PRESENTED TO
City of St Albert

NOVEMBER 2014
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EXECUTIVE SUMMARY

On March 24, 2014, the City Council of St. Albert recommended that a Mountain Bike Skills Park (the Project) be constructed at 43R Riel Drive (the Property), pending a Natural Areas Assessment of the Property. In June 2014, Tetra Tech EBA Ltd (Tetra Tech EBA) was contracted to carry out a Natural Areas Assessment, as part of the next step to move the Project forward.

The Project will be contained within 2.1 hectares at the Property. The Project will include a variety of features designed to develop technical mountain bike skills, such as rocks and logs, engineered features like ladder bridges, wall rides, pump tracks, teeter totters, log rides and dirt jumps.

The Natural Areas Assessment was conducted in July 2014. The purpose was to identify the environmental function and values present at the Property, conduct an impact assessment to identify how the Project could potentially interact with the environmental functions and values at the Property and areas at risk to migrating effects, and propose mitigation to reduce or eliminate the effects of the Project on the environment. Desktop and field baseline data were collected to characterize the natural areas at the Project site, including data on terrestrial ecosystems, wetlands, soils, vegetation, rare plants, wildlife, and the aquatic environment.

Ecological communities present at the property include various wetlands, aspen forest, and grassland. The wetlands and the aspen forest were classified as Natural Areas; the grassland was not considered a Natural Area. The wetlands met the criteria to classify as an Environmentally Sensitive Area and the aspen forest was classified as a Significant Natural Area (Spencer 1999). From the baseline data, 12 potential Valued Ecosystem Components were identified. Given the general description of Project activities, eight potential effects were identified. The assessment identified 47 potential interactions between the Project and the environment. Once mitigation measures were applied, these interactions were reduced to six. However, St. Albert will mitigate these effects by avoiding any construction or fill activity within these wetlands.
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LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of the City of St. Albert and their agents. Tetra Tech EBA Inc. (Tetra Tech EBA) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than City of St. Albert, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this report is subject to the terms and conditions stated in Tetra Tech EBA’s Services Agreement. Tetra Tech EBA’s General Conditions are provided in Appendix A of this report.
1.0 INTRODUCTION

1.1 Project Overview

On March 24, 2014, the City Council of St. Albert recommended that a Mountain Bike Skills Park (the Project) be constructed at 43R Riel Drive (the Property). Initially, the City of St. Albert identified 34 potential sites that met the criteria for the Project. After extensive public engagement and consultation, the site at 43R Riel Drive was recommended as the preferred site due to accessibility and proximity to the Red Willow Park Trail system.

The mountain bike skills park project is being proposed for parcel 43R in Riel Industrial Park which is approximately 2.1 hectares (ha) in area. This parcel is adjacent to the Sturgeon River and within the 1:100 year floodplain. Within the City of St. Albert’s Land Use Bylaw, passive recreation features are an acceptable use within the floodplain. It is anticipated that the bike skills park with use approximately 70% of the parcel but not all of this area will be disturbed for construction. There will likely be some areas of fill placement to provide topography to site but other bike skills features such as rocks, logs and metal structures will also be used. The design will emphasize fitting in with the local natural features and minimizing impacts to the environment. The site is bounded to the north by an asphalt trail, past which runs the Sturgeon River. The riparian zone along the Sturgeon River has been compromised and is no longer in a natural state. St. Albert Community Gardens lies to the east; the area to the west is a natural area composed largely of deciduous trees and riparian vegetation. A concrete plant lies to the south. Some of the Property has been used as a fill site for concrete in the past. A Natural Areas Inventory completed in 1999 (Spencer 1999) identified the Property as part of the Sturgeon River riverine natural area.

In June, 2014, Tetra Tech EBA Inc. (Tetra Tech EBA) was contracted to carry out a Natural Areas Assessment, as part of the next step to move the Project forward. This report presents the results of desktop and field biophysical inventory of the Project site, and the results of the assessment of effects on the natural areas due to the construction, use and maintenance of the Project.

1.2 Natural Areas Definitions

The following definitions were used to guide the assessment of the current viability and sustainability of the Property as a Natural Area. These were derived iteratively from land classification reports (Pedocan 1990), and past natural areas assessments (Spencer 1999; Stantec 2007, 2013).

