mixed forest with secondary habitats of shrubby fields and forest edges (The Cornell Lab of Ornithology, 2019). Primary and secondary habitat is available within the Project Area and although no recordings of this species occurred during point count surveys it is likely to occur within the Project Area.

Based on the available habitat the owl species that would likely be found within the Project Area are great horned owl, barred owl, northern saw-whet owl, and long-eared owl. The Project Area provides foraging and/or nesting options for each of these species. Confirmation of the presence of the Great horned owl was documented in the Stantec Ecological Inventory and was recorded as an incidental observation during surveys in 2019.

The little brown bat (*Myotis lucifugus*) is listed as Endangered under SARA. Habitat requirements are based on overwintering and areas for foraging near structures for roosting or maternity colonies. Generally little brown bats do not overwinter in buildings. Overwintering sites are often under bridges, rock crevices or in cavities of canopy trees in forests. Roosting occurs in various places such as buildings, bridges, rock crevices, behind bark, and in tree cavities including tall, large-diameter snags in open areas within mature to over-mature forested areas. Little brown bats generally avoid large, cleared areas, but forage over still water, rivers, and forest gaps, edges or along trails and are found in both deciduous and coniferous forest stands (Committee on the Status of Endangered Wildlife in Canada, 2013). The Project Area provides the required habitat for this species. The

presence of this species was confirmed through wildlife surveys conducted by Stantec for the ASP's Ecological Inventory at survey stations B and D (Stantec Consulting Ltd., 2018).

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) identifies the most significant contribution to the decline of many eastern subpopulations of the little brown bat is the White-Nose Syndrome, which has likely caused a 94% overall decline. Expansion of the disease is estimated to be spreading north and west at a rate of 200-250 km per year.

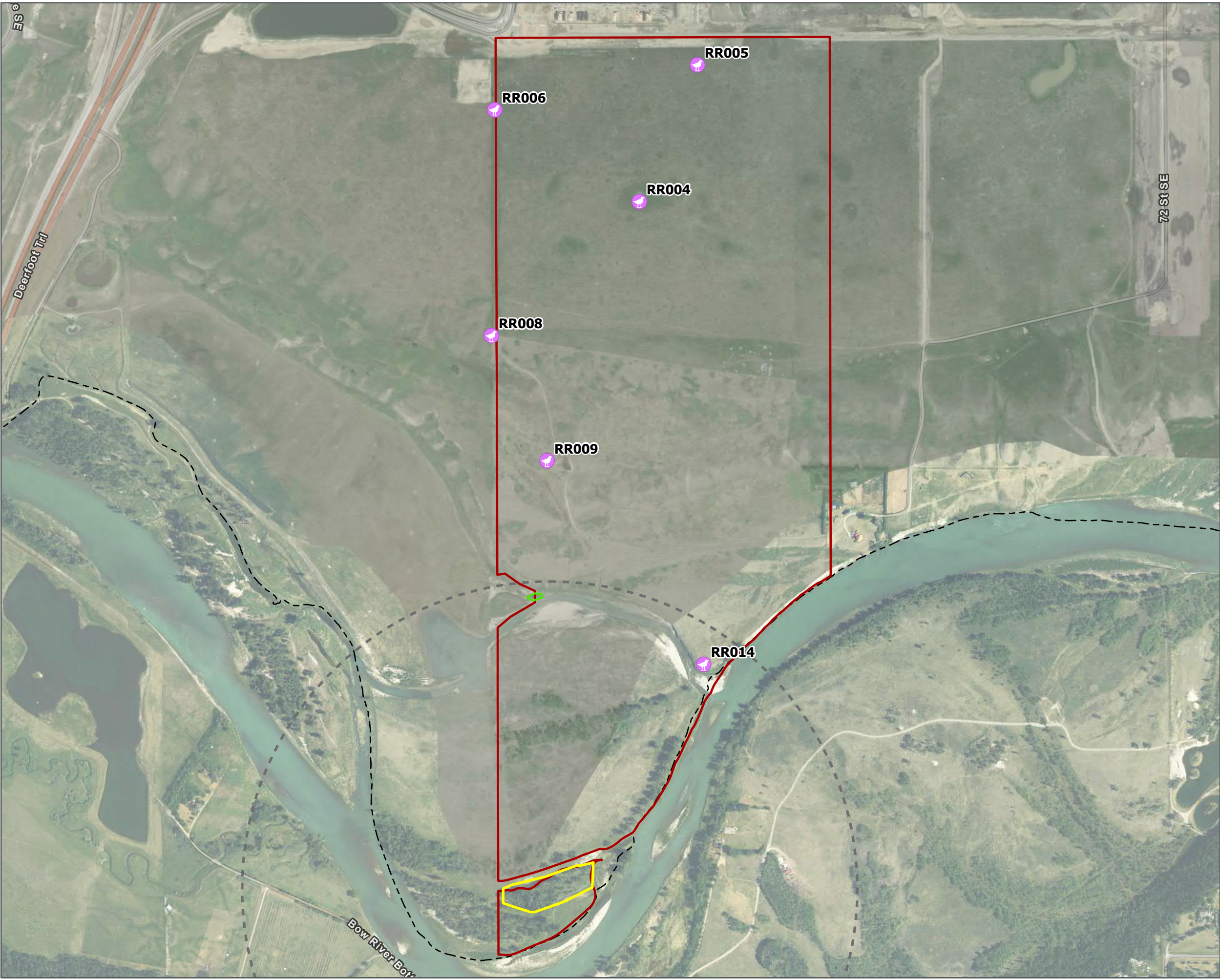
Other threats and impacts of bat species identified are public behavior in the removal of bats and roosts over concerns of zoonotic diseases, noise, and hygiene (Government of Canada, 2018). Chemical contamination changes in forest structure and wind turbines also contribute to population declines. However, the extent of the disturbance of impacts other than White-Nose Syndrome is unknown (Committee on the Status of Endangered Wildlife in Canada, 2013).

Snake hibernacula surveys were not conducted based on the lack of suitable habitat and the results of the Stantec EI in which no occurrence was recorded (Stantec Consulting Ltd., 2018).



Last updated by SdeBoerFuller on February 6, 2023 at 10:02 AM  
Last exported by SdeBoerFuller on February 6, 2023 10:02 AM  
Last printed by SdeBoerFuller on July 14, 2020 4:45 PM

\\us1.urban-systems.com\projects\Projects\_CAL\2197\0009\02\ID-Design\GIS\Projects\Pro\_Projects\Genesis\_Ricardo\_Environmental\_Inspection\20200604 aprx\Genesis\_Fig8a\_Wildlife\_Birds\_20200218

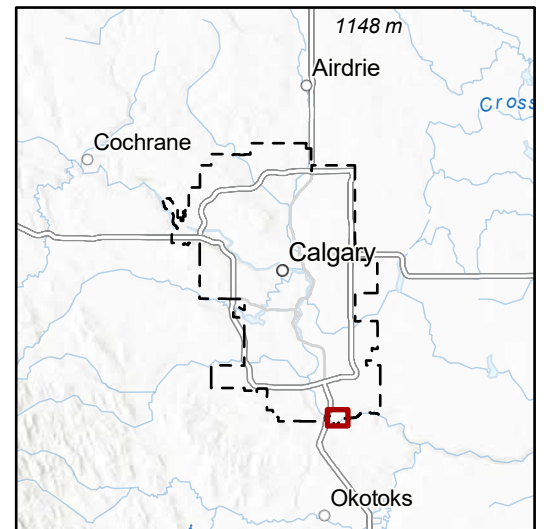


# GENESIS

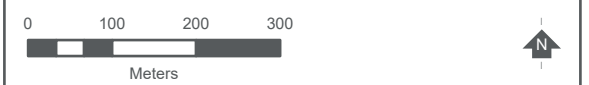
## Logan Landing Biophysical Impact Assessment Bird Surveys and Wildlife Observations

NW Sec 10 - Twp 022 - Rge 29 - Mer 4  
SW Sec 10 - Twp 022 - Rge 29 - Mer 4  
NW Sec 03 - Twp 022 - Rge 29 - Mer 4

- Bird Survey Locations
- Bank Swallow Nesting Site
- Heron Colony
- Heron Rookery Setback (750m)
- Project Area
- Calgary Municipal Boundary



The accuracy & completeness of information shown on this drawing is not guaranteed. It will be the responsibility of the user of the information shown on this drawing to locate & establish the precise location of all existing information whether shown or not.



**Coordinate System:** NAD 1983 3TM 114  
**Scale:** 1:9,000 (When plotted at 11"x17")

**Data Sources:**  
- Aerial imagery provided by Esri  
- Bird survey and wildlife observation points obtained by field data collection

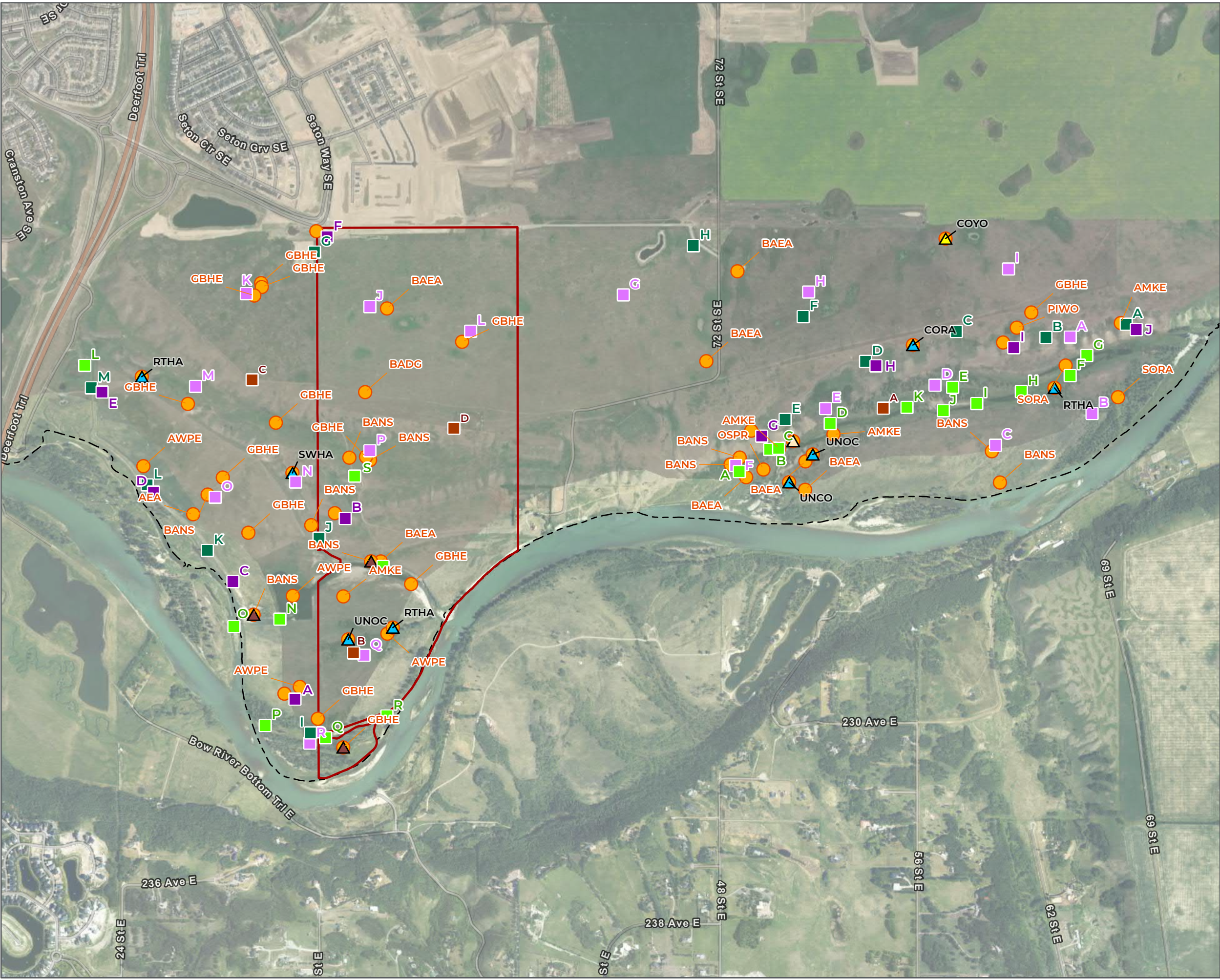
Project #:	2197.0009.02
Author:	SDF
Checked:	TD
Status:	<b>FINAL</b>
Revision:	A
Date:	2023 / 2 / 6



**FIGURE 8a**



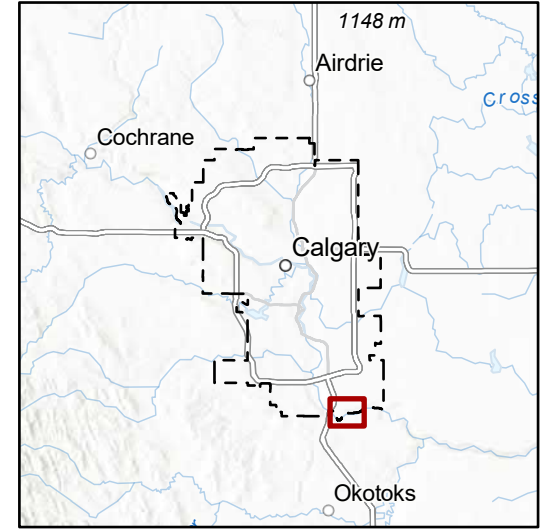
Last updated by SdeBoerFuller on February 6, 2023 at 11:41 AM  
 Last exported by SdeBoerFuller on February 6, 2023 at 11:41 AM  
 Last printed by SdeBoerFuller on July 14, 2020 at 4:45 PM  
 \\usl-urban-systems.com\projects\Projects\_CAL\2197\0009\02\ID-Design\GIS\Projects\Pro\_Projects\Genesis\_Ricardo\_Environmental\_Inspection\20200604\_aprx\Genesis\_Fig8b\_Stantec\_WildlifeObs\_20230206



## Logan Landing Biophysical Impact Assessment Stantec's Wildlife Survey Stations, Features and Species of Management Concern Observations

NW Sec 10 - Twp 022 - Rge 29 - Mer 4  
 SW Sec 10 - Twp 022 - Rge 29 - Mer 4  
 NW Sec 03 - Twp 022 - Rge 29 - Mer 4

- |  |  |
|--|--|
| <span style="color: orange;">●</span> Wildlife Species of Management Concern Observation                                     | <span style="color: brown;">■</span> Bat                     |
| <span style="border: 1px solid red; display: inline-block; width: 10px; height: 10px;"></span> Project Area                  | <span style="color: purple;">■</span> Breeding Bird          |
| <span style="border: 1px dashed black; display: inline-block; width: 10px; height: 10px;"></span> Calgary Municipal Boundary | <span style="color: green;">■</span> Diurnal Amphibian       |
| <span style="color: orange;">▲</span> Colony   | <span style="color: darkgreen;">■</span> Nocturnal Amphibian |
| <span style="color: yellow;">▲</span> Den  | <span style="color: purple;">■</span> Nocturnal Rail         |
| <span style="color: green;">▲</span> Nest  |  |
| <span style="color: blue;">▲</span> Raptor Nest  |  |



The accuracy & completeness of information shown on this drawing is not guaranteed. It will be the responsibility of the user of the information shown on this drawing to locate & establish the precise location of all existing information whether shown or not.

0 100 200 300  
Meters

**Coordinate System:** NAD 1983 3TM 114

**Scale:** 1:15,000  
(When plotted at 11"x17")

**Data Sources:**  
 - Aerial imagery provided by Esri  
 - observation points obtained by Stantec - Ricardo Ranch ASP Ecological Inventory Report

Project #: 2197.0009.02  
 Author: SDF  
 Checked: TD  
 Status: **FINAL**  
 Revision: A  
 Date: 2023 / 2 / 6



**FIGURE 8b**



# 5 ENVIRONMENTALLY SIGNIFICANT AREAS

As per the Open Space Plan (The City of Calgary Parks, 2003) habitat areas were rated to determine whether or not they met the City’s criteria as ESA. **Table 5-1** below provides a ranking of the potential ESA’s.

The overlay of the provincial ESA Inventory did result in ESA’s with values greater than 0.189 within the Project Area. Values higher than 0.189 indicate areas of land that are important in maintaining physical landscape features, ecological services and functions, biological diversity, or other natural processes (Fiera, 2014). Provincial values are generated through a ranking attribute, which were then summed to calculate the final weighing by quarter section. A standardized score is generated and then the scores are compared to a pre-determined cut-off value of >0.189 (Fiera Biological Consulting Ltd., 2014).

**Figure 9** shows both the Provincial ESA and areas determined through the City’s ESA criteria. Much of the south half of the Project Area is designated as a Provincial ESA due to the Bow River Valley corridor and its flood plain, however parts of the Provincial ESA include highly disturbed areas such as the homestead, which has been highly impacted and influenced through anthropogenic activities.

Each criterion was assessed and designated a low, medium, or high rating of different habitat types to determine whether it is considered an ESA. Where a criterion is ranked high, the habitat has been designated as an ESA.

**Table 5-1: ESA Assessment**

Habitat Type	Quality of Biotic Community (minimal Disturbance)	Ecological Function – Natural	Distinctive and/or Unusual landform	Uniqueness	Rating
<b>Marsh Wetlands</b>	Low	Med	Low	Low	Low
<b>Sloped Spring-fed Wetlands</b>	High	High	High	High	High
<b>Upper Escarpment</b>	Med	High	High	Med	High
<b>Lower Escarpment</b>	Low	Med	High	Med	Med-High
<b>Native/Mixed Grassland</b>	Med	High	Med	High	Med - High
<b>Fluvial Avulsion Channel</b>	Med	High	High	Low	High
<b>Habitat FFB2 and FFB3</b>	Med	Med	Low	Low	Med
<b>Balsam Poplar/Tall Shrub</b>	High	High	Med	Med	High

Habitat Type	Quality of Biotic Community (minimal Disturbance)	Ecological Function – Natural	Distinctive and/or Unusual landform	Uniqueness	Rating
<b>Anthropogenic Disturbed</b>	Low	Low	Low	Low	Low
<b>Bow River Valley</b>	Med-High	Med-High	High	High	High

The marsh wetlands are specific to the wetlands that were identified along the upper plateau of the Project Area. They have seen a higher rate of impacts from both cultivation and grazing over the past 100 years. The vegetation is neither diverse, rare, or unique and the wetlands are not expected to be groundwater fed. Due to the lack of diversity of the vegetation and common nature of these types of wetlands, this habitat type does not meet the criteria of an ESA.

The escarpment and spring fed slope wetlands provide a high degree of resources, cover, and movement for a wide range of birds, insects, and terrestrial species within the Bow River corridor. Freshwater springs and associated groundwater along the escarpment support vigorous native vegetation growth beyond the wetland boundaries throughout the growing season. Due to the slope position of these wetlands, they have not been subjected to the same degenerative anthropogenic disturbance such as plowing, herbicide, pesticides, and fertilizers as many of the other wetlands in the region. These spring fed wetlands are unique and uncommon in this region and have been rated high for an ESA designation.

The escarpment exhibits an undulating and terraced landscape with thin breaks, several ephemeral drainages, and three (3) spring fed slope wetlands. The native grassland communities are mainly found along the top half of the escarpment. The upper half of the escarpment (mixed grassland/upland low shrub) provides a greater diversity of native vegetation such as Columbia needle grass (*Achnatherum nelsonii ssp. dorei*), gamma grass (*Bouteloua gracilis*), and June grass (*Koeleria macrantha*) than the plateau. The upper and lower sections of the escarpment have greater than 15% slope and contains a higher diversity of native species than the other habitat types. The upper escarpment is rated high and the lower escarpment as med-high as distinctive landforms, but is not unique to the river valley landscape. Both the upper and lower escarpment were assigned a higher ESA score based on the relative percentage of native grasses, reduced disturbance, presence of spring fed wetlands and steep slopes.

Native/mixed grassland areas are patchy throughout the sloped wetlands, along the escarpment, and along the south end of the Project Area. The native species provide diversity, soil stability and staging areas for several bird species. Grassland habitat is on a decline, and this habitat has been degraded/influenced by agricultural practices and non-native and invasive species. Based on these impacts the ranking is a med-high for ESA.

The active avulsed side channel of the Bow River provides quality habitat for many aquatic and terrestrial species. Along the north bank of the channel, several active bank swallow nests were observed, and the substrate of gravels and cobbles provide fish spawning habitat with connectivity to the Bow River. Additionally, multiple observations of the rare plant Western false gromwell were observed along the gravel banks of the channel. The quality of the habitat and ecological function rate high for an ESA.



Habitat FFB2 and FFB3 are rated as medium as these habitat areas exhibit a high percentage of non-native species, and long term grazing impacts. However, native vegetation species are present throughout and the habitat does provide foraging, breeding and rearing conditions for a wide range of wildlife.

Balsam poplar habitat is found within the flood plain of the Bow River Valley. It is rated as a significant habitat due to its relatively undisturbed condition with a mostly native shrub and grassland understory and high value habitat for wildlife.

The floodplain and flood fringe areas south of the side channel on the Bow River are a mix of native and non-native grassland, and native low shrub communities. The proximity to the Bow River and connectivity to the Bow River Valley give this area a high ecological value for wildlife habitat and connectivity. The quality of the habitat and ecological function also rate high for an ESA.

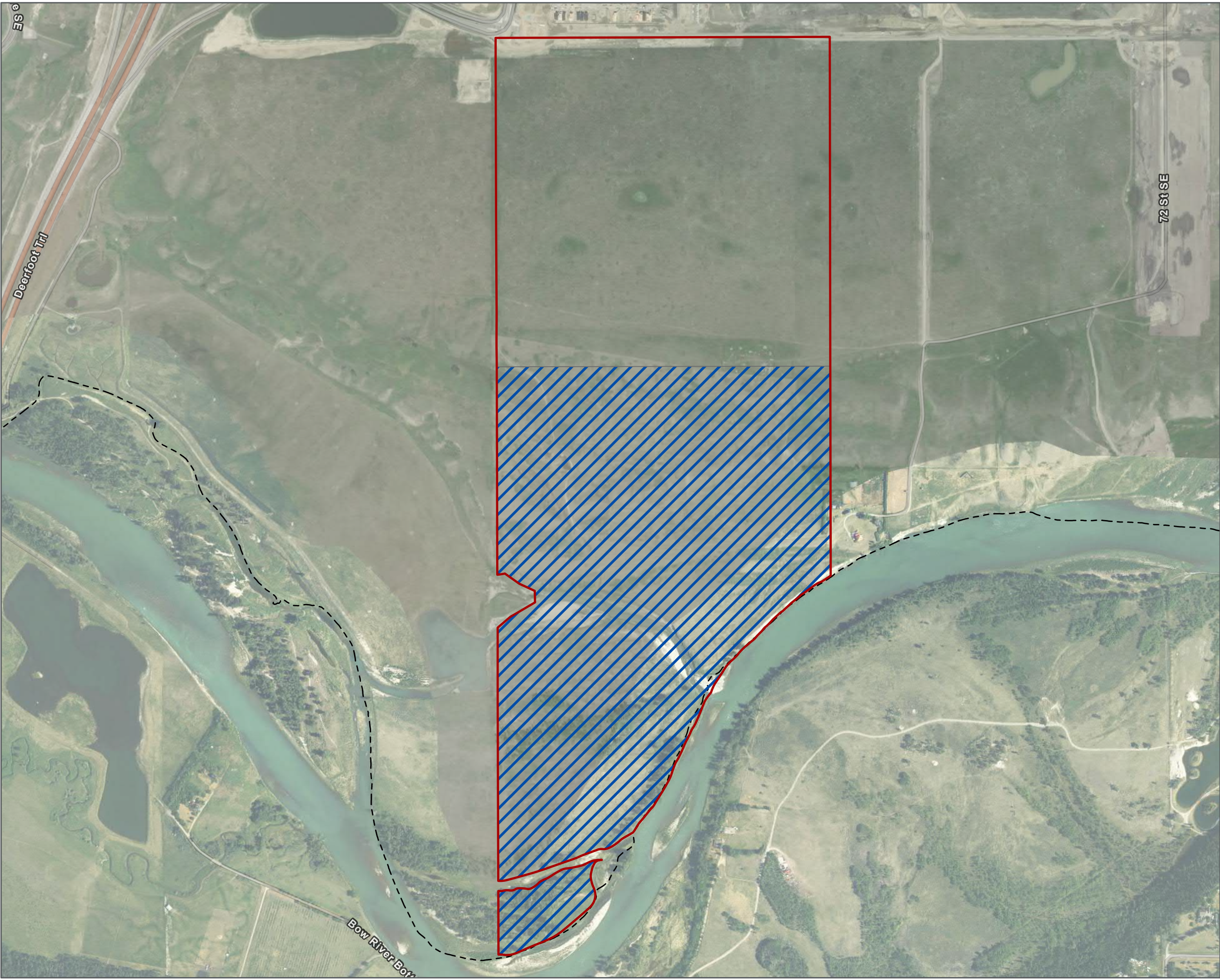
Anthropogenic disturbance is identified as the access road to the homestead and the homestead area. The highest rates of non-native/invasive species are found along the gravel access road to the homestead site. The homestead site is the hub of storage and maintenance for agricultural machinery, manicured grass and non-native or ornamental species have been planted such as caragana.

The different features and ecological areas of the Project Area were assessed under the City's ESA criteria independently by USL based on the field surveys conducted. The Bow River Valley as whole is considered a valued ecological component both locally in the context of the ASP area, and regionally within the context of the Southeast Planning Area Regional Policy Plan. Different habitats and communities within the Bow River Valley and within the Project Area boundaries exhibit different levels of disturbance from past and current land use.






Last updated by SdeBoerFuller on March 15, 2023 at 9:10 AM  
Last exported by SdeBoerFuller on March 15, 2023 9:10 AM  
Last printed by SdeBoerFuller on July 14, 2020 4:47 PM

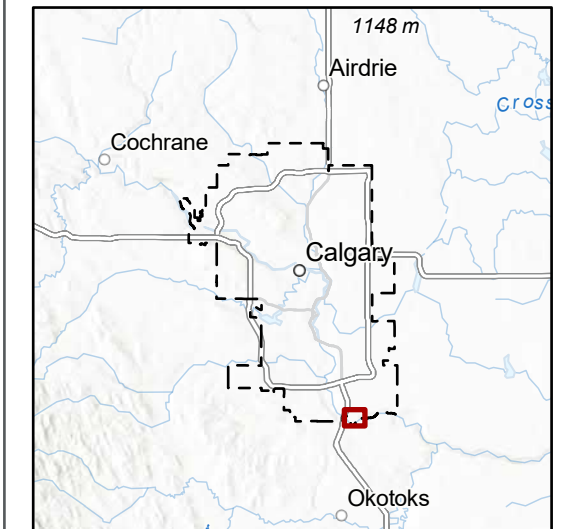
\\usl.urban-systems.com\projects\Projects\_CAL\2197\0009\02\ID-Design\GIS\Projects\Pro\_Projects\Genesis\Genesis\_Ricardo\_Environmental\_Inspection\20200604 aprx\Genesis\_Fig9\_ESAs\_20200218



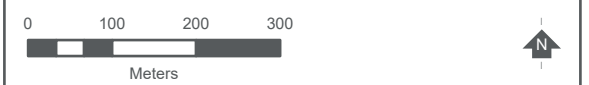
### Logan Landing Biophysical Impact Assessment Provincial and City of Calgary ESA's

NW Sec 10 - Twp 022 - Rge 29 - Mer 4  
SW Sec 10 - Twp 022 - Rge 29 - Mer 4  
NW Sec 03 - Twp 022 - Rge 29 - Mer 4

-  ESA - City of Calgary
-  Project Area
-  Calgary Municipal Boundary



The accuracy & completeness of information shown on this drawing is not guaranteed. It will be the responsibility of the user of the information shown on this drawing to locate & establish the precise location of all existing information whether shown or not.



**Coordinate System:** NAD 1983 3TM 114  
**Scale:** 1:9,000 (When plotted at 11"x17")

**Data Sources:**  
- Aerial imagery provided by Esri  
- Calgary municipal boundary provided by the city of Calgary  
- Environmentally significant areas provided by the Gov. of AB

Project #: 2197.0009.02  
Author: SDF  
Checked: TD  
Status: **FINAL**  
Revision: A  
Date: 2023 / 3 / 15



**FIGURE 9**



# 6 IMPACTS AND MITIGATION MEASURES

## 6.1 PROJECT IMPACTS

The potential impacts of the proposed development were identified based on a combination of the outline plan development footprint, the Ricardo Ranch ASP area, and residual impacts to ecological, social, and physical impacts on Bow River Valley. Impacts are assessed with consideration of;

- Displacement or disturbance of environmentally significant areas and other natural areas
- Alteration of natural surface water and groundwater impacts due to increased impermeable surfaces, and the build out of roads and stormwater infrastructure
- Required regulatory design criteria
- Construction activities
- Changes to land use

Avoidance and minimization options were considered in several iterations of a draft outline plan. The Outline Plan shows avoidance of the many features that are identified as ESA including the avulsion channel, escarpments, ephemeral drainages, riparian and flood fringe areas.

Impacts to areas that qualify as ESA include:

- The upper catchments of the ephemeral drainages will be displaced or diverted by stormwater infrastructure and the natural water flow frequency and volume will be reduced.
- The natural hydroperiod for most wetlands on the Project Area on the upper bench are dependent on surface flow and would not be able to be naturally maintained. Most or all of the catchment area have been or will be removed.
- Loss or disturbance to portions of native grassland.
- A segment of the escarpment will be altered, and loss of three groundwater fed wetlands, WL28S (Class III), WL029S (Class II) and WL030 (Class III) that qualify as ESA.

The entirety of the Bow River Valley is considered an ESA as directed by the City of Calgary and is estimated to be approximately 83 ha. Within the Bow River Valley ESA the individual habitat types with the highest ESA ranking (based species composition and intactness) cover a total of 46.8 ha. The highest ranked ESA's are similar in size and area to the Environmental Open Space Study Area identified in the ASP.

To understand the loss within the Bow River Valley as a whole, the area of the Valley within the Project Area is approximately 83 ha, of which 46.6 ha (or 56%) will be dedicated as ER.

### 6.1.1 Rational for Unavoidable Impacts to Wetlands 28 and 30

Various components of the development were reviewed to determine location and access to the lower bench. Many iterations of the plan were arranged to try to avoid wetlands, and/or the ephemeral drainage overland flow paths along the escarpment. Further assessment on groundwater conditions, slopes, road designs, utilities and stormwater were conducted.

#### *Road Network*

Ricardo Ranch Blvd is a critical road connection between the upper and lower bench of the development and is conceptually located in the ASP. Based on the City of Calgary Environmental Reserve Setback Policy (City of



Calgary, 2007), W28 qualifies for a 30m setback, outside of which development can occur. W28 is a sloped wetland and is groundwater fed. Therefore, feasibility of W28 retention relies on mitigating any negative impacts to the groundwater source. Since the groundwater source for the wetlands comes from the north, only development impacts north of the wetlands are relevant.

The finished grade elevation of development around W28 is fixed by maximum road grades coming from the collector road that connects the upper plateau lands to the lower bench lands, as conceptually located in the Ricardo Ranch ASP. Road grades have been set at 6% starting from the lower bench based on City of Calgary policy and engineering best practices. The resulting finished grade of development north of W28 is +/-1020m with deep utility grades of about +/-1015m. The perched groundwater system daylight into the Logan Landing slope from the north at W28 at a ground elevation of +/-1018m. Due to the required road grades, the elevation of utility infrastructure is at or below the groundwater source and presents an unavoidable impact.

### ***Groundwater Influence***

Basement weeping tile systems are placed around the basement footings of residential development in order to direct groundwater and surface water infiltration away from concrete foundations. Water is intercepted by weeping tile and directed into the storm sewer system. It is standard engineering best practice as well as a City of Calgary requirement to use weeping tile systems to intercept groundwater and mitigate the risk of water damaging basement foundations. Weeping tile systems are typically located +/-3m below finished grade elevation.

Deep utility bedding gravels are used to properly install and backfill deep utilities (sanitary sewer, storm sewer, potable water) that service adjacent development. Since bedding gravels are clean graded (high percentage of voids in the mix) they allow groundwater to infiltrate and typically conduct groundwater to enter the storm sewer system. Deep utility bedding gravels are typically located in a +/- 3m to 5m zone below finished grade elevation. The groundwater impact zone of basement weeping tile systems and deep utility bedding gravels north of the wetlands ranges from approximately 1015m-1017m in elevation. This zone is below the elevation of the wetlands' groundwater source (+/-1018m) and thus will intercept the groundwater feeding W28. This will eliminate the hydrological regime feeding W28 and likely result in W28 losing most or potentially all wetland characteristics in a short timeframe.

The impacts to groundwater cannot be avoided without risking the safety and integrity of City infrastructure and adjacent development. Thus, development occurring north of W28 will eliminate the sustaining groundwater source for the wetlands.

It is not possible to reliably maintain W28 in any foreseeable post development condition while maintaining the safety and integrity of nearby infrastructure and development. Since impact avoidance of W28 is not possible, the location of Ricardo Ranch Blvd was chosen to instead minimize back sloping impacts to the escarpment and avoid further impact to natural drainage channels along the escarpment.

### ***Avoidance and Setback Considerations***

Ordinary development setbacks would not only result in the elimination of W28 due to groundwater interception, but also W30, both wetlands lie along the same topographic line. A way to potentially maintain the wetlands is to establish an increased development setback that would move the groundwater impact zone of adjacent development up and out of the perched groundwater table (i.e. protect the hydraulic connectivity of the wetlands).

Assuming the +/-5m depth of deep utility bedding gravels governs the groundwater impact zone, it is estimated that the wetland setback would need to be increased to 120m total based on the elevation of the

escarpment road. This buffer would need to extend on the north, west and east sides of the wetlands in order to preserve the existing groundwater feed.

While a 120m buffer is an estimation at how far away road and land development would need to be in order to preserve the groundwater table feeding W28 and W30, it is not guaranteed to be sufficient. Groundwater behavior can be difficult to predict, and it is nearly impossible to certify that W28 and W30 will not be impacted by development anywhere in the upper bench lands in the Ricardo Ranch ASP. Per the McIntosh Lalani Wetland Impacts memorandum, it is expected that “development of Ricardo Ranch as well as the surrounding lands will severely limit the potential for stormwater to collect and recharge the shallow groundwater table, which could result in the proposed wetland drying out.” Regardless of the post development scenario around W28 and W30, there remains a clear risk to their long-term viability.

Furthermore, attempting to maintain these wetlands with groundwater flow will pose a risk to infrastructure and development to the south (downslope) from winter seepage and ice buildup. Any groundwater reaching the wetland will be uncontrolled and pose a safety risk to infrastructure and development down slope from the wetlands. It is for this reason that it is engineering best practice and the standard City of Calgary approach to control and mitigate groundwater from reaching the surface and posing a risk to infrastructure and development.

The above considerations notwithstanding, providing a 120m+ buffer for development adjacent to W28 and W30 are not practical when considering the required collector road alignment as proposed in the Ricardo Ranch ASP and development within the area.

While the groundwater source for W28S and W30 will be impacted, surface water may be added to the wetlands. However, since these wetlands are located along a slope, water will run off and not support the wetlands in their current state. Attempting to sustain these wetlands by surface water instead of groundwater will alter the biophysical regime of the wetlands and poses significant risk to their function and viability.

In order to retain the escarpment, development must match existing grades at the top of slope and connect back to the upper bench at acceptable grades (6-8%) in order to meet City engineering standards and best practices. These grading requirements results in finished grade elevations in the range of 1015m-1020m for development adjacent to W28 and W30. This in turn results in deep utility bedding gravels and basement weeping tile systems in the range of 1010m-1015m. This is lower than the groundwater table location (+/-1018m). Thus, the grading requirements for the escarpment result in development impacts to both W28 and W30.

The challenges, impacts and feasibility of W28 and W30 retention also relies on mitigating negative impacts to the groundwater source. W30 lies along the same elevation as W28 and has a very small surface water catchment area, which suggests the wetland has a greater influence from groundwater inputs than surface water. The technical memorandum of the above constraints and conditions is provided in **Appendix M**.

## 6.2 MITIGATION MEASURES

**Table 6-1** below provides a list of potential impacts and mitigation measures based on construction activities and the post development outline plan.