**Natural Area (NA):** a relatively undisturbed remnant of large-scale natural habitat, such as a tree stand, wetland, lake, creek, or ravine system, that provides habitat for native flora and fauna, links the natural area to similar natural areas within proximity, is sustainable in the long-term context or performs critical hydrologic or hydrogeological functions.

**Significant Natural Area (SNA):** a natural area equal to or greater than 0.5 hectares, which because of its features or characteristics is significant from an environmental perspective to the community of St. Albert. SNAs can withstand various degrees of human use.

**Environmentally Sensitive Area (ESA):** is an undisturbed or relatively undisturbed natural area which, because of its features characteristics or ecological functions is significant and highly sensitive to most forms of disturbance (i.e. its values and functions would be significantly altered by natural or human-caused disturbance).
1.3 Description of the Project

The Project will be contained within the 2.1 ha lot at 43R Riel Drive. The Project will include a variety of features designed to develop technical mountain bike skills, including natural obstacles such as rocks and logs, and engineered features including ladder bridges, wall rides, pump tracks, teeter totters, log rides and dirt jumps.

At this time, the Project design is conceptual in nature and, therefore, there are no available designs to allow for a footprint analysis to determine potential Project effects. Consequently, the discussions regarding the potential impact of the Project on natural areas will assume that Project will be similar in concept as those designs presented for proposed but rejected sites (i.e., Deerbourne, Liberton, and Mission). However, the Project will likely include activity within 70% of the site, most of which will be low impact. Strategies to minimize impacts will include:

- Using minimal fill material;
- Minimizing vegetation clearing;
- Using built structures (i.e., mountain bike structures) rather than terrain grading;
- Limiting grading to the grassland area; and
- Implementing erosion and sedimentation control with use of coarse materials where grading is required and re-establishment of riparian vegetation along the Red Willow Park Trail.

1.4 Project Alternatives

Initially, City Administration identified 34 sites that met the desired criteria, but through a detailed review, 31 of the sites were eliminated for various reasons. In 2013, after extensive public consultation, sites at Liberton Park and Seven Hills were excluded from the list of potential sites and the Riel Park and Gloucester Park locations were chosen as candidates for the park’s possible location. A public consultation process was carried out from November 2013 to January 2014. The results concluded that the 70.2% of the respondents fully supported the concept of a bike park, and that the preferred site was the 43R Riel Drive property (St Albert City Council 2014).

1.5 Regulatory Framework

The regulatory framework affecting the design, construction and operation of the Project is informed by the City Plan St. Albert Municipal Development Plan (MDP) Bylaw 15/2007, as this document was prepared within the context of Provincial and Federal legislation. St. Albert considers it important to maintain the greenway linkages and trail system through natural areas. The Project is to be located in the Riel Industrial Area, which is immediately adjacent to Red Willow Park Trail system that runs along the Sturgeon River and incorporates 34 kilometres of walking trails linking many neighbourhoods. Policy 9.7 in the MDP discusses the Red Willow Park corridor and states that the Land Use Bylaw shall protect and enhance the Red Willow Park corridor; however, private development may occur in the Red Willow Urban Park corridor consistent with the Red Willow Urban Park Master Plan and the Land Use Bylaw. In addition to this, the Land Use bylaw states that trails can be approved within the floodplain.

Section 10 of the MDP focuses on environmental management of natural areas and Policy 10.2 discusses how St. Albert should not only protect provincially and regionally significant areas, but also locally significant, sustainable areas except where the protection compromises other open space requirements. Policy 10.4 states that the City of St. Albert shall preserve and protect the Sturgeon River Valley Corridor in accordance with the
Red Willow Park Urban Park Master Plan. In Section 14 on inter-municipal planning and regional cooperation, one of their objectives is to specifically address the desire for a regional parks corridor that connects to the Red Willow Park system.