**Table 6-1: Impacts and Mitigation Measures**

ECOLOGICAL COMPONENT	POTENTIAL IMPACT(S)	MITIGATION MEASURES*
<b>Terrain/Soils</b>	<ul style="list-style-type: none"> <li>Soil compaction from heavy equipment.</li> </ul>	Restrict operation of machinery and trucks to designated areas within the

ECOLOGICAL COMPONENT	POTENTIAL IMPACT(S)	MITIGATION MEASURES*
		<p>project footprint to minimize impact on surrounding areas.</p> <p>Use existing access, roads and trails.</p>
	<ul style="list-style-type: none"> <li><i>Admixing of soil horizons.</i></li> </ul>	<p>Stockpile soil horizons separately and replace in proper order.</p> <p>As per the City of Calgary’s Soil Handling Recommendations, topsoil piles should be no higher than 1.3 m with a slope that does not exceed 3:1 (City of Calgary, 2018).</p> <p>Stabilize stockpiles in place longer than 30 days.</p>
	<ul style="list-style-type: none"> <li><i>Removal or erosion of natural topsoil.</i></li> </ul>	<p>Prepare and implement an Erosion and Sediment Control Plan (ESC).</p> <p>Avoid or phase removal of existing vegetation when possible.</p> <p>Re-use stockpiled soils for grading and landscaping.</p>
	<ul style="list-style-type: none"> <li><i>Discovery of historical deposition of debris.</i></li> </ul>	<p>Screen debris and construction waste from the disturbed fill area and dispose at an approved facility.</p> <p>Determine if Section 31 of the Historical Resources Act applies and if so, report in accordance with the Alberta Culture Standards.</p>
	<ul style="list-style-type: none"> <li><i>Accidental spills and leaks of fuels, chemicals, and other potentially hazardous materials/waste (construction and operation)</i></li> </ul>	<p>Have a spill response plan and spill kits in place prior to Project initiation</p> <p>Inspect and maintain spill kits during operation and construction. If spill kit materials are consumed due to a release ensure materials are replenished prior to resuming activity in the area.</p> <p>Establish staging areas away from the river (minimum 100 m) for fueling, maintenance of equipment, and storage of hazardous goods</p> <p>Ensure equipment is clean and leak-free prior to project initiation.</p>



ECOLOGICAL COMPONENT	POTENTIAL IMPACT(S)	MITIGATION MEASURES*
		<p>Implement best management practices for equipment maintenance, storage, refueling, and concrete washout stations.</p> <p>Ensure all equipment and vehicles are clean and free of soil prior to arrival on the Project Area.</p>
<p><b>Upland Vegetation</b></p>	<ul style="list-style-type: none"> <li>• <i>Loss of native grassland</i></li> <li>• <i>Loss of low/tall shrub communities</i></li> <li>• <i>Accidental damage of retained plant communities</i></li> <li>• <i>Introduction and increase of weeds and other invasive plants during construction and operation</i></li> </ul>	<p>Retain and protect native plant communities, where practicable. Preservation will occur within ER along escarpment and adjacent to the Bow River.</p> <p>Prepare, implement, and monitor erosion and sediment control measures.</p> <p>Prepare and implement a Habitat Restoration Plan with landscape strategies to incorporate and transplant native species within detailed designs, where appropriate.</p> <p>Prepare Parks Management Plan to minimize weed establishment and promote successful native plant establishment.</p> <p>Conduct post-construction monitoring to evaluate health of retained native communities until regeneration has occurred, as outlined in the Habitat Restoration Plan.</p> <p>Any imported topsoil should be certified weed free.</p> <p>Minimize the degradation of preserved vegetation by clearly marking and working within designated workspace during construction.</p> <p>Develop recreational pathways in preserved natural areas.</p>

ECOLOGICAL COMPONENT	POTENTIAL IMPACT(S)	MITIGATION MEASURES*
		<p>De-compact soils (where required) prior to planting/seeding</p> <p>Naturalize municipal reserves with native species or transplanting of local annual/perennial species, where appropriate. Details will be provided in landscape design drawings.</p> <p>Transplant native species prior to construction, where appropriate, and conduct post-transplant monitoring.</p> <p>Prepare educational resources and information packages for community residences.</p> <p>Areas designated as ER are to be protected and undisturbed, where possible. If disturbance occurs, a Habitat Restoration Plan will be prepared and followed for restoration of ER.</p> <p>Implement controls to prevent the spread of noxious or prohibited noxious weeds during growing season (e.g., mowing, spraying).</p> <p>Revegetation should occur using the City of Calgary's Seed Mixes guidelines (City of Calgary, 2018) and the City of Calgary's Plant Lists guidelines (City of Calgary, 2019).</p> <p>No mowing of areas planted with native seed mixes for control of weeds. If a native seed mix contains forbs, broad leaf weed control should target individual weeds only.</p> <p>Use vegetation plot 13 area for salvage of native species and transplant to naturalized MR areas and/or for restoring areas of ER as outlined in the Habitat Restoration Plan.</p> <p>The Outline Plan protects 46.46ha of Environmental Reserve, which accounts for approximately 33% of the Project Area.</p>

ECOLOGICAL COMPONENT	POTENTIAL IMPACT(S)	MITIGATION MEASURES*
<p><b>Proximity to the Bow River/watercourses/overland flow paths</b></p>	<ul style="list-style-type: none"> <li>• <i>Accidental spills of fuel, chemicals, or sedimentation</i></li> <li>• <i>Reduced water quality due to spills or erosion</i></li> <li>• <i>Modified watercourses/drainages</i></li> <li>• <i>Loss of flow paths</i></li> <li>• <i>Increased runoff</i></li> <li>• <i>loss of native vegetation</i></li> <li>• <i>loss of habitat</i></li> <li>• <i>increased wildlife disturbance (sensory, habitat)</i></li> </ul>	<p><i>Avoidance of ephemeral drainages with setbacks.</i></p> <p><i>Clearly identify and mark setback areas prior to construction to reduce incidental disturbance.</i></p> <p>Implement Staged Master Drainage Plan</p> <p>Use of temporary ponds during construction</p> <p>Implement and monitor the COC approved ESC plan during and post construction until restoration or development is complete.</p> <p>Retain native vegetation seedbanks where possible by stripping and stockpiling topsoil from disturbed natural areas to restore temporarily impacted areas. Reuse suitable soils on areas disturbed areas designated as MR.</p> <p>Conduct post construction monitoring for retained flow paths.</p> <p>Obtain Water Act approval for temporary impacts or loss of flow paths.</p> <p><i>Establish slope modified buffers adjacent to retained drainage channels.</i></p> <p><i>Develop and implement Habitat Restoration Plan in areas where disturbance occurs</i></p>
<p><b>Wildlife and wildlife habitat (excluding migratory birds – see below)</b></p>	<ul style="list-style-type: none"> <li>• <i>Damage, disturbance or loss of individual wildlife species and their residences and qualify as ER</i></li> <li>• <i>Temporary sensory disturbance during construction(light and noise)</i></li> <li>• <i>Ongoing sensory disturbance due to land use change.</i></li> <li>• <i>Human/wildlife interactions</i></li> </ul>	<p>Conduct a wildlife sweep prior to construction for non-migratory birds (i.e.: owls, raptors) and other potential species such as fox and badger dens. Raptor nests may be active as early as March 1 (Alberta Environment and Parks, December 2018).</p> <p>Wildlife sweeps should be ideally undertaken within 72 hours prior to disturbance where feasible and</p>



ECOLOGICAL COMPONENT	POTENTIAL IMPACT(S)	MITIGATION MEASURES*
		<p>within no more than 7 days prior to construction. Sweeps must be repeated if work stops for 4 or more consecutive days.</p> <p>If a nest/den is found during construction, all work within the area should be stopped immediately and a biologist and the appropriate authorities should be contacted immediately. If appropriate, mitigations will be implemented, and work may not continue until these are in place.</p> <p>Do not feed or approach wildlife.</p> <p>Do not allow off-leash dogs within ER areas.</p> <p>Provide educational signage to reduce wildlife/human interactions, as outlined with landscape construction drawings and detailed within the Habitat Restoration Plan.</p> <p>Limit recreational access the sensitive environmental reserve.</p> <p>Post Development wildlife monitoring.</p> <p>Store garbage in appropriate bins to deter animal access.</p> <p>Avoid disturbance to designated ER.</p>
	<ul style="list-style-type: none"> <li>Decrease in ecological function due to wetland disturbance.</li> </ul>	<p>Avoid disturbance to retained watercourses/overland flow paths by establishing and implementing appropriate development buffers.</p> <p>Obtain approval under the Alberta Water Act for alteration/removal of wetland areas.</p>
	<ul style="list-style-type: none"> <li>Loss of breeding habitat potential due to wetland loss</li> </ul>	<p>Obtain approval under the Alberta Water Act for alteration of wetland areas.</p> <p>Execute a Wetland Compensation Agreement for replacement of lost wetland area.</p>

ECOLOGICAL COMPONENT	POTENTIAL IMPACT(S)	MITIGATION MEASURES*
		<p>Design stormwater management facility with naturalized features/slopes/buffers/vegetation to provide habitat.</p>
	<ul style="list-style-type: none"> <li>Domestic animal and wildlife interactions</li> </ul>	<p>Do not feed or approach wildlife.</p> <p>Do not allow off-leash dogs within ER areas.</p> <p>Provide educational signage to reduce wildlife/human interactions, as outlined with landscape construction drawings and detailed within the Park Management Plan.</p> <p>Store garbage in appropriate bins to deter animal access.</p>
	<ul style="list-style-type: none"> <li>Habitat Fragmentation</li> </ul>	<p>Establish and maintain the minimum 750 meters setback from the heron colony as outlined within the WEST Mitigation Plan approved by AEP and designate the setback as ER. Setback will be fenced to limit recreational access, and appropriate signage shall be installed and maintained.</p> <p>Establish and maintain a minimum 50m setback from the bank swallow nests on the banks of the avulsion channel.</p> <p>Avoid disturbance to designated ER.</p> <p>Maintain connectivity to adjacent habitat.</p> <p>Areas designated as ER are to be protected and undisturbed, where possible. If disturbance occurs, a Habitat Restoration Plan will be prepared and followed for restoration of ER.</p> <p>Schedule construction timing to limit or avoid sensitive breeding and migratory timing windows.</p>

ECOLOGICAL COMPONENT	POTENTIAL IMPACT(S)	MITIGATION MEASURES*
		<p>Schedule construction near setback boundaries outside of breeding and migratory timing windows.</p>
<p><b>Migratory Birds</b></p>	<p>Disturbance to migratory birds during breeding period (April 15 to August 31).</p> <p>Disturbance of the great blue heron colony during construction and after land use change.</p> <p>Disturbance of bank swallow nesting site.</p>	<p>Conduct clearing of vegetation outside of the nesting window of April 15 to August 31 to avoid incidental take of migratory birds, nests, or eggs and to maintain compliance with the <i>Migratory Birds Convention Act</i>, the <i>Species-at-risk Act</i>, and the <i>Alberta Wildlife Act</i>.</p> <p>If clearing of vegetation is required within general nesting periods, migratory bird breeding surveys should be completed by a qualified avian specialist; if breeding activity is observed appropriate disturbance buffers should be implemented until young have fledged and left the nesting area.</p> <p>Wildlife sweeps should be ideally undertaken within 72 hours prior to disturbance where feasible and within no more than 7 days prior to construction. Sweeps must be repeated if work stops for 4 or more consecutive days.</p> <p>Establish and maintain the minimum 750 meters setback from the heron colony outlined within the WEST Mitigation Plan approved by AEP, and designate the setback as ER. Setback will be fenced to limit recreational access, and appropriate signage shall be installed and maintained.</p> <p>Conduct pre-construction monitoring of the heron colony to understand baseline conditions. (In progress)</p> <p>Conduct construction monitoring program for the heron colony, with</p>



ECOLOGICAL COMPONENT	POTENTIAL IMPACT(S)	MITIGATION MEASURES*
		<p>timely mitigation of construction impacts if required.</p> <p>Conduct post-construction monitoring program for the heron colony, completed by developer, with transfer of post-construction monitoring program to the City after obtaining Final Acceptance Certificate (FAC)</p> <p>Install wildlife cameras to monitor and observe the behavior of the heron colony during construction.</p> <p>Prepare a landowners' information package for community members with educational information on the heron colony and associated habitat, with protection measures clearly outlined.</p> <p>Establish and maintain a minimum 50m setback from the bank swallow nests on the banks of the avulsion channel.</p> <p>Install a fence and signage a minimum of 50m from the swallow nesting site to minimize disturbance.</p> <p>Maintain the signage and fencing year-round to minimize disturbance to the heron colony and bank swallows.</p> <p>Manage public access by continued public education through local Home Owners Associations (HOA) (once established), signage, and other resources.</p> <p>The City of Calgary's <i>Bird-Friendly Urban Design Guidelines</i> (City of Calgary, 2023) are to be implemented and followed</p>
	<p>Loss of wetland habitat due to wetland removal.</p>	<p>Avoid disturbance to retained watercourses/overland flow paths by establishing and implementing appropriate development buffers.</p>

ECOLOGICAL COMPONENT	POTENTIAL IMPACT(S)	MITIGATION MEASURES*
		<p>Obtain approval under the Alberta <i>Water Act</i> for alteration of wetland areas; and</p> <p>Execute a Wetland Compensation Agreement for replacement of lost wetland area.</p>
<p><b>Historical Resources</b></p>	<p>Discovery of Historical Resources</p>	<p>Obtain clearance under the provincial Historical Resources Act.</p> <p>If historical resources are discovered during excavation/construction stop work and notify the Alberta Historical Resources Management Branch.</p> <p>Protect existing historical resources within ER lands, as agreed upon with Parks and Open Space</p> <p>Location of pathways, fencing, and signage to be field fit to avoid disturbance of historical resources.</p> <p>Work with municipal and provincial authorities to protect historical resources through development of a Heritage Resources Management Plan.</p> <p>Explore opportunities for indigenous knowledge transfer.</p> <p>Incorporate Traditional Knowledge into landscape design and educational signage, where appropriate.</p> <p>Ongoing Indigenous engagement program in collaboration with City of Calgary.</p> <p>The Natural Area Management Plan will be developed in collaboration with the Cultural Landscape Portfolio to include long term avoidance strategies of sensitive areas. Disturbances within the ER, including but not limited to, pathways, fencing, grading and planting will be field fit as part of the Engineering/Landscape Construction</p>

ECOLOGICAL COMPONENT	POTENTIAL IMPACT(S)	MITIGATION MEASURES*
		<p>Design undertaken at Subdivision stage. All site activities will be undertaken will continue pursuant to any Historic Resources Act requirements.</p>
<b>Wetlands</b>	<p>Change in local hydrology due to change in grading and stormwater management.</p> <p>Loss of habitat</p> <p>Loss of wetland functions (i.e.: flood retention, carbon sequestration, habitat)</p>	<p>Maintain existing overland flow paths and pre-development runoff volumes with pre-determined buffers. These elements should be incorporated into the Staged Master Drainage Plan where possible.</p> <p>Obtain approval under the Alberta Water Act for alteration of wetland area.</p> <p>Execute a Wetland Compensation Agreement for replacement of lost wetland area.</p> <p>Post development monitoring</p>
<b>Hydrology (surface and groundwater)</b>	<ul style="list-style-type: none"> <li>• Alteration to groundwater</li> <li>• Alteration to surface water</li> </ul>	<p>Ensure site maintenance to satisfy Community Standards Bylaw.</p> <p>Retention of ephemeral overland flow paths along the lower escarpment</p> <p>Implement measures detailed to the Staged Master Drainage Plan.</p> <p>Implement best practices for stormwater management strategies.</p> <p>Use of weeping tile designs</p> <p>Installation of subdrains along road structures</p>
<b>Bow River Valley</b>	<ul style="list-style-type: none"> <li>• Loss of habitat</li> <li>• Increased wildlife disturbance (Breeding, sensory, foraging)</li> <li>• Alteration of topography/grades</li> <li>• Alteration to escarpment</li> <li>• Hydraulic alteration</li> </ul>	<p>Retention of escarpment and associated ephemeral overland flow pathways, and where possible, their catchments.</p> <p>Design the Project within lower valued ecological components and retention of higher valued components.</p> <p>Development setbacks along Bow River have assessed 1:200 river meander,</p>



ECOLOGICAL COMPONENT	POTENTIAL IMPACT(S)	MITIGATION MEASURES*
		<p>wildlife setbacks, and slope modified setback requirements.</p> <p>Conduct pre and post monitoring of the retained and set back areas.</p> <p>Design municipal reserve areas that are connected to areas preserved as Environmental Reserve along the escarpment.</p> <p>Complete wildlife and nest sweeps and surveys prior to construction.</p> <p>Where possible avoid construction during sensitive breeding periods.</p> <p>Develop and implement Habitat Restoration Plan in areas where disturbance occurs.</p> <p>Protect existing historical resources within ER lands, where practicable.</p> <p>Develop recreational pathways to reduce development of unofficial trails and control public access to sensitive setback areas.</p> <p>The location of pathways, fencing, and signage is to be field fit to avoid disturbance of historical resources.</p> <p>Work with municipal and provincial authorities to protect historical resources through development of a Heritage Resources Management Plan.</p> <p>Use of native plants in MR sites will be detailed in landscape design plans, where appropriate.</p> <p>Develop and implement Parks Management Plan to manage natural and constructed landscapes.</p>
<p><b>Environmentally Significant Areas</b></p>	<ul style="list-style-type: none"> <li>• Temporary impacts to vegetation from construction (i.e.: back sloping)</li> <li>• Loss of ESA area</li> <li>• Loss of habitat</li> </ul>	<p>Retention of ephemeral overland flow paths</p> <p>Dedication of ESA land (as ER) that are contiguous with ER.</p>

ECOLOGICAL COMPONENT	POTENTIAL IMPACT(S)	MITIGATION MEASURES*
	<ul style="list-style-type: none"> <li>Alteration of escarpment</li> </ul>	<p>Incorporate Environmental Reserve setbacks.</p> <p>Develop and implement Habitat Restoration Plan in areas where disturbance occurs.</p> <p>Restore vegetation through predetermined native seed mixes, planting plans, and post planting monitoring as outlined in the Habitat Restoration Plan and on landscape construction drawings.</p> <p>Develop and implement Parks Management Plan to manage natural and constructed landscapes.</p> <p>Post Construction monitoring programs developed within Parks Management Plan and Habitat Restoration Plan.</p> <p>Use vegetation plot 13 area for salvage of native species and transplant to naturalized MR areas and/or for restoring areas of ER. This will be outlined in the Habitat Restoration Plan.</p> <p>Setbacks protected for Bow River Meander Belt, Bow River side channels, retained drainage courses, and top of slope.</p>
<p><b>Species at Risk</b></p>	<ul style="list-style-type: none"> <li>Loss of habitat</li> <li>Loss of critical habitat</li> <li>Mortality during construction</li> </ul>	<p>Incorporate setbacks and protection measures for the Great Blue Heron Colony and bank swallows.</p> <p>Protect minimum setback (750 meters) from heron colony, based on the WEST Mitigation Plan as approved by AEP, and designate setback as ER. Setback will be fenced, and appropriate signage maintained.</p> <p>Conduct pre-construction monitoring of heron colony to understand baseline conditions (in Progress).</p>

ECOLOGICAL COMPONENT	POTENTIAL IMPACT(S)	MITIGATION MEASURES*
		<p>Conduct construction monitoring program for the heron colony, with timely mitigation of construction impacts if required.</p> <p>Conduct post-construction monitoring program for the heron colony, completed by developer, with potential to transfer post-construction monitoring responsibilities to the City after FAC.</p> <p>Post wildlife cameras to monitor and observe behavior of the heron colony.</p> <p>Prepare a landowners' information package for community members with educational information on the heron colony and associated habitat, with protection measures clearly outlined.</p> <p>Protect a minimum of 50m from the bank swallow nests at avulsion channel.</p> <p>Fence 50m setback from the bank swallow nesting site to minimize disturbance.</p> <p>Maintain signage and fencing year-round to minimize disturbance to the heron colony and bank swallows.</p> <p>Manage public access by continued public education through HOA, signage, and other resources.</p> <p>Conduct migratory breeding bird surveys prior to construction</p> <p>Where possible avoid of clearing and construction during the breeding season</p> <p>Conduct on-site monitoring of sensitive areas (i.e.: Heron colony and bank swallow habitat – avulsion channel) during and post construction</p>

\*Measures in Green are related to the Outline plan (Figure 2) and measures in Black are related to construction activities.



To establish appropriate setbacks on retained areas with the ESA, a drainage setback of 6 m and a slope modified drainage setback was applied to the ephemeral overland flow paths along the escarpment. **Figure 10** is a map of the determined setbacks.

Additional mitigation measures to implement across all impacted areas will include the transfer of important and valuable Indigenous knowledge gained through ongoing consultation with First Nation stakeholders. Managing residences and public access will be collaborated through a combination of but not limited to education, signage, designated pathways, and fencing.

A document will be prepared that will incorporate the following plans: Habitat Restoration Plan, Heritage Resources Management Plan, Park Management Plan, and Landscape Design and Drawings. This document will also identify post monitoring targets and timelines.

The great blue heron (*Ardea herodias*) colony identified is protected under the Alberta Wildlife Act and the Government of Alberta recommends a setback distance of 1,000 meters from great blue heron colonies for high disturbance activities. Western EcoSystems Technology (WEST) has prepared the Ricardo Ranch Great Blue Heron Colony Mitigation Plan (2020) on behalf of Genesis, which outlines appropriate construction setbacks and mitigation measures for a relaxation of the 1,000 meter buffer. In summary these mitigation measures include:

#### Preconstruction Phase

- Consideration and pursuit of alternative locations greater than 1000m from the colony from the policeman's flats boat launch.
- Development of a colony specific monitoring plan.
- Preconstruction baseline monitoring of colony and submission of data to Environmental and Protected Areas (EPA) Fish and Wildlife Management Information System (FWMIS).

#### Construction Phase

- To the extent possible, conduct construction work within 1000m of the colony when the great blue herons are not present (approximately mid-August to mid-April).
- Weekly monitoring of the colony when work being done within 1500m or within the great blue heron breeding season (mid-April to mid-August).
- Should construction activity occurring within 1000m result in acoustic disturbance during the breeding season daily monitoring of the colony by a qualified wildlife biologist.
- Cessation of construction activity should unacceptable disturbance be noted by a qualified wildlife biologist. Resumption of construction activity will be determined by the biologist and may include additional mitigation measures dictated by Genesis, The City, or EPA.
- Submit data collected to EPA and FWMIS
- Designation by the City of Calgary for all undeveloped lands within a >750m buffer as an environmental reserve (ER) of municipal reserve.
- Constructing a fence and signage restricting public access to the ER and providing interpretive information to the public about the importance of protecting the colony.
- Retention of all trees with a diameter of greater than 6 inches within the >750m buffer.
- Planting of trees between the colony and the develop to increase a natural barrier.

- Installation of a 24-hour wildlife monitoring camera. Field of view will consist only of the colony and footage will be publicly accessible.
- Development of community manual with educational information pertaining to the ER and heron colony.

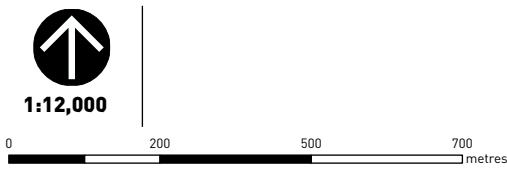
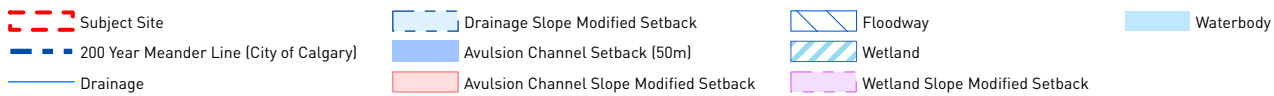
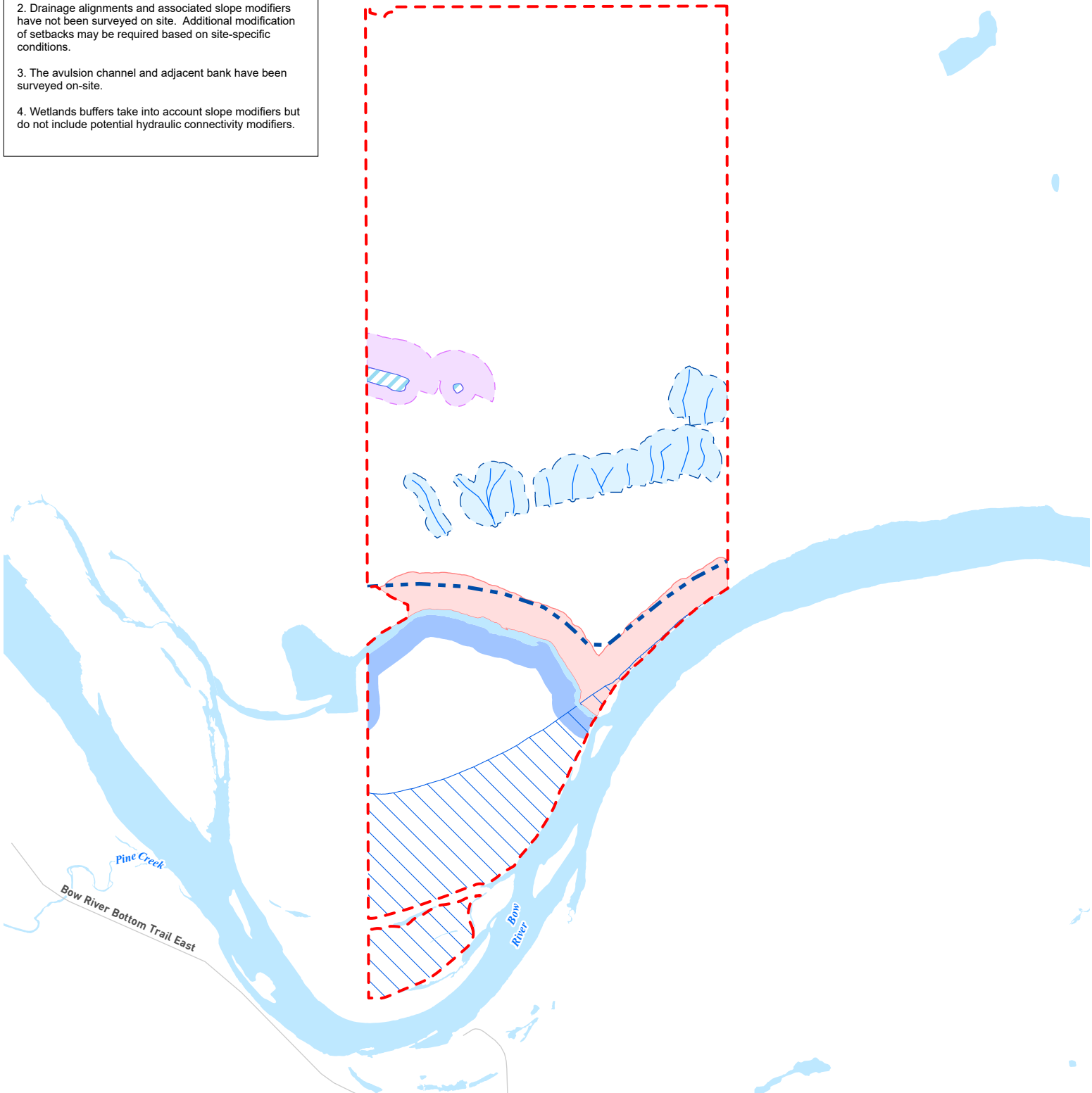
#### Postconstruction Phase

- Biannual monitoring of the colony for minimum of 5 years and submit data collected to the EPA and FWMIS.

Correspondence and review of the Great Blue Heron Colony Mitigation Plan from Brett Boukall, Senior Wildlife Biologist with Alberta Environment has agreed to accept the plan for implementation for construction. A copy of the mitigation plan and the 2021 and 2022 monitoring of the Heron Colony are provided in **Appendix N**

**Notes:**

1. Potential pre-development ER area outlined within this figure is based upon both desktop analysis and field assessment.
2. Drainage alignments and associated slope modifiers have not been surveyed on site. Additional modification of setbacks may be required based on site-specific conditions.
3. The avulsion channel and adjacent bank have been surveyed on-site.
4. Wetlands buffers take into account slope modifiers but do not include potential hydraulic connectivity modifiers.



**Ricardo Ranch ASP**  
**Potential Pre-Development ER Areas**  
 Genesis Land Development



March 2023



## 7 CUMULATIVE EFFECTS

A cumulative effects assessment is a description of the potential positive and negative environmental, social, economic, and cultural impacts of a proposed project, and includes cumulative, regional, temporal, and spatial considerations. The elements of a cumulative effects assessment include issues and Valued Ecosystem Components (VECs) identification, spatial and temporal scales as well as past, existing, and proposed projects; impact characterization; and significance evaluation and determination (City of Calgary Parks, 2010). VEC's of the Project Area and the associated cumulative effects are described below.

### BOW RIVER VALLEY

The Bow River valley has been recognized in the Southeast Planning Area Regional Policy Plan as having regional significance, serving as a natural corridor from both a regional and project specific perspective (City of Calgary, 2004). As such, cumulative impacts on the Bow River Valley have been considered on both a local and regional scale.

Located in the Bow River Valley, the Project Area is within a Key Wildlife and Biodiversity Zone (KWBZ), providing winter ungulate habitat and has a wide range of species diversity. Extensive development currently exists surrounding and within the Bow River Valley within the City of Calgary. Further development within the Bow River Valley is likely to result in increased habitat fragmentation and loss, with upstream connectivity already significantly disrupted. While the downstream Bow River Valley is mostly undeveloped with a few exceptions between the Project Area and the confluence of the Bow and Highwood Rivers, adjacent developments may be proposed/approved within the adjacent municipal districts. This will result in further ecological loss, increased recreational pressures, and greater cumulative effects over time.

KWBZ's play a key role in maintaining ungulate populations on a regional level and development within the area may impact breeding and movement within the corridor. As future developments occur within the Bow River Valley, increased habitat loss and stressors are anticipated to impact wildlife populations in the area, further exasperating the cumulative effects.

Great blue heron colonies within proximity to the City of Calgary boundary have been in decline over the last several decades, highlighting the importance of conservation and successful implementation of the mitigation measures prescribed in **Section 6.2**. On a regional scale, the occurrence of the great blue heron colony is significant, and while the rookery is not being removed by the Project footprint, indirect residual impacts may occur to the colony. Residual impacts are likely to be the result of increased recreational pressures within the Bow River Valley and habitat disruption resulting in species stressors. Additional proposed developments in the adjacent lands will further increase cumulative effects and potential residual impacts. Strong public education, signage, and appropriate setbacks are crucial to ensure the longevity of the colony as development expands in the area and within the Bow River Valley as a whole.

The occurrence of bank swallow nesting sites within the avulsion channel of the Bow River Valley in proximity to the Project Area is significant. The nesting sites and associated habitat will maintained with appropriate setbacks, and no direct impacts to the nesting sites are anticipated. Indirect residual impacts may occur to species populations as a result of increased recreation in the area and surrounding changes in land use. Successful implementation of all mitigation measures outlined in **Section 6.2** is crucial to minimize residual impacts and ensure the nesting can continue to occur as development expands in the area.

## WETLANDS

Wetland loss and surface water degradation within the region is extensive, with an estimated 90% of pre-settlement wetlands within the City of Calgary having been lost to development (The City of Calgary, 2004). Wetland loss within the Project Area will result in cumulative effects on a local and regional level. Wetlands within the Project Area of lower ecological value will not be retained and those of higher ecological value will be lost due to the impact of the groundwater system from meeting design and infrastructure requirements. These impacts will be mitigated through the provincial Water Act approval process. Other important water resources such as the avulsion channel, overland flow paths and the mapped flood plain of the Project Area will be avoided and maintained with appropriate setbacks.

## NATIVE GRASSLANDS

Native grasslands have experienced significant loss in Canada. Nature Canada estimates there is approximately 25% of native grasslands remaining (Nature Canada, 2023). The Project Area exhibits native grassland species intertwined with non-native and weedy species impacted through extensive long-term grazing. Most of the Project Area has native grassland species throughout, and the area with the largest area of high valued and intact native grassland species are being retained within the setback from the Heron colony.

On a regional and local scale, the overall footprint of the proposed concept does result in a cumulative loss of native ecological areas, function and habitat. Cumulative effects and losses in the area may be further exacerbated as adjacent developments occur. Adaptive management strategies may be required as development expands in the area in order to ensure the longevity of VEC's and minimize residual effects. Approval of the ASP allows for development within this region and through careful planning considerations, technical studies, and implementation of mitigation measures (pre and post construction), significant residual impacts can be reduced.

# 8 REGULATORY FRAMEWORK

As part of the Outline plan submission to the City of Calgary a BIA is required. This BIA meets and addresses the requirements in the BIA framework and will also satisfy the requirement under the Water Act and submission to EPA under the Alberta wetland policy.

There are various other environmental acts and regulations that will be triggered throughout the development process. A list of the anticipated regulations but not limited to is provided in **Table 8-1** below.

**Table 8-1: Regulatory Framework**

Legislation	Description	Trigger
<b>Municipal Legislation</b>		
<i>Municipal Government Act</i>	Provides municipal governments with the authority to declare Environmental Reserves and Conservation Easements in order to manage waterbodies.	Development in proximity to retained waterbodies will require a minimum of a 6m setback from the bed and shore of the body.

Legislation	Description	Trigger
<i>Natural Area Management Plan</i>	A municipal guidance framework for natural area management.	Development in areas of native vegetation and in proximity to the Bow River.
<i>Open Space Plan</i>	A municipal guidance document for the procurement, development and use of open spaces, ESA's and areas related to stormwater management.	Development in proximity of the Bow River and ESA's. Cumulative planning for open spaces.
<i>Environmental Reserve Setback Policy</i>	A municipal policy recommending guidelines for site-specific setbacks from Environmental Reserves as a means of preventing waterbody pollution.	Development in proximity to retained waterbodies will require a minimum of a 6m setback from the bed and shore of the body.
<i>Calgary Wetland Conservation Plan</i>	Outlines the City of Calgary's policies, procedures, and guidelines for wetland conservation within the development approval process.	Presence of wetlands within the Project Area.
<i>City of Calgary Biophysical Impact Assessment Framework</i>	Municipal framework outlining the review process, approval process and level of BIA required for development projects.	Development in proximity of ESA's, Natural Environment Parks (NEP), ER's, waterbodies, wetlands, contaminated sites and/or species-at-risk.
<i>City of Calgary Habitat Restoration Framework</i>	Municipal document providing requirements and guidance for habitat restoration in NEP's.	Restoration of habitat within the City of Calgary
<i>City of Calgary Soil Handling Recommendations</i>	Municipal recommendations for soil restoration in conjunction with the Habitat Restoration Framework.	Restoration of habitat within the City of Calgary
<i>City of Calgary Seed Mix Guidelines</i>	Municipal recommendations for vegetation restoration in conjunction with the Habitat Restoration Framework.	Restoration of habitat within the City of Calgary



Legislation	Description	Trigger
<i>City of Calgary Plant Lists</i>	Municipal recommendations for vegetation restoration in conjunction with the Habitat Restoration Framework.	Restoration of habitat within the City of Calgary
<b>Provincial Legislation</b>		
<i>Alberta Wildlife Act</i>	Provides for the protection and conservation of wild animals in Alberta.	Disturbance or destruction of an animal, or its active residence.
<i>Alberta Weed Control Act</i>	Outlines proponent's responsibility in controlling and limiting the spread of provincially listed weed species.	Part 1 Section 4(1) states that it is the responsibility of companies operating on agricultural lands to mitigate the spread of noxious weeds or prohibited noxious weeds (Government of Alberta, 2008).
<i>Alberta Guide to Wetland Construction in Stormwater Management Facilities</i>	Provincial guidance document on constructed wetlands and wetland habitat to maintain relative value.	Presence of wetlands within the Project Area.
<i>Alberta Water Act</i>	The diversion and use of water in Alberta is controlled under provisions of the <i>Water Act</i> with approvals required for disturbance of water and the bed and shore of waterbodies/water courses. Unless exempt, any disturbance of rivers requires prior approval by Alberta Environment and Parks.	Any disturbance or activity within a waterbody/water course. This includes the diversion from or discharge of water and or sediment into a waterbody.
<i>Alberta Public Lands Act</i>	Prohibits the unauthorized use of Alberta's public lands, including the beds and shores of all-natural water courses and permanent and naturally occurring bodies of water.	An approval process may be triggered when development of public lands is proposed.

Legislation	Description	Trigger
<i>Alberta Soil Conservation Act</i>	Discourages practices that cause soil degradation.	Must actively prevent soil loss or deterioration throughout the life of the project.
<i>Alberta Culture and Tourism (Historical Resources Act)</i>	The Act enables the protection and preservation of natural or anthropogenic historical resources.	If archaeological artefacts or paleontological resources are discovered during construction, efforts must be made to preserve the site until Alberta Culture and Tourism has been notified.
<i>Environmental Protection and Enhancement Act (EPEA)</i>	Promotes the protection, enhancement, and wise use of the environment.	The diversion, discharge, or retention of surface waters will require EPEA approval. Any contamination release into/onto the environment will trigger EPEA.
Federal Legislation		
<i>Species at Risk Act (SARA)</i>	Provides for the protection and conservation of wild animals in Canada.	Disturbance or destruction of an animal, its active residence or its critical habitat.
<i>Migratory Birds Convention Act</i>	Provides for the protection of migratory birds, their nests or their habitats.	Development within areas of suitable nesting habitat during the Restricted Activity Period.

## 9 DISCUSSION

The areas designated as ER include most of the lower escarpment with associated overland flow paths, a small portion of the upper escarpment, native grasslands/low shrub habitat to the south, the avulsion channel, and a setback from the Bow River, which includes the great blue heron colony and bank swallow habitat. The total developable Project Area is approximately 142.7 ha. Based on the outline plan 46.6 ha or approximately 33% of the developable area is planned for ER dedication.

The entirety of the Bow River Valley is considered an ESA as directed by the City of Calgary and is estimated to be approximately 83 ha. Within the Bow River Valley ESA the individual habitat types with the highest ESA ranking (based species composition and intactness) cover a total of 46.8 ha. The highest ranked ESA's are similar in size and area to the Environmental Open Space Study Area identified in the ASP.

Multiple mitigation measures have been identified to minimize the impact throughout construction and post development, which include measures such as monitoring, setbacks and designation of ER. To further

minimize the loss of native grassland and other native species, areas designated as municipal reserve will be landscaped to include transplant of annual/perennial species. The preparation of a community or landowner manual with historical and educational information of the preserved and enhanced areas will help to promote a sense of pride and value for the community. Education signage and fencing will be set in place for community members and the public to respect and protect the natural preserved ER areas of the Bow River Valley. Access restrictions related to the heron colony and public with information and data on natural areas will ensure the designated ER will be a valuable amenity to the public while fostering conservation.

Evaluation of the site-specific constraints and broader project context determined that Wetlands W28S, W29S and W30 would not be retained but removed and compensated through the provincial Water Act. Wetlands W28S, W29S and W30 are a sloped wetlands, W28S and W30 are classified as Class III seasonal and W29S is a Class II temporary wetland. They are fed by a perched groundwater table and their viability is dependant on maintaining the predevelopment groundwater flow.

After hydrogeological analysis and a detailed review of possible site grades and developability, it was determined that development of the Project Area was impossible without negatively impacting the area groundwater. This combined with the removal of catchment areas, will likely result in drying out W28S, W29S and W30 and negatively impact their current value and function.

It was further determined that, to maintain the safety and integrity of nearby infrastructure and development, it was not possible to reliably maintain these wetlands in a post development condition (Urban Systems Ltd., 2021). A significant number of sloped groundwater fed wetlands and overland flow paths are being preserved across the broader Ricardo Ranch ASP area.

Marsh wetlands on the upper plateau are temporary in nature and the catchments have been or will be fully removed by development and would not likely sustain function post development. Retention would require augmented water sources, significant setbacks, and challenging design constraints that would not be able to meet planning, transportation, or development requirements. Under the City of Calgary Wetland Policy, they do not qualify as ER.

Cumulative effects are expected based on both local and regional scales. Various mitigation measures have been identified in preparation for construction and post construction activities to reduce or eliminate residual effects. Mitigations include avoidance of sensitive areas within the Valley portion of the Project Site with appropriate setbacks, post construction monitoring and a multi-year monitoring plan for the heron colony (currently underway), post development planning and educational tools and incorporating historical cultural resources.



# 10 CORPORATE AUTHORIZATION

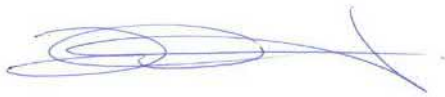
This document, entitled Logan Landing *Biophysical Impact Assessment* is prepared by Urban Systems Ltd. for Genesis Land Development Corp. The material in this report reflects the best judgment of Urban Systems based on the information available at the time of preparation. Any use, which a third party makes of this report, or reliance on or decisions made based on it, is the responsibilities of the third party. Urban Systems Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken based on this report.

Report Prepared By:



Jason Frederickson, AIT  
Environmental Consultant

Reviewed By:



Terri Duret, P.Biol, Q.W.S.P  
Senior Environmental Consultant

# 11 REFERENCES

- Adams, B. W., Ehlert, R., Moisey, D., & McNeil, R. L. (2003). Rangeland Plant Communities and Range Health Assessment Guideline for the Foothills Fescue Natural Subregion of Alberta. Lethbridge: Alberta Rangeland Management Branch, Public Lands Division, Alberta Sustainable Resources Development.
- Alberta Agriculture and Forestry. (2018, 07 31). *Alberta Climate Information Service*. Retrieved from Interpolated Weather Data Since 1961 for Alberta Townships: <http://agriculture.alberta.ca/acis/township-data-viewer.jsp>
- Alberta Environment and Parks. (2019, December 3). Wild Species Status Search.
- Alberta Environment and Parks. (December 2018). *Master Schedule of Standards and Conditions*. Government of Alberta.
- Alberta Environment and Sustainable Resources Development. (2015). *Alberta Wetland Classification System*. Edmonton, AB: Water Policy Branch, Policy and Planning Division.
- ASRD. (2011). *Alberta Sustainable Resources Development Government of Alberta Grassland Vegetation Inventory (GVI) Specifications, 5th edition*. Government of Alberta.
- Calgary Parks and Recreation. (1994). *Natural Area Management Plan*. Calgary.
- Canadian Environmental Assessment Agency. (2019). *Reference Guide: Addressing Cumulative Environmental Effects*. Retrieved from Government of Canada: <https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/reference-guide-addressing-cumulative-environmental-effects.html>
- City of Calgary. (1994). *Natural Area Management Plan*. Calgary, Alberta: City of Calgary.
- City of Calgary. (2003). *Open Spaces Plan*. Calgary, Alberta: City of Calgary.
- City of Calgary. (2004). *Southeast Planning Area Regional Policy Plan*. Calgary: Land Use Planning & Policy Division Planning, Development & Assessment Department.
- City of Calgary. (2007). *Environmental Reserve Setbacks-Att1.doc*. Calgary, Alberta.
- City of Calgary. (2018). *City of Calgary Seed Mixes - Recommendations and Guidelines to Inform Revegetation Work in Calgary*. City of Calgary.
- City of Calgary. (2018). *Soil Handling Recommendations - Best Practices to Improve Restoration Work*. City of Calgary.
- City of Calgary. (2019). *City of Calgary Plant Lists - Recommendations Based on Habitat Type and Desired Outcome to Inform Revegetation Work*. City of Calgary.
- City of Calgary. (2019, 03 11). *Non permanent streams:Supplementary User Guide and Data Descriptions*. Retrieved from Open Calgary: <https://data.calgary.ca/Environment/Non-permanent-streams/vimf-vkj4>
- City of Calgary. (2021, July 29). *The City of Calgary non-permanent stream layer*. Retrieved from City of Calgary: <https://data.calgary.ca/Environment/Non-permanent-streams/vimf-vkj4>
- City of Calgary. (2023, 04 11). *Bird-Friendly Urban Design Guidelines*. Retrieved from <https://abcbirds.org/wp-content/uploads/2020/11/Calgary.pdf>

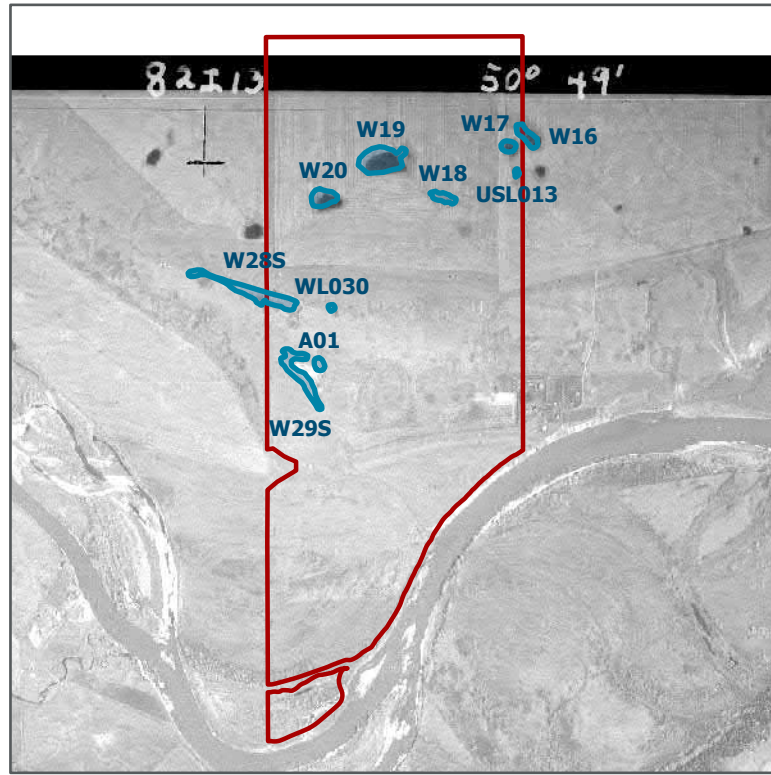
- City of Calgary Parks. (2010, January 15). Biophysical Impact Assessment Framework. Calgary, Alberta, Canada: The City of Calgary Parks.
- Committee on the Status of Endangered Wildlife in Canada. (2013). *COSEWIC Assessment and Status Report on the Little Brown Myotis (Myotis lucifugus), Northern Myotis (Myotis septentrionalis) Tri-colored Bat (Perimyotis subflavus) in Canada*. Ottawa: COSEWIC.
- Committee on the Status of endangered Wildlife in Canada. (2013, 09). *Species at Risk Public Registry*. Retrieved from COSEWIC Assessment and Status Report on the Little Brown Myotis lucifugus Northern Myotis Myotis septentrionalis Tri-colored Bat Perimyotis subflavus in Canada : [http://www.sararegistry.gc.ca/default.asp?lang=en&n=18D50944-1#\\_03\\_1](http://www.sararegistry.gc.ca/default.asp?lang=en&n=18D50944-1#_03_1)
- Cornell Lab of Ornithology. (2020, 04 29). *eBird*. Retrieved from Hotspot MAP, Policeman's Flats: <https://ebird.org/hotspot/L430047?yr=all&m=>
- Culture, Multiculturalism and Status of Women. (2019, October 1). Listing of Historical Resources. Edmonton, Alberta, Canada.
- ESRD. (2013). *Sensitive Species Inventory Guidelines*.
- Fiera Biological Consulting Ltd. (2014). *Environmentally Significant Areas in Alberta: 2014 Update Final Report*. Edmonton: Government of Alberta.
- Golder Associates. (2018). *Ricardo Ranch - Bow River Morphology Study - Technical Memorandum*. Calgary, Alberta: Golder Associates.
- Golder Associates Ltd. (2014). *Rangeview Area Structure Plan*. Calgary, Alberta.
- Government of Alberta. (2008). *Weed Control Act*. Alberta Queens Printer.
- Government of Alberta. (2015). *Alberta Wetland Identification and Deliniation Directive*. Edmonton, Alberta: Water Policy Branch, Alberta Environment and Parks.
- Government of Alberta. (2020). *Alberta Soil Information Viewer*. Retrieved from Alberta.ca: <https://www.alberta.ca/alberta-soil-information-viewer.aspx>
- Government of Alberta. (2020). *Alberta.ca*. Retrieved from Noxious weeds and plants: <https://www.alberta.ca/noxious-weeds-and-plants.aspx>
- Government of Alberta. (April 2013). *Sensitive Species Inventory Guidelines*. Edmonton: Government of Alberta.
- Government of Canada. (2018, 10 30). *General Nesting Periods of Nesting Birds*. Retrieved from Government of Canada: <https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/general-nesting-periods/nesting-periods.html>
- Government of Canada. (2018, 01 01). *Species at Risk Public Registry*. Retrieved from Species Profile: [http://www.sararegistry.gc.ca/species/speciesDetails\\_e.cfm?sid=139](http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=139)
- Government of Canada. (2019, October 1). *Species at Risk Public Registry*.
- Government of Canada. (2021). *Recovery Strategy for the Bank Swallow (Riparia riparia) in Canada [proposed] 2021*.
- Maxar Technologies. (2022, 06 01). Retrieved from Google Earth.
- Munsell. (2009). *Munsell Soil Color Book*.
- Natural Regions Committee. (2006). *Natural Regions and Subregions of Alberta*. Government of Alberta.



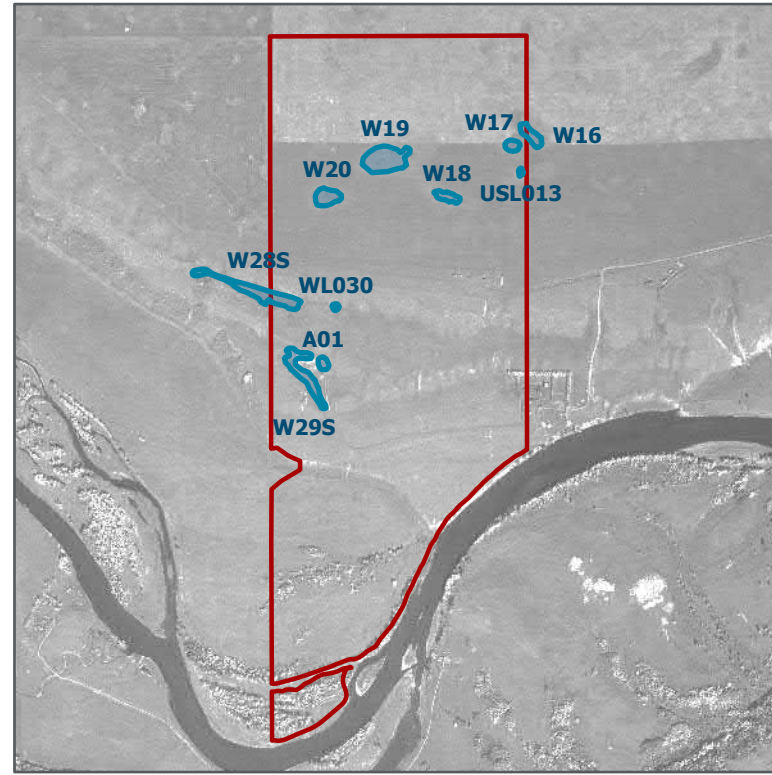
- O2 Planning + Design. (2020). *Ricardo Ranch Flood Fringe Study*. Calgary.
- Paul Gregoire per comm. Environnement and Climate Change Canada. (2022, July 7). *Personal Correspondence*.
- Stantec Consulting Ltd. (2018). *Ricardo Ranch Area Structure Plan Ecological Inventory*. Calgary, AB: Stantec Consulting Ltd.
- The City of Calgary. (2004). *Calgary Wetland Conservation Plan*. Calgary. Retrieved from Parks and Recreation.
- The City of Calgary. (2019). *Ricardo Ranch Area Structure Plan (Draft)*. Calgary.
- The City of Calgary Parks. (2003). *Open Space Plan*.
- The Cornell Lab of Ornithology. (2019, October 1). *All About Birds*. Retrieved from <https://www.allaboutbirds.org/news/>
- Urban Systems Ltd. (2021, September 30). Memorandum Supplementary Information - August 25 Meeting. Calgary, Alberta, Canada.
- Waterline Resources Inc. (2019). *Preliminary Hydrogeological Assessment Rangeview Cell E Area Structure Plan Ricardo Ranch, In Southeast Calgary, Alberta*. Calgary.
- WEST. (2020). *Technical Memorandum "Ricardo Ranch Great Blue Heron Colony Mitigation Plan"*. Calgary.

**APPENDIX A:**  
**HISTORICAL AERIAL**  
**PHOTOGRAPHS**

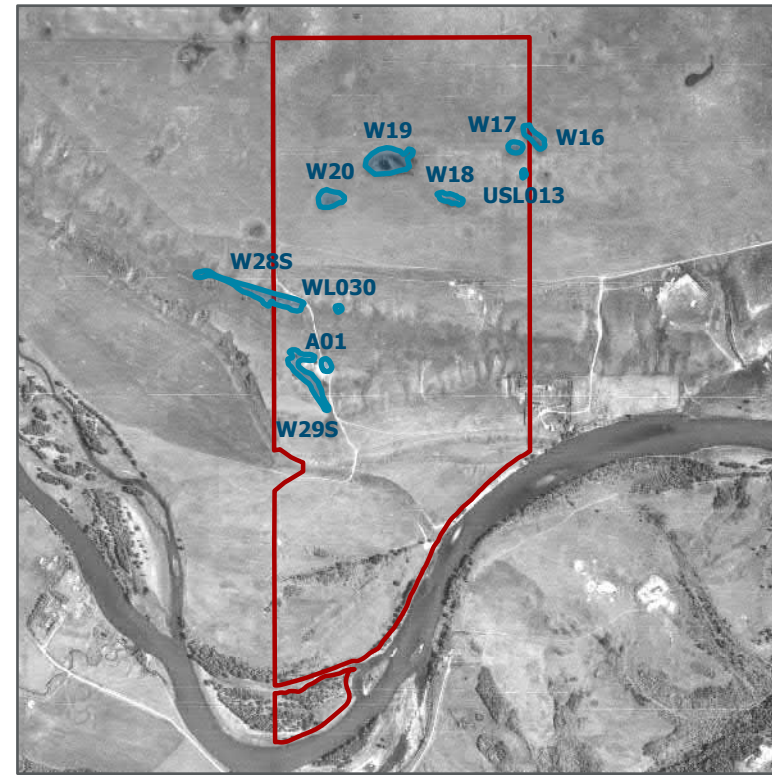




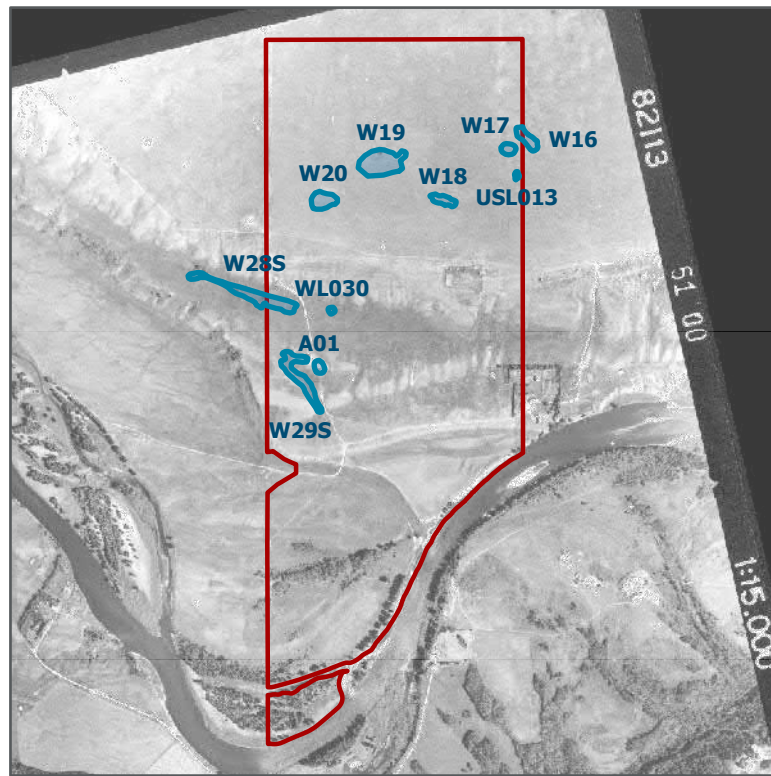
April 30, 1950



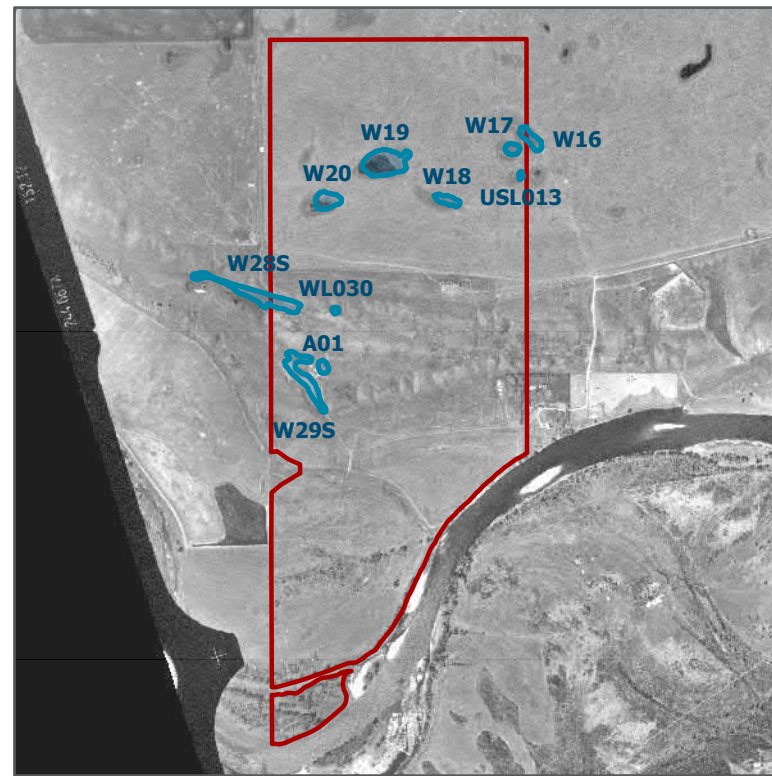
September 20, 1962



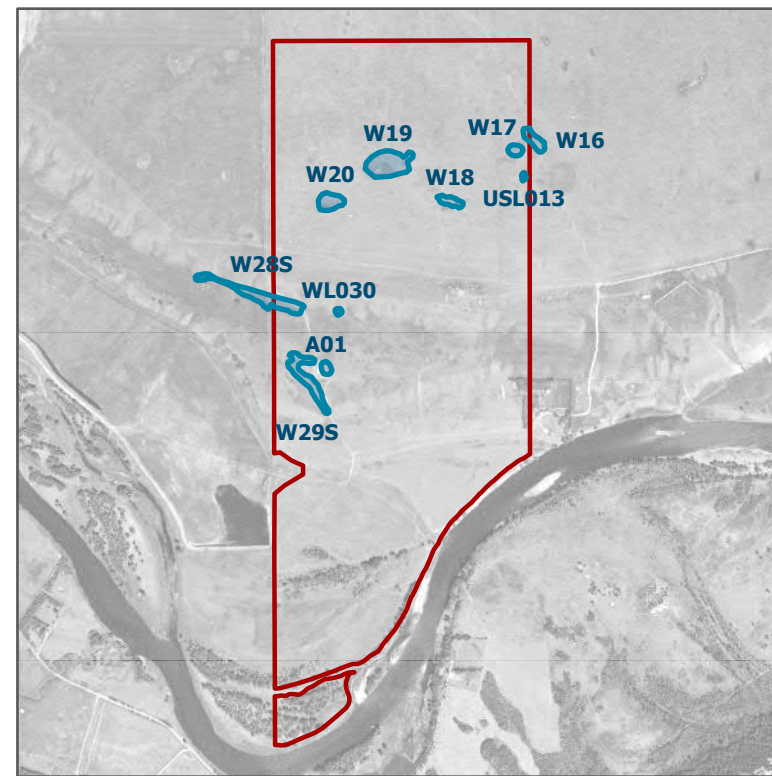
June 13, 1974



July 30, 1982



May 25, 1996



July 7, 2001

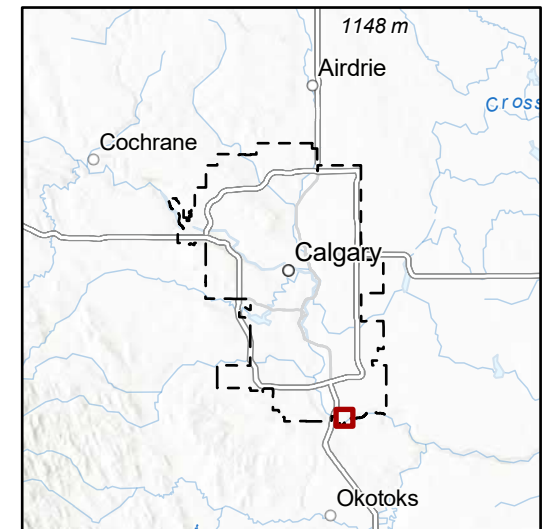


## Logan Landing Biophysical Impact Assessment

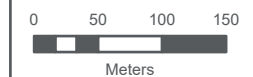
### Historical Imagery

NW Sec 10 - Twp 022 - Rge 29 - Mer 4  
 SW Sec 10 - Twp 022 - Rge 29 - Mer 4  
 NW Sec 03 - Twp 022 - Rge 29 - Mer 4

- Wetlands
- Project Area



The accuracy & completeness of information shown on this drawing is not guaranteed. It will be the responsibility of the user of the information shown on this drawing to locate & establish the precise location of all existing information whether shown or not.



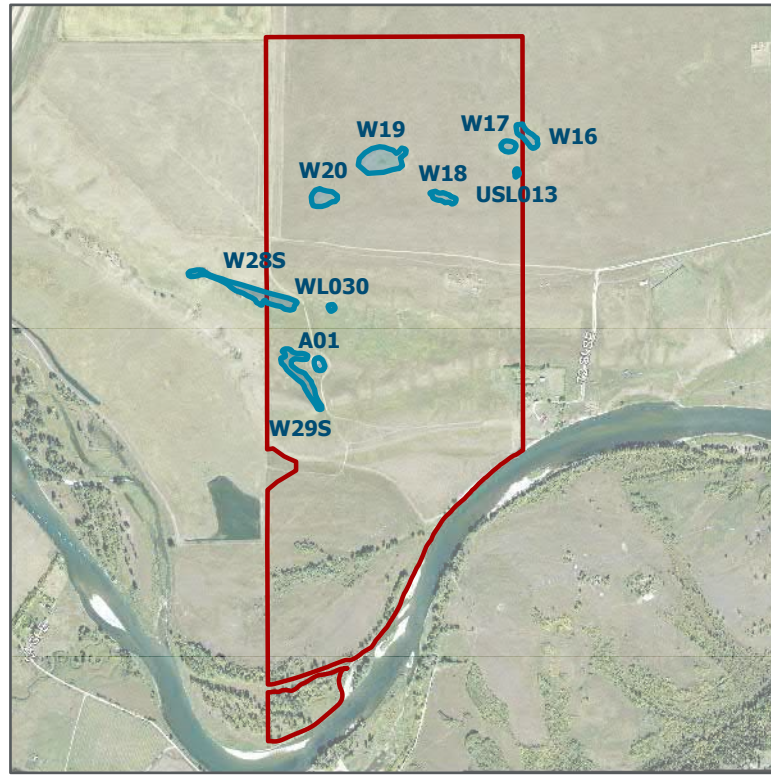
**Coordinate System:** NAD 1983 3TM 114  
**Scale:** 1:24,000  
 (When plotted at 11"x17")

**Data Sources:**  
 - Environmental Inspection data  
 - Historical imagery provided by Government of Alberta

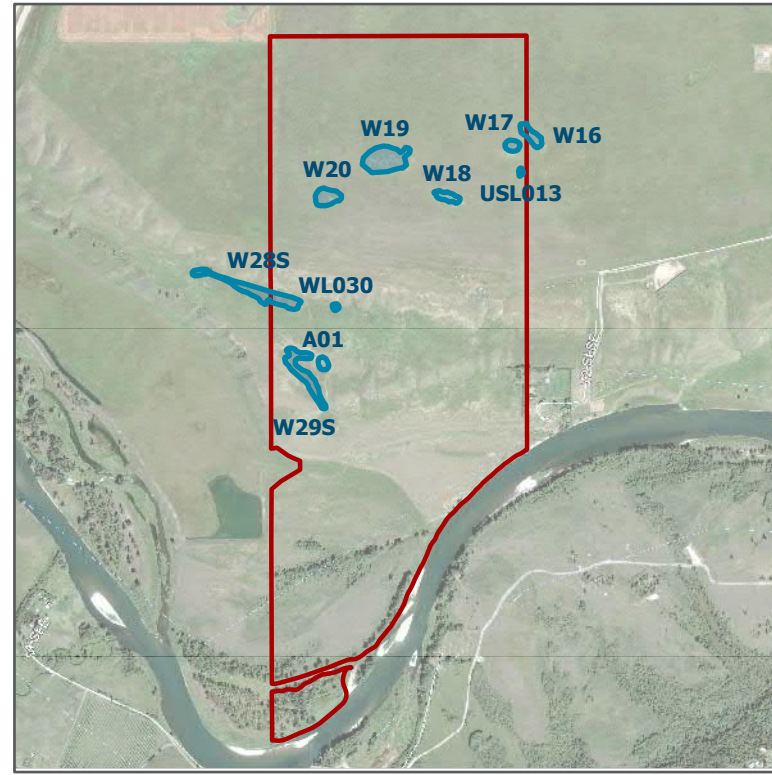
Project #: 2197.0009.02  
 Author: SDF  
 Checked: TD  
 Status: **Final**  
 Revision: A  
 Date: 2023 / 1 / 10



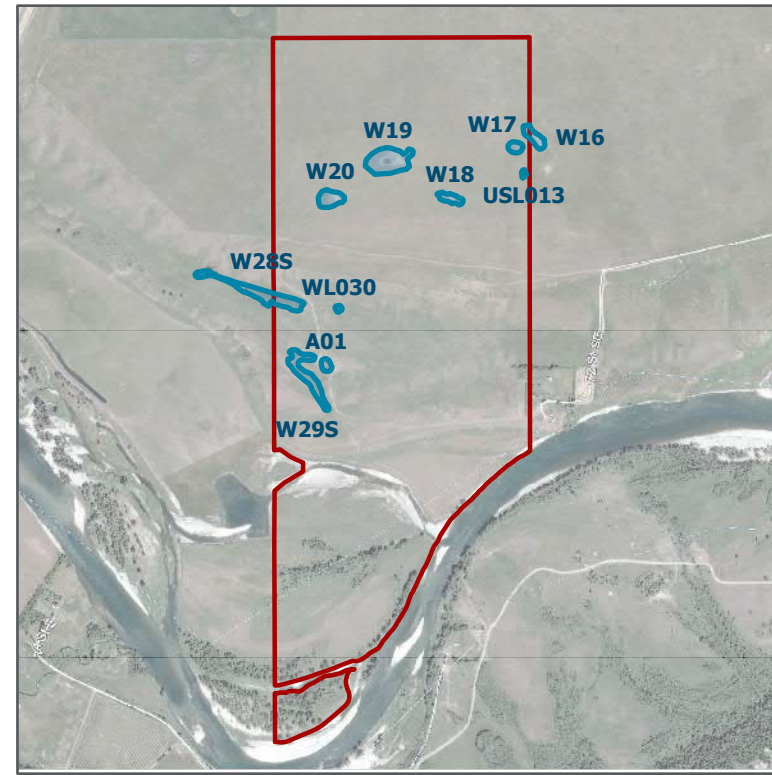




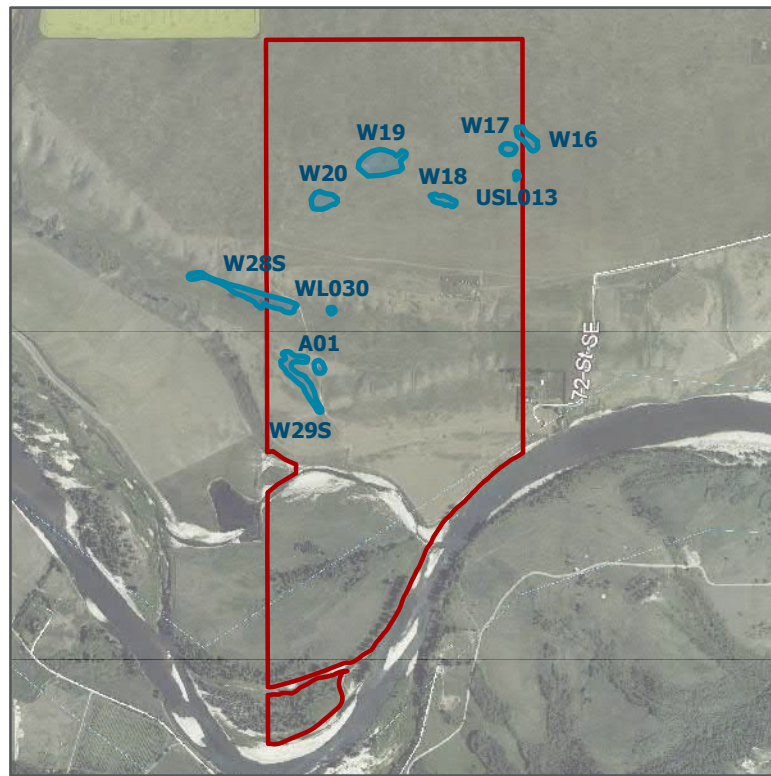
September 13, 2008



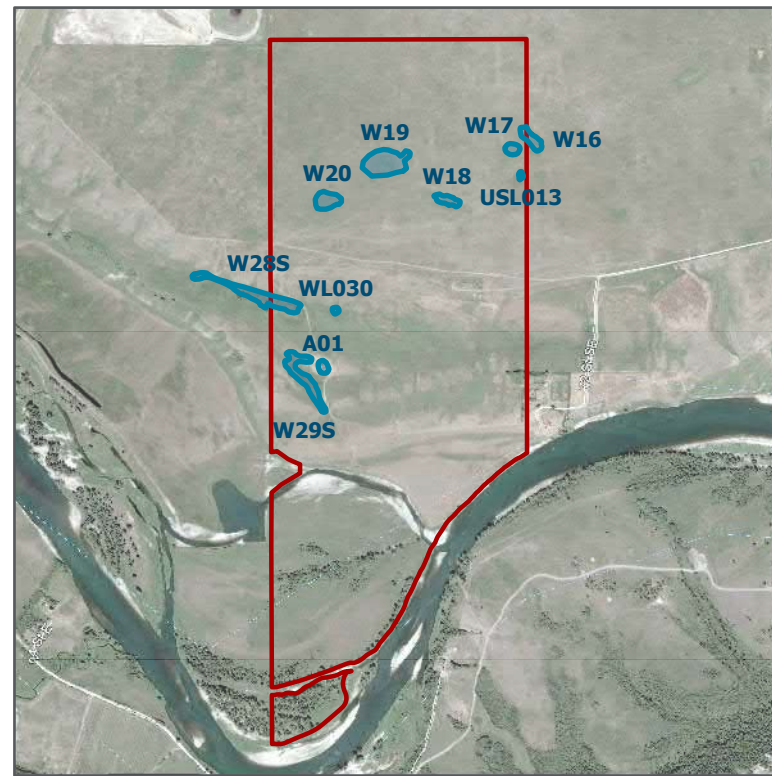
August 31, 2011



July 28, 2014



April 30, 2016



July 6, 2017

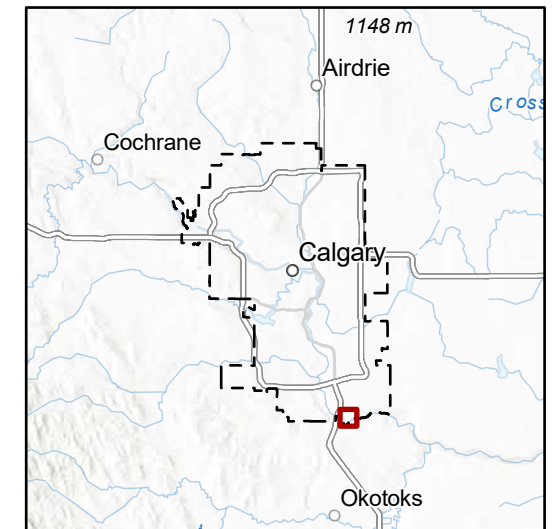


## Logan Landing Biophysical Impact Assessment

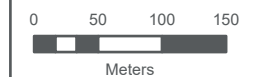
### Historical Imagery

NW Sec 10 - Twp 022 - Rge 29 - Mer 4  
 SW Sec 10 - Twp 022 - Rge 29 - Mer 4  
 NW Sec 03 - Twp 022 - Rge 29 - Mer 4

- Wetlands
- Project Area



The accuracy & completeness of information shown on this drawing is not guaranteed. It will be the responsibility of the user of the information shown on this drawing to locate & establish the precise location of all existing information whether shown or not.



**Coordinate System:** NAD 1983 3TM 114  
**Scale:** 1:24,000  
 (When plotted at 11"x17")

**Data Sources:**  
 - Environmental Inspection data  
 - Historical imagery provided by Government of Alberta

Project #: 2197.0009.02  
 Author: SDF  
 Checked: TD  
 Status: **Final**  
 Revision: A  
 Date: 2023 / 1 / 10

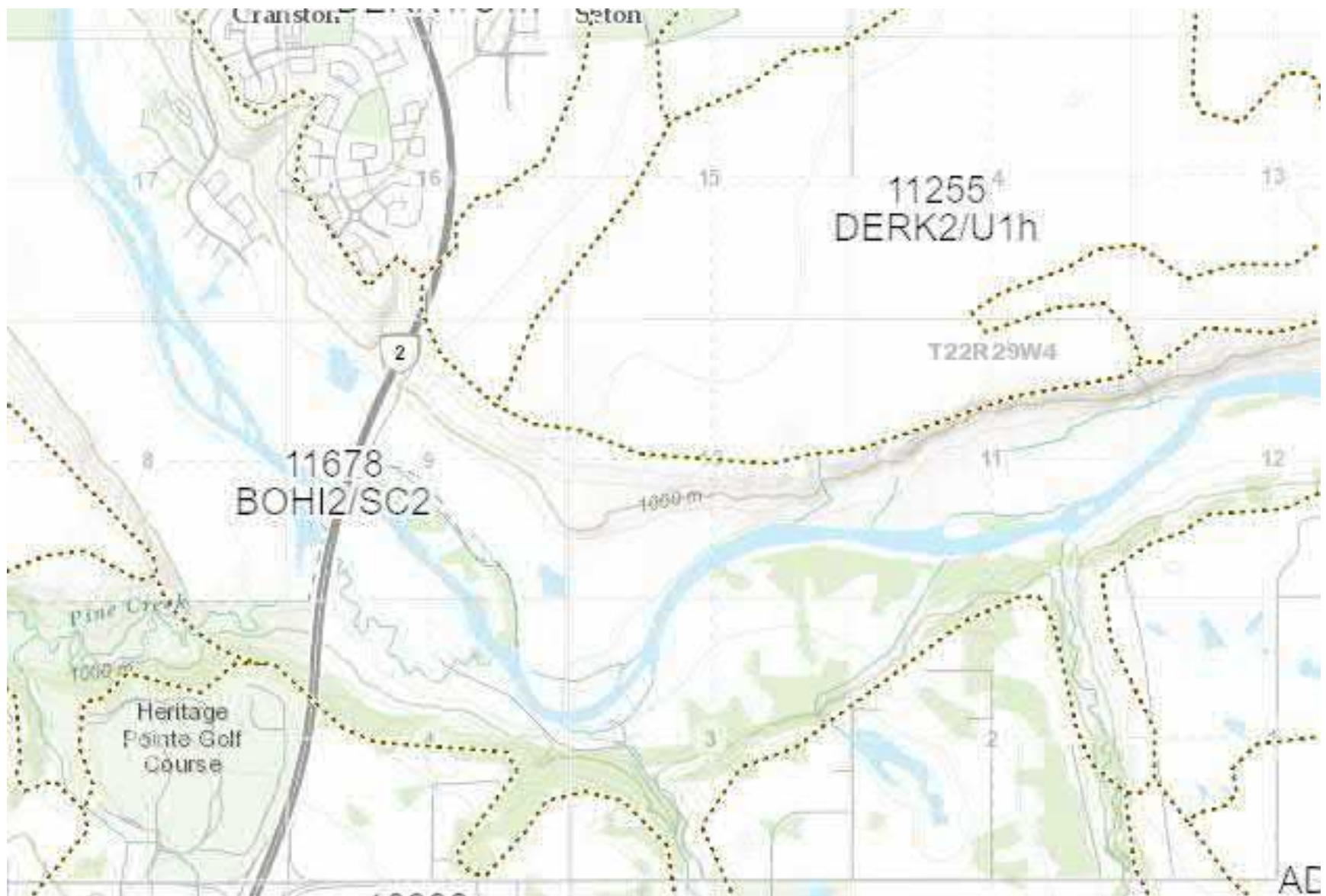


**APPENDIX A-2**



# APPENDIX B:

## AGRASID DATABASE RESULTS



AGRASID Soil Inventory Database Map of Ricardo Ranch Area.



Variable	Value
POLY_ID	11678
Map Unit Name	BOHI2/SC2
Landform	SC2 - valley with terraces
LSRS Rating (Spring Grains)	3M(5) - 6TM(4) - 5W(1)

**Landscape Model Descriptions:**

Orthic Black Chernozem on gravel or gravelly coarse textured (S, LS, SL) undifferentiated materials (includes cobbly and stony variations) (BOV).

Rego Black Chernozem on very coarse textured (S, LS) sediments deposited by wind or water (HIW).

The polygon includes poorly drained soils (2).

Valley with terraces landform with slopes ranging from 1-5% on terraces and up to 35% on the side slopes (SC2).

AGRASID Polygon Details for the Ricardo Ranch Valley Area.

Variable	Value
POLY_ID	11255
Map Unit Name	DERK2/U1h
Landform	U1h - undulating - high relief
LSRS Rating (Spring Grains)	2HTA(8) - 5W(2)

**Landscape Model Descriptions:**

Orthic Black Chernozem on medium textured (L, CL) till (DEL).

Orthic Black Chernozem on medium textured (L, SiCL, CL) materials over medium (L, CL) or fine (C) textured till (RKV).

The polygon includes poorly drained soils (2).

Undulating, high relief landform with a limiting slope of 4% (U1h).

AGRASID Polygon Details for the Ricardo Ranch Plateau Area.

# APPENDIX C:

# HISTORICAL RESOURCES ACT RESPONSE



## Historical Resources Act Requirements

---

Proponent: Genesis Land Development  
7315 - 8th Street NE, Calgary, AB T2E 8A2

Contact: Ms. Chris Sargent

Proponent: Brookfield Residential  
4906 Richard Road SW, Calgary, AB T3E 6L1

Contact: Mr. Trevor Huber

Proponent: Mr. Sandy Soutzo  
21909 - 72nd Street SE, Calgary, AB T3M 0M2

Contact: Mr. Sandy Soutzo

Agent: Stantec Consulting Ltd.

Contact: Kate Peach

**Project Name:** Cell E South Rangeview Area Structure Plan (Cell E SRASP); Ricardo Ranch ASP

Project Components: Area Structure Plan / Outline Plan

Application Purpose: Requesting HRA Approval / Requirements  
Update to Project Name and/or Ownership

---

Pursuant to Section 37(2) of the *Historical Resources Act*, a Historic Resources Impact Assessment is required for all or portions of those activities described in this application and its attached plan(s)/sketch(es). The Historic Resources Impact Assessment is to be conducted in accordance with the instructions outlined in the following schedule.



---

David Link  
Assistant Deputy Minister

---

### SCHEDULE OF REQUIREMENTS

#### ARCHAEOLOGICAL RESOURCES

Pursuant to Section 37(2) of the *Historical Resources Act*, a Historic Resources Impact Assessment for archaeological resources is to be conducted on behalf of the proponent by an archaeologist qualified to hold an archaeological research permit within the Province of Alberta. A permit must be issued by Alberta Culture and Tourism prior to the initiation of any archaeological field investigations. Please allow ten working days for the permit application to be processed.

**SCHEDULE OF REQUIREMENTS (continued)**

1. The Historic Resources Impact Assessment must address all areas of high archaeological potential within the project area including the target areas identified in the Statement of Justification (see attached Figure 8). This assessment must include, but is not limited to, visual examination of the surface of all three terraces, and subsurface testing where warranted, including areas considered to have some potential for the presence of a subsurface archaeological component associated with any historic features and structures.
2. The Historic Resources Impact Assessment is to be carried out prior to the initiation of any land surface disturbance activities under snow-free, unfrozen ground conditions, preferably during spring when vegetation growth is minimal, to facilitate identification and recording of stone features. Should the project require field studies under winter conditions, directions in the [Archaeological Survey Information Bulletin: Winter Conditions](#) must be followed.
3. A deep testing program is required in areas of significant sedimentation.
4. During the conduct of the Historic Resources Impact Assessment, the proponent's consulting archaeologist must revisit all previously recorded precontact sites within the proposed project footprint in order to evaluate current HRV designations and confirm the relationship between each previously recorded site and the project footprint. Previously recorded sites within the project footprint include EfPI-73, 74, 75, 76, 77, 78, 277, 278, 285, and 286.

<b>SITE</b>	<b>HRV</b>	<b>SITE DESCRIPTION</b>	<b>CONDITIONS/APPROVAL</b>
EfPI-73	4	campsite/stone feature	The proponent's consulting archaeologist is to confirm the relationship between this site and the footprint of the proposed project.
EfPI-74	4	campsite	The proponent's consulting archaeologist is to confirm the relationship between this site and the footprint of the proposed project.
EfPI-75	4	campsite/stone feature	The proponent's consulting archaeologist is to confirm the relationship between this site and the footprint of the proposed project.
EfPI-76	4	campsite/stone feature	The proponent's consulting archaeologist is to confirm the relationship between this site and the footprint of the proposed project.
EfPI-77	4	campsite	The proponent's consulting archaeologist is to confirm the relationship between this site and the footprint of the proposed project.
EfPI-78	4	stone feature/campsite	The proponent's consulting archaeologist is to confirm the relationship between this site and the footprint of the proposed project.
EfPI-277	4	campsite/stone feature	The proponent's consulting archaeologist is to confirm the relationship between this site and the footprint of the proposed project.

---

**SCHEDULE OF REQUIREMENTS (continued)**

EfPI-278	4	scatter	The proponent's consulting archaeologist is to confirm the relationship between this site and the footprint of the proposed project .As outlined in Schedule A (4650-11-009; March 23/2011), assessment of site EfPI-278 must include systematic shovel testing to depths of at least 70 cm (base of upper dark sediments) to delineate the site boundaries and provide evidence that the site is cultural.
EfPI-285	4	campsite	The proponent's consulting archaeologist is to confirm the relationship between this site and the footprint of the proposed project. Assessment of this site must include surface inspection to record any surface features and shovel testing for identification of subsurface deposits, given that the initial HRIA which identified the site was limited to visual inspection of the cutbanks within the confines of the high-water mark of the river valley.
EfPI-286	4	campsite	The proponent's consulting archaeologist is to confirm the relationship between this site and the footprint of the proposed project. Assessment of this site must include surface inspection to record any surface features and shovel testing for identification of subsurface deposits, given that the initial HRIA which identified the site was limited to visual inspection of the cutbanks within the confines of the high-water mark of the river valley.

---

**PALAEONTOLOGICAL RESOURCES**

Pursuant to Section 37(2) of the *Historical Resources Act*, a Historic Resources Impact Assessment for palaeontological resources is to be conducted on behalf of the proponent by a palaeontologist qualified to hold a palaeontological research permit within the Province of Alberta. A permit must be issued by Alberta Culture and Tourism prior to the initiation of any palaeontological field investigations. Please allow ten working days for the permit application to be processed.

1. The Historic Resources Impact Assessment must target the following locations:
  - Bedrock exposures along the valley slope, including coulees where bedrock exposures may be obscured by vegetation.
  - Areas of fluvial deposits in the river valley, including the Bighill Creek gravels and the late Pleistocene/early Holocene sediments that outcrop in the high terrace. Deep testing must be carried out for Quaternary sediments along the valley floor as well as for the high terrace.
2. The Historic Resources Impact Assessment is to be carried out prior to the initiation of any land surface disturbance activities under snow free, unfrozen ground conditions. Should the project require survey under winter conditions, assessment procedures must be discussed in advance with the Royal Tyrrell Museum of Palaeontology.



---

### SCHEDULE OF REQUIREMENTS (continued)

3. A palaeontologist is to be present to monitor any archaeological deep testing programs due to the potential to encounter post-glacial fossils. Should significant palaeontological resources be encountered during the conduct of the monitoring program, the Royal Tyrrell Museum of Palaeontology must be contacted. It may then be necessary for Alberta Culture and Tourism to issue further instructions regarding these resources.

#### ABORIGINAL TRADITIONAL USE SITES

There are no Historical Resources Act requirements associated with Aboriginal traditional use sites of a historic resource nature; however, the proponent must comply with standard conditions under the Historical Resources Act, which are applicable to all land surface disturbance activities in the Province.

#### HISTORIC STRUCTURES

There are no Historical Resources Act requirements associated with historic structures; however, the proponent must comply with standard conditions under the Historical Resources Act, which are applicable to all land surface disturbance activities in the Province.

#### PROVINCIALY DESIGNATED HISTORIC RESOURCES

There are no Historical Resources Act requirements associated with Provincially Designated Historic Resources; however, the proponent must comply with standard conditions under the Historical Resources Act, which are applicable to all land surface disturbance activities in the Province.

#### ADDITIONAL COMMENTS

1. In addition to any specific conditions detailed above, the proponent must abide by all [Standard Conditions under the Historical Resources Act](#).

---

Lands Affected: All New Lands

Proposed Development Area:

MER	RGE	TWP	SEC	LSD List
4	29	22	3	12-14
4	29	22	4	9,16
4	29	22	9	1-2,6-11,14-16
4	29	22	10	2-16
4	29	22	11	5-16
4	29	22	12	5,12-13
4	29	22	13	4
4	29	22	14-15	1-4
4	29	22	16	1-2

**SCHEDULE OF REQUIREMENTS (continued)**

Documents Attached:

Document Name	Document Type
Context Plan	Illustrative Material
SoJ Figure 8 ARCH target areas	Miscellaneous

# APPENDIX D: VEGETATION PLOT DATA



**Vegetation Plot: VP4**

Common Name	Scientific Name	Percent Cover
Silverweed	<i>Argentina anserina</i>	5
Wild bergamot	<i>Monarda fistulosa</i>	1
Kentucky bluegrass	<i>Poa pratensis</i>	30
Wild licorice	<i>Glycyrrhiza lepidota</i>	10
Canada anemone	<i>Anemone canadensis</i>	10
Silverberry	<i>Elaeagnus commutata</i>	10
Black medick	<i>Medicago lupulina</i>	4
Common horsetail	<i>Equisetum arvense</i>	5
Common dandelion	<i>Taraxacum officinale</i>	1
Tufted vetch	<i>Vicia cracca</i>	5
Timothy	<i>Phleum pratense</i>	20
Goldenrod sp.	<i>Solidago sp.</i>	20
Wild mint	<i>Mentha arvensis</i>	inc.

**VEGETATION PLOT: VP6**

Common Name	Scientific Name	Percent Cover
Showy locoweed	<i>Oxytropis splendens</i>	<1
Shrubby cinquefoil	<i>Dasiphora fruticosa</i>	<1
Pasture sedge	<i>Carex petasata</i>	5
Purple prairie-clover	<i>Dalea purpurea</i>	1
White clover	<i>Trifolium repens</i>	1
Smooth brome	<i>Bromus inermis</i>	5
Creeping thistle	<i>Cirsium arvense</i>	5
Bull thistle	<i>Cirsium vulgare</i>	inc
Common yarrow	<i>Achillea millefolium</i>	5
Kentucky bluegrass	<i>Poa pratensis</i>	25
Alfalfa	<i>Medicago sativa</i>	20
Small-leaved everlasting	<i>Antennaria parvifolia</i>	20
Harebell	<i>Campanula rotundifolia</i>	inc.
Wild vetch	<i>Vicia americana</i>	10
Late yellow locoweed	<i>Oxytropis monticola</i>	1

## VEGETATION PLOT: VP12

Common Name	Scientific Name	Percent Cover
Buckbrush	<i>Symphoricarpos occidentalis</i>	20
Pasture sagewort	<i>Artemisia frigida</i>	2
Low goldenrod	<i>Solidago missouriensis</i>	5
Kentucky bluegrass	<i>Poa pratensis</i>	25
Marsh yellow cress	<i>Rorippa palustris</i>	10
June grass	<i>Koeleria macrantha</i>	1
Gaillardia	<i>Gaillardia aristata</i>	inc.
Pasture sagewort	<i>Artemisia frigida</i>	inc.
Plains rough fescue	<i>Festuca hallii</i>	1
Smooth brome	<i>Bromus inermis</i>	inc.
Foxtail barley	<i>Hordeum jubatum</i>	inc.
Common wild rose	<i>Rosa woodsii</i>	5
Western wheat grass	<i>Pascopyrum smithii</i>	20
Cut-leaved anemone	<i>Anemone multifida</i>	5
Crested wheatgrass	<i>Agropyron cristatum</i>	inc.
Narrow-leaved puccoon	<i>Lithospermum incisum</i>	inc.

## VEGETATION PLOT: VP13

Common Name	Scientific Name	Percent Cover
Wild licorice	<i>Glycyrrhiza lepidota</i>	10
Blue grama	<i>Bouteloua gracilis</i>	5
June grass	<i>Koeleria macrantha</i>	5
Bluebunch fescue	<i>Festuca idahoensis</i>	25
Moss sp.	-	10
Alfalfa	<i>Medicago sativa</i>	5
Fescue sp.	<i>Vulpia sp.</i>	10
Kentucky bluegrass	<i>Poa pratensis</i>	10
Pasture sagewort	<i>Artemisia frigida</i>	1
Cut-leaved fleabane	<i>Erigeron compositus</i>	5
Common goatsbeard	<i>Aruncus dioicus</i>	1
Tufted fleabane	<i>Erigeron caespitosus</i>	incidental

## VEGETATION PLOT: VP14

Common Name	Scientific Name	Percent Cover
Dotted blazingstar	<i>Liatris punctata</i>	10
Common yarrow	<i>Achillea millefolium</i>	5
Smooth brome	<i>Bromus inermis</i>	5
Blue grama	<i>Bouteloua gracilis</i>	10
Leafy arnica	<i>Arnica chamissonis</i>	1
Crested wheatgrass	<i>Agropyron cristatum</i>	10
June grass	<i>Koeleria macrantha</i>	5
Wild licorice	<i>Glycyrrhiza lepidota</i>	10
Buckbrush	<i>Symphoricarpos occidentalis</i>	5
Fescue sp.	<i>Vulpia sp.</i>	5
Kentucky bluegrass	<i>Poa pratensis</i>	5
Pasture sagewort	<i>Artemisia frigida</i>	<1
Willow sp.	<i>Salix sp.</i>	<1

## VEGETATION PLOT: VP15

Common Name	Scientific Name	Percent Cover
Western false gromwell	<i>Onosmodium molle</i>	-
Wild mint	<i>Mentha arvensis</i>	-
Common scouring-rush	<i>Equisetum hyemale</i>	-
Small-fruited bulrush	<i>Scirpus microcarpus</i>	-
Perennial sow-thistle	<i>Sonchus arvensis</i>	-
Bull thistle	<i>Cirsium vulgare</i>	-
Creeping thistle	<i>Cirsium arvense</i>	-
Reed canary grass	<i>Phalaris arundinacea</i>	-
Sandbar willow	<i>Salix interior</i>	-
Absinthe wormwood	<i>Artemisia absinthium</i>	-
Common tansy	<i>Tanacetum vulgare</i>	-
Awned sedge	<i>Carex atherodes</i>	-
Fowl bluegrass	<i>Poa palustris</i>	-
Sedge sp.	<i>Salix sp.</i>	-
White sweet-clover	<i>Melilotus albus</i>	-
Yellow sweet-clover	<i>Melilotus officinalis</i>	-



## VEGETATION PLOT: VP16

Common Name	Scientific Name	Percent Cover
Wild bergamot	<i>Monarda fistulosa</i>	5
Wild vetch	<i>Vicia americana</i>	5
Smooth brome	<i>Bromus inermis</i>	25
Snowberry	<i>Symphoricarpos albus</i>	25
Northern bedstraw	<i>Galium boreale</i>	10
Fowl bluegrass	<i>Poa palustris</i>	15
Common baby's-breath	<i>Gypsophila paniculata</i>	2
Creeping thistle	<i>Cirsium arvense</i>	10
Shrubby cinquefoil	<i>Dasiphora fruticosa</i>	5
Silverberry	<i>Elaeagnus commutata</i>	1
Common wild rose	<i>Rosa woodsii</i>	15
Common horsetail	<i>Equisetum arvense</i>	10
Showy aster	<i>Eurybia conspicua</i>	inc.
Canada anemone	<i>Anemone canadensis</i>	inc.
River alder	<i>Alnus incana ssp. tenuifolia</i>	inc.

## VEGETATION PLOT: VP33

Common Name	Scientific Name	Percent Cover
Silverberry	<i>Elaeagnus commutata</i>	10
Wild licorice	<i>Glycyrrhiza lepidota</i>	5
Willow sp.	<i>Salix sp.</i>	1
Common wildrose	<i>Rosa woodsii</i>	5
Woolly gromwell	<i>Lithospermum ruderales</i>	1
Kentucky bluegrass	<i>Poa pratensis</i>	10
Baltic rush	<i>Juncus balticus</i>	10
Sunflower	<i>Helianthus sp.</i>	2
Salomon seal	<i>Polygonatum</i>	3
Canada goldenrod	<i>Solidago canadensis</i>	10
Perennial sow thistle	<i>Sonchus arvensis</i>	1
Tall goldenrod	<i>Solidago altissima</i>	5
Sandbar willow	<i>Salix interior</i>	<1
Fowl bluegrass	<i>Poa palustris</i>	15
Cut-leaved anemone	<i>Anemone multifida</i>	<1
Snowberry	<i>Symphoricarpos albus</i>	5
Wheatgrass sp.	<i>Agropyron sp.</i>	2
White fleabane	<i>Erigeron annuus</i>	<1
Smooth aster	<i>Symphyotrichum laeve</i>	2

**Appendix D: Vegetation Plot Data**

Smooth brome	<i>Bromus inermis</i>	10
Shrubby cinquefoil	<i>Dasiphora fruticosa</i>	15
Timothy	<i>Phleum pratense</i>	5
Wild bergamot	<i>Monarda fistulosa</i>	<1

**VEGETATION PLOT: VP34**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Percent Cover</b>
Silverberry	<i>Elaeagnus commutata</i>	5
Snowberry	<i>Symphoricarpos albus</i>	40
Tufted white prairie aster	<i>Symphyotrichum ericoides</i>	5
Kentucky bluegrass	<i>Poa pratensis</i>	5
Smooth brome	<i>Bromus inermis</i>	25
Smooth aster	<i>Symphyotrichum laeve</i>	1
Canada goldenrod	<i>Solidago canadensis</i>	1
Low goldenrod	<i>Solidago missouriensis</i>	incidental
Creeping thistle	<i>Cirsium arvense</i>	2
Woolly gromwell	<i>Lithospermum ruderale</i>	incidental
Columbia needle grass	<i>Achnatherum nelsonii ssp. dorei</i>	2

## VEGETATION PLOT: VP35

Common Name	Scientific Name	Percent Cover
Blue grama	<i>Bouteloua gracilis</i>	10
Pasture sedge	<i>Carex petasata</i>	35
Snowberry	<i>Symphoricarpos albus</i>	15
Kentucky bluegrass	<i>Poa pratensis</i>	30
Columbia needle grass	<i>Achnatherum nelsonii ssp. dorei</i>	1
Low goldenrod	<i>Solidago missouriensis</i>	5
June grass	<i>Koeleria macrantha</i>	<1
Broad-leaved everlasting	<i>Antennaria neglecta</i>	inc

## VEGETATION PLOT: VP36

Common Name	Scientific Name	Percent Cover
Pasture sagewort	<i>Artemisia frigida</i>	20
Columbia needle grass	<i>Achnatherum nelsonii ssp. dorei</i>	5
Snowberry	<i>Symphoricarpos albus</i>	10
Kentucky bluegrass	<i>Poa pratensis</i>	30
Low goldenrod	<i>Solidago missouriensis</i>	7
Leafy spurge	<i>Euphorbia esula</i>	inc.
Tufted white prairie aster	<i>Symphotrichum ericoides</i>	10
Common yarrow	<i>Achillea millefolium</i>	3
Wheatgrass sp.	<i>Agropyron sp.</i>	<1
Common goatsbeard	<i>Aruncus dioicus</i>	<1

## Vegetation Plot: VP030

Common Name	Scientific Name	Percent Cover
Silverberry	<i>Elaeagnus commutata</i>	5
Buckbrush	<i>Symphoricarpos occidentalis</i>	20
Heartleaf alexanders	<i>Zizia aptera</i>	5
Kentucky bluegrass	<i>Poa pratensis</i>	35
Wild licorice	<i>Glycyrrhiza lepidota</i>	1
Sow thistle	<i>Sonchus</i>	10
Smooth brome	<i>Bromus inermis</i>	10
Prickly rose	<i>Rosa acicularis</i>	1
Goldenrod sp.	<i>Solidago sp.</i>	2
Solomon's seal	<i>Polygonatum</i>	1
White death camas	<i>Anticlea elegans</i>	15
Common dandelion	<i>Taraxacum officinale</i>	1



# APPENDIX E:

## ACIMS DATABASE SEARCH RESULTS

Date: 27/4/2020  
 Requestor: Industry  
 Reason for Request: Environmental Assessment  
 SEC: 10 TWP: 022 RGE: 29 MER: 4



### ■ Non-sensitive EOs (updated: October 2017)

M_RR_TTT_SS	EO_ID	ECODE	S_RANK	SNAME	SCOMNAME	LAST_OBS_D
4-29-022-10	23039	PDBOR0S030	S3	Lithospermum occidentale	western false gromwell	2013-09-20
4-29-022-10	24424	PDBRA27080	S3	Rorippa curvipes	blunt-leaved watercress	2006-09-12
4-29-022-10	23750	PDBOR0S030	S3	Lithospermum occidentale	western false gromwell	2006-07-08

Next Steps: [See FAQ](#)

### ■ Sensitive EOs (updated: October 2017)

M-RR-TTT	EO_ID	ECODE	S_RANK	SNAME	SCOMNAME	LAST_OBS_D
----------	-------	-------	--------	-------	----------	------------

No Sensitive EOs Found: Next Steps - [See FAQ](#)

### ■ Protected Areas (updated: October 2017)

M-RR-TTT-SS	PROTECTED_AREA_NAME	TYPE	IUCN
-------------	---------------------	------	------

No Protected Areas Found

### ■ Crown Reservations/Notations (updated: October 2017)

M-RR-TTT-SS	NAME	TYPE
-------------	------	------

No Crown Reservations/Notations Found

# APPENDIX F: WETLAND DATA



## WETLAND USL013: HISTORICAL AND PRECIPITATION DATA

Photo Date (MM/DD/YY)	Photo ID (roll, AS#, Photo#)	Resolution	* Season	AWCS Wetland Class	** Precipitation Annual Data	Precipitation 30 Days Prior to Image (mm)	Precipitation Daily Data 10 Days Previous and Daily (mm)	*** Open Water Visible (OW), Consistent Wetland Vegetation
04/30/50	AS 170 Line 5014 100	1:40,000	Unknown	Marsh-Temporary	Unknown	Unknown	Unknown	DVI
09/20/62	AS 833 62	1:31,680	F	Marsh-Temporary	D	47.7	0 (1.1 in previous 10 days)	DVI
06/13/74	AS 1315 Line 13 303	1:31,680	S	Marsh-Temporary	D	57.6	0 (13.4 in previous 10 days)	DVI
07/25/82	AS 2570 Line 4 84	1:15,000	SUM	Marsh-Temporary	N	94.2	0 (4.2 in previous 10 days)	DVI
05/25/96	AS 4696 Line 9E 54	1:20,000	S	Marsh-Temporary	N	42.6	1.25 (5.6 in previous 10 days)	DV
07/07/01	AS 5166B Line 3 30	1: 30,000	SUM	Marsh-Temporary	D	55.0	0 (6.1 in previous 10 days)	DVI
09/13/08	Google Earth	NA	F	Marsh-Temporary	W	74.1	0 (25.2 in previous 10 days)	DVI

Appendix F: Wetland Survey Data

Photo Date (MM/DD/YY)	Photo ID (roll, AS#, Photo#)	Resolution	* Season	AWCS Wetland Class	** Precipitation Annual Data	Precipitation 30 Days Prior to Image (mm)	Precipitation Daily Data 10 Days Previous and Daily (mm)	*** Open Water Visible (OW), Consistent Wetland Vegetation
08/31/11	Google Earth	NA	SUM	Marsh-Temporary	W	58.9	27.4 (42.3 in previous 10 days)	DVI
07/28/14	Google Earth	NA	SUM	Marsh-Temporary	N	18.7	0 (5.3 in previous 10 days)	DVI
04/30/16	Google Earth	NA	S	Marsh-Temporary	N	8.0	0 (5.8 in previous 10 days)	DVI
07/06/17	Google Earth	NA	S	Marsh-Temporary	D	45.6	0 (2.1 in previous 10 days)	DV

\* S= Spring (April to June); Sum=Mid to Late Summer (June to September); F=Fall (Sept-Nov)

\*\* D=Dryer; N-Normal; W=Wetter; N/A= Not Available

\*\*\* W=Water Present/inundated; D=Dry; DV=Dry, vegetated (consistent with wetland class); DVI=Dry, vegetated (indistinguishable from

WETLAND USL013: APPENDIX 7 DATA

Question	Soil Indicators of Wetlands	Y/N	Coordinates	
S1	Organic Soils (except folists) present	N	-113.941, 50.859	
S2	Presence of peat accumulation determined by Von Post test	N		
S3	Of, Om, Oh horizons (organic surface layer 20-40 cm thick) present	N		
S4	Sulfidic material present	N		
S5	Gleying or mottling present immediately below the surface layer and within 30 cm	N		
S6	Native prairie soils with a low chroma matrix within 30 cm of the soil surface and the following present: b) Presence of iron within 30 cm of the surface	Y		
S7	Nonsandy soils with a low chroma matrix within 40 cm of the soil surface and one of the following present within 30 cm of the surface	N		
S8	Sandy soils with one of the following present:	N		
S9	Remains of aquatic invertebrates are present within 30 cm of the soil surface in pothole-like depressions	N		
S10	Other regionally applicable, field-verifiable soil properties associated with prolonged seasonal high water?	N		
Munsel Soil Color				
Soil Horizon	Depth (cm)	Hue	Value	Chroma
A	0-20	10YR	2	1
B	20+	10YR	3	2
Incidental Plant Species Within Wetland				
water smartweed	<i>Polygonum amphibium</i>	wire rush	<i>Juncus balticus</i>	
fowl bluegrass	<i>Poa palustris</i>	reed canary grass	<i>Phalaris arundinacea</i>	
smooth brome	<i>Bromus inermis</i>	timothy	<i>Phleum pratense</i>	



**WETLAND USL013: LOOKING SOUTH**



## WETLAND W16: HISTORICAL AND PRECIPITATION DATA

Photo Date (MM/DD/YY)	Photo ID (roll, AS#, Photo#)	Resolution	* Season	AWCS Wetland Class	** Precipitation Annual Data	Precipitation 30 Days Prior to Image (mm)	Precipitation Daily Data 10 Days Previous and Daily (mm)	*** Open Water Visible (OW), Consistent Wetland Vegetation
04/30/50	AS 170 Line 5014 100	1:40,000	Unknown	Marsh-Temporary	Unknown	Unknown	Unknown	W
09/20/62	AS 833 62	1:31,680	F	Marsh-Temporary	D	47.7	0 (1.1 in previous 10 days)	DVI
06/13/74	AS 1315 Line 13 303	1:31,680	S	Marsh-Temporary	D	57.6	0 (13.4 in previous 10 days)	W
07/25/82	AS 2570 Line 4 84	1:15,000	SUM	Marsh-Temporary	N	94.2	0 (4.2 in previous 10 days)	DVI
05/25/96	AS 4696 Line 9E 54	1:20,000	S	Marsh-Temporary	N	42.6	1.25 (5.6 in previous 10 days)	W
07/07/01	AS 5166B Line 3 30	1: 30,000	SUM	Marsh-Temporary	D	55.0	0 (6.1 in previous 10 days)	DVI
09/13/08	Google Earth	NA	F	Marsh-Temporary	W	74.1	0 (25.2 in previous 10 days)	DV

Appendix F: Wetland Survey Data

Photo Date (MM/DD/YY)	Photo ID (roll, AS#, Photo#)	Resolution	* Season	AWCS Wetland Class	** Precipitation Annual Data	Precipitation 30 Days Prior to Image (mm)	Precipitation Daily Data 10 Days Previous and Daily (mm)	*** Open Water Visible (OW), Consistent Wetland Vegetation
08/31/11	Google Earth	NA	SUM	Marsh-Temporary	W	58.9	27.4 (42.3 in previous 10 days)	DV
07/28/14	Google Earth	NA	SUM	Marsh-Temporary	N	18.7	0 (5.3 in previous 10 days)	DV
04/30/16	Google Earth	NA	S	Marsh-Temporary	N	8.0	0 (5.8 in previous 10 days)	DVI
07/06/17	Google Earth	NA	S	Marsh-Temporary	D	45.6	0 (2.1 in previous 10 days)	DV

\* S= Spring (April to June); Sum=Mid to Late Summer (June to September); F=Fall (Sept-Nov)

\*\* D=Dryer; N-Normal; W=Wetter; N/A= Not Available

\*\*\* W=Water Present/inundated; D=Dry; DV=Dry, vegetated (consistent with wetland class); DVI=Dry, vegetated (indistinguishable from



## WETLAND W16: APPENDIX 7 DATA

Plot #	Plot location Coordinates	Common Name	Scientific Name	Facultative or Obligate Wetland sp. (Y/N)	Percent Cover (round to nearest 5)
Upland Vegetation	-113.941, 50.861	smooth brome	<i>Bromus inermis</i>	N	60
		fowl bluegrass	<i>Poa palustris</i>	Y	15
		common yarrow	<i>Achillea millefolium</i>	N	<1
		Cultivated wheatgrass	<i>Agropyron sp.</i>	N	5
Wetland Vegetation	-113.941, 50.861	reed canary grass	<i>Phalaris arundinacea</i>	Y	50
		fowl bluegrass	<i>Poa palustris</i>	Y	40
		smooth brome	<i>Bromus inermis</i>	N	10
<b>Incidental Vegetation Within Wetland</b>					
wild mint	<i>Mentha arvensis</i>	awned sedge	<i>Carex atherodes</i>		
graceful sedge	<i>Carex praegracilis</i>	hemp-nettle	<i>Galeopsis tetrahit</i>		

**WETLAND W16: LOOKING SOUTH**



## WETLAND W17: HISTORICAL AND PRECIPITATION DATA

Photo Date (MM/DD/YY)	Photo ID (roll, AS#, Photo#)	Resolution	* Season	AWCS Wetland Class	** Precipitation Annual Data	Precipitation 30 Days Prior to Image (mm)	Precipitation Daily Data 10 Days Previous and Daily (mm)	*** Open Water Visible (OW), Consistent Wetland Vegetation
04/30/50	AS 170 Line 5014 100	1:40,000	Unknown	Marsh-Temporary	Unknown	Unknown	Unknown	W
09/20/62	AS 833 62	1:31,680	F	Marsh-Temporary	D	47.7	0 (1.1 in previous 10 days)	DVI
06/13/74	AS 1315 Line 13 303	1:31,680	S	Marsh-Temporary	D	57.6	0 (13.4 in previous 10 days)	W
07/25/82	AS 2570 Line 4 84	1:15,000	SUM	Marsh-Temporary	N	94.2	0 (4.2 in previous 10 days)	DVI
05/25/96	AS 4696 Line 9E 54	1:20,000	S	Marsh-Temporary	N	42.6	1.25 (5.6 in previous 10 days)	DV
07/07/01	AS 5166B Line 3 30	1: 30,000	SUM	Marsh-Temporary	D	55.0	0 (6.1 in previous 10 days)	DVI
09/13/08	Google Earth	NA	F	Marsh-Temporary	W	74.1	0 (25.2 in previous 10 days)	DV



Appendix F: Wetland Survey Data

Photo Date (MM/DD/YY)	Photo ID (roll, AS#, Photo#)	Resolution	* Season	AWCS Wetland Class	** Precipitation Annual Data	Precipitation 30 Days Prior to Image (mm)	Precipitation Daily Data 10 Days Previous and Daily (mm)	*** Open Water Visible (OW), Consistent Wetland Vegetation
08/31/11	Google Earth	NA	SUM	Marsh-Temporary	W	58.9	27.4 (42.3 in previous 10 days)	DV
07/28/14	Google Earth	NA	SUM	Marsh-Temporary	N	18.7	0 (5.3 in previous 10 days)	DV
04/30/16	Google Earth	NA	S	Marsh-Temporary	N	8.0	0 (5.8 in previous 10 days)	DV
07/06/17	Google Earth	NA	S	Marsh-Temporary	D	45.6	0 (2.1 in previous 10 days)	DVI

\* S= Spring (April to June); Sum=Mid to Late Summer (June to September); F=Fall (Sept-Nov)

\*\* D=Dryer; N-Normal; W=Wetter; N/A= Not Available

\*\*\* W=Water Present/inundated; D=Dry; DV=Dry, vegetated (consistent with wetland class); DVI=Dry, vegetated (indistinguishable from

WETLAND W17: APPENDIX 7 DATA, STANTEC BOUNDARY ACCEPTED.

Question	Soil Indicators of Wetlands	Y/N	Coordinates	
S1	Organic Soils (except folists) present	N	E 6036.4636 N 5636220.695	
S2	Presence of peat accumulation determined by Von Post test	N		
S3	Of, Om, Oh horizons (organic surface layer 20-40 cm thick) present	N		
S4	Sulfidic material present	N		
S5	Gleying or mottling present immediately below the surface layer and within 30 cm	Y		
S6	Native prairie soils with a low chroma matrix within 30 cm of the soil surface and the following present: b) Presence of iron within 30 cm of the surface	Y		
S7	Nonsandy soils with a low chroma matrix within 40 cm of the soil surface and one of the following present within 30 cm of the surface	N		
S8	Sandy soils with one of the following present:	N		
S9	Remains of aquatic invertebrates are present within 30 cm of the soil surface in pothole-like depressions	N		
S10	Other regionally applicable, field-verifiable soil properties associated with prolonged seasonal high water?	N		
Munsell Soil Color				
Soil Horizon	Depth (cm)	Hue	Value	Chroma
A	0-16	10YR	2	1
B	16+	2.5YR	2.5	1
Incidental Plant Species Within Wetland				
reed canary grass	<i>Phalaris arundinacea</i>	wire rush	<i>Juncus balticus</i>	
fowl bluegrass	<i>Poa palustris</i>	awned sedge	<i>Carex atherodes</i>	
slender wheatgrass	<i>Elymus trachycaulus</i>	water smartweed	<i>Polygonum amphibium</i>	

**WETLAND W17: LOOKING SOUTHWEST**





## WETLAND W18: HISTORICAL AND PRECIPITATION DATA

Photo Date (MM/DD/YY)	Photo ID (roll, AS#, Photo#)	Resolution	* Season	AWCS Wetland Class	** Precipitation Annual Data	Precipitation 30 Days Prior to Image (mm)	Precipitation Daily Data 10 Days Previous and Daily (mm)	*** Open Water Visible (OW), Consistent Wetland Vegetation
04/30/50	AS 170 Line 5014 100	1:40,000	Unknown	Marsh-Temporary	Unknown	Unknown	Unknown	W
09/20/62	AS 833 62	1:31,680	F	Marsh-Temporary	D	47.7	0 (1.1 in previous 10 days)	DVI
06/13/74	AS 1315 Line 13 303	1:31,680	S	Marsh-Temporary	D	57.6	0 (13.4 in previous 10 days)	W
07/25/82	AS 2570 Line 4 84	1:15,000	SUM	Marsh-Temporary	N	94.2	0 (4.2 in previous 10 days)	DVI
05/25/96	AS 4696 Line 9E 54	1:20,000	S	Marsh-Temporary	N	42.6	1.25 (5.6 in previous 10 days)	DV
07/07/01	AS 5166B Line 3 30	1: 30,000	SUM	Marsh-Temporary	D	55.0	0 (6.1 in previous 10 days)	DVI
09/13/08	Google Earth	NA	F	Marsh-Temporary	W	74.1	0 (25.2 in previous 10 days)	DV

Appendix F: Wetland Survey Data

Photo Date (MM/DD/YY)	Photo ID (roll, AS#, Photo#)	Resolution	* Season	AWCS Wetland Class	** Precipitation Annual Data	Precipitation 30 Days Prior to Image (mm)	Precipitation Daily Data 10 Days Previous and Daily (mm)	*** Open Water Visible (OW), Consistent Wetland Vegetation
08/31/11	Google Earth	NA	SUM	Marsh-Temporary	W	58.9	27.4 (42.3 in previous 10 days)	DV
07/28/14	Google Earth	NA	SUM	Marsh-Temporary	N	18.7	0 (5.3 in previous 10 days)	DV
04/30/16	Google Earth	NA	S	Marsh-Temporary	N	8.0	0 (5.8 in previous 10 days)	DV
07/06/17	Google Earth	NA	S	Marsh-Temporary	D	45.6	0 (2.1 in previous 10 days)	DV

\* S= Spring (April to June); Sum=Mid to Late Summer (June to September); F=Fall (Sept-Nov)

\*\* D=Dryer; N-Normal; W=Wetter; N/A= Not Available

\*\*\* W=Water Present/inundated; D=Dry; DV=Dry, vegetated (consistent with wetland class); DVI=Dry, vegetated (indistinguishable from

WETLAND W18: APPENDIX 7 DATA

Plot #	Plot location Coordinates	Common Name	Scientific Name	Facultative or Obligate Wetland sp. (Y/N)	Percent Cover (round to nearest 5)
Upland Vegetation	-113.944, 50.858	smooth brome	<i>Bromus inermis</i>	N	20
		fowl bluegrass	<i>Poa palustris</i>	Y	40
		common yarrow	<i>Achillea millefolium</i>	N	<1
		graceful sedge	<i>Carex praegracilis</i>	Y	5
Wetland Vegetation	-113.944, 50.858	Carex sp.	<i>Sedge sp.</i>	Y	35
		timothy	<i>Phleum pratense</i>	N	5
		fowl bluegrass	<i>Poa palustris</i>	Y	25
		hemp-nettle	<i>Galeopsis tetrahit</i>	Y	<1
		slender wheatgrass	<i>Elymus trachycaulus</i>	Y	<1
<b>Incidental Vegetation Within Wetland</b>					
fowl bluegrass	<i>Poa palustris</i>	awned sedge	<i>Carex atherodes</i>		
American Golden Dock	<i>Rumex fueginus</i>	graceful sedge	<i>Carex praegracilis</i>		
Kentucky bluegrass	<i>Poa pratensis</i>	western wheat grass	<i>Pascopyrum smithii</i>		
reed canary grass	<i>Phalaris arundinacea</i>				



**WETLAND W18: LOOKING NORTH**



## WETLAND W19: HISTORICAL AND PRECIPITATION DATA

Photo Date (MM/DD/YY)	Photo ID (roll, AS#, Photo#)	Resolution	* Season	AWCS Wetland Class	** Precipitation Annual Data	Precipitation 30 Days Prior to Image (mm)	Precipitation Daily Data 10 Days Previous and Daily (mm)	*** Open Water Visible (OW), Consistent Wetland Vegetation
04/30/50	AS 170 Line 5014 100	1:40,000	Unknown	Marsh-Temporary	Unknown	Unknown	Unknown	W
09/20/62	AS 833 62	1:31,680	F	Marsh-Temporary	D	47.7	0 (1.1 in previous 10 days)	DV
06/13/74	AS 1315 Line 13 303	1:31,680	S	Marsh-Temporary	D	57.6	0 (13.4 in previous 10 days)	OW
07/25/82	AS 2570 Line 4 84	1:15,000	SUM	Marsh-Temporary	N	94.2	0 (4.2 in previous 10 days)	W
05/25/96	AS 4696 Line 9E 54	1:20,000	S	Marsh-Temporary	N	42.6	1.25 (5.6 in previous 10 days)	OW
07/07/01	AS 5166B Line 3 30	1: 30,000	SUM	Marsh-Temporary	D	55.0	0 (6.1 in previous 10 days)	DV
09/13/08	Google Earth	NA	F	Marsh-Temporary	W	74.1	0 (25.2 in previous 10 days)	W

**Appendix F: Wetland Survey Data**

Photo Date (MM/DD/YY)	Photo ID (roll, AS#, Photo#)	Resolution	* Season	AWCS Wetland Class	** Precipitation Annual Data	Precipitation 30 Days Prior to Image (mm)	Precipitation Daily Data 10 Days Previous and Daily (mm)	*** Open Water Visible (OW), Consistent Wetland Vegetation
08/31/11	Google Earth	NA	SUM	Marsh-Temporary	W	58.9	27.4 (42.3 in previous 10 days)	DV
07/28/14	Google Earth	NA	SUM	Marsh-Temporary	N	18.7	0 (5.3 in previous 10 days)	W
04/30/16	Google Earth	NA	S	Marsh-Temporary	N	8.0	0 (5.8 in previous 10 days)	DV
07/06/17	Google Earth	NA	S	Marsh-Temporary	D	45.6	0 (2.1 in previous 10 days)	DV

\* S= Spring (April to June); Sum=Mid to Late Summer (June to September); F=Fall (Sept-Nov)

\*\* D=Dryer; N-Normal; W=Wetter; N/A= Not Available

\*\*\* W=Water Present/inundated; D=Dry; DV=Dry, vegetated (consistent with wetland class); DVI=Dry, vegetated (indistinguishable from



WETLAND W19: APPENDIX 7 DATA

Question	Soil Indicators of Wetlands			Y/N	Coordinates
S1	Organic Soils (except folists) present			N	-113.947, 50.860
S2	Presence of peat accumulation determined by Von Post test			N	
S3	Of, Om, Oh horizons (organic surface layer 20-40 cm thick) present			N	
S4	Sulfidic material present			N	
S5	Gleying or mottling present immediately below the surface layer and within 30 cm			Y	
S6	Native prairie soils with a low chroma matrix within 30 cm of the soil surface and the following present: b) Presence of iron within 30 cm of the surface			Y	
S7	Nonsandy soils with a low chroma matrix within 40 cm of the soil surface and one of the following present within 30 cm of the surface			N	
S8	Sandy soils with one of the following present:			N	
S9	Remains of aquatic invertebrates are present within 30 cm of the soil surface in pothole-like depressions			N	
S10	Other regionally applicable, field-verifiable soil properties associated with prolonged seasonal high water?			N	
Munsell Soil Color					
Soil Horizon	Depth (cm)	Hue	Value	Chroma	
A	Ah	10YR	2	1	
B	B	10YR	3	2	
Incidental Plant Species Within Wetland					
reed canary grass	Phalaris arundinacea	slough grass	Beckmannia syzigachne		
awned sedge	Carex atherodes	common tall manna grass	Glyceria grandis		
fowl bluegrass	Poa palustris	creeping spikerush	Eleocharis macrostachya		
hemp-nettle	Galeopsis tetrahit	short-awned foxtail	Alopecurus aequalis		
foxtail barley	Hordeum jubatum	slender wheatgrass	Elymus trachycaulus		
goosefoot	Chenopodium sp.	American Golden Dock	Rumex fueginus		

**WETLAND W19: LOOKING NORTH**



## WETLAND W20: HISTORICAL AND PRECIPITATION DATA

Photo Date (MM/DD/YY)	Photo ID (roll, AS#, Photo#)	Resolution	* Season	AWCS Wetland Class	** Precipitation Annual Data	Precipitation 30 Days Prior to Image (mm)	Precipitation Daily Data 10 Days Previous and Daily (mm)	*** Open Water Visible (OW), Consistent Wetland Vegetation
04/30/50	AS 170 Line 5014 100	1:40,000	Unknown	Marsh-Temporary	Unknown	Unknown	Unknown	W
09/20/62	AS 833 62	1:31,680	F	Marsh-Temporary	D	47.7	0 (1.1 in previous 10 days)	DVI
06/13/74	AS 1315 Line 13 303	1:31,680	S	Marsh-Temporary	D	57.6	0 (13.4 in previous 10 days)	W
07/25/82	AS 2570 Line 4 84	1:15,000	SUM	Marsh-Temporary	N	94.2	0 (4.2 in previous 10 days)	DVI
05/25/96	AS 4696 Line 9E 54	1:20,000	S	Marsh-Temporary	N	42.6	1.25 (5.6 in previous 10 days)	W
07/07/01	AS 5166B Line 3 30	1: 30,000	SUM	Marsh-Temporary	D	55.0	0 (6.1 in previous 10 days)	DV



Appendix F: Wetland Survey Data

Photo Date (MM/DD/YY)	Photo ID (roll, AS#, Photo#)	Resolution	* Season	AWCS Wetland Class	** Precipitation Annual Data	Precipitation 30 Days Prior to Image (mm)	Precipitation Daily Data 10 Days Previous and Daily (mm)	*** Open Water Visible (OW), Consistent Wetland Vegetation
09/13/08	Google Earth	NA	F	Marsh-Temporary	W	74.1	0 (25.2 in previous 10 days)	DV
08/31/11	Google Earth	NA	SUM	Marsh-Temporary	W	58.9	27.4 (42.3 in previous 10 days)	DV
07/28/14	Google Earth	NA	SUM	Marsh-Temporary	N	18.7	0 (5.3 in previous 10 days)	DV
04/30/16	Google Earth	NA	S	Marsh-Temporary	N	8.0	0 (5.8 in previous 10 days)	DVI
07/06/17	Google Earth	NA	S	Marsh-Temporary	D	45.6	0 (2.1 in previous 10 days)	DVI

\* S= Spring (April to June); Sum=Mid to Late Summer (June to September); F=Fall (Sept-Nov)

\*\* D=Dryer; N-Normal; W=Wetter; N/A= Not Available

\*\*\* W=Water Present/inundated; D=Dry; DV=Dry, vegetated (consistent with wetland class); DVI=Dry, vegetated (indistinguishable from

WETLAND W20: APPENDIX 7 DATA

Plot #	Plot location Coordinates	Common Name	Scientific Name	Facultative or Obligate Wetland sp. (Y/N)	Percent Cover (round to nearest 5)
Upland Vegetation	-113.950, 50.858	smooth brome	<i>Bromus inermis</i>	N	40
		hemp-nettle	<i>Galeopsis tetrahit</i>	Y	<1
		tufted white prairie	<i>Symphyotrichum ericoides</i>	N	5
		long-bracted sedge	<i>Carex athrostachya</i>	Y	5
		fowl bluegrass	<i>Poa palustris</i>	Y	10
		common yarrow	<i>Achillea millefolium</i>	N	<1
Wetland Vegetation	-113.950, 50.858	yellow sedge	<i>Carex flava</i>	Y	20
		fowl bluegrass	<i>Poa palustris</i>	Y	15
		smooth brome	<i>Bromus inermis</i>	N	5
		timothy	<i>Phleum pratense</i>	N	<1
<b>Incidental Vegetation Within Wetland</b>					
Kentucky bluegrass	<i>Poa pratensis</i>	hemp-nettle	<i>Galeopsis tetrahit</i>		
reed canary grass	<i>Phalaris arundinacea</i>	American Golden Dock	<i>Rumex fueginus</i>		
graceful sedge	<i>Carex praeegracilis</i>				

WETLAND W20: LOOKING EAST





## WETLAND W28S: HISTORICAL AND PRECIPITATION DATA

Photo Date (MM/DD/YY)	Photo ID (roll, AS#, Photo#)	Resolution	* Season	AWCS Wetland Class	** Precipitation Annual Data	Precipitation 30 Days Prior to Image (mm)	Precipitation Daily Data 10 Days Previous and Daily (mm)	*** Open Water Visible (OW), Consistent Wetland Vegetation
04/30/50	AS 170 Line 5014	1:40,000	Unknown	Marsh- Graminoid- Seasonal	Unknown	Unknown	Unknown	DV
09/20/62	AS 833 62	1:31,680	F	Marsh- Graminoid- Seasonal	D	47.7	0 (1.1 in previous 10 days)	DV
06/13/74	AS 1315 Line 13 303	1:31,680	S	Marsh- Graminoid- Seasonal	D	57.6	0 (13.4 in previous 10 days)	DV
07/25/82	AS 2570 Line 4 83	1:15,000	SUM	Marsh- Graminoid- Seasonal	N	94.2	0 (4.2 in previous 10 days)	DV
05/25/96	AS 4696 Line 9E 53	1:20,000	S	Marsh- Graminoid- Seasonal	N	42.6	1.25 (5.6 in previous 10 days)	DV
07/07/01	AS5166B Line 3 30	1: 30,000	SUM	Marsh- Graminoid- Seasonal	D	55.0	0 (6.1 in previous 10 days)	DV
09/13/08	Google Earth	NA	F	Marsh- Graminoid- Seasonal	W	74.1	0 (25.2 in previous 10 days)	DV

Appendix F: Wetland Survey Data

Photo Date (MM/DD/YY)	Photo ID (roll, AS#, Photo#)	Resolution	* Season	AWCS Wetland Class	** Precipitation Annual Data	Precipitation 30 Days Prior to Image (mm)	Precipitation Daily Data 10 Days Previous and Daily (mm)	*** Open Water Visible (OW), Consistent Wetland Vegetation
08/31/11	Google Earth	NA	SUM	Marsh-Graminoid-Seasonal	W	58.9	27.4 (42.3 in previous 10 days)	DV
07/28/14	Google Earth	NA	SUM	Marsh-Graminoid-Seasonal	N	18.7	0 (5.3 in previous 10 days)	DV
04/30/16	Google Earth	NA	S	Marsh-Graminoid-Seasonal	N	8.0	0 (5.8 in previous 10 days)	DV
07/06/17	Google Earth	NA	S	Marsh-Graminoid-Seasonal	D	45.6	0 (2.1 in previous 10 days)	DV

\* S= Spring (April to June); Sum=Mid to Late Summer (June to September); F=Fall (Sept-Nov)

\*\* D=Dryer; N-Normal; W=Wetter; N/A= Not Available

\*\*\* W=Water Present/inundated; D=Dry; DV=Dry, vegetated (consistent with wetland class); DVI=Dry, vegetated (indistinguishable from

## WETLAND W28S: APPENDIX 7 DATA

Plot #	Plot location Coordinates	Common Name	Scientific Name	Facultative or Obligate Wetland sp. (Y/N)	Percent Cover (round to nearest 5)
Upland Vegetation	-113.953, 50.856	fowl bluegrass	<i>Poa palustris</i>	Y	25
		woolly gromwell	<i>Lithospermum ruderale</i>	N	<1
		Canada goldenrod	<i>Solidago canadensis</i>	N	<1
		tufted white prairie	<i>Symphotrichum ericoides</i>	N	15
		wild bergamot	<i>Monarda fistulosa</i>	N	<1
		silverberry	<i>Elaeagnus commutata</i>	N	10
		perennial sow-thistle	<i>Sonchus arvensis</i>	Y	10
		smooth brome	<i>Bromus inermis</i>	N	5
		buckbrush	<i>Symphoricarpos occidentalis</i>	N	<1
		common horsetail	<i>Equisetum arvense</i>	Y	5
		timothy	<i>Phleum pratense</i>	N	5
		wild mint	<i>Mentha arvensis</i>	Y	<1
Wetland Vegetation	-113.953, 50.856	knotted rush	<i>Juncus nodosus</i>	Y	40
		brome sp.	<i>Bromus sp.</i>	N	20
		creeping spikerush	<i>Eleocharis macrostachya</i>	Y	5
		timothy	<i>Phleum pratense</i>	N	<1
		fowl bluegrass	<i>Poa palustris</i>	Y	5
		common horsetail	<i>Equisetum arvense</i>	Y	<1
		northern grass-of-parnassus	<i>Parnassia palustris</i>	Y	<1
<b>Incidental Vegetation Within Wetland</b>					
willow sp.	<i>Salix sp.</i>	knotted rush	<i>Juncus nodosus</i>		
creeping white prairie aster	<i>Symphotrichum falcatum</i>	silverweed	<i>Argentina anserina</i>		
water sedge	<i>Carex aquatilis</i>	long-styled rush	<i>Juncus longistylis</i>		
woolly sedge	<i>Carex pellita</i>	common tall sunflower	<i>Helianthus nuttallii</i>		



**Appendix F: Wetland Survey Data**

Timothy	<i>Phleum pratense</i>	river alder	<i>Alnus incana ssp. tenuifolia</i>
fowl bluegrass	<i>Poa palustris</i>	northern reed grass	<i>Calamagrostis stricta ssp.</i>
water-hemlock	<i>Cicuta maculata</i>	wire rush	<i>Juncus balticus</i>
northern grass-of-parnassus	<i>Parnassia palustris</i>	common horsetail	<i>Equisetum arvense</i>
common great bulrush	<i>Schoenoplectus</i>	slender wheatgrass	<i>Elymus trachycaulus</i>
perennial sow-thistle	<i>Sonchus arvensis</i>	creeping spikerush	<i>Eleocharis macrostachya</i>
water smartweed	<i>Polygonum amphibium</i>	graceful sedge	<i>Carex praegracilis</i>
water sedge	<i>Carex aquatilis</i>	Yellow sedge	<i>Carex flava</i>

**WETLAND W28S: LOOKING NORTH**



WETLAND W29S: HISTORICAL AND PRECIPITATION DATA

Photo Date (MM/DD/YY)	Photo ID (roll, AS#, Photo#)	Resolution	* Season	AWCS Wetland Class	** Precipitation Annual Data	Precipitation 30 Days Prior to Image (mm)	Precipitation Daily Data 10 Days Previous and Daily (mm)	*** Open Water Visible (OW), Consistent Wetland Vegetation
04/30/50	AS 170 Line 5014 100	1:40,000	Unknown	Marsh- Graminoid- Temporary	Unknown	Unknown	Unknown	DV
09/20/62	AS 833 62	1:31,680	F	Marsh- Graminoid- Temporary	D	47.7	0 (1.1 in previous 10 days)	DV
06/13/74	AS 1315 Line 13 303	1:31,680	S	Marsh- Graminoid- Temporary	D	57.6	0 (13.4 in previous 10 days)	DV
07/25/82	AS 2570 Line 4 84	1:15,000	SUM	Marsh- Graminoid- Temporary	N	94.2	0 (4.2 in previous 10 days)	DV
05/25/96	AS 4696 Line 9E 54	1:20,000	S	Marsh- Graminoid- Temporary	N	42.6	1.25 (5.6 in previous 10 days)	DV
07/07/01	AS 5166B Line 3 30	1: 30,000	SUM	Marsh- Graminoid- Temporary	D	55.0	0 (6.1 in previous 10 days)	DV
09/13/08	Google Earth	NA	F	Marsh- Graminoid- Temporary	W	74.1	0 (25.2 in previous 10 days)	DV

Appendix F: Wetland Survey Data

Photo Date (MM/DD/YY)	Photo ID (roll, AS#, Photo#)	Resolution	* Season	AWCS Wetland Class	** Precipitation Annual Data	Precipitation 30 Days Prior to Image (mm)	Precipitation Daily Data 10 Days Previous and Daily (mm)	*** Open Water Visible (OW), Consistent Wetland Vegetation
08/31/11	Google Earth	NA	SUM	Marsh-Graminoid-Temporary	W	58.9	27.4 (42.3 in previous 10 days)	DV
07/28/14	Google Earth	NA	SUM	Marsh-Graminoid-Temporary	N	18.7	0 (5.3 in previous 10 days)	DV
04/30/16	Google Earth	NA	S	Marsh-Graminoid-Temporary	N	8.0	0 (5.8 in previous 10 days)	DV
07/06/17	Google Earth	NA	S	Marsh-Graminoid-Temporary	D	45.6	0 (2.1 in previous 10 days)	DV

\* S= Spring (April to June); Sum=Mid to Late Summer (June to September); F=Fall (Sept-Nov)

\*\* D=Dryer; N-Normal; W=Wetter; N/A= Not Available

\*\*\* W=Water Present/inundated; D=Dry; DV=Dry, vegetated (consistent with wetland class); DVI=Dry, vegetated (indistinguishable from



## WETLAND W29S: APPENDIX 7 DATA

Plot #	Plot location Coordinates	Common Name	Scientific Name	Facultative or Obligate Wetland sp. (Y/N)	Percent Cover (round to nearest 5)
Upland Vegetation	E 3446.7361 N 5635284.884	silverberry	<i>Elaeagnus commutata</i>	N	5
		snowberry	<i>Symphoricarpos albus</i>	N	20
		Canada goldenrod	<i>Solidago canadensis</i>	N	10
		sandbar willow	<i>Salix interior</i>	N	15
		fowl bluegrass	<i>Poa palustris</i>	Y	10
		tufted white prairie	<i>Symphyotrichum ericoides</i>	N	5
Wetland Vegetation	E 3446.7361 N 5635284.884	silverweed	<i>Argentina anserina</i>	N	5
		long-styled rush	<i>Juncus longistylis</i>	Y	1
		wire rush	<i>Juncus balticus</i>	Y	40
		fowl bluegrass	<i>Poa palustris</i>	Y	10
		willow sp.	<i>Salix sp.</i>	N	1
		sandbar willow	<i>Salix interior</i>	N	5
<b>Incidental Vegetation Within Wetland</b>					
silverweed	<i>Argentina anserina</i>	tufted white prairie aster	<i>Symphyotrichum ericoides</i>		
small bottle sedge	<i>Carex utriculata</i>	willow sp.	<i>Salix sp.</i>		
graceful sedge	<i>Carex praegracilis</i>	perennial sow-thistle	<i>Sonchus arvensis</i>		
woolly sedge	<i>Carex pellita</i>	Canada anemone	<i>Anemone canadensis</i>		
wire rush	<i>Juncus balticus</i>	fleabane sp.	<i>Erigeron sp.</i>		
Kentucky bluegrass	<i>Poa pratensis</i>	long-styled rush	<i>Juncus longistylis</i>		
common scouring-rush	<i>Equisetum hyemale</i>	snowberry	<i>Symphoricarpos albus</i>		
common dandelion	<i>Taraxacum officinale</i>	silverberry	<i>Elaeagnus commutata</i>		
sandbar willow	<i>Salix interior</i>	common wild rose	<i>Rosa woodsii</i>		
fowl bluegrass	<i>Poa palustris</i>				

**WETLAND W29S: LOOKING SOUTH**



## WETLAND W030: HISTORICAL AND PRECIPITATION DATA

Photo Date (MM/DD/YY)	Photo ID (roll, AS#, Photo#)	Resolution	* Season	AWCS Wetland Class	** Precipitation Annual Data	Precipitation 30 Days Prior to Image (mm)	Precipitation Daily Data 10 Days Previous and Daily (mm)	*** Open Water Visible (OW), Consistent Wetland Vegetation
04/30/50	AS 170 Line 5014 100	1:40,000	Unknown	Marsh- Graminoid- Seasonal	Unknown	Unknown	Unknown	DV
09/20/62	AS 833 62	1:31,680	F	Marsh- Graminoid- Seasonal	D	47.7	0 (1.1 in previous 10 days)	NA
06/13/74	AS 1315 Line 13 303	1:31,680	S	Marsh- Graminoid- Seasonal	D	57.6	0 (13.4 in previous 10 days)	NA
07/25/82	AS 2570 Line 4 84	1:15,000	SUM	Marsh- Graminoid- Seasonal	N	94.2	0 (4.2 in previous 10 days)	DV
05/25/96	AS 4696 Line 9E 54	1:20,000	S	Marsh- Graminoid- Seasonal	N	42.6	1.25 (5.6 in previous 10 days)	NA
07/07/01	AS 5166B Line 3 30	1: 30,000	SUM	Marsh- Graminoid- Seasonal	D	55.0	0 (6.1 in previous 10 days)	NA
09/13/08	Google Earth	NA	F	Marsh- Graminoid- Seasonal	W	74.1	0 (25.2 in previous 10 days)	DV

Appendix F: Wetland Survey Data

Photo Date (MM/DD/YY)	Photo ID (roll, AS#, Photo#)	Resolution	* Season	AWCS Wetland Class	** Precipitation Annual Data	Precipitation 30 Days Prior to Image (mm)	Precipitation Daily Data 10 Days Previous and Daily (mm)	*** Open Water Visible (OW), Consistent Wetland Vegetation
08/31/11	Google Earth	NA	SUM	Marsh-Graminoid-Seasonal	W	58.9	27.4 (42.3 in previous 10 days)	NA
07/28/14	Google Earth	NA	SUM	Marsh-Graminoid-Seasonal	N	18.7	0 (5.3 in previous 10 days)	DV
07/06/17	Google Earth	NA	S	Marsh-Graminoid-Seasonal	D	45.6	0 (2.1 in previous 10 days)	DV

\* S= Spring (April to June); Sum=Mid to Late Summer (June to September); F=Fall (Sept-Nov)

\*\* D=Dryer; N-Normal; W=Wetter; N/A= Not Available

\*\*\* W=Water Present/inundated; D=Dry; DV=Dry, vegetated (consistent with wetland class); DVI=Dry, vegetated (indistinguishable from



## WETLAND W030: APPENDIX 7 DATA

Plot #	Plot location Coordinates	Common Name	Scientific Name	Facultative or Obligate Wetland sp. (Y/N)	Percent Cover (round to nearest 5)
Upland Vegetation	E 292422 N 5637870	Silverweed	<i>Argentina anserina</i>	N	10
		Vetch sp.	<i>Vicia sp.</i>	N	15
		Goldenrod sp.	<i>Solidago sp.</i>	N	15
		Smooth brome	<i>Bromus inermis</i>	N	10
		Baltic rush	<i>Juncus balticus</i>	Y	5
		Kentucky bluegrass	<i>Poa pratensis</i>	Y	15
		Common horsetail	<i>Equisetum arvense</i>	Y	5
Wetland Vegetation	E 292422 N 5637870	Solomon's seals	<i>Polygonatum sp.</i>	Y	5
		Silverweed	<i>Argentina anserina</i>	N	10
		Wild vetch	<i>Vicia sativa</i>	Y	5
		Common horsetail	<i>Equisetum arvense</i>	Y	10
		Baltic rush	<i>Juncus balticus</i>	Y	25
		Solomon's seals	<i>Polygonatum sp.</i>	Y	5
		Kentucky bluegrass	<i>Poa pratensis</i>	Y	10
Water sedge	<i>Carex aquatilis</i>	Y	5		
Incidental Vegetation Within Wetland					
Fowl bluegrass	<i>Poa palustris</i>	Willow sp.	<i>Salix sp.</i>		
Prairie smoke	<i>Geum triflorum</i>	Seaside arrow grass	<i>Triglochin maritima</i>		
Baltic rush	<i>Juncus balticus</i>	Bog orchid	<i>Platanthera sp.</i>		
Creeping spike rush	<i>Eleocharis macrostachya</i>	Creeping thistle	<i>Cirsium arvense</i>		
Northern reed grass	<i>Calamagrostis stricta ssp.</i>	Mint	<i>Mentha arvensis</i>		
Silverweed	<i>Argentina anserina</i>	Bottle sedge	<i>Carex utriculata</i>		
Canada anemone	<i>Anemone canadensis</i>	Water sedge	<i>Carex aquatilis</i>		
Timothy	<i>Phleum pratense</i>	Sow thistle	<i>Sonchus arvensis</i>		
Sandbar willow	<i>Salix interior</i>	Common dandelion	<i>Taraxacum officinale</i>		

**WETLAND W030: LOOKING NORTH**





**WATERBODY A01: LOOKING NORTHWEST**





# APPENDIX G:

# PUBLIC LANDS RESPONSE



## Wang, Sunny

---

**From:** Sid Parseyan <sid.parseyan@gov.ab.ca>  
**Sent:** Wednesday, September 20, 2017 9:37 AM  
**To:** Wang, Sunny  
**Cc:** Silver, Carly; Koop, Marissa  
**Subject:** RE: Evaluation of Crown Claim for 9-22-29-W4M, 11-22-29-W4M, 3-22-29-W4M, and 4-22-29-W4M

Good morning Sunny,

Thank you for your enquiry. Please be advised that the Crown in right of Alberta asserts a claim to the bed and shore of all existing natural channels of Bow River which has not yet accreted to the adjoining uplands with the exception of channels labelled on Figure 1.1 of your report as "OB10" and "OB11". Apparently, these two channels which in an east-west direction connect channel "OB05" to the main channel of Bow River are formed due to the avulsive flood event of 2013. In the future if these two channels continue to remain as part of the active channels of the river, the Crown may assert a claim to their bed and shore.

Any other water feature which you have identified and labelled on Figures 1.1 and 1.2 of your report does not meet the criteria of having a permanent and naturally occurring body of water with a Crown claimable bed and shore. As such, if those water features are not located on Crown lands, the Crown in right of Alberta does not assert a claim to their bed and shore.

This assessment is not a permission to alter any of the existing wetlands in that area. Local environmental office and/or the Water Act Approval authorities must be contacted before planning any action which may affect any of the existing wetlands.

If you need any further clarifications and/or have any questions or comments on this matter, please do not hesitate to contact us.

Thank you,

Sid

---

### Sid Parseyan, M.Sc.

Senior Waterbody/Boundary Research Analyst  
Provincial Wetlands & Water Boundaries Section  
Operations Division  
2<sup>nd</sup> Floor, South Petroleum Plaza  
9915 – 108 Street, Edmonton, AB T5K 2G8  
Phone: (780) 422-0187 | Fax: (780) 422-3120  
Email: [sid.parseyan@gov.ab.ca](mailto:sid.parseyan@gov.ab.ca)



**Please consider your environmental responsibility before printing this e-mail**

---

**From:** Wang, Sunny [mailto:Sunny.Wang@stantec.com]  
**Sent:** September-15-17 1:29 PM  
**To:** AEP Water-Boundaries <Water.Boundaries@gov.ab.ca>

**Cc:** Silver, Carly <Carly.Silver@stantec.com>; Koop, Marissa <marissa.koop@stantec.com>

**Subject:** Evaluation of Crown Claim for 9-22-29-W4M, 11-22-29-W4M, 3-22-29-W4M, and 4-22-29-W4M

Good afternoon,

Please see attached submission letter requesting an evaluation of Crown claim on thirty-six features located in southeast Calgary, Alberta within sections 9-22-29-W4M, 11-22-29-W4M, 3-22-29-W4M, and 4-22-29-W4M.

Should you have any questions or concerns, please do not hesitate to let me know.

Thank you for your time,

**Sunny Wang, B.Sc., B.I.T**

Environmental Planner

Community Development

Stantec

200-325 25 Street SE, Calgary AB T2A 7H8

Phone: (403) 207-7377

Cell: (403) 561-3723

Sunny.Wang@stantec.com



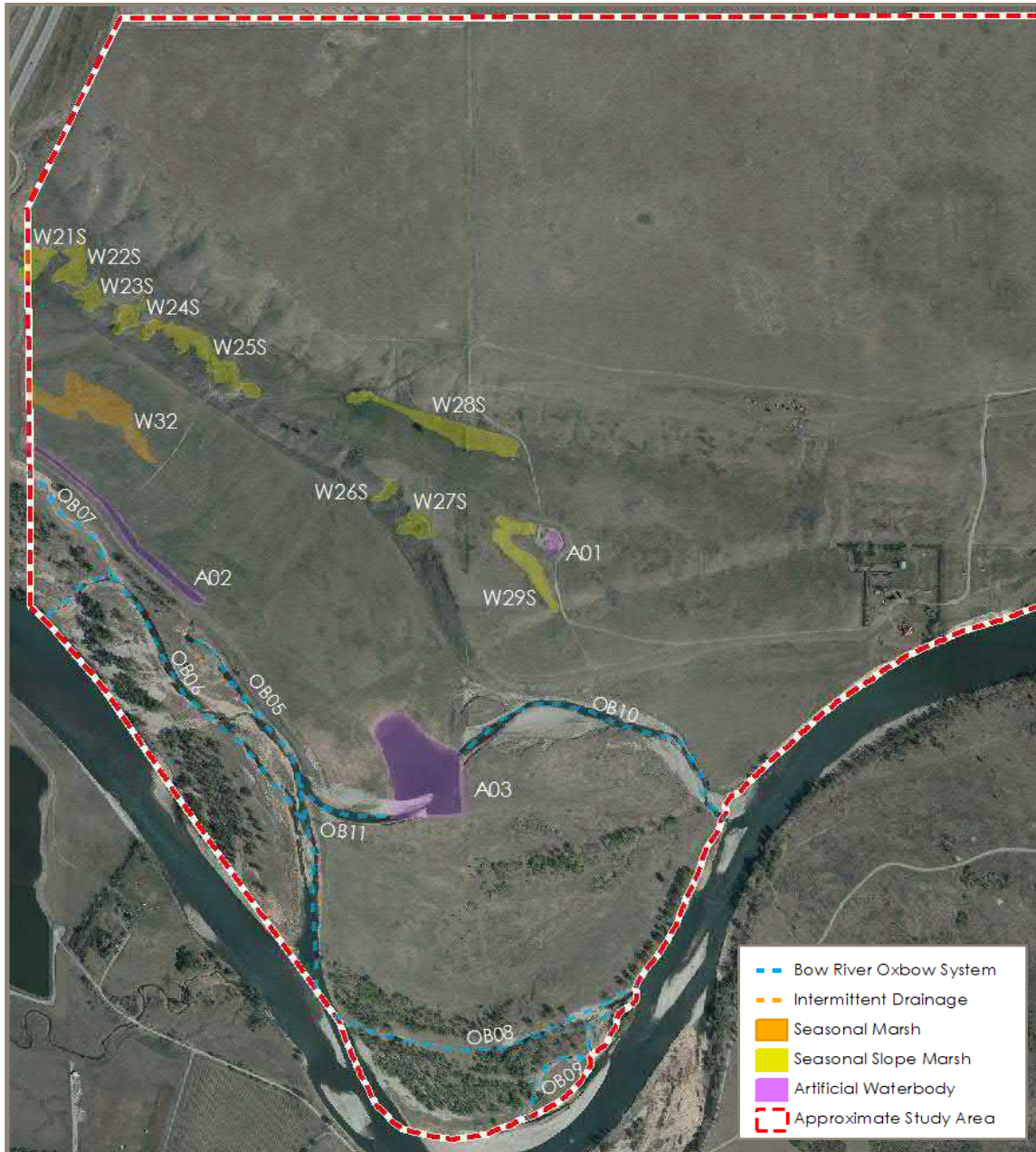
The content of this email is the confidential property of Stantec and should not be copied, modified, retransmitted, or used for any purpose except with Stantec's written authorization. If you are not the intended recipient, please delete all copies and notify us immediately.

 Please consider the environment before printing this email.

This email and any files transmitted with it are confidential and intended solely for the use of the individual or entity to whom they are addressed. If you have received this email in error please notify the system manager. This message contains confidential information and is intended only for the individual named. If you are not the named addressee you should not disseminate, distribute or copy this e-mail.



**Reference:** Cell E Planning Area – South Rangeview Area Structure Plan  
Genesis Land Development, Brookfield Residential, and Mr. Sandy Soutzo  
Summary Report in support of Ownership Determination under the *Public Lands Act*

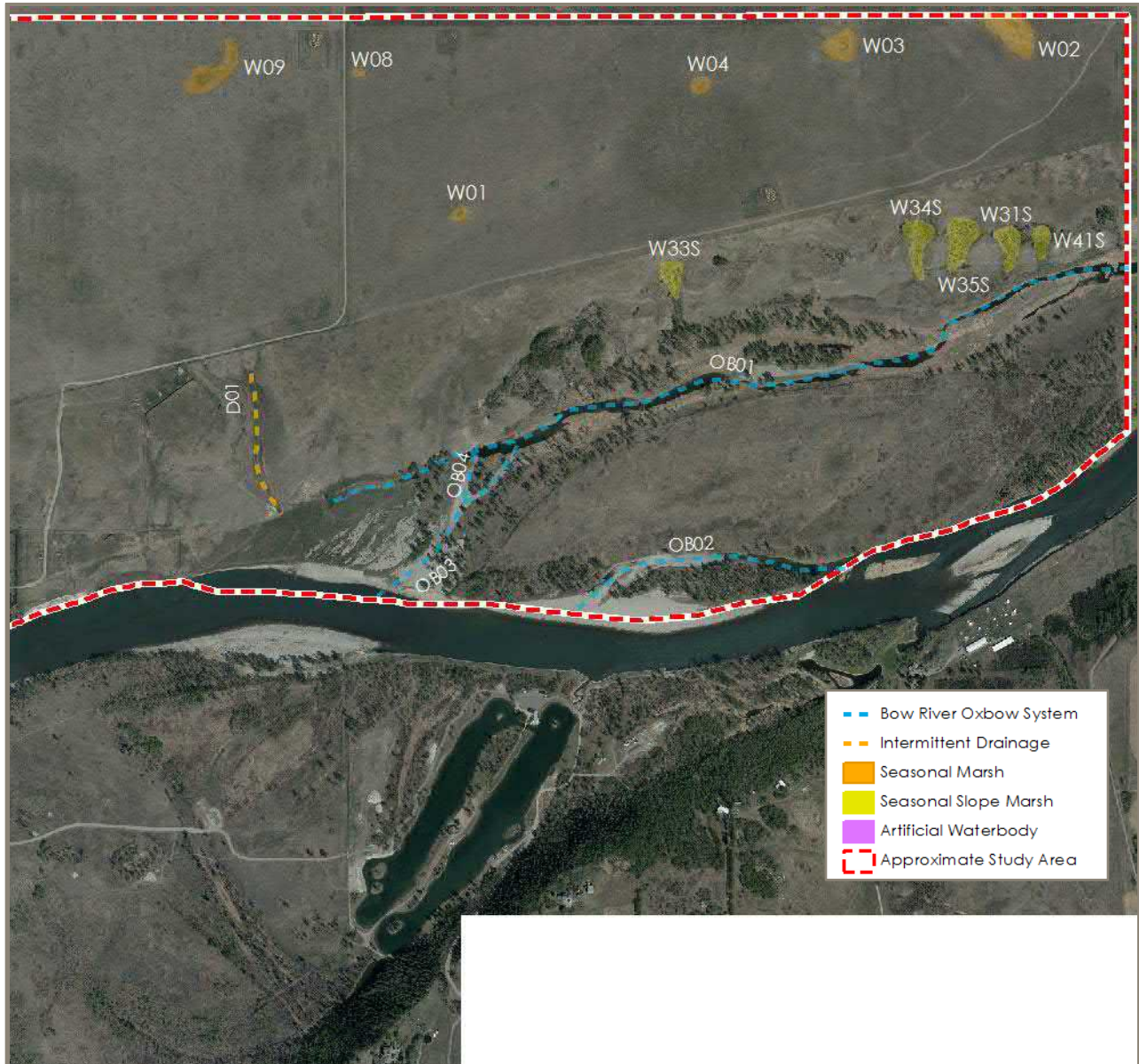


**Figure 1.1 – Waterbody Features within the Study Area (West)**





**Reference: Cell E Planning Area – South Rangeview Area Structure Plan  
Genesis Land Development, Brookfield Residential, and Mr. Sandy Soutzo  
Summary Report in support of Ownership Determination under the *Public Lands Act***



**Figure 1.2 – Waterbody Features within the Study Area (East)**

# APPENDIX H:

## FISH AND WILDLIFE INFORMATION MANAGEMENT TOOL DATABASE RESULTS

# Fish and Wildlife Internet Mapping Tool (FWIMT)

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

## Species Summary Report

Report Created: 8-May-2019 15:08

### Species present within the current extent :

#### Fish Inventory

BROWN TROUT  
 BULL TROUT  
 BURBOT  
 CUTTHROAT TROUT X RAINBOW TF  
 LONGNOSE DACE  
 LONGNOSE SUCKER  
 MOUNTAIN WHITEFISH  
 NORTHERN PIKE  
 RAINBOW TROUT  
 WHITE SUCKER

#### Wildlife Inventory

AMERICAN KESTREL  
 BAIRD'S SPARROW  
 BALD EAGLE  
 BALTIMORE ORIOLE  
 BANK SWALLOW  
 GREAT BLUE HERON  
 LEAST FLYCATCHER  
 LITTLE BROWN BAT

#### Stocked Inventory

No Species Found in Search Extent

### Buffer Extent

#### Centroid (X,Y):

575791, 5632479

#### Projection

10-TM AEP Forest

#### Centroid: (Qtr Sec Twp Rng Mer)

NW 11 22 29 4

#### Radius or Dimensions

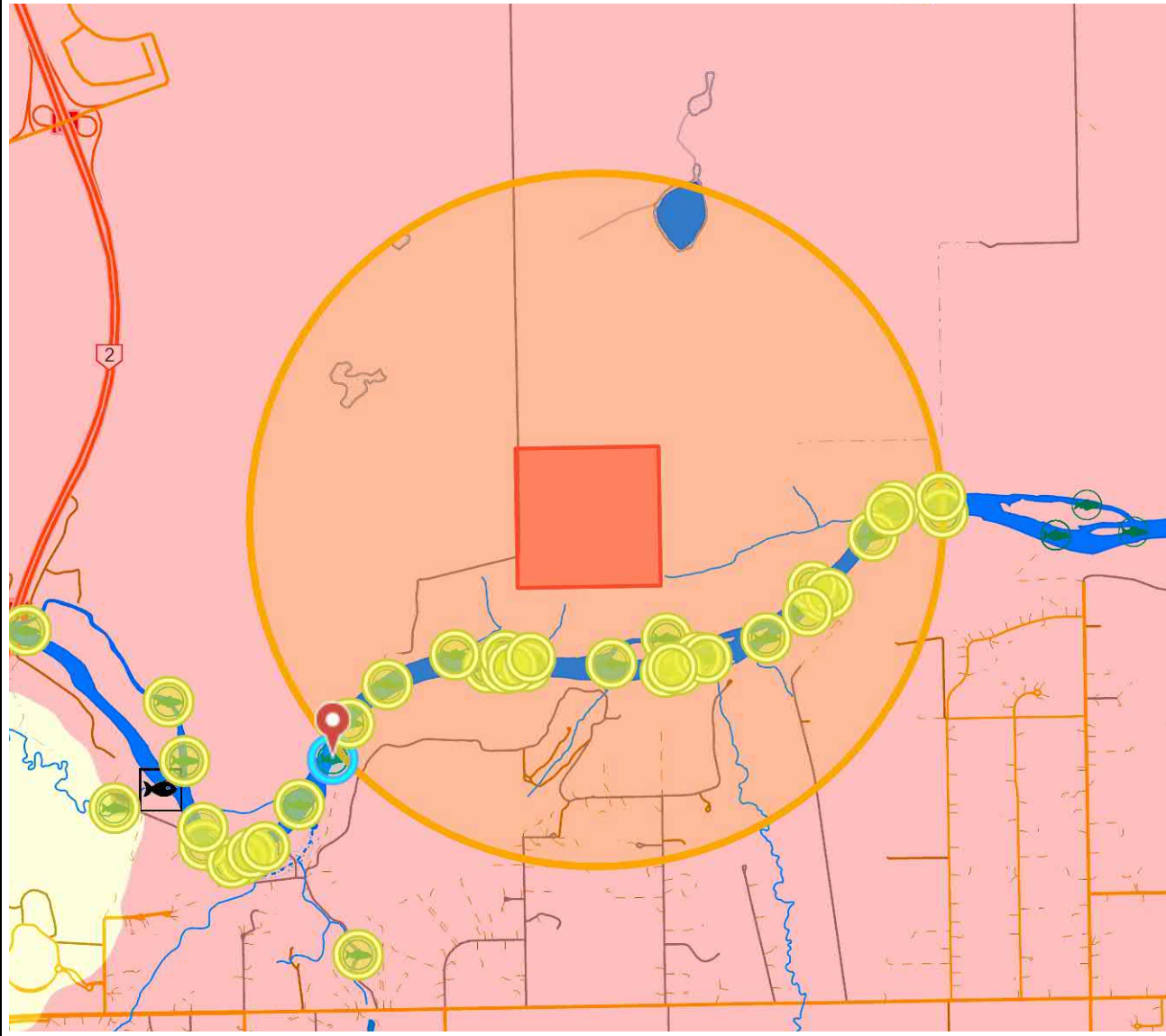
2 kilometers

### Contact Information

For contact information, please visit:

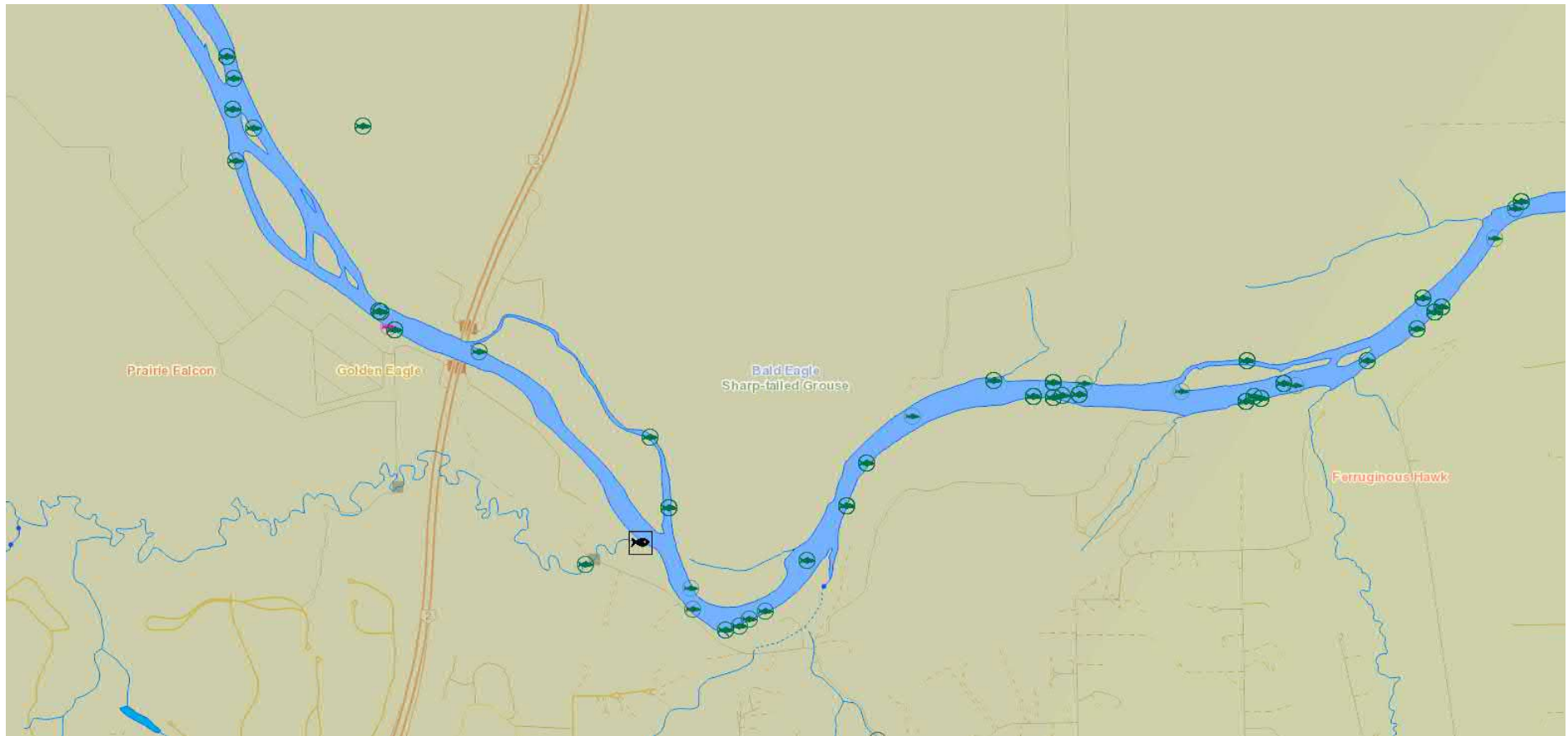
<http://aep.alberta.ca/about-us/contact-us/fisheries-wildlife-management-area-contacts.aspx>



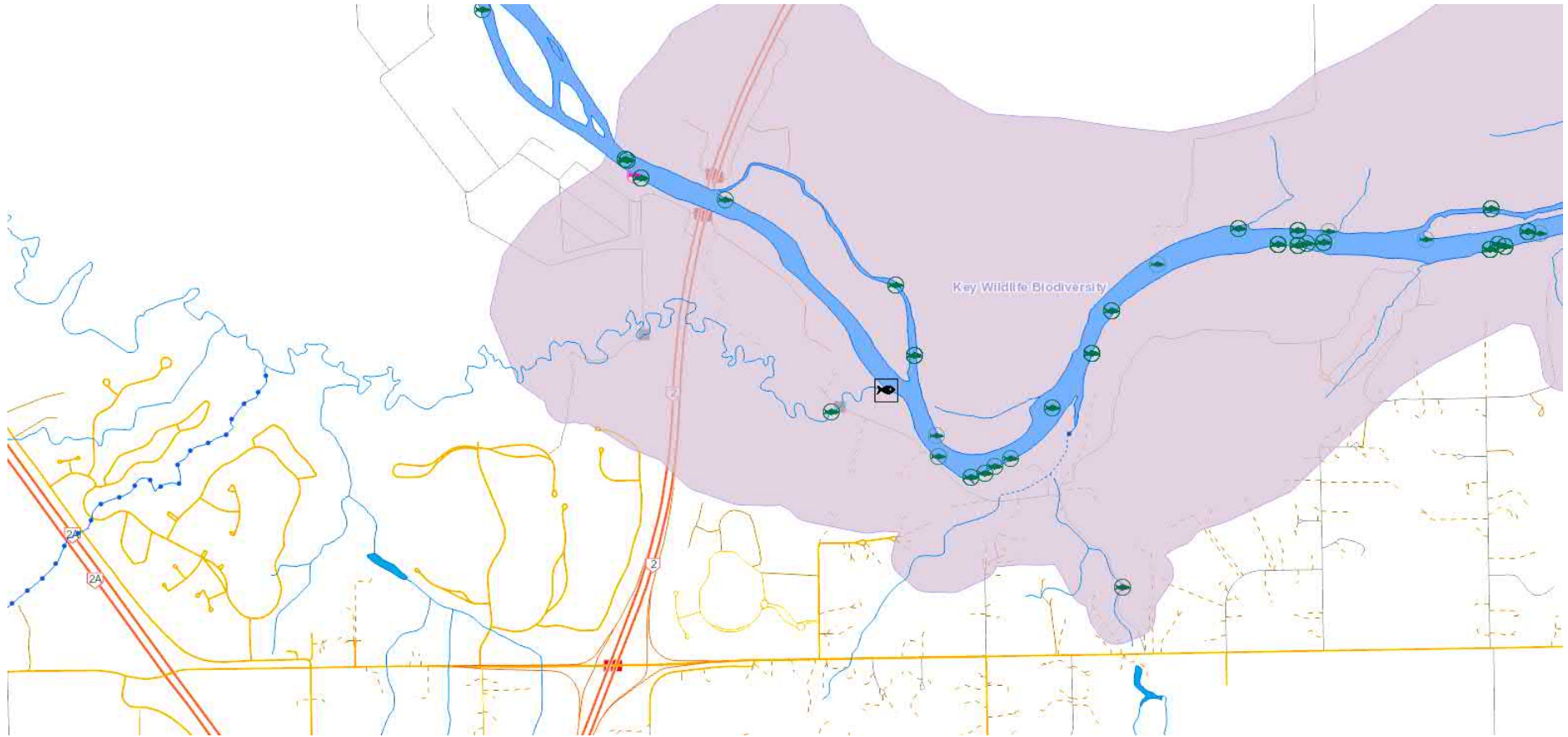


Display may contain: Base Map Data provided by the Government of Alberta under the Alberta Open Government Licence. Cadastral and Dispositions Data provided by Alberta Data Partnerships. ©GeoEye, all rights reserved. Information as depicted is subject to change, therefore the Government of Alberta assumes no responsibility for discrepancies at time of use.

© 2019 Government of Alberta



FWIMT Wildlife Sensitivity Map.



FWIMT Key Wildlife Biodiversity Area Map.



# APPENDIX I:

## POTENTIAL WILDLIFE SPECIES LIST

## Logan Landing Potential Species List

Scientific Name	Common Name
<i>Bonasa umbellus</i>	Ruffed Grouse
<i>Tympanuchus phasianellus</i>	Sharp-tailed Grouse
<i>Anser albifrons</i>	Greater White-fronted Goose
<i>Chen caerulescens</i>	Snow Goose
<i>Chen rossii</i>	Ross's Goose
<i>Branta canadensis</i>	Canada Goose
<i>Branta hutchinsii</i>	Cackling Goose
<i>Cygnus columbianus</i>	Tundra Swan
<i>Anas strepera</i>	Gadwall
<i>Anas platyrhynchos</i>	Mallard
<i>Anas crecca</i>	Green-winged Teal
<i>Anas platyrhynchos</i>	Mallard
<i>Anas acuta</i>	Northern Pintail
<i>Anas discors</i>	Blue-winged Teal
<i>Anas cyanoptera</i>	Cinnamon Teal
<i>Anas clypeata</i>	Northern Shoveler
<i>Anas strepera</i>	Gadwall
<i>Anas americana</i>	American Wigeon
<i>Aythya valisineria</i>	Canvasback
<i>Aythya americana</i>	Redhead
<i>Aythya collaris</i>	Ring-necked Duck
<i>Aythya marila</i>	Greater Scaup
<i>Aythya affinis</i>	Lesser Scaup
<i>Melanitta perspicillata</i>	Surf Scoter
<i>Bucephala albeola</i>	Bufflehead
<i>Bucephala clangula</i>	Common Goldeneye
<i>Bucephala islandica</i>	Barrow's Goldeneye
<i>Lophodytes cucullatus</i>	Hooded Merganser
<i>Mergus merganser</i>	Common Merganser
<i>Mergus serrator</i>	Red-breasted Merganser
<i>Oxyura jamaicensis</i>	Ruddy Duck
<i>Gavia immer</i>	Common Loon
<i>Podilymbus podiceps</i>	Pied-billed Grebe

## Logan Landing Potential Species List

Scientific Name	Common Name
<i>Podiceps auritus</i>	Horned Grebe
<i>Podiceps grisegena</i>	Red-necked Grebe
<i>Podiceps nigricollis</i>	Eared Grebe
<i>Aechmophorus occidentalis</i>	Western Grebe
<i>Aechmophorus clarkii</i>	Clark's Grebe
<i>Pelecanus erythrorhynchos</i>	American White Pelican
<i>Phalacrocorax auritus</i>	Double-crested Cormorant
<i>Botaurus lentiginosus</i>	American Bittern
<i>Ardea herodias</i>	Great Blue Heron
<i>Nycticorax nycticorax</i>	Black-crowned Night-Heron
<i>Pandion haliaetus</i>	Osprey
<i>Circus cyaneus</i>	Northern Harrier
<i>Falco peregrinus</i>	Peregrine Falcon
<i>Falco mexicanus</i>	Prairie Falcon
<i>Accipiter striatus</i>	Sharp-shinned Hawk
<i>Accipiter cooperii</i>	Cooper's Hawk
<i>Accipiter gentilis</i>	Northern Goshawk
<i>Buteo platypterus</i>	Broad-winged Hawk
<i>Buteo swainsoni</i>	Swainson's Hawk
<i>Buteo jamaicensis</i>	Red-tailed Hawk
<i>Buteo regalis</i>	Ferruginous Hawk
<i>Buteo lagopus</i>	Rough-legged Hawk
<i>Aquila chrysaetos</i>	Golden Eagle
<i>Haliaeetus leucocephalus</i>	Bald Eagle
<i>Rallus limicola</i>	Virginia Rail
<i>Porzana carolina</i>	Sora
<i>Himantopus mexicanus</i>	Black-necked Stilt
<i>Recurvirostra americana</i>	American Avocet
<i>Pluvialis squatarola</i>	Black-bellied Plover
<i>Pluvialis dominica</i>	American Golden-Plover
<i>Charadrius semipalmatus</i>	Semipalmated Plover
<i>Charadrius melodus circumcinctus</i>	Piping Plover
<i>Charadrius vociferus</i>	Killdeer



## Logan Landing Potential Species List

Scientific Name	Common Name
<i>Gallinago delicata</i>	Wilson's Snipe
<i>Limnodromus griseus</i>	Short-billed Dowitcher
<i>Limnodromus scolopaceus</i>	Long-billed Dowitcher
<i>Limosa fedoa</i>	Marbled Godwit
<i>Numenius americanus</i>	Long-billed Curlew
<i>Tringa melanoleuca</i>	Greater Yellowlegs
<i>Tringa flavipes</i>	Lesser Yellowlegs
<i>Tringa solitaria</i>	Solitary Sandpiper
<i>Tringa semipalmata</i>	Willet
<i>Actitis macularius</i>	Spotted Sandpiper
<i>Bartramia longicauda</i>	Upland Sandpiper
<i>Arenaria interpres</i>	Ruddy Turnstone
<i>Calidris alba</i>	Sanderling
<i>Calidris pusilla</i>	Semipalmated Sandpiper
<i>Calidris mauri</i>	Western Sandpiper
<i>Calidris minutilla</i>	Least Sandpiper
<i>Calidris fuscicollis</i>	White-rumped Sandpiper
<i>Calidris bairdii</i>	Baird's Sandpiper
<i>Calidris melanotos</i>	Pectoral Sandpiper
<i>Calidris alpina</i>	Dunlin
<i>Phalaropus tricolor</i>	Wilson's Phalarope
<i>Phalaropus lobatus</i>	Red-necked Phalarope
<i>Leucophaeus pipixcan</i>	Franklin's Gull
<i>Chroicocephalus philadelphia</i>	Bonaparte's Gull
<i>Larus delawarensis</i>	Ring-billed Gull
<i>Larus californicus</i>	California Gull
<i>Larus argentatus</i>	Herring Gull
<i>Hydroprogne caspia</i>	Caspian Tern
<i>Sterna hirundo</i>	Common Tern
<i>Sterna forsteri</i>	Forster's Tern
<i>Chlidonias niger</i>	Black Tern
<i>Zenaida macroura</i>	Mourning Dove

## Logan Landing Potential Species List

Scientific Name	Common Name
<i>Bubo scandiacus</i>	Snowy Owl
<i>Bubo virginianus</i>	Great Horned Owl
<i>Strix nebulosa</i>	Great Gray Owl
<i>Glaucidium gnoma</i>	Northern Pygmy-Owl
<i>Aegolius acadicus</i>	Northern Saw-whet Owl
<i>Asio otus</i>	Long-eared Owl
<i>Asio flammeus</i>	Short-eared Owl
<i>Chordeiles minor</i>	Common Nighthawk
<i>Archilochus colubris</i>	Ruby-throated Hummingbird
<i>Selasphorus rufus</i>	Rufous Hummingbird
<i>Megaceryle alcyon</i>	Belted Kingfisher
<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker
<i>Sphyrapicus varius</i>	Yellow-bellied Sapsucker
<i>Sphyrapicus nuchalis</i>	Red-naped Sapsucker
<i>Picoides pubescens</i>	Downy Woodpecker
<i>Picoides villosus</i>	Hairy Woodpecker
<i>Colaptes auratus</i>	Northern Flicker
<i>Dryocopus pileatus</i>	Pileated Woodpecker
<i>Sayornis saya</i>	Say's Phoebe
<i>Contopus cooperi</i>	Olive-sided Flycatcher
<i>Contopus sordidulus</i>	Western Wood-Pewee
<i>Empidonax alnorum</i>	Alder Flycatcher
<i>Empidonax minimus</i>	Least Flycatcher
<i>Tyrannus verticalis</i>	Western Kingbird
<i>Tyrannus tyrannus</i>	Eastern Kingbird
<i>Lanius excubitor</i>	Northern Shrike
<i>Lanius ludovicianus</i>	Loggerhead Shrike
<i>Vireo gilvus</i>	Warbling Vireo
<i>Vireo olivaceus</i>	Red-eyed Vireo
<i>Cyanocitta cristata</i>	Blue Jay
<i>Pica hudsonia</i>	Black-billed Magpie
<i>Corvus brachyrhynchos</i>	American Crow
<i>Corvus corax</i>	Common Raven

## Logan Landing Potential Species List

Scientific Name	Common Name
<i>Bombycilla garrulus</i>	Bohemian Waxwing
<i>Bombycilla cedrorum</i>	Cedar Waxwing
<i>Poecile atricapillus</i>	Black-capped Chickadee
<i>Poecile gambeli</i>	Mountain Chickadee
<i>Stelgidopteryx serripennis</i>	Northern Rough-winged Swallow
<i>Riparia riparia</i>	Bank Swallow
<i>Petrochelidon pyrrhonota</i>	Cliff Swallow
<i>Hirundo rustica</i>	Barn Swallow
<i>Eremophila alpestris</i>	Horned Lark
<i>Regulus satrapa</i>	Golden-crowned Kinglet
<i>Regulus calendula</i>	Ruby-crowned Kinglet
<i>Sitta canadensis</i>	Red-breasted Nuthatch
<i>Sitta carolinensis</i>	White-breasted Nuthatch
<i>Certhia americana</i>	Brown Creeper
<i>Troglodytes aedon</i>	House Wren
<i>Cistothorus palustris</i>	Marsh Wren
<i>Dumetella carolinensis</i>	Gray Catbird
<i>Toxostoma rufum</i>	Brown Thrasher
<i>Sialia mexicana</i>	Western Bluebird
<i>Sialia currucoides</i>	Mountain Bluebird
<i>Myadestes townsendi</i>	Townsend's Solitaire
<i>Catharus fuscescens</i>	Veery
<i>Catharus ustulatus</i>	Swainson's Thrush
<i>Catharus guttatus</i>	Hermit Thrush
<i>Turdus migratorius</i>	American Robin
<i>Anthus rubescens</i>	American Pipit
<i>Anthus spragueii</i>	Sprague's Pipit
<i>Spinus pinus</i>	Pine Siskin
<i>Spinus tristis</i>	American Goldfinch
<i>Acanthis flammea</i>	Common Redpoll
<i>Leucosticte tephrocotis</i>	Gray-crowned Rosy-Finch
<i>Haemorhous purpureus</i>	Purple Finch



## Logan Landing Potential Species List

Scientific Name	Common Name
<i>Haemorhous mexicanus</i>	House Finch
<i>Loxia curvirostra</i>	Red Crossbill
<i>Loxia leucoptera</i>	White-winged Crossbill
<i>Coccothraustes vespertinus</i>	Evening Grosbeak
<i>Oreothlypis peregrina</i>	Tennessee Warbler
<i>Oreothlypis celata</i>	Orange-crowned Warbler
<i>Setophaga petechia</i>	Yellow Warbler
<i>Setophaga striata</i>	Blackpoll Warbler
<i>Setophaga magnolia</i>	Magnolia Warbler
<i>Setophaga tigrina</i>	Cape May Warbler
<i>Setophaga coronata</i>	Yellow-rumped Warbler
<i>Setophaga townsendi</i>	Townsend's Warbler
<i>Mniotilta varia</i>	Black-and-white Warbler
<i>Setophaga ruticilla</i>	American Redstart
<i>Seiurus aurocapilla</i>	Ovenbird
<i>Parkesia noveboracensis</i>	Northern Waterthrush
<i>Geothlypis tolmiei</i>	MacGillivray's Warbler
<i>Geothlypis trichas</i>	Common Yellowthroat
<i>Cardellina pusilla</i>	Wilson's Warbler
<i>Icteria virens</i>	Yellow-breasted Chat
<i>Icterus galbula</i>	Baltimore Oriole
<i>Molothrus ater</i>	Brown-headed Cowbird
<i>Agelaius phoeniceus</i>	Red-winged Blackbird
<i>Euphagus carolinus</i>	Rusty Blackbird
<i>Euphagus cyanocephalus</i>	Brewer's Blackbird
<i>Quiscalus quiscula</i>	Common Grackle
<i>Sturnella neglecta</i>	Western Meadowlark
<i>Xanthocephalus xanthocephalus</i>	Yellow-headed Blackbird
<i>Dolichonyx oryzivorus</i>	Bobolink
<i>Calcarius lapponicus</i>	Lapland Longspur
<i>Calcarius ornatus</i>	Chestnut-collared Longspur
<i>Plectrophenax nivalis</i>	Snow Bunting
<i>Calamospiza melanocorys</i>	Lark Bunting

## Logan Landing Potential Species List

Scientific Name	Common Name
<i>Spizelloides arborea</i>	American Tree Sparrow
<i>Spizella passerina</i>	Chipping Sparrow
<i>Spizella pallida</i>	Clay-colored Sparrow
<i>Spizella breweri</i>	Brewer's Sparrow
<i>Pooecetes gramineus</i>	Vesper Sparrow
<i>Chondestes grammacus</i>	Lark Sparrow
<i>Passerculus sandwichensis</i>	Savannah Sparrow
<i>Ammodramus bairdii</i>	Baird's Sparrow
<i>Ammodramus leconteii</i>	Le Conte's Sparrow
<i>Ammodramus nelsoni</i>	Nelson's Sparrow
<i>Passerella iliaca</i>	Fox Sparrow
<i>Melospiza melodia</i>	Song Sparrow
<i>Melospiza lincolnii</i>	Lincoln's Sparrow
<i>Melospiza georgiana</i>	Swamp Sparrow
<i>Zonotrichia albicollis</i>	White-throated Sparrow
<i>Pipilo maculatus</i>	Spotted Towhee
<i>Piranga ludoviciana</i>	Western Tanager
<i>Pheucticus ludovicianus</i>	Rose-breasted Grosbeak
<i>Sorex cinereus</i>	Cinereus Shrew
<i>Sorex monticolus</i>	Dusky Shrew
<i>Sorex hoyi</i>	American Pygmy Shrew
<i>Myotis lucifugus</i>	Little Brown Myotis
<i>Myotis evotis</i>	Long-eared Myotis
<i>Myotis volans</i>	Long-legged Myotis
<i>Myotis ciliolabrum</i>	Western Small-footed Myotis
<i>Lasionycteris noctivagans</i>	Silver-haired Bat
<i>Eptesicus fuscus</i>	Big Brown Bat
<i>Lasiurus cinereus</i>	Hoary Bat
<i>Lepus americanus</i>	Snowshoe Hare
<i>Lepus townsendii</i>	White-tailed Jackrabbit
<i>Neotamias minimus</i>	Least Chipmunk
<i>Marmota monax</i>	Woodchuck

## Logan Landing Potential Species List

Scientific Name	Common Name
<i>Urocitellus richardsonii</i>	Richardson's Ground Squirrel
<i>Castor canadensis</i>	American Beaver
<i>Peromyscus maniculatus</i>	North American Deermouse
<i>Microtus pennsylvanicus</i>	Meadow Vole
<i>Microtus longicaudus</i>	Long-tailed Vole
<i>Ondatra zibethicus</i>	Common Muskrat
<i>Erethizon dorsatum</i>	North American Porcupine
<i>Canis latrans</i>	Coyote
<i>Canis lupus</i>	Gray Wolf
<i>Vulpes velox</i>	Swift Fox
<i>Ursus americanus</i>	American Black Bear
<i>Ursus arctos</i>	Brown Bear
<i>Pekania pennanti</i>	Fisher
<i>Martes americana</i>	American Marten
<i>Mustela erminea</i>	Ermine
<i>Mustela nivalis</i>	Least Weasel
<i>Mustela frenata</i>	Long-tailed Weasel
<i>Vison vison</i>	American Mink
<i>Taxidea taxus</i>	American Badger
<i>Mephitis mephitis</i>	Striped Skunk
<i>Lontra canadensis</i>	North American River Otter
<i>Lynx canadensis</i>	Canada Lynx
<i>Lynx rufus</i>	Bobcat
<i>Puma concolor</i>	Cougar
<i>Odocoileus hemionus</i>	Mule Deer
<i>Odocoileus virginianus</i>	White-tailed Deer
<i>Alces americanus</i>	Moose
<i>Thamnophis elegans</i>	Terrestrial Gartersnake
<i>Thamnophis radix</i>	Plains Gartersnake
<i>Thamnophis sirtalis</i>	Common Gartersnake
<i>Lithobates pipiens</i>	Northern Leopard Frog
<i>Lithobates sylvaticus</i>	Wood Frog
<i>Pseudacris maculata</i>	Boreal Chorus Frog

### Logan Landing Potential Species List

Scientific Name	Common Name
Ambystoma macrodactylum	Long-toed Salamander
Ambystoma mavortium	Barred Tiger Salamander
Anaxyrus cognatus	Great Plains Toad
Anaxyrus hemiophrys	Canadian Toad
Anaxyrus boreas	Western Toad



# APPENDIX-J

## E-BIRD CHECKLIST

# eBird Field Checklist

## Policeman's Flats

Calgary, Alberta, CA

[ebird.org/hotspot/L430047](http://ebird.org/hotspot/L430047)

121 species (+8 other taxa) - Year-round, All Years

**Date:** \_\_\_\_\_  
**Start Time:** \_\_\_\_\_  
**Duration:** \_\_\_\_\_  
**Distance:** \_\_\_\_\_  
**Party Size:** \_\_\_\_\_  
**Notes:** \_\_\_\_\_

This checklist is generated with data from eBird (ebird.org), a global database of bird sightings from birders like you. If you enjoy this checklist, please consider contributing your sightings to eBird. It is 100% free to take part, and your observations will help support birders, researchers, and conservationists worldwide.

Go to [ebird.org](http://ebird.org) to learn more!

### Waterfowl

- Canada Goose
- Trumpeter Swan
- Tundra Swan
- Trumpeter/Tundra Swan
- Wood Duck
- Blue-winged Teal
- Cinnamon Teal
- Northern Shoveler
- Gadwall
- Eurasian Wigeon
- American Wigeon
- Mallard
- Northern Pintail
- Green-winged Teal
- Canvasback
- Redhead
- Ring-necked Duck
- Greater Scaup
- Lesser Scaup
- Bufflehead
- Common Goldeneye
- Barrow's Goldeneye
- Hooded Merganser
- Common Merganser
- duck sp.

### Grouse, Quail, and Allies

- Ring-necked Pheasant

### Grebes

- Horned Grebe

- Eared Grebe
- Western Grebe

### Pigeons and Doves

- Rock Pigeon
- Mourning Dove

### Rails, Gallinules, and Allies

- Sora
- American Coot

### Shorebirds

- Killdeer
- Pectoral Sandpiper
- Wilson's Snipe
- Spotted Sandpiper
- Solitary Sandpiper
- Greater Yellowlegs
- Willet
- Lesser Yellowlegs

### Gulls, Terns, and Skimmers

- Franklin's Gull
- Ring-billed Gull
- California Gull
- Herring Gull
- gull sp.
- Least Tern
- Black Tern
- Common Tern
- Forster's Tern

### Cormorants and Anhingas

- Double-crested Cormorant

**Pelicans** American White Pelican**Hérons, Ibis, and Allies** Great Blue Heron**Vultures, Hawks, and Allies**

Osprey  
 Sharp-shinned Hawk  
 Northern Goshawk  
 Bald Eagle  
 Swainson's Hawk  
 Red-tailed Hawk  
 Rough-legged Hawk

**Owls** Great Horned Owl**Kingfishers** Belted Kingfisher**Woodpeckers**

Yellow-bellied Sapsucker  
 Red-naped Sapsucker  
 Downy Woodpecker  
 Hairy Woodpecker  
 Pileated Woodpecker  
 Northern Flicker

**Falcons and Caracaras**

American Kestrel  
 Merlin  
 falcon sp.

**Tyrant Flycatchers: Pewees, Kingbirds, and Allies**

Olive-sided Flycatcher  
 Western Wood-Pewee

Least Flycatcher  
 Western Kingbird  
 Eastern Kingbird

**Vireos** Warbling Vireo**Shrikes** Northern Shrike**Jays, Magpies, Crows, and Ravens**

Blue Jay  
 Black-billed Magpie  
 American Crow  
 Common Raven

**Tits, Chickadees, and Titmice** Black-capped Chickadee**Larks** Horned Lark**Martins and Swallows**

Northern Rough-winged Swallow  
 Tree Swallow  
 Bank Swallow  
 Barn Swallow  
 Cliff Swallow  
 swallow sp.

**Nuthatches**

Red-breasted Nuthatch  
 White-breasted Nuthatch

**Wrens** House Wren**Starlings and Mynas** European Starling**Catbirds, Mockingbirds, and Thrashers** Gray Catbird**Thrushes**

Townsend's Solitaire  
 American Robin

**Waxwings**

Bohemian Waxwing  
 Cedar Waxwing

**Old World Sparrows** House Sparrow**Finches, Euphonias, and Allies**

House Finch  
 Common Redpoll  
 American Goldfinch

**New World Sparrows**

Chipping Sparrow  
 Clay-colored Sparrow  
 American Tree Sparrow  
 Dark-eyed Junco  
 White-crowned Sparrow  
 Harris's Sparrow  
 White-throated Sparrow  
 Vesper Sparrow  
 LeConte's Sparrow  
 Savannah Sparrow  
 Song Sparrow  
 Lincoln's Sparrow  
 Spotted Towhee  
 sparrow sp.

This field checklist was generated using eBird (ebird.org)

**Blackbirds**

- Yellow-headed Blackbird
- Western Meadowlark
- Baltimore Oriole
- Red-winged Blackbird
- Brown-headed Cowbird
- Brewer's Blackbird
- blackbird sp.

**Wood-Warblers**

- Common Yellowthroat
- Yellow Warbler
- Yellow-rumped Warbler

**Cardinals, Grosbeaks, and Allies**

- Western Tanager

**Others**

- passerine sp.

This field checklist was generated using eBird (ebird.org)



# APPENDIX-K

## POINT COUNT DATA

Appendix I: Logan's Landing Bird Point Count Data

Site No.	Common Name	Scientific Name	Count	Date	Time	Weather	Cloud Cover	Easting	Northing
<b>RR04</b>	Clay-colored Sparrow	Spizella pallida	1	11-Jun-19	5:40	8c light breeze	60	3713.485	5635888
	Savannah Sparrow	Passerculus sandwichensis	3						
	Western Meadowlark	Sturnella neglecta	1						
<b>RR005</b>	California Gull	Larus californicus	2	11-Jun-19	6:00	10c calm	60	3855.293	5636222
	Great Blue Heron	Ardea herodias	2						
	Savannah Sparrow	Passerculus sandwichensis	4						
	Western Meadowlark	Sturnella neglecta	3						
<b>RR006</b>	Clay-colored Sparrow	Spizella pallida	3	11-Jun-19	6:20	12c light breeze	50	3360.875	5636112
	Franklin's Gull	Leucophaeus pipixcan	1						
	Savannah Sparrow	Passerculus sandwichensis	1						
	Western Meadowlark	Sturnella neglecta	3						
<b>RR008</b>	Clay-colored Sparrow	Spizella pallida	1	11-Jun-19	7:05	8c light breeze	70	3352.871	5635561
	Great Blue Heron	Ardea herodias	1						
	Red-winged Blackbird	Agelaius phoeniceus	1						
	Savannah Sparrow	Passerculus sandwichensis	1						

Appendix I: Logan's Landing Bird Point Count Data

Site No.	Common Name	Scientific Name	Count	Date	Time	Weather	Cloud Cover	Easting	Northing
<b>RR009</b>	American Robin	Turdus migratorius	1	11-Jun-19	7:30	8c light breeze	70	3488.417	5635256
	Clay-colored Sparrow	Spizella pallida	9						
	European Starling	Sturnus vulgaris	2						
	Franklin's Gull	Leucophaeus pipixcan	20						
	Mallard	Anas platyrhynchos	2						
	Savannah Sparrow	Passerculus sandwichensis	3						
	Western Meadowlark	Sturnella neglecta	1						
<b>RR014</b>	Blue-winged Teal	Anas discors	1	12-Jun-19	7:15	12c light air	10	2995.526	5634873
	Clay-colored Sparrow	Spizella pallida	1						
	European Starling	Sturnus vulgaris	2						
	Franklin's Gull	Leucophaeus pipixcan	9						
	Great Blue Heron	Ardea herodias	1						
	Northern Rough-winged Swallow	Stelgidopteryx serripennis	10						
	Red-winged Blackbird	Agelaius phoeniceus	4						

# APPENDIX-L

## STANTEC DATA





TABLE F-1 – SOMC POTENTIALLY OCCURRING WITHIN PLAN AREA

Common Name	Scientific Name	SARA Status <sup>1</sup>	COSEWIC Status <sup>2</sup>	AESCC Status <sup>3</sup>	Alberta General Status <sup>4</sup>	Habitat Association
Birds						
trumpeter swan	<i>Cygnus buccinator</i>	-	Not at Risk	Special Concern	Sensitive	Shallow lakes, marshes and ponds, wooded swamps - migration
white-winged scoter	<i>Melanitta fusca</i>	-	-	-	Sensitive	Ponds, lakes and oxbows in open country
sharp-tailed grouse	<i>Tympanuchus phasianellus</i>	-	-	-	Sensitive	Native grassland and tame pasture
pieb-billed grebe	<i>Podilymbus podiceps</i>	-	-	-	Sensitive	Seasonal or permanent wetlands with emergent vegetation
horned grebe	<i>Podiceps auritus</i>	Special Concern (Schedule 1)	Special concern	-	Sensitive	Small, shallow, graminoid ponds and marshes
western grebe	<i>Aechmophorus occidentalis</i>	Special Concern (Schedule 1)	Special Concern	Threatened	At Risk	Lakes and marshes with large open area – most likely during migration
common nighthawk	<i>Chordeiles minor</i>	Threatened (Schedule 1)	Threatened	-	Sensitive	Grassland, clear-cut areas of forest, gravel
yellow rail	<i>Coturnicops noveboracensis</i>	Special Concern (Schedule 1)	Special Concern	-	Undetermined	Sedge marsh
sora	<i>Porzana Carolina</i>	-	-	-	Sensitive	Seasonal or semi-permanent graminoid marsh or wet meadows
sandhill crane	<i>Grus Canadensis</i>	-	-	-	Sensitive	Isolated bogs, marshes, swamps; cultivated fields - during migration
black-necked stilt	<i>Himantopus</i>	-	-	-	Sensitive	Wet pastures, pools, marshes or lakes, mudflats.
upland sandpiper	<i>Bartramia longicauda</i>	-	-	-	Sensitive	Pasture, wet meadows
long-billed curlew	<i>Numenius americanus</i>	-	-	-	Sensitive	Grasslands
buff-breasted sandpiper	<i>Calidris subruficollis</i>	Special Concern (Schedule 1)	Special Concern	-	-	Upland borders wetlands –during migration



Common Name	Scientific Name	SARA Status <sup>1</sup>	COSEWIC Status <sup>2</sup>	AESCC Status <sup>3</sup>	Alberta General Status <sup>4</sup>	Habitat Association
black tern	<i>Chlidonias niger</i>	-	-	-	Sensitive	Shallow marshes, semi-permanent ponds
Forster's tern	<i>Sterna forsteri</i>	-	-	-	Sensitive	Islands or floating vegetation in marshes or streams
American white pelican	<i>Pelecanos erythrorhynchos</i>	-	-	-	Sensitive	Islands on lakes for breeding, forage in marshes, lakes, or rivers
American bittern	<i>Botarus lentiginosus</i>	-	-	-	Sensitive	Graminoid marsh
great blue heron	<i>Ardea Herodias</i>	-	-	-	Sensitive	Swamps or islands on lakes
black-crowned night-heron	<i>Nycticorax nycticorax</i>	-	-	-	Sensitive	Swamps, streams, rivers, marshes
osprey	<i>Pandion haliaetus</i>	-	-	-	Sensitive	Large trees, typically broadleaf, and man-made structures near waterbodies with fish
bald eagle	<i>Haliaeetus leucocephalus</i>	-	Not at Risk	-	Sensitive	Large trees, typically broadleaf, and man-made structures near waterbodies with fish
northern goshawk	<i>Accipiter gentilis (atricapillus)</i>	-	Not at Risk	-	Sensitive	Mature mixed and broadleaf forest
broad-winged hawk	<i>Buteo platypterus</i>	-	-	-	Sensitive	Broadleaf or coniferous forest
ferruginous hawk	<i>Buteo regalis</i>	Threatened (Schedule 1)	Threatened	Endangered	At Risk	Dry native grasslands, pasture
golden eagle	<i>Aquila chrysaetos</i>	-	Not at Risk	-	Sensitive	Grassland, shrubland, riparian and coniferous forest
northern pygmy owl	<i>Glaucidium gnoma</i>	-	-	-	Sensitive	Mature coniferous forest; open forests
barred owl	<i>Strix varia</i>	-	-	Special concern	Sensitive	Broadleaf or mixed forest
great gray owl	<i>Strix nebulosa</i>	-	Not at Risk	-	Sensitive	Coniferous forest
short-eared owl	<i>Asio flammeus</i>	Special Concern (Schedule 1)	Special Concern	-	May be at Risk	Grasslands and meadows
pileated woodpecker	<i>Dryocopus pileatus</i>	-	-	-	Sensitive	Mixed and broadleaf forest



Common Name	Scientific Name	SARA Status <sup>1</sup>	COSEWIC Status <sup>2</sup>	AESCC Status <sup>3</sup>	Alberta General Status <sup>4</sup>	Habitat Association
American kestrel	<i>Falco sparverius</i>	-	-	-	Sensitive	Grassland, meadows, agricultural fields with broadleaf or mixedwood tree stands
peregrine falcon	<i>Falco peregrinus (anatum/tundrius)</i>	Special Concern (Schedule 1)	Not at Risk	Threatened	At Risk	Cliffs, grassland, shrubland
prairie falcon	<i>Falco mexicanus</i>	-	Not at Risk	Special concern	Sensitive	Cliff; grassland, shrubland
olive-sided flycatcher	<i>Contopus cooperi</i>	Threatened (Schedule 1)	Threatened	-	May Be at Risk	Coniferous and mixed forests, near open areas/edges; burns, with tall trees, dead standing trees
western wood-pewee	<i>Contopus sordidulus</i>	-	-	-	May Be At Risk	Broadleaf and mixed forest near riparian zones
alder flycatcher	<i>Empidonax alnorum</i>	-	-	-	Sensitive	Open broadleaf and mixed forest
least flycatcher	<i>Empidonax minimus</i>	-	-	-	Sensitive	Open broadleaf and mixed forest
eastern phoebe	<i>Sayornis phoebe</i>	-	-	-	Sensitive	Open broadleaf or mixed forest near water
eastern kingbird	<i>Tyrannus tyrannus</i>	-	-	-	Sensitive	Open shrublands and woodlots, often near water
loggerhead shrike	<i>Lanius ludovicianus</i>	Threatened (Schedule 1)	Threatened	Special Concern	Sensitive	Shrubland and native prairie
purple martin	<i>Progne subis</i>	-	-	-	Sensitive	Shrubland and native prairie
bank swallow	<i>Riparia riparia</i>	Threatened (Schedule 1)	Threatened	-	-	Banks of river, streams, and wetlands
barn swallow	<i>Hirundo rustica</i>	Threatened (Schedule 1)	Threatened	-	Sensitive	Near water in grassland, shrubland, open forest
Sprague's pipit	<i>Anthus spragueii</i>	Threatened (Schedule 1)	Threatened	Special Concern	Sensitive	Native grasslands and pasture
evening grosbeak	<i>Coccothraustes vespertinus</i>	-	Special Concern	-	-	Various habitats during winter.
bobolink	<i>Dolichonyx orizivorus</i>	Threatened (Schedule 1)	Threatened	-	Sensitive	Pastures, hayfields and meadows



Common Name	Scientific Name	SARA Status <sup>1</sup>	COSEWIC Status <sup>2</sup>	AESCC Status <sup>3</sup>	Alberta General Status <sup>4</sup>	Habitat Association
Baltimore oriole	<i>Icterus galbula</i>	-	-	-	Sensitive	Mixed and broadleaf forest
rusty blackbird	<i>Euphagus carolinus</i>	Special Concern (Schedule 1)	Special Concern	-	Sensitive	Wet coniferous and mixed forest, fens, bogs, swamps – during migration
common yellowthroat	<i>Geothlypis trichas</i>	-	-	-	Sensitive	Graminoid marsh, shrubby and wooded swamp
western tanager	<i>Piranga ludoviciana</i>	-	-	-	Sensitive	Coniferous and mixed forest
<b>Mammals</b>						
silver-haired bat	<i>Lasiurus noctivagans</i>	-	-	-	Sensitive	Mature/old-growth forests with cavities,
eastern red bat	<i>Lasiurus borealis</i>	-	-	-	Sensitive	Broadleaf and mixed forest
western small-footed myotis	<i>Myotis ciliolabrum</i>	-	-	Special Concern	Sensitive	Grasslands, badlands.
little brown myotis	<i>Myotis lucifugus</i>	Endangered (Schedule 1)	Endangered	-	May Be at Risk	Mature/old-growth forests with cavities, rock crevices, buildings
bobcat	<i>Lynx rufus</i>	-	-	-	Sensitive	Forests, grassland, shrubland, coulees
long-tailed weasel	<i>Mustela frenata</i>	-	Not at Risk	-	May Be at Risk	Grassland, shrubland, forest, agricultural land, marshes
<b>Amphibians</b>						
northern leopard frog	<i>Lithobates pipiens</i>	Special Concern (Schedule 1)	Special Concern	Threatened	At Risk	Graminoid marsh, swamps, shallow open water with emergent vegetation
western toad	<i>Anaxyrus boreas</i>	Special Concern (Schedule 1)	Special Concern	-	Sensitive	
Canadian toad	<i>Anaxyrus hemiophrys</i>	-	-	Data Deficient	May Be at Risk	
western (barred) tiger salamander	<i>Ambystoma mavortium</i>	No Status (No Schedule)	Special Concern	-	Secure	Semi-permanent and permanent wetlands





Common Name	Scientific Name	SARA Status <sup>1</sup>	COSEWIC Status <sup>2</sup>	AESCC Status <sup>3</sup>	Alberta General Status <sup>4</sup>	Habitat Association
Reptiles						
wandering garter snake	<i>Thamnophis elegans vagrans</i>	-	-	-	Sensitive	Grassland, open forest, meadows, riparian areas, south facing slopes and escarpments
plains garter snake	<i>Thamnophis radix</i>	-	-	-	Sensitive	
red-sided garter snake	<i>Thamnophis sirtalis</i>	-	-	-	Sensitive	
<sup>1</sup> – listed Endangered, Threatened, or Special Concern by SARA Public Registry (Government of Canada 2017b); <sup>2</sup> – listed Endangered, Threatened, or Special Concern by COSEWIC (COSEWIC 2017); <sup>3</sup> – listed species legally protected under the AWA (AESCC 2015); <sup>4</sup> – listed At Risk, May be at Risk, or Sensitive under the Alberta Wild Species General Listing of 2015 (Government of Alberta 2017a); “-“ – Dash indicates no status or non-occurring.						



TABLE F-2 – LANDSCAPE COVER TYPES SURVEYED PER TRANSECT IN WINTER TRACK COUNT SURVEY

Transect (m)	Lotic (Deciduous)	Lotic (Herbaceous)	Lotic (River)	Overflow	Thin Breaks	Loamy	Tame Pasture & Rural
	Percent (%)						
A (1,050)	-	-	-	-	-	-	100
B (1,400)	8	-	8	20	15	5	44
C (1,500)	18	-	14	28	12	27	1
D (1,250)	-	-	-	-	-	-	100
E (600)	60	12	-	-	16	12	-
F (650)	32	8	-	31	25	4	-
G (700)	23	4	-	51	19	3	-
H (725)	22	15	-	14	23	27	-
Plan Area (7,875)	16	3	4	17	12	10	37

"-" – Dash indicates absence of species track counts

TABLE F-3 – RELATIVE ABUNDANCE (TRACKS/KM-DAY) OF WILDLIFE SPECIES PER LANDSCAPE COVER TYPE IN WINTER TRACK COUNT SURVEY

Landscape Cover (m)	upland game bird	small rodent	porcu pine	coyote	ermine	least weasel	deer spp.	Species Richness	Km-Days Sampled
	Tracks/km-Day								
Lotic (Deciduous) (1275)	0.01	0.06	-	0.13	-	0.01	0.41	5	6.35
Lotic (Herbaceous) (265)	-	0.10	-	1.64	-	-	1.53	3	1.41
Lotic (River) (320)	-	-	0.18	2.09	-	-	0.27	3	1.42
Overflow (1370)	-	-	-	0.13	0.06	-	0.32	3	6.70
Thin Breaks (970)	0.05	0.07	-	0.26	0.04	-	1.03	5	4.77
Loamy (785)	-	-	-	0.42	-	-	-	1	3.84
Tame Pasture (2890)	-	0.05	-	0.01	-	-	0.07	3	13.3
Plan Area (7875)	0.21	0.67	0.05	3.05	0.28	0.05	7.03	7	38.98

"-" – Dash indicates absence of species track counts



TABLE F-4 – DOMINANT SITE TYPES PER BREEDING BIRD SURVEY STATION

Station	Dominant Landscape Cover Types Surveyed (ha) per Station	Landscape Features
A	Thin Breaks/ Lentic (Seasonal)/Loamy	grassland, grassland slopes
B	Lotic (Deciduous)/Overflow	grassland
C	Overflow	grassland and shrubland habitat types
D	Lotic (Deciduous)/Lotic (Herbaceous)	-
E	Think Breaks	grassland slopes
F	Lotic (Herbaceous)/Thin Breaks	grassland slopes
G	Tame Pasture	-
H	Tame Pasture	-
I	Tame Pasture	-
J	Tame Pasture	-
K	Tame Pasture	-
L	Tame Pasture	-
M	Thin Breaks <sup>1</sup> /Lentic (Seasonal)	grassland slopes
N	Loamy/Thin Break/Lentic (Seasonal)	grassland, grassland slopes
O	Tame Pasture	-
P	Thin Break/Loamy	grassland, grassland slopes
Q	Lotic (Deciduous)/Overflow	grassland and shrubland habitat types
R	Lotic (River)/Lotic (Deciduous)	-

TABLE F-5 – BREEDING BIRD SURVEY RESULTS

Common Name	Scientific Name	Breeding Territories per Station																	Total	
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q		R
common goldeneye	<i>Bucephala clangula</i>	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	2
common merganser	<i>Mergus merganser</i>	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
yellow-bellied sapsucker	<i>Sphyrapicus petechia</i>	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-	2
downy woodpecker	<i>Picoides pubescens</i>	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	3
northern flicker	<i>Colaptes auratus</i>	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	1	1	4
western wood-pewee	<i>Contopus sordidulus</i>	-	2	-	2	1	-	-	-	-	-	-	-	-	-	-	-	1	5	11
least flycatcher	<i>Empidonax minimus</i>	-	1	-	2	1	1	-	-	-	-	-	-	-	-	-	-	2	-	7
western kingbird	<i>Tyrannus verticalis</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
eastern kingbird	<i>Tyrannus tyrannus</i>	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	2	4
warbling vireo	<i>Vireo gilvus</i>	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	2	4
mourning dove	<i>Zenaidura macroura</i>	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1



Common Name	Scientific Name	Breeding Territories per Station																	Total	
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q		R
tree swallow	<i>Tachycineta bicolor</i>	1	1	-	1	1	1	-	-	-	-	-	1	1	-	-	1	2	10	
northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>	-	-	-	-	1	1	-	-	-	-	-	1	-	-	-	-	-	3	
<b>bank swallow</b>	<b><i>Riparia riparia</i></b>	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	2	
black-capped chickadee	<i>Poecile atricapillus</i>	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	
white-breasted nuthatch	<i>Sitta carolinensis</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	
house wren	<i>Troglodytes aedon</i>	4	5	-	5	4	1	-	-	-	-	-	1	2	-	-	5	9	36	
American robin	<i>Turdus migratorius</i>	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	
gray catbird	<i>Dumetella carolinensis</i>	1	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	3	
European starling	<i>Sturnus vulgaris</i>	-	2	-	1	2	-	-	-	-	-	-	-	1	-	-	-	2	8	
cedar waxwing	<i>Bombycilla cedrorum</i>	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	3	
yellow warbler	<i>Setophaga petechia</i>	-	1	1	6	1	1	-	-	-	-	-	-	-	-	-	1	1	12	
clay-colored sparrow	<i>Spizella pallida</i>	1	4	3	-	1	2	-	-	-	-	-	5	2	-	6	1	-	25	
vesper sparrow	<i>Poocetes gramineus</i>	-	-	-	-	-	-	-	-	-	-	-	1	1	-	1	-	-	3	
savannah sparrow	<i>Passerculus sandwichensis</i>	-	-	5	-	-	5	2	4	2	4	6	4	8	5	3	4	2	54	
<b>Baird's sparrow</b>	<b><i>Ammodramus bairdii</i></b>	-	-	-	-	-	-	-	2	-	2	1	5	-	-	-	-	-	10	
Le Conte's sparrow	<i>Ammodramus leconteii</i>	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2	
song sparrow	<i>Melospiza melodia</i>	-	-	-	2	1	1	-	-	-	-	-	-	-	-	-	-	2	6	
western meadowlark	<i>Sturnella neglecta</i>	1	-	-	-	-	-	2	3	2	2	1	4	-	1	-	2	-	18	
red-winged blackbird	<i>Agelaius phoeniceus</i>	1	-	-	1	2	3	-	-	-	-	-	-	-	-	-	-	-	7	
brown-headed cowbird	<i>Molothrus ater</i>	-	1	-	1	1	2	-	-	-	-	-	-	-	-	-	-	2	9	
<b>Baltimore oriole</b>	<b><i>Icterus galbula</i></b>	-	-	-	1	3	-	-	-	-	-	-	-	-	-	-	1	3	8	
American goldfinch	<i>Spinus tristis</i>	-	1	-	-	-	-	-	-	-	-	-	-	1	-	-	4	-	6	
Total Number of Territories		10	22	10	27	27	20	4	9	4	8	8	13	19	14	3	13	22	35	267
Species Richness		7	13	4	15	19	11	2	3	2	3	3	3	8	8	1	4	12	14	33
* <b>Bold</b> style font indicates SOMC																				





TABLE F-6 – DOMINANT SITE TYPES PER BAT AUTOMATED ACOUSTIC DETECTOR STATION

Station	Landscape Cover Type	Landscape Features
A	Lotic (Deciduous)/Lotic (Herbaceous)	deciduous trees and water
B	Overflow/Lotic (Deciduous)	deciduous trees, grassland and shrubland
C	Loamy/Tame Pasture	grassland
D	Loamy/Tame Pasture/Rural Residence	grassland, farm buildings

TABLE F-7 – ALL WILDLIFE SPECIES OBSERVED IN THE PLAN AREA

Common Name	Scientific Name	SARA Status (Schedule) <sup>1</sup>	COSEWIC Status <sup>2</sup>	AESCC Status <sup>3</sup>	Alberta General Status <sup>4</sup>
<b>Birds</b>					
Canada goose	<i>Branta canadensis</i>	-	-	-	Secure
tundra swan	<i>Cygnus columbianus</i>	-	-	-	Secure
blue-winged teal	<i>Spatula discors</i>	-	-	-	Secure
northern shoveler	<i>Spatula clypeata</i>	-	-	-	Secure
gadwall	<i>Mareca strepera</i>	-	-	-	Secure
American wigeon	<i>Mareca Americana</i>	-	-	-	Secure
mallard	<i>Anas platyrhynchos</i>	-	-	-	Secure
lesser scaup	<i>Aythya affinis</i>	-	-	-	Secure
common goldeneye	<i>Bucephala clangula</i>	-	-	-	Secure
common merganser	<i>Mergus merganus</i>	-	-	-	Secure
ruby-throated hummingbird	<i>Archilochus colubris</i>	-	-	-	Secure
mourning dove	<i>Zenaida macroura</i>	-	-	-	Secure
<b>sora</b>	<b><i>Porzana carolina</i></b>	-	-	-	<b>Sensitive</b>
killdeer	<i>Charadrius vociferous</i>	-	-	-	Secure
spotted sandpiper	<i>Actitis macularius</i>	-	-	-	Secure
solitary sandpiper	<i>Tringa solitaria</i>	-	-	-	Secure
lesser yellowlegs	<i>Tringa flavipes</i>	-	-	-	Secure
greater yellowlegs	<i>Tringa melanoleuca</i>	-	-	-	Secure
Franklin's gull	<i>Leucophaeus pipixcan</i>	-	-	-	Secure
double-crested cormorant	<i>Phalacrocorax auritus</i>	-	-	-	Secure
<b>American white pelican</b>	<b><i>Pelecanus erythrorhynchos</i></b>	-	-	-	<b>Sensitive</b>
<b>great blue heron</b>	<b><i>Ardea herodias</i></b>	-	-	-	<b>Sensitive</b>
<b>osprey</b>	<b><i>Pandion haliaetus</i></b>	-	-	-	<b>Sensitive</b>



Common Name	Scientific Name	SARA Status (Schedule) <sup>1</sup>	COSEWIC Status <sup>2</sup>	AESCC Status <sup>3</sup>	Alberta General Status <sup>4</sup>
<b>bald eagle</b>	<i>Haliaeetus leucocephalus</i>	-	-	-	<b>Sensitive</b>
red-tailed hawk	<i>Buteo jamaicensis</i>	-	-	-	Secure
Swainson's hawk	<i>Buteo swainsoni</i>	-	-	-	Secure
northern harrier	<i>Circus hudsonius</i>	-	-	-	Secure
great horned owl	<i>Bubo virginianus</i>	-	-	-	Secure
belted kingfisher	<i>Megaceryle alcyon</i>	-	-	-	Secure
yellow-bellied sapsucker	<i>Sphyrapicus petechia</i>	-	-	-	Secure
downy woodpecker	<i>Picoides pubescens</i>	-	-	-	Secure
northern flicker	<i>Colaptes auratus</i>	-	-	-	Secure
<b>pileated woodpecker</b>	<i>Dryocopus pileatus</i>	-	-	-	<b>Sensitive</b>
<b>American kestrel</b>	<i>Falco sparverius</i>	-	-	-	<b>Sensitive</b>
merlin	<i>Falco columbarius</i>	-	-	-	Secure
<b>western wood-pewee</b>	<i>Contopus sordidulus</i>	-	-	<b>May Be At Risk</b>	<b>Sensitive</b>
<b>least flycatcher</b>	<i>Empidonax minimus</i>	-	-	-	<b>Sensitive</b>
western kingbird	<i>Tyrannus verticalis</i>	-	-	-	Secure
<b>eastern kingbird</b>	<i>Tyrannus tyrannus</i>	-	-	-	<b>Sensitive</b>
warbling vireo	<i>Vireo gilvus</i>	-	-	-	Secure
black-billed magpie	<i>Pica hudsonia</i>	-	-	-	Secure
American crow	<i>Corvus brachyrhynchos</i>	-	-	-	Secure
common raven	<i>Corvus corax</i>	-	-	-	Secure
tree swallow	<i>Tachycineta bicolor</i>	-	-	-	Secure
northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>	-	-	-	Secure
<b>bank swallow</b>	<i>Riparia riparia</i>	<b>Threatened (Schedule 1)</b>	<b>Threatened</b>	-	<b>Sensitive</b>
cliff swallow	<i>Petrochelidon pyrrhonota</i>	-	-	-	Secure
black-capped chickadee	<i>Poecile atricapillus</i>	-	-	-	Secure
white-breasted nuthatch	<i>Sitta carolinensis</i>	-	-	-	Secure
house wren	<i>Troglodytes aedon</i>	-	-	-	Secure
marsh wren	<i>Cistothorus palustris</i>	-	-	-	Secure
American robin	<i>Turdus migratorius</i>	-	-	-	Secure
gray catbird	<i>Dumetella carolinensis</i>	-	-	-	Secure
European starling	<i>Sturnus vulgaris</i>	-	-	-	Exotic/Alien
cedar waxwing	<i>Bombycilla cedrorum</i>	-	-	-	Secure



Common Name	Scientific Name	SARA Status (Schedule) <sup>1</sup>	COSEWIC Status <sup>2</sup>	AESCC Status <sup>3</sup>	Alberta General Status <sup>4</sup>
American goldfinch	<i>Spinus tristis</i>	-	-	-	Secure
clay-colored sparrow	<i>Spizella pallida</i>	-	-	-	Secure
vesper sparrow	<i>Poocetes gramineus</i>	-	-	-	Secure
savannah sparrow	<i>Passerculus sandwichensis</i>	-	-	-	Secure
<b>Baird's sparrow</b>	<b><i>Ammodramus bairdii</i></b>	<b>Special Concern (Schedule 1)</b>	<b>Special Concern</b>	-	<b>Sensitive</b>
Le Conte's sparrow	<i>Ammodramus leconteii</i>	-	-	-	Secure
Nelson's sparrow	<i>Ammodrammus nelsonii</i>	-	-	-	Secure
song sparrow	<i>Melospiza melodia</i>	-	-	-	Secure
Lincoln's sparrow	<i>Melospiza lincolnii</i>	-	-	-	Secure
western meadowlark	<i>Sturnella neglecta</i>	-	-	-	Secure
red-winged blackbird	<i>Agelaius phoeniceus</i>	-	-	-	Secure
brown-headed cowbird	<i>Molothrus ater</i>	-	-	-	Secure
<b>Baltimore oriole</b>	<b><i>Icterus galbula</i></b>	-	-	-	<b>Sensitive</b>
yellow warbler	<i>Setophaga petechia</i>	-	-	-	Secure
<b>Mammals</b>					
Richardson's ground squirrel	<i>Spermophilus richardsonii</i>	-	-	-	Secure
muskrat	<i>Ondatra zibethicus</i>	-	-	-	Secure
deer mouse	<i>Peromyscus maniculatus</i>	-	-	-	Secure
beaver	<i>Castor canadensis</i>	-	-	-	Secure
porcupine	<i>Erethizon dorsatum</i>	-	-	-	Secure
white-tailed jackrabbit	<i>Lepus townsendii</i>	-	-	-	Secure
silver-haired bat	<i>Lasionycteris noctivagans</i>	-	-	-	Sensitive
eastern red bat	<i>Lasiurus borealis</i>	-	-	-	Sensitive
western small-footed myotis	<i>Myotis ciliolabrum</i>	-	-	-	Sensitive
little-brown myotis	<i>Myotis lucifugus</i>	Threatened (Schedule 1)	Threatened	-	May Be At Risk
red fox	<i>Vulpes vulpes</i>	-	-	-	Secure
coyote	<i>Canis latrans</i>	-	-	-	Secure
least weasel	<i>Mustela nivalis</i>	-	-	-	Secure
ermine	<i>Mustela erminea</i>	-	-	-	Secure
<b>American badger</b>	<b><i>Taxidea taxus taxus</i></b>	-	<b>Special Concern</b>	<b>Data Deficient</b>	<b>Sensitive</b>
raccoon	<i>Procyon lotor</i>	-	-	-	Secure



Common Name	Scientific Name	SARA Status (Schedule) <sup>1</sup>	COSEWIC Status <sup>2</sup>	AESCC Status <sup>3</sup>	Alberta General Status <sup>4</sup>
mule deer	<i>Odocoileus hemionus</i>	-	-	-	Secure
white-tailed deer	<i>Odocoileus virginianus</i>	-	-	-	Secure
moose	<i>Alces americanus</i>	-	-	-	Secure
<b>Amphibians</b>					
Boreal chorus frog	<i>Pseudacris maculata</i>	-	-	-	Secure
Wood frog	<i>Lithobates sylvaticus</i>	-	-	-	Secure
<sup>1</sup> – listed Endangered, Threatened, or Special Concern by SARA Public Registry (Government of Canada 2017b); <sup>2</sup> – listed Endangered, Threatened, or Special Concern by COSEWIC (COSEWIC 2017); <sup>3</sup> – listed species legally protected under the AWA (AESCC 2015); <sup>4</sup> – listed At Risk, May be at Risk, or Sensitive under the Alberta Wild Species General Listing of 2015 (Government of Alberta 2017a); <b>*Bold</b> style font indicates SOMC; “-” – Dash indicates no status.					

**TABLE F-8 – POTENTIAL SETBACK DISTANCES FOR ACTIVE WILDLIFE HABITAT FEATURES OBSERVED OR POTENTIALLY OCCURRING<sup>1</sup> IN THE PLAN AREA**

Species or Species group	Scientific Name	Potential Breeding Season Setback <sup>2</sup> (m)
waterfowl/waterbirds	-	50 – 100
sensitive raptors	-	100 – 1,000
bald eagle	<i>Haliaeetus leucocephalus</i>	1,000
great blue heron	<i>Ardea herodias</i>	1,000
red-tailed hawk	<i>Buteo jamaicensis</i>	100
swainson's hawk	<i>Buteo Swainsoni</i>	100
great horned owl	<i>Bubo virginianus</i>	100
pileated woodpecker	<i>Dryocopus pileatus</i>	100
common raven	<i>Corvus corax</i>	30 – 50
bank swallow	<i>Riparia riparia</i>	50
Baird's sparrow	<i>Ammodrammus bairdii</i>	100
other migratory songbirds	-	30 – 50
Coyote	<i>Canis latrans</i>	50 – 100
American badger	<i>Taxus taxidea</i>	100
<sup>1</sup> - based on field results and/or available databases <sup>2</sup> - setbacks shown are limited to the breeding season. All setbacks and restricted activity periods shown are subject to change through consultation with AEP and are dependent on the combination of the level of disturbance of proposed construction activities and ambient disturbance levels experienced at specific breeding sites and other potential contributing factors. All consultation shall be completed prior to final determination of setbacks.		



# APPENDIX-M

## ENGINEERING TECHNICAL MEMORANDUM

DATE: September 30, 2021  
TO: CPAG Team – Logan Landing Outline Plan LOC2020-0100  
CC: Arnie Stefaniuk, Genesis; Pam MacInnis, B&A  
FROM: Trenton Gartke, Urban Systems  
FILE: 2197.0009.11  
SUBJECT: Supplementary Information – August 25 Meeting

## BACKGROUND

An Outline Plan and Land Use Redesignation application for Logan Landing was submitted to the City of Calgary in July 2020. After circulation, numerous DTR comments were focused on Environmental Reserve, existing natural features, road alignment, and developable area. In an effort to work together to resolve these comments, the City of Calgary and the developer and consultant team have been meeting for a series of workshops to discuss existing site conditions, the proposed plan, and potential ER areas.

In an August 25, 2021 meeting, the City requested the consultant and developer team to provide more information on the following:

- The viability of maintaining Wetlands W28S and W30 using ordinary development setbacks
- The best guess at development constraints that would be required to maintain Wetlands W28S and W30

The above information is captured in this technical memorandum under engineering seal and permit.

Wetland W28S and W30 are sloped wetlands classified as Class III seasonal wetlands. They are fed by a perched groundwater table (see McIntosh Lalani's 2021-09-16 Wetland Impact memorandum and Waterline's 2019 hydrogeology report) and are not significantly fed by surface drainage. The viability of the wetlands is dependant on maintaining the current groundwater flow.

The presence of groundwater in the Logan Landing area has been conceptually mapped through Golder's 2014 desktop study as well as Waterline's hydrogeological report (August 2019). Based on the mapping available and site reconnaissance, the perched groundwater system daylight into the Logan Landing slope from the north at the wetland locations, at a ground elevation of +/-1018m.

It is noteworthy that W28S and W30 are two of several sloped wetlands in the Ricardo Ranch ASP but the only ones impacted by proposed development.

## VIABILITY OF WETLANDS W28S AND W30 UNDER ORDINARY SETBACKS

Based on the City of Calgary Environmental Reserve Setback Policy (City of Calgary, 2007), W28S and W30 qualify for a 30m setback, outside of which development can occur. Since the groundwater source for the wetlands comes from the north, only development impacts north of the wetlands are considered.

The finished grade elevation of development around W28S and W30 is fixed by maximum road grades coming from the collector road that connects the upper plateau lands to the lower bench lands, as conceptually located in the Ricardo Ranch ASP. Road grades have been set at 6% starting from the lower bench based on City of Calgary policy and engineering best practices. The resulting finished grade of development north of W28S is +/-1020m with deep utility grades of about +/- 1015m.

The impacts on groundwater by adjacent development come by way of basement weeping tile systems and deep utility bedding gravels.

Basement weeping tile systems are placed around the basement footings of residential development in order to direct groundwater and surface water infiltration away from concrete foundations. Water is intercepted by weeping tile and directed into the storm sewer system. It is standard engineering best practice as well as a City of Calgary requirement to use weeping tile systems to intercept groundwater and mitigate the risk of water damaging basement foundations. Weeping tile systems are typically located +/-3m below finished grade elevation.

Deep utility bedding gravels are used to properly install and backfill deep utilities (sanitary sewer, storm sewer, potable water) that service adjacent development. Since bedding gravels are clean graded (high percentage of voids in the mix) they allow groundwater to infiltrate and typically conduct groundwater to enter the storm sewer system. Deep utility bedding gravels are typically located in a +/- 3m to 5m zone below finished grade elevation.

The groundwater impact zone of basement weeping tile systems and deep utility bedding gravels north of the wetlands ranges from approximately 1015m-1017m in elevation. This zone is below the elevation of the wetlands' groundwater source (1018m) and thus will intercept the groundwater feeding W28S and W30. This will eliminate the hydrological regime feeding W28S and W30 and likely result in both wetlands losing most or potentially all wetland characteristics in a short timeframe.

The impacts to groundwater cannot be avoided without risking the safety and integrity of City infrastructure and adjacent development. Thus, development occurring north of W28S and W30 will eliminate the sustaining groundwater source for the wetlands.

While the groundwater source for W28S and W30 will be impacted, surface water may be added to the wetlands. However, since W28S and W30 are located along a slope, water will run off and not support the wetlands in their current state. Attempting to sustain these wetlands by surface water instead of groundwater will alter the biophysical regime of the wetlands and poses significant risk to their viability.

## VIABILITY OF WETLANDS W28S AND W30 UNDER INCREASED SETBACKS

Since ordinary development setbacks would result in the elimination of W28S and W30 due to groundwater interception, a way to potentially maintain the wetlands is to establish an increased development setback that would move the groundwater impact zone of adjacent development up and out of the perched groundwater table (i.e. protect the hydraulic connectivity of the wetlands).

Assuming the +/-5m depth of deep utility bedding gravels governs the groundwater impact zone, it is estimated that the wetland setback would need to be increased to 120m total based on the elevation of the escarpment road. This buffer would need to extend on the north, west and east sides of the wetlands in order to preserve the existing groundwater feed.

While a 120m buffer is an estimation at how far away road and land development would need to be in order to preserve the groundwater table feeding W28S and W30, it is by no means guaranteed to be sufficient. Groundwater behaviour can be difficult to predict, and it is nearly impossible to certify that W28S and W30 will not be impacted by development anywhere in the upper bench lands in the Ricardo Ranch ASP. Per the attached McIntosh Lalani Wetland Impacts memorandum, it is expected that "development of Ricardo Ranch as well as the surrounding lands will severely limit the potential for stormwater to collect and recharge the shallow

# URBAN SYSTEMS MEMORANDUM

DATE: September 30, 2021

FILE: 2197.0009.11

PAGE: 3 of 3

SUBJECT: Supplementary Information – August 25 Meeting

groundwater table, which could result in the proposed wetland drying out.” Regardless of the post development scenario around W28S and W30, there will exist a risk to their long-term viability.

Furthermore, attempting to maintain W28S and W30 with groundwater flow will pose a risk to infrastructure and development to the south (downslope) from winter seepage and ice buildup. Any groundwater reaching the wetland will be uncontrolled and pose a safety risk to infrastructure and development down slope from the wetland. It is for this reason that it is engineering best practice and the standard City of Calgary approach to control and mitigate groundwater from reaching the surface and posing a risk to infrastructure and development.

The above considerations notwithstanding, providing a 120m+ buffer for development adjacent to W28S is not practical when considering the required collector road alignment as proposed in the Ricardo Ranch ASP and development within the area.

## CONCLUSION AND RECOMMENDATIONS

Based on the post development scenario under normal development setbacks, groundwater will be intercepted by weeping tile and deep utility bedding gravels required to mitigate the risk to safety and integrity of City infrastructure and adjacent development.

The required setbacks in order to potentially maintain W28S and W30 (120m) are prohibitively large. Regardless, even with increased setbacks, it is expected that development of the Ricardo Ranch area will in general reduce the shallow groundwater table and result in the drying out of these wetlands.

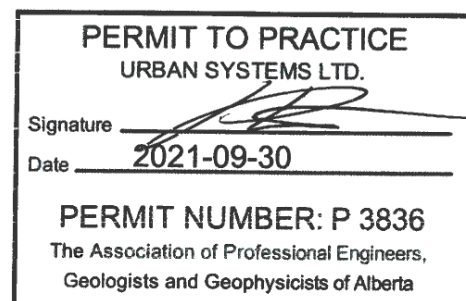
Based on this analysis, it is not possible to reliably maintain W28S or W30 in any foreseeable post development condition while maintaining the safety and integrity of nearby infrastructure and development.

Sincerely,

**URBAN SYSTEMS LTD.**

Trenton Gartke, P.Eng.  
Project Engineer

/tg

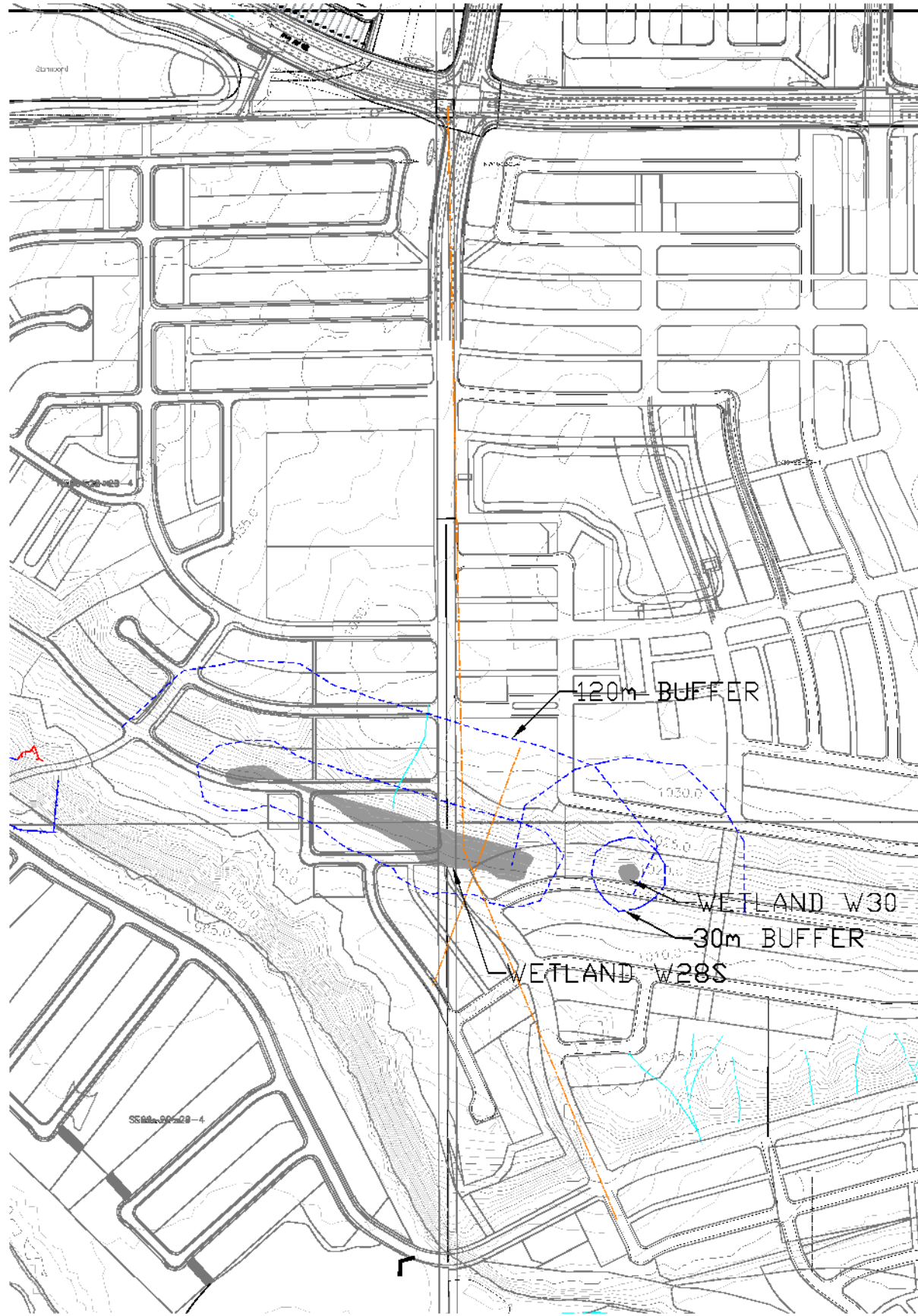


Phil Nottveit, P.Eng.  
Senior Engineer

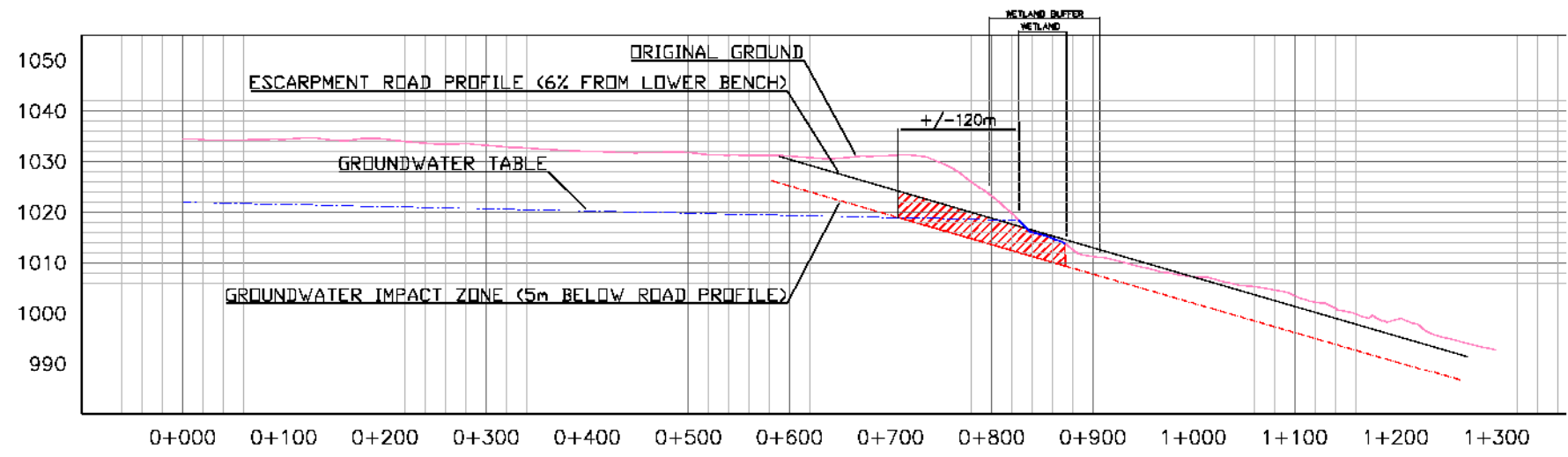
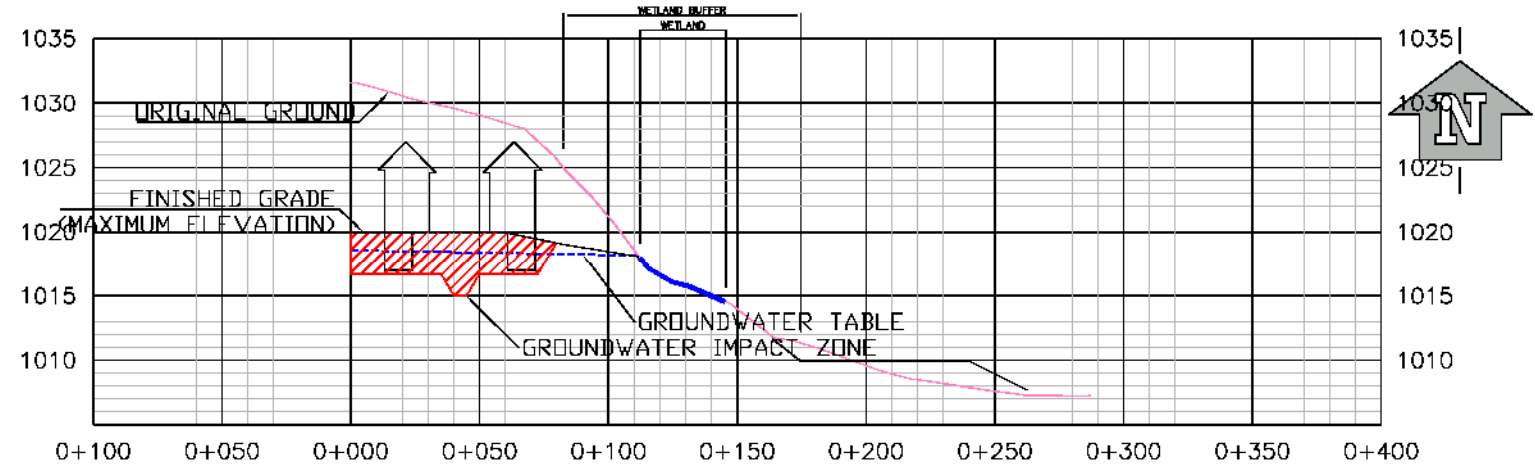
U:\Projects\_CAL\2197\0009\11\C-Correspondence\C4-Government-Agencies-Utilities\2021-09-08-Memo Wetland Impact\2021-09-30-MEMO-Wetland Impact.docx



L:\Projects\_CA\_21970009110\_Design\CAD\PROJ\FIG-2\1900311\fig-sections\_2.dwg 11x17 LANDSCAPE 20210917 04:07 pm ipg/rlc



**LOGAN LANDING**



Client/Project		
GENESIS		
2197.0009.11		
Scale	Revision Date	Figure
nts	2021-07-12	1
2197.0009.11	Title	

**WETLAND CONSTRAINTS ORIGINAL GROUND PROFILES**

# APPENDIX-N

## WEST MITIGATION AND MONITORING REPORTS

**Genesis Ricardo Ranch  
Great Blue Heron Colony Monitoring  
Calgary, Alberta**

---



**Prepared for:**

**Genesis Land Development**

6240, 333 – 96 Ave NE  
Calgary, Alberta T3K 0S3

---

**Prepared by:**

Western EcoSystems Technology, ULC  
Suite 303, 1000 9<sup>th</sup> Avenue SW  
Calgary, Alberta, T2P 2Y6

**August 02, 2022**



---

Confidential Business Information

**TABLE OF CONTENTS**

INTRODUCTION ..... 1  
    Background..... 1  
Methods..... 2  
Results..... 2  
    May 20, 2022 Site Visit ..... 2  
    July 8, 2022 Site Visit..... 3  
Discussion ..... 4  
REFERENCES ..... 6

**LIST OF APPENDICES**

Appendix A. Colony Monitoring Observation Log



## INTRODUCTION

Genesis Land Development Corp. (Genesis) contracted Western EcoSystems Technology, ULC (WEST) to complete colony monitoring at a great blue heron (*Ardea herodias*) colony at the proposed Ricardo Ranch development in the southeast portion of the City of Calgary near the community of Seton (Figure 1). Following the development of the *Ricardo Ranch Great Blue Heron Colony Mitigation Plan* (the Plan; Bartok and Russell 2019), a monitoring program was developed to provide a baseline of the heron's behaviours, evaluate their reaction to anthropogenic disturbance, and to determine the number of active nests in the colony. Monitoring of the heron colony commenced in 2021. This report comprises year two of monitoring for 2022.

### Background

Although the Alberta subspecies of great blue heron is not a species at risk (Government of Canada 2002), the British Columbia subspecies (*Ardea Herodias fannini*) is at risk, and as such, a federal management plan for the species was developed. The management plan identified residential development as a threat to the species with potential loss of nesting habitat, and colony disturbance as a result of noise and human activity. Construction work may also cause abandonment of nests (Government of Canada 2020).

In 2017, a passive scan of the colony documented 18 nests with at least 10 active (Stantec 2018). A site visit in 2018 determined that the colony is located in a stand of mature (i.e., tall) cottonwood trees approximately 170 m from the closest open water of the Bow River to the southeast and about 750 m from the nearest area of the proposed Ricardo Ranch development to the north (Bartok 2019). A total of 55 nest structures were observed, with an estimated 30 actually in use, based on nest size and quality (Photo 1). In 2021, the colony was monitored for a total of 10 hours in May and July to determine the number of active nests and to record behavioural observations of the colony with respect to anthropogenic disturbance. During the 2021 monitoring, a minimum of 8 nests were considered active (Bartok et al. 2021).



*Photo 1. Nest structures in the great blue heron colony within the Ricardo Ranch ASP boundary.*

Current sources of disturbance to the great blue heron colony include: 1) the Policeman's Flats boat launch (approximately 250 m southeast of the colony); 2) more than 30 existing residences located between 400 and 1,000 m south of the colony; and 3) recreational boaters, fishermen, and river users within 100 m (south) of the colony.

## **Methods**

To determine the number of active nests and provide a behavioral baseline of the great blue heron colony, WEST observed the great blue heron colony from the Policeman's Flats boat launch on the southern bank of the Bow River on May 20, 2022 and July 8, 2022. All active nests were recorded and heron activity, relative to human activity in the area, was recorded. The colony was observed from approximately 250 m away at the Policeman's Flats boat launch and was not entered during either visit to minimize disturbance to the nesting birds.

## **Results**

### **May 20, 2022 Site Visit**

A WEST biologist completed monitoring of the colony on Friday, May 20, 2022 between 06:25 and 11:25 hours (hrs). The weather was overcast with periods of rain and a high of 10°C. Based on direct observation of nests with juveniles as well as adult nesting behavior, 12 of the 25 visible nests were active (Appendix A1). The other 30 nest structures documented during the 2018 visit were obscured by leaves and could not be viewed without entering the colony (Photo 2).



*Photo 2. Great blue heron colony as viewed from Policeman's Flats boat launch on May 20, 2022.*

During the May 20, 2022 visit, one boat was launched at Policeman's Flats and a maximum of 4 vehicles were in the parking lot at a given time. Some human activities (e.g., fishing, dog-walking, bird-watching, and photography) occurred along the south bank of the Bow River during the monitoring; however, the activities were apparently undisruptive to the colony. At approximately 10:30 a.m., a fisherman exited and lost control of his boat and began chasing it along the north bank of the Bow River within 100 m of the colony, however, this disturbance did not appear to affect the colony.

The herons were most active in the morning and activity appeared to decrease (e.g., adult birds left the colony less frequently) as the morning progressed. Earlier in the morning, herons were frequently observed flying in and out of the colony and did not appear to exhibit signs of stress

while vehicles moved in and out of the Policeman's Flats parking lot. Herons were also observed collecting nesting material along the north bank of the Bow River (within 250 m of the colony). The birds generally flew east when leaving the colony and avoided the south bank of the Bow River around the Policeman's Flats parking lot.

### **July 8, 2022 Site Visit**

A WEST biologist completed monitoring of the heron colony on Saturday July 8, 2022 between 08:00 and 13:10 hrs. The weather was sunny with a high of 27°C. Based on direct observation of nests with juveniles as well as adult nesting behavior, a minimum of 10 of the 4 visible nests were confirmed as active. The reduction in active nests between the two visits is due to the increase in leafy vegetation obscuring portions of the colony (Photo 3). The colony was not entered to avoid disturbing the birds.



*Photo 3. Great blue heron colony viewed from 100 m east of Policeman's Flats boat launch on July 8, 2022.*

During the July 8, 2022 visit, the Policeman's Flats boat launch was busy with human activity during the morning with a maximum of 19 vehicles in the parking lot at a given time. Human activity at the boat launch decreased after approximately 10:00 a.m. Herons appeared aware of boats passing by and exhibited some signs of stress (e.g., flapping of wings) during very loud noises, but did not flush from their nests (Appendix A2). No herons were observed landing on the riverbank during this visit. Herons most frequently flew to the east and southeast when exiting the colony. One instance of an adult feeding a juvenile was observed at one of the nests. Most nests were left unattended for longer periods of time (i.e., longer than 1 hour; Table 1). Heron activity decreased after 11:00 a.m., which was likely a result of rising ambient air temperature.

## **Discussion**

During the 2021 monitoring, 11 nests were recorded as active based on either direct observation of either juveniles on nests or adults exhibiting nesting behaviour. In 2022, 12 nests were recorded as active. Although the biologist was unable to observe all nest structures from the south bank of the Bow River, it appears that the number of active nests within the colony has remained consistent between years. As the biologist did not physically enter the colony, an exact count of active nests could not be determined.

Similar to 2021, the earlier of the two colony monitoring visits had cool temperatures with overcast and rainy conditions and human activity was low as a result. Conversely, the July 8 visit had favorable weather for outdoor recreation activities (sunny and 27°C) and the amount of human activity was correspondingly high. Generally, the herons exhibited more behavioural stress responses (e.g., increased alertness, reluctance to forage) during the July 8 visit when compared to the May 20 visit. This was likely a result of greater human activity during the second visit. As observed in 2021, the herons were less likely to react to quieter disturbances (e.g., kayaks floating by), but did exhibit stress responses (e.g., increased vigilance and flapping) to loud noises and visual disturbances.

During the 2022 monitoring, at no point did anthropogenic disturbance result in herons flushing from their nests or the colony. This may be due to the herons being acclimated to the human disturbance associated with the Policeman's Flats boat launch. Heron colonies can habituate to low-level and non-threatening stimulus (Vennesland 2010) and adult herons tend to flush less after chicks have hatched (Vennesland 2000).

Great blue heron colonies do exist in high human activity areas, such as a colony in an urban park in the city of Victoria, British Columbia (Vennesland 2010) and a colony in the city of Medicine Hat, however higher disturbance levels can result in lower nesting success when compared to colonies with lower levels of human disturbance (e.g., Keller 1989; Lord et al. 2001; Skagen et al. 2001; Vennesland and Butler 2004). As observed in 2021 and 2022, the herons appear to be habituated to the disturbance associated with the Policeman's Flats boat launch and appear capable of co-existing with human presence.

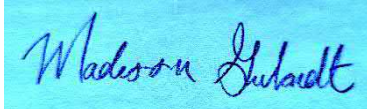


Should you have any questions or require additional information, please do not hesitate to contact us.

Regards,

**Western EcoSystems Technology, ULC**

**Author:**



Madison Gerbrandt, B. Sc.  
Wildlife Technician  
(403) 401-6655  
mgerbrandt@west-ulc.ca

**Reviewed by:**



Kent Russell, B.Sc., P.Biol., R.P.Bio.  
Wildlife Biologist and Project Manager  
(403) 607-0342  
krussell@west-ulc.ca



Josh Sullivan, M.Sc., P.Biol.  
Wildlife Biologist and Project Manager  
(587) 435-5674  
jsullivan@west-ulc.ca

## REFERENCES

- Bartok and Russell. 2019. Technical Memorandum to Genesis Land Development Corp., 7315 - 8th Street NE, Calgary AB. Revised November 25, 2020. 14 pp.
- Bartok, Russell, and Gerbrandt. 2021. Technical Memorandum to Genesis Land Development Corp., 7315 - 8th Street NE, Calgary AB.
- Government of Canada. 2002. Species at Risk Act. Available at: <https://laws-lois.justice.gc.ca/eng/acts/s15.3/>. Accessed November 16, 2018
- Government of Canada. 2020. Management Plan for the Great Blue Heron *fannini* subspecies in Canada. Environment Canada and Climate Change. 26 pp.
- Keller. 1989. Variations in the response of Great-crested Grebes *Podiceps Cristatus* to human disturbance – a sign of adaptation? *Biol. Conserv.* 49(1): pp. 31-45
- Lord, Waas, Innes, and Whittingham. 2001. Effects of Human Approaches to Nests of Northern New Zealand Dotterels. *Biol. Conserv.* 98: pp. 233-240.
- Skagen, Melcher, and Muths. 2001. The Interplay of Habitat Change, Human Disturbance and Species Interactions in a Waterbird Colony. *The American Midland Naturalist*, 145(1): pp.18-28.
- Vennesland. 2000. The effects of disturbance from humans and predators on the breeding decisions and productivity of the Great Blue Heron in south-coastal British Columbia. M.S. Thesis, Simon Fraser University, B.C.
- Vennesland and Butler. 2004. Factors influencing Great Blue Herons nesting productivity on the Pacific Coast of Canada from 1998 to 1999, *Waterbirds*. 27(3): pp. 289-296
- Vennesland. 2010. Risk perception of nesting Great Blue Herons: experimental evidence of habituation. *NRC Research Press*, pp. 81-89

## **Appendix A. Colony Monitoring Observation Log**

**Table A1:** May 20, 2022 - Great Blue Heron Nest Monitoring

Observer: Madison Gerbrandt			Active Nests: 12
Start Time	End Time	Heron Activity	Human Activity
6:25	6:30	<ul style="list-style-type: none"> <li>No herons visible.</li> </ul>	1 truck in parking lot.
6:30	6:35		
6:35	6:40	<ul style="list-style-type: none"> <li>1 heron on nest.</li> </ul>	
6:40	6:45		
6:45	6:50	<ul style="list-style-type: none"> <li>1 heron flies south from colony.</li> </ul>	
6:50	6:55		<ul style="list-style-type: none"> <li>1 man walks to truck and garbage bin, starts vehicle.</li> <li>1 SUV enters parking lot.</li> </ul>
6:55	7:00		
7:00	7:05	<ul style="list-style-type: none"> <li>1 heron flies north into colony.</li> <li>1 heron flies east out of colony.</li> </ul>	<ul style="list-style-type: none"> <li>1 SUV enters lot and parks near boat launch to birdwatch.</li> </ul>
7:05	7:10	<ul style="list-style-type: none"> <li>1 heron flies into colony from the east.</li> <li>1 heron flies southeast out of colony.</li> </ul>	
7:10	7:15	<ul style="list-style-type: none"> <li>1 heron flies into colony from the southeast.</li> </ul>	<ul style="list-style-type: none"> <li>Man from truck walks over to east.</li> </ul>
7:15	7:20	<ul style="list-style-type: none"> <li>1 heron circles colony and leaves to the northeast.</li> </ul>	<ul style="list-style-type: none"> <li>Man walks north along river bank.</li> </ul>
7:20	7:25	<ul style="list-style-type: none"> <li>1 heron flies from east, lands in northeast grassland for 2 minutes, then flies to nest colony.</li> </ul>	<ul style="list-style-type: none"> <li>Man wanders around outside of car.</li> </ul>
7:25	7:30	<ul style="list-style-type: none"> <li>1 heron flies north.</li> </ul>	
7:30	7:35		<ul style="list-style-type: none"> <li>1 vehicle drove in with a boat and started offloading.</li> <li>2 men outside their vehicles.</li> </ul>
7:35	7:40		<ul style="list-style-type: none"> <li>People still working on boat.</li> </ul>
7:40	7:45		
7:45	7:50	<ul style="list-style-type: none"> <li>1 heron flies in from the east</li> </ul>	
7:50	7:55	<ul style="list-style-type: none"> <li>1 heron flies into colony from the southeast.</li> <li>1 heron flies to the river bank east of colony and lands on the ground.</li> </ul>	
7:55	8:00	<ul style="list-style-type: none"> <li>3 herons sitting on nests.</li> <li>Possibly 3 more herons obstructed by leaf out.</li> </ul>	



Observer: Madison Gerbrandt			Active Nests: 12
Start Time	End Time	Heron Activity	Human Activity
8:00	8:05	<ul style="list-style-type: none"> <li>• 2 herons on nest stand up and stretch.</li> <li>• 1 flies off to east, another heron stands up to stretch.</li> </ul>	<ul style="list-style-type: none"> <li>• People with motorized fishing boat making loud banging noises.</li> </ul>
8:05	8:10	<ul style="list-style-type: none"> <li>• Herons hunkered down in nests.</li> <li>• 1 heron foraging to the east.</li> </ul>	<ul style="list-style-type: none"> <li>• Boat enters water and drives upstream.</li> <li>• A truck shifts places in parking lot.</li> <li>• Boat still audible.</li> </ul>
8:10	8:15	<ul style="list-style-type: none"> <li>• 1 heron stands up in nest.</li> <li>• 1 heron stands and feeds another heron.</li> <li>• 1 heron stands and flaps.</li> <li>• 10 herons visible.</li> <li>• 1 heron stands up in nest</li> <li>• 11 active nests confirmed.</li> <li>• 1 heron flies out and lands on northeast bank in the grass. It preens, grabs nest material, then flies back to the colony</li> </ul>	
8:15	8:20	<ul style="list-style-type: none"> <li>• 1 heron departs colony.</li> <li>• 1 heron flew to grass and foraging for nest material.</li> <li>• 1 heron flew from colony north out of sight.</li> <li>• 1 heron flew from east to colony.</li> </ul>	
8:20	8:25	<ul style="list-style-type: none"> <li>• 1 heron flew from colony to grass.</li> </ul>	
8:25	8:30	<ul style="list-style-type: none"> <li>• 1 heron flew from grassy area to colony.</li> <li>• 1 heron standing up.</li> </ul>	<ul style="list-style-type: none"> <li>• Boat audible again.</li> </ul>
8:30	8:35	<ul style="list-style-type: none"> <li>• Canada goose lands on an empty nest in colony.</li> </ul>	
8:35	8:40		
8:40	8:45		<ul style="list-style-type: none"> <li>• 4 cars in parking lot.</li> <li>• 1 maintenance truck behind parking lot.</li> </ul>
8:45	8:50	<ul style="list-style-type: none"> <li>• Canada goose sits down in nest and rearranges nest material then flies to branch next to nest.</li> </ul>	
8:50	8:55	<ul style="list-style-type: none"> <li>• 1 heron flies into nest colony from west.</li> <li>• 1 heron flies from east to colony and lands in nest out of sight.</li> </ul>	<ul style="list-style-type: none"> <li>• Man with dog walks from parking lot along south bank.</li> </ul>
8:55	9:00	<ul style="list-style-type: none"> <li>• 2 herons fly from south and land on nest out of sight.</li> </ul>	

Observer: Madison Gerbrandt			Active Nests: 12
Start Time	End Time	Heron Activity	Human Activity
		<ul style="list-style-type: none"> <li>1 heron flies from colony to land in grassland then flies back to colony with nesting material then leaves colony and flies northeast out of sight.</li> </ul>	
9:00	9:05	<ul style="list-style-type: none"> <li>1 heron flying east out of sight.</li> </ul>	
9:05	9:10		<ul style="list-style-type: none"> <li>1 car leaves parking lot.</li> </ul>
9:10	9:15	<ul style="list-style-type: none"> <li>1 heron flies from east to west out of sight.</li> </ul>	
9:15	9:20	<ul style="list-style-type: none"> <li>1 heron stands in nest.</li> </ul>	<ul style="list-style-type: none"> <li>Maintenance truck leaves area behind parking lot.</li> </ul>
9:20	9:25	<ul style="list-style-type: none"> <li>Canada goose leaves nest.</li> </ul>	
9:25	9:30	<ul style="list-style-type: none"> <li>Low level of heron activity.</li> </ul>	
9:30	9:35	<ul style="list-style-type: none"> <li>1 heron stands in nest.</li> <li>1 heron flies to nest and partner heron stands up then the first heron leaves nest again towards the east.</li> </ul>	
9:35	9:40	<ul style="list-style-type: none"> <li>1 heron leaves colony and flies east.</li> </ul>	
9:40	9:45	<ul style="list-style-type: none"> <li>Low level of heron activity.</li> </ul>	
9:45	9:50	<ul style="list-style-type: none"> <li>Low level of heron activity.</li> </ul>	
9:50	9:55	<ul style="list-style-type: none"> <li>Low level of heron activity.</li> </ul>	
9:55	10:00	<ul style="list-style-type: none"> <li>1 heron rises from colony and circles above colony and lands back in colony.</li> </ul>	
10:00	10:05		<ul style="list-style-type: none"> <li>Boat visible and audible to the west.</li> </ul>
10:05	10:10		<ul style="list-style-type: none"> <li>Men park the boat on the west side of the north bank and walk onto land out of sight.</li> </ul>
10:10	10:15	<ul style="list-style-type: none"> <li>Heron leaves colony and lands in grass.</li> </ul>	
10:15	10:20	<ul style="list-style-type: none"> <li>Heron leaves colony and lands on grass.</li> <li>1 heron stands on branch next to partner in nest.</li> <li>Another heron stands up and waves wings and rubs beak on bark.</li> <li>1 of the pair leaves the colony and circles back to another branch in colony then moves back towards nest.</li> </ul>	
10:20	10:25	<ul style="list-style-type: none"> <li>Heron from grass flies back towards colony out of sight.</li> <li>Heron on branch flew up and circled.</li> </ul>	<ul style="list-style-type: none"> <li>1 car pulls into parking lot and man comes out of car to take photos of birds.</li> </ul>

Observer: Madison Gerbrandt			Active Nests: 12
Start Time	End Time	Heron Activity	Human Activity
		<ul style="list-style-type: none"> <li>• 1 heron is sitting upright.</li> <li>• 1 heron is standing next to nest then takes off flying east and lands in the grass.</li> </ul>	
10:25	10:30	<ul style="list-style-type: none"> <li>• 2 herons are in grass, one is collecting nesting material.</li> <li>• 1 heron stands up in nest.</li> <li>• 1 heron flies from south towards colony.</li> </ul>	<ul style="list-style-type: none"> <li>• Car pulls into parking lot.</li> <li>• Man taking photos walks east along bank.</li> </ul>
10:30	10:35	<ul style="list-style-type: none"> <li>• 2 herons from the grass return to colony.</li> <li>• 1 heron flies from southeast to colony.</li> </ul>	<ul style="list-style-type: none"> <li>• Boat becomes dislodged from western bank and is carried down the river without man in it. Man realizes boat is drifting away and chases it and then attempts to wade in at eastern end of colony.</li> </ul>
10:35	10:40	<ul style="list-style-type: none"> <li>• Herons remain in nests, no reaction to man running.</li> </ul>	
10:40	10:45		
10:45	10:50		<ul style="list-style-type: none"> <li>• Birder secures boat on southeastern bank and fisherman attempts to cross river to get to his boat.</li> </ul>
10:50	10:55		
10:55	11:00	<ul style="list-style-type: none"> <li>• 2 herons flying north of colony.</li> </ul>	<ul style="list-style-type: none"> <li>• Man remains on island in river.</li> </ul>
11:00	11:05	<ul style="list-style-type: none"> <li>• 1 heron flying east from colony and lands on a nearby tree.</li> </ul>	<ul style="list-style-type: none"> <li>• 1 car enters parking lot.</li> </ul>
11:05	11:10		<ul style="list-style-type: none"> <li>• Birder leaves.</li> </ul>
11:10	11:15		<ul style="list-style-type: none"> <li>• Birder returns.</li> </ul>
11:15	11:20	<ul style="list-style-type: none"> <li>• 1 heron flies east out of colony and circles back.</li> </ul>	
11:20	11:25	<ul style="list-style-type: none"> <li>• 1 heron stands up in nest.</li> </ul>	<ul style="list-style-type: none"> <li>• Fisherman remains on island in river.</li> </ul>

**Table A2:** July 8, 2022 - Great Blue Heron Nest Monitoring

Observer: Madison Gerbrandt			Active Nests: Minimum 10
Start Time	End Time	Heron Activity	Human Activity
8:00	8:05	<ul style="list-style-type: none"> <li>• 3 chicks visible on nests.</li> </ul>	<ul style="list-style-type: none"> <li>• 8 cars and 3 people in parking lot.</li> </ul>
8:05	8:10	<ul style="list-style-type: none"> <li>• 1 heron flies out of colony to southeast.</li> </ul>	
8:10	8:15		<ul style="list-style-type: none"> <li>• 1 truck with boat and trailer pulls into lot.</li> </ul>
8:15	8:20	<ul style="list-style-type: none"> <li>• Chicks wander around in nest.</li> </ul>	<ul style="list-style-type: none"> <li>• 1 man prepares fishing gear.</li> </ul>
8:20	8:25		<ul style="list-style-type: none"> <li>• 3 boats on trailers enter lot.</li> </ul>
8:25	8:30	<ul style="list-style-type: none"> <li>• Chick preens.</li> </ul>	<ul style="list-style-type: none"> <li>• 1 boat and trailer pulls into lot.</li> </ul>
8:30	8:35	<ul style="list-style-type: none"> <li>• 1 adult returns to colony from southeast.</li> </ul>	<ul style="list-style-type: none"> <li>• People start to unload boat.</li> </ul>
8:35	8:40	<ul style="list-style-type: none"> <li>• Adult preens and interacts with chick.</li> </ul>	<ul style="list-style-type: none"> <li>• People grouped together.</li> </ul>
8:40	8:45	<ul style="list-style-type: none"> <li>• 1 chick calls briefly.</li> </ul>	<ul style="list-style-type: none"> <li>• 6 Fishermen in lot preparing gear quietly.</li> </ul>
8:45	8:50	<ul style="list-style-type: none"> <li>• Chicks interact with each other in second highest nest.</li> </ul>	
8:50	8:55	<ul style="list-style-type: none"> <li>• 1 chick flaps.</li> </ul>	<ul style="list-style-type: none"> <li>• 1 car pulls in and 2 people get out.</li> </ul>
8:55	9:00		<ul style="list-style-type: none"> <li>• 2 men join 6 other fishermen and prepare rods.</li> </ul>
9:00	9:05	<ul style="list-style-type: none"> <li>• 1 heron flies from colony towards southeast.</li> </ul>	<ul style="list-style-type: none"> <li>• 8 fishermen in parking lot preparing for launch.</li> <li>• 14 cars in lot.</li> </ul>
9:05	9:10	<ul style="list-style-type: none"> <li>• 1 heron flies into colony from east.</li> </ul>	<ul style="list-style-type: none"> <li>• 1 boat starts its engine.</li> <li>• 3 kayakers pass by.</li> </ul>
9:10	9:15	<ul style="list-style-type: none"> <li>• Heron flaps in nest.</li> </ul>	<ul style="list-style-type: none"> <li>• 1 boat with 3 men floats by.</li> </ul>
9:15	9:20	<ul style="list-style-type: none"> <li>• 1 chick preens.</li> </ul>	<ul style="list-style-type: none"> <li>• 1 boat with 3 men floats by.</li> </ul>
9:20	9:25	<ul style="list-style-type: none"> <li>• 1 heron flaps in a nest hidden by foliage.</li> </ul>	<ul style="list-style-type: none"> <li>• 1 boat with 3 men floats by.</li> </ul>
9:25	9:30	<ul style="list-style-type: none"> <li>• Heron calls as boat goes by.</li> </ul>	<ul style="list-style-type: none"> <li>• 1 boat with 2 men floats by.</li> <li>• 1 boat with 3 men floats by.</li> </ul>
9:30	9:35	<ul style="list-style-type: none"> <li>• 1 heron foraging around nest.</li> <li>• Top nest has 2 chicks.</li> </ul>	<ul style="list-style-type: none"> <li>• Boat engine heard in the distance.</li> </ul>
9:35	9:40	<ul style="list-style-type: none"> <li>• 2 chicks stand and flap in top nest.</li> </ul>	<ul style="list-style-type: none"> <li>• 1 car pulls into parking lot.</li> </ul>
9:40	9:45	<ul style="list-style-type: none"> <li>• 7 herons visible in nests.</li> </ul>	<ul style="list-style-type: none"> <li>• 1 boat with 2 men floats by.</li> <li>• 1 boat with 3 men floats by.</li> </ul>



Observer: Madison Gerbrandt			Active Nests: Minimum 10
Start Time	End Time	Heron Activity	Human Activity
9:45	9:50	<ul style="list-style-type: none"> <li>• 4 of 7 herons standing and flapping to cool off.</li> </ul>	<ul style="list-style-type: none"> <li>• The boat with 2 men enters a channel near colony to fish.</li> </ul>
9:50	9:55	<ul style="list-style-type: none"> <li>• 1 heron flies west into colony from the ground.</li> <li>• 1 heron flies out of colony to southwest.</li> <li>• 1 heron passes 100 m north of the colony going north.</li> </ul>	<ul style="list-style-type: none"> <li>• 2 Fishermen still in channel near colony.</li> </ul>
9:55	10:00		<ul style="list-style-type: none"> <li>• Sound of weed whipping in the distance.</li> </ul>
10:00	10:05	<ul style="list-style-type: none"> <li>• Chicks have settled and are mostly sitting.</li> </ul>	
10:05	10:10		
10:10	10:15	<ul style="list-style-type: none"> <li>• 1 chick stands and flaps.</li> </ul>	
10:15	10:20	<ul style="list-style-type: none"> <li>• 2 chicks stand and preen in second highest nest.</li> </ul>	
10:20	10:25	<ul style="list-style-type: none"> <li>• 1 heron flies southwest out of colony.</li> </ul>	<ul style="list-style-type: none"> <li>• 19 cars in lot.</li> </ul>
10:25	10:30	<ul style="list-style-type: none"> <li>• 2 chicks flap.</li> </ul>	<ul style="list-style-type: none"> <li>• 1 car pulls into parking lot.</li> </ul>
10:30	10:35	<ul style="list-style-type: none"> <li>• 1 chick flaps.</li> </ul>	
10:35	10:40	<ul style="list-style-type: none"> <li>• 2 chicks flapping in different nests.</li> </ul>	<ul style="list-style-type: none"> <li>• 1 car pulls into parking lot, loud vehicle enters lot.</li> </ul>
10:40	10:45	<ul style="list-style-type: none"> <li>• 3 chicks flap while loud vehicle revs engine.</li> </ul>	
10:45	10:50	<ul style="list-style-type: none"> <li>• 1 heron flies into colony from the north.</li> <li>• 2 adults and 1 chick standing in second highest nest.</li> <li>• 2 chicks in highest nest are sitting.</li> <li>• 1 chick flaps.</li> <li>• Adult returns from southwest to colony and lands on a hidden nest.</li> <li>• Behaviour on nest obscured by leaves</li> </ul>	
10:50	10:55	<ul style="list-style-type: none"> <li>• 1 heron leaves colony to southeast.</li> </ul>	
10:55	11:00	<ul style="list-style-type: none"> <li>• 1 heron preens.</li> </ul>	
11:00	11:05		<ul style="list-style-type: none"> <li>• Plane flies overhead.</li> </ul>
11:05	11:10	<ul style="list-style-type: none"> <li>• 2 herons leave colony to the north from second highest nest.</li> </ul>	
11:10	11:15	<ul style="list-style-type: none"> <li>• Herons all sitting low in nests.</li> </ul>	<ul style="list-style-type: none"> <li>• Boat approaches launch.</li> </ul>
11:15	11:20	<ul style="list-style-type: none"> <li>• Herons have settled in the heat.</li> </ul>	<ul style="list-style-type: none"> <li>• Boat starts to load onto trailer.</li> </ul>
11:20	11:25		<ul style="list-style-type: none"> <li>• 19 cars in lot but many boats have departed from other boat ramp at west end of parking lot.</li> </ul>

Observer: Madison Gerbrandt			Active Nests: Minimum 10
Start Time	End Time	Heron Activity	Human Activity
11:25	11:30		<ul style="list-style-type: none"> <li>• 2 men loading boat.</li> </ul>
11:30	11:35		<ul style="list-style-type: none"> <li>• Loaded boat departs parking lot.</li> </ul>
11:35	11:40		<ul style="list-style-type: none"> <li>• 1 boat being launched at far launch.</li> </ul>
11:40	11:45	<ul style="list-style-type: none"> <li>• No changes.</li> </ul>	
11:45	11:50	<ul style="list-style-type: none"> <li>• No changes.</li> </ul>	
11:50	11:55	<ul style="list-style-type: none"> <li>• No changes.</li> </ul>	
11:55	12:00	<ul style="list-style-type: none"> <li>• 1 heron leaves the colony towards the west from highest nest.</li> </ul>	<ul style="list-style-type: none"> <li>• 1 boat floats by with 3 men onboard.</li> </ul>
12:00	12:05	<ul style="list-style-type: none"> <li>• Only 2 chicks currently visible, both sitting low in nest.</li> </ul>	
12:05	12:10	<ul style="list-style-type: none"> <li>• No changes.</li> </ul>	
12:10	12:15	<ul style="list-style-type: none"> <li>• No changes.</li> </ul>	
12:15	12:20	<ul style="list-style-type: none"> <li>• No changes.</li> </ul>	<ul style="list-style-type: none"> <li>• No changes.</li> </ul>
12:20	12:25	<ul style="list-style-type: none"> <li>• 2 herons fly into colony from southwest and land on highest nest.</li> </ul>	<ul style="list-style-type: none"> <li>• 18 cars in lot.</li> <li>• No people around.</li> </ul>
12:25	12:30	<ul style="list-style-type: none"> <li>• Herons feed chick.</li> <li>• 1 heron flies off to the west and another flies off west then returns to nest and resumes feeding chick.</li> </ul>	
12:30	12:35	<ul style="list-style-type: none"> <li>• 1 adult heron watches over highest nest and is alert as boat passes.</li> </ul>	<ul style="list-style-type: none"> <li>• 1 boat with 2 men pass launch quietly.</li> </ul>
12:35	12:40	<ul style="list-style-type: none"> <li>• 2 adult herons return to nest from east.</li> </ul>	
12:40	12:45	<ul style="list-style-type: none"> <li>• 2 chicks call and flap for food and are fed in second highest nest.</li> </ul>	<ul style="list-style-type: none"> <li>• 2 people prepare a blow-up raft.</li> </ul>
12:45	12:50	<ul style="list-style-type: none"> <li>• 2 adults sit on nest and flap, other adult begins vocalizing.</li> </ul>	<ul style="list-style-type: none"> <li>• A boat engine is heard in the distance.</li> </ul>
12:50	12:55	<ul style="list-style-type: none"> <li>• 1 heron enters previously unobserved nest and flaps</li> <li>• Chicks wander around in nest.</li> </ul>	<ul style="list-style-type: none"> <li>• A car enters the lot.</li> </ul>
12:55	13:00	<ul style="list-style-type: none"> <li>• 2 chicks and parents wander around nest and in nearby branches.</li> </ul>	<ul style="list-style-type: none"> <li>• The blow-up raft floats by.</li> <li>• 1 car enters lot.</li> </ul>
13:00	13:05	<ul style="list-style-type: none"> <li>• 1 heron enters colony from southeast and lands out of sight.</li> </ul>	<ul style="list-style-type: none"> <li>• Vehicle still running.</li> </ul>
13:05	13:10	<ul style="list-style-type: none"> <li>• 1 adult from highest nest moves to branches 10 m away.</li> </ul>	<ul style="list-style-type: none"> <li>• 14 vehicles in lot.</li> <li>• 1 man walking his dog.</li> </ul>



## **TECHNICAL MEMORANDUM**

---

**DATE:** January 11, 2019

**REVISED**  
**DATE:** November 25, 2020

**TO:** Genesis Land Development Corp., 7315 - 8th Street NE, Calgary AB,  
T2E 8A2

**FROM:** Nick Bartok and Kent Russell, Western EcoSystems Technology, ULC

**RE:** Ricardo Ranch Great Blue Heron Colony Mitigation Plan

---

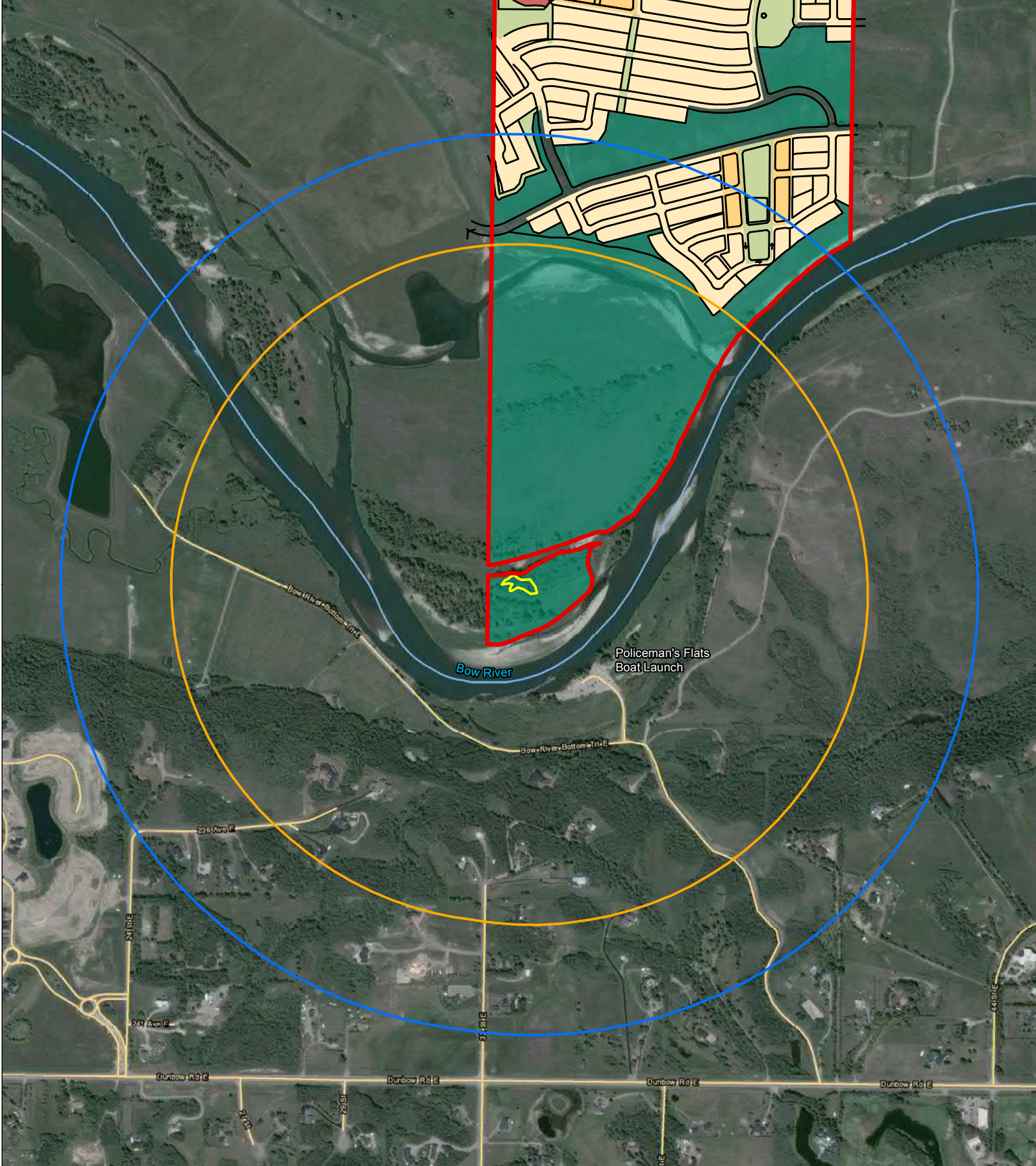
### **BACKGROUND**

Genesis Land Development Corp. (Genesis) is in the process of obtaining approvals from the City of Calgary (the City) for their Ricardo Ranch (the Project) development in the southeast portion of the City near the community of Seton (Figure 1). As part of the Ricardo Ranch Area Structure Plan (ASP) development, Genesis contracted Stantec Consulting Ltd. (Stantec) to conduct an Ecological Inventory (City of Calgary 2016, Stantec 2018). A great blue heron (*Ardea herodias*) colony was identified within the ASP boundary, which may impact the process for obtaining approvals from the City.

Genesis contracted Western EcoSystems Technology, ULC (WEST) to develop a Great Blue Heron Colony Mitigation Plan (the Plan). This plan outlines the purpose, provides a brief literature review, regulatory summary, results of a site visit, and the proposed mitigation for the development of the Project.

### **2020 Update**

On October 21, 2020, B&A Planning Group and WEST had a conference call to discuss project updates and changes since this plan was originally drafted. A Biophysical Impact Assessment (BIA) was completed by Urban Systems and is currently in the review process by the City. WEST was re-engaged to review the Plan and make updates based on any new pertinent information.



<b>Ricardo Ranch Great Blue Heron Rookery</b>	Site Boundary	Colony Extent	Stream/River	<b>Development Type</b>
	Open Nature District	Colony Extent - 750-m Setback	Road	Special Purpose
	Colony Extent - 1,000-m Setback	Development	Commercial	Residential
				Street-oriented Townhouses

 N W — E S	0 ————— 0.45 mi 0 ————— 0.8 km	Data Source: World Imagery 2020 Coordinate System: NAD 1983 UTM Zone 12N Author: B. Barbieri Date: 10/27/2020	
---------------------	---	--	--



## PURPOSE

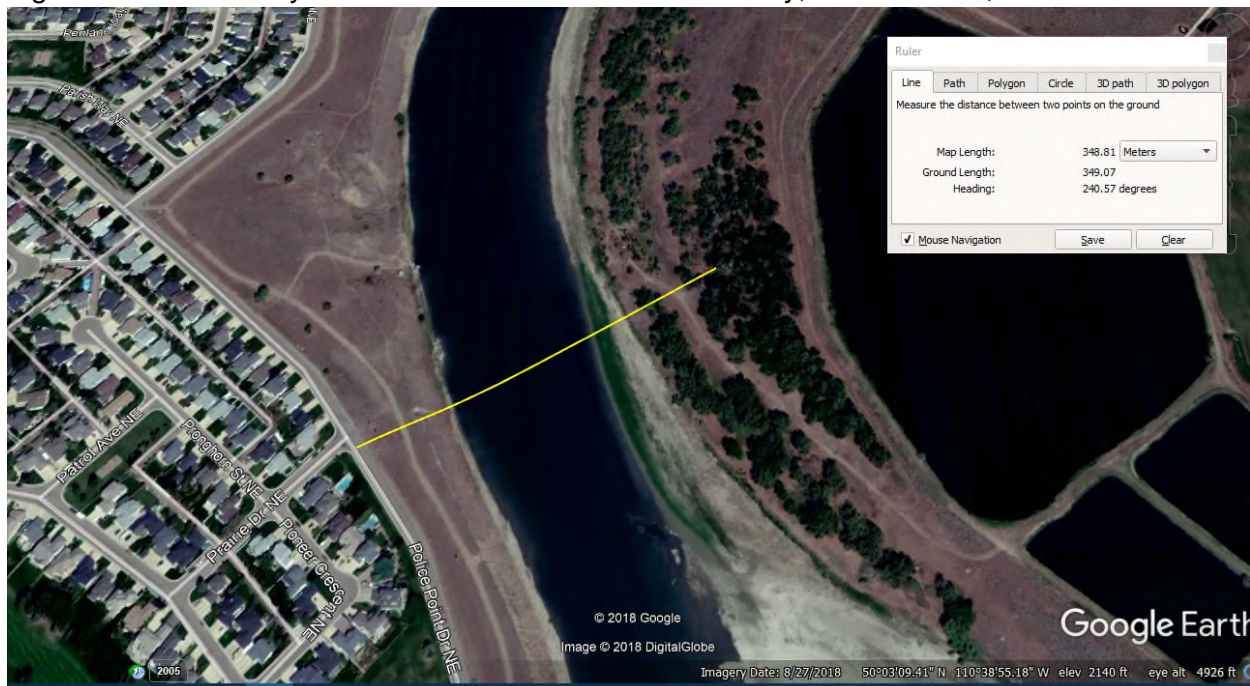
The primary purpose of this Plan is to identify the mitigations to be implemented to maintain the safety of the birds, and continued productivity of the colony while enabling development of the Project up to 750 metres (m) from the colony.

## LITERATURE REVIEW

To date, the great blue heron colony near the Project is only the third colony to be recorded in the City (Government of Alberta 2018). The first documented colony was in Fish Creek Provincial Park near Bow Valley Ranch, and the second was on a small island on the Bow River near Douglasdale. The Bow Valley Ranch colony was active for over 40 years, becoming inactive in 1986. The cessation of activity was attributed to 1) increased human recreational activity near the nests (i.e., <400 m), 2) development of nearby communities, and 3) tree age (i.e., decaying may have made for unattractive nest sites; Fish Creek Provincial Park 2006); although, none of these attributions can be confirmed. The Bow River (Douglasdale) colony was only documented for two years, 1991-1992 (Government of Alberta 2018).

An active great blue heron colony occurs within the City of Medicine Hat approximately 350 m northeast of the Parkview community, between the South Saskatchewan River and the City Sewage treatment ponds (Figure 2; Society of Grassland Naturalists 2017). This colony has been active for multiple decades and does not appear to have been impacted by the development of the nearby Medicine Hat residential communities.

Figure 2: Heron colony in relation to the Parkview community, Medicine Hat, Alberta.



Although the Alberta subspecies of great blue heron is not a species at risk (Government of Canada 2002), the British Columbia subspecies (*Ardea Herodias fannini*) is at risk, and as such, a management plan for the species was developed. The management plan identified residential development as a threat to the species resulting from loss of nesting habitat, and colony disturbance as a result of noise and human activity. Construction work has resulted in abandonment of nests (Government of Canada 2016).

Summary of possible, recommended, or utilized mitigation measures from the literature:

- 1) Year-round protection of the nests (Government of Canada 2016).
- 2) Development of Care factsheets for local landowners and land managers (Mackintosh et al. 2006, Government of Canada 2016).
- 3) Scheduling of construction, or other loud noise activities, to occur outside of the breeding season (Mackintosh et al. 2006, City of Olympia 2017).
- 4) Retention of trees six inches in diameter or larger (City of Olympia 2017).
- 5) Prevention of development within the colony (City of Olympia 2017).
- 6) A year-round setback to maintain baseline development conditions and ambient noise levels (City of Olympia 2017).
- 7) Protection of the colony location for a minimum of 10 years, if the location is abandoned (City of Olympia 2017).
- 8) Restriction of recreational activity within 100 m of the colony and within the breeding period (Vermont Fish & Wildlife Department 2002).
- 9) Fencing in of the colony to promote security (Mackintosh et al. 2006).
- 10) Implementation of monitoring protocols to determine if human activities are having an effect on the colony (Mackintosh et al. 2006).
- 11) Maintenance of a 1,000-m- year-round setback from nesting sites (Government of Alberta 2011).
- 12) Maintenance of a reduced setback (e.g., 750 m) following a number of mitigation commitments.

## **Regulatory Summary**

The great blue heron is a species of management concern, as they are listed as Sensitive by Alberta Environment and Parks (AEP), and are protected under the Alberta *Wildlife Act* (AWA; Government of Alberta 2000). The Alberta subspecies of great blue heron is not listed federally under the *Species at Risk Act* (SARA; Government of Canada 2002), nor does the species have any federal setbacks. To avoid and minimize anthropogenic disturbances to great blue heron rookeries in Alberta, the recommended setback distance for active nests is 1,000 m year-round, and companies should avoid construction and/or disturbance activities within this setback (Government of Alberta 2011). Based on available literature, there is no defined level of acceptable or allowable disturbance for activities around a great blue heron colony; however, the 1,000-m setback is recommended due to the species sensitivity to disturbance and potential for nest abandonment if a particular disturbance is too great. Therefore, determining an acceptable level of disturbance is difficult and is site-specific.

## Consultation with the Municipal District of Foothills No. 31

On December 13, 2018, Nick Bartok (WEST) discussed the proposed project in relation to the colony with The Municipal District of Foothills No. 31 (the County) planner Julie McLean. WEST then reconfirmed initial discussions with the County on October 22, 2020. The goal of the discussions was to gain an understanding of mitigation measures undertaken by the County to minimize impacts to the colony to date, and mitigation plans for possible future development near the colony. There is an inactive gravel pit approximately 1,000 m to the west of the colony that may be operational again in the future as the land was recently sold; however, the timing of future development is unknown. The Sanctuary on the Bow ASP (The Municipal District of Foothills No. 31 2006) is in place for approximately two-quarter sections of development to the east of the colony, and within the recommended 1,000-m setback; however, due to flooding in 2015, it is unlikely the County will allow development. The landowners are currently exploring adding conservation easements to these lands. The County is aware of a potential move of the Policeman's Flats boat launch to the north side of the river and downstream of the colony. The County is supportive of this move, as the boat launch is regularly flooded and is provincially owned. The County has yet to implement any mitigation for the colony, having only become aware of the colony during consultation with the City regarding the Project ASP.

## SITE VISIT

On Tuesday November 13, 2018, WEST wildlife biologists Kent Russell and Nick Bartok conducted a site visit to the colony (Figure 1) to assess the surrounding landscape and habitat, and determine the number of nests present. The colony is located approximately 170 m from the closest open water of the Bow River to the southeast and about 750 m from the nearest area of development to the north (Figure 1; Appendix A). A total of 55 nest structures were observed, with an estimated 30 actually in use, based on nest size and quality. In 2017, a passive scan of the colony documented 18 nests with at least 10 active (Stantec 2018). A confirmation of active nests will not be possible until April or May 2019, when the birds return from their wintering grounds and begin nesting. The nests are situated in a stand of mature (i.e., tall) poplar trees (*Populus* spp.), with the Bow River to the south, east, and west, and a shallow, ephemeral side channel to the north, which puts the nests on a temporary Island. The proposed project is situated on the Bow River basin ridge to the north, and has two Bow River side channels and two tree lines dividing the nest locations with the Project. The river channels are 20 - 60 m wide and the tree lines are 55 - 65 m wide (Appendix A). Current sources of disturbance include: 1) the Policeman's Flats boat launch (approximately 250 m southeast of the colony); 2) more than 30 existing residences located between 400 and 1,000 m south of the colony; and 3) recreational boaters, fishermen, and river users within 100 m (south) of the colony. All existing known sources of disturbance are located in the County.

## **PROPOSED MITIGATION**

Based on results of the site visit, literature review, and professional judgment, the following is a list of proposed mitigations to be implemented by Genesis, the City, and/or the Province of Alberta should the Project be permitted, to support the proposed setback reduction.

### **Pre-construction Phase**

1. Identification of alternative locations, greater than 1,000 m from the colony, for the Policeman's Flats boat launch, to reduce disturbance to the colony. Discussions are ongoing between the County, the City, and the Province for this proposed re-location.
2. Development of a colony specific monitoring plan, encompassing pre-construction, construction, and post-construction.
3. Baseline monitoring of the colony to occur yearly until construction begins and begin in spring 2021. Monitoring should consist of two site visits per year, to ascertain the number of active nests, and if possible, number of young.
4. Submission of data collected to the AEP Fisheries and Wildlife Management Information System (FWMIS).

### **Construction Phase**

1. To the extent possible, conduct construction work (e.g., houses, infrastructure) within 1,000 m of the colony, when the great blue herons are not present at the colony (approximately mid-August to mid-April).
2. Identify an approved location for a new public river access / boat launch outside the 1,000m setback. Public / vehicle access to the Policeman's Flats boat launch would cease following completion of the new site.
3. Monitoring of the colony for one day a week, by a qualified wildlife biologist, should any construction activity occur within 1,500 m and within the great blue heron breeding season (approximately mid-April to mid-August).
4. Monitoring of the colony daily, by a qualified wildlife biologist, should construction activity utilizing heavy machinery, house construction, or similar loud noises (i.e., noises that will cause a disturbance to the colony, for example, causing herons to flush off a nest) occur within 1,000 m and within the great blue heron breeding season (approximately mid-April to mid-August).
5. Cessation of construction activity should unacceptable disturbance be noted by a qualified wildlife biologist. Resumption of construction activity will be determined by the qualified wildlife biologist, Genesis, the City, and/or AEP, and may include additional mitigation.



6. Submission of data collected to the AEP Fisheries and Wildlife Management Information System (FWMIS).
7. Designation, by the City of Calgary, of all undeveloped lands in the agreed upon 750 m setback as an Environmental or Municipal Reserve; currently listed as an Urban Nature District (Figure 1). The Reserve will have signs posted around the extent stating “Environmental Reserve – Do Not Enter” or preferred alternative.
8. Construction of a fence by the City of Calgary, between the designated Environmental or Municipal Reserve and the Project/City pathways, which will be signed “Great Blue Heron Nesting Colony – Do Not Enter”. The purpose of the fence will be to limit human movement from the upland areas into the reserve, whilst not restricting wildlife movement through the area. The exact location of the fence is to be determined by Genesis, the City, and a qualified wildlife biologist.
9. Retention of all large (i.e., >6 inch diameter) trees within 750 m of the colony.
10. Planting of sapling trees (via foot access only) between the two Bow River channels, to further increase barriers between the colony and development. Planting locations, species, and density of saplings to be determined in consultation with the City, Genesis, and a qualified botanist and/or landscaping company.
11. Installation of a 24-hour wildlife monitoring camera to document nest activity. The video footage will be publically viewable, used for public education, help coordinate construction activities, and the field of view will only be the colony.
12. Development of interpretive signs to be displayed along the City Pathways next to the Reserve to educate the public on the importance of the reserve in the protection of the heron colony, as well as other wildlife.
13. Develop a type of community or landowner manual with educational information related to the Reserve and the heron colony (Urban Systems 2020).

### **Post-construction Phase**

1. Monitoring of the colony to be conducted for a minimum of five years, and should consist of two site visits per year to ascertain the number of active nests, and if possible, number of young.
2. Submission of data collected to the AEP Fisheries and Wildlife Management Information System (FWMIS).

Should you have any questions or require additional information, please do not hesitate to contact us.

Regards,

**Western EcoSystems Technology, ULC**

Author:



Nick Bartok, M.Sc., P. Biol., R.P.Bio.  
Wildlife Biologist / Team Lead  
Phone: 403-629-6741  
nbartok@west-ulc.ca

Senior Review:



Kent Russell, B.Sc., P. Biol., R.P.Bio.  
Wildlife Biologist  
Phone: 403-607-0342  
krussell@west-ulc.ca

## REFERENCES

- City of Calgary. 2016. Ecological Inventory Framework: Area Structure Plans. Available at: <http://www.calgary.ca/CSPS/Parks/Pages/Construction/Park-development-guidelines.aspx>. Accessed November 23, 2018.
- City of Olympia. 2017. Great Blue Heron Development Conditions (Attachment 4). Critical Areas Ordinance (OMC 18.32).
- Fish Creek Provincial Park. 2006. Great Blue Herons in the Park. ISBN: 0-7785-4886-4.
- Government of Alberta. 2000. Alberta Wildlife Act. Available at: [www.qp.alberta.ca/documents/Acts/W10.pdf](http://www.qp.alberta.ca/documents/Acts/W10.pdf). Accessed November 16, 2018.
- Government of Alberta. 2011. Recommended Land Use Guidelines for Protection of Selected Wildlife Species and Habitat with Grassland and Parkland Natural Regions of Alberta. Available at: <http://aep.alberta.ca/fish-wildlife/wildlife-land-use-guidelines/default.aspx>. Accessed November 16, 2018.
- Government of Alberta. 2018. Historical Records from FWMIS. Alberta Environment and Parks. Data received November 23, 2018.
- Government of Canada. 2002. Species at Risk Act. Available at: <https://laws-lois.justice.gc.ca/eng/acts/s-15.3/>. Accessed November 16, 2018.
- Government of Canada. 2016. Management Plan for the Great Blue Heron *fannini* subspecies in Canada (Proposed). Environment Canada and Climate Change. 26 pp.
- Mackintosh et al. 2006. Stanley Park Heronry Management Plan. 70 pp.
- Society of Grasslands Naturalists. 2017. Southeastern Alberta Birding Trails Guide. Available at: [http://www.natureline.info/gn/documents/birding\\_trails/Southeastern%20Birding%20Trail%20Full%20Guide.pdf](http://www.natureline.info/gn/documents/birding_trails/Southeastern%20Birding%20Trail%20Full%20Guide.pdf). Accessed November 26, 2018. 47 pp.
- The Municipal District of Foothills No. 31. 2006. Sanctuary on the Bow Area Structure Plan. Available at: [https://www.mdfoothills.com/media/files/upload/sanctuaryOnTheBowASP\\_web\\_cqh.pdf](https://www.mdfoothills.com/media/files/upload/sanctuaryOnTheBowASP_web_cqh.pdf). Accessed December 17, 2018.
- Urban Systems. 2020. Ricardo Ranch Biophysical Impact Assessment. Prepared for Genesis Land Development. File: 2197.0009.02.
- Vermont Fish & Wildlife Department. 2002. Guidelines for Protection & Mitigation of Impacts to Great Blue Heron Rookeries in Vermont. Agency of Natural Resources. 13 pp.

**APPENDIX A. Site and Colony Photos**



## **Appendix A: Ricardo Ranch Great Blue Heron Colony**



**A1. South facing view from the proposed Ricardo Ranch community from the top of the Bow River basin overlooking the great blue heron colony identified by the green oval.**



**A2. South facing view of Bow River side channel (foreground) and tree line (background). The tree line obstructs view of the great blue heron colony.**





**A3. South facing view of a second Bow River channel and view of currently inactive great blue heron nests.**



**A4. Great blue heron nests recently fallen.**





**A5. South facing view from east side of great blue heron colony, showing proximity of the Policeman's Flats boat launch on south side of the Bow River in Municipal District of Foothills.**



**A6. North facing view of the Bow River basin from southern edge of side channel.**





# *Approval*

**FILE #:** LOC2020-0100  
**DATE:** April 28, 2023  
**To:** Terri Duret P.Biol., Q.W.S.P  
Senior Environmental Consultant  
Urban Systems  
**From:** Tanya Hope B.Sc.  
Parks Ecologist  
City of Calgary  
**RE:** LOC2020-0100 Logan Landing Outline Plan

---

Thank you for submitting the above-noted Biophysical Impact Assessment (BIA). Parks has reviewed the subject document and approves it for the purposes of the Logan Landing Outline Plan (LOC2020-0100), subject to the following conditions:

1. All recommendations and mitigation measures outlined in the BIA must be followed through all planning and development stages.
2. Any changes to the outline plan / land use amendment for which the BIA was prepared may trigger requirements to update the BIA and/or complete additional studies.

Please contact the following with any questions, comments or concerns.

Regards,

Tanya Hope B.Sc  
Parks Ecologist (Habitat Conservation)  
Climate and Environment

- cc. Valerie Veenstra, Environmental Planning Supervisor, Climate and Environment  
Shimin Wu, Parks Development Coordinator, Community Planning  
Laureen Bryant, Cultural Landscape Planner, Parks and Open Spaces  
Chris Wolfe, Senior Planner, Community Planning  
Marissa Koop, Associate, Sustainability & Environment Lead, B&A