1.6 Past Reviews

Spencer Environmental Management Services Ltd. (Spencer) carried out a Natural Areas Inventory for the City of St. Albert in 1999 (Spencer 1999). This report informed the development of conservation policies around proposed developments. Without implementing minimum size limits, the inventory identified 232 areas that qualified (during airphoto review) as natural areas. Setting a minimum size of 0.5 ha to qualify for further investigation, 91 sites were inspected in the field, with 29 SNAs and 49 ESAs identified during fieldwork.

The City of St. Albert’s Bylaw 4/2000 requires that the Natural Areas inventory remain current. Stantec was hired in 2008 to complete an addendum to Spencer 1999 including an assessment of land recently acquired by the City of St. Albert. This assessment resulted in the addition of 35 sites to the inventory.

2.0 METHODOLOGY

The Natural Areas Assessment was carried out in July of 2014. The purpose of the Natural Areas Assessment was to:

- Identify the environmental function and values present at the Property;
- Classify the property according to appropriate type of Natural Area;
- Carry out an impact assessment to identify how the Project could potentially interact with the environmental functions and values at the Property and areas at risk to migrating effects; and
- Propose mitigation to reduce or eliminate the effects of the Project on the environment.

Baseline characteristics of ecological components were identified and described using desktop and field based studies. Data was compiled to characterize the aquatic environment (including water quality, fish and fish habitat) and the terrestrial environment (upland and wetland ecosystems, rare plants, wildlife and wildlife habitat, and species at risk). Field studies were conducted over two days in July 2014, and included vegetation community surveys (wetlands and uplands), soil assessments, rare plant surveys and wildlife surveys.

The Baseline Study Area (the Study Area) was confined to the boundaries of 43R Riel Drive.

2.1 Desktop Review

A desktop review was conducted in order to identify land use information, geographic information, and sensitive environmental elements. The review involved consulting government Acts and Regulations, publically available databases, maps, publications, and historical imagery where available.

2.1.1 Historical Airphoto Review & Site History

A review of historical airphotos was undertaken, chronologically from 1949 until the present day. Airphotos for years 1949, 1976, and 1994 were obtained from Tetra Tech EBA files. Google Earth imagery was viewed for 2004, 2008, and 2013.

An interview with a City of St. Albert staff member was conducted for additional site history.
2.1.2 Aquatic Ecosystems

A search of the Fisheries and Wildlife Management Information System (FWMIS) (Government of Alberta 2013) was conducted in order to identify fish species that are known to occur in the Sturgeon River.

2.1.3 Terrestrial Ecosystems

The Alberta Conservation Information Management System (ACIMS) database (Government of Alberta 2014a) was consulted for vegetation elements of conservation concern (i.e., vegetation resources that are rare or sensitive in nature that may be of value for their contribution to biodiversity at a local, regional, provincial, federal, or international scale), protected areas, and Crown reservations up to two kilometres from the Study Area. Generally, vegetation elements of conservation concern are considered to be:

- Species listed to be of Special Concern, Threatened or Endangered under Schedule 1 of the federal *Species at Risk Act, 2000*;
- Species assessed to be of Special Concern, Threatened or Endangered according to the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (Government of Canada 2014);
- Species listed as Threatened or Endangered under Schedule 6 of the *Wildlife Regulation* of the Alberta *Wildlife Act, 2000*;
- Species assessed to be of Special Concern, Threatened or Endangered according to the Alberta Endangered Species Conservation Committee (ESCC) (Government of Alberta 2014b); and
- Species and ecological communities listed on the ACIMS *List of Tracked and Watched Elements – May 2014* (Government of Alberta 2014c).

Additionally, a search for Environmentally Significant Areas (ESAs) and Aquatic Environmentally Significant Areas (AESAs) (i.e., lands considered to be important for the long-term maintenance of biological diversity, soil, water, and natural processes [Fiera Biological Consulting Ltd. 2009, 2010]) was conducted.

Plant species referred to as Exotic are those listed as such under the ACIMS database (Government of Alberta 2014d) and refer to plants that are non-indigenous to Alberta. Several exotic species are also listed under the provincial *Weed Control Act* and include species that are listed as Noxious and Prohibited Noxious under the Act. Within this report, the term Invasive Species refers to both Exotic species and listed Noxious and Prohibited Noxious weeds under the *Weed Control Act*.

2.1.4 Wildlife

A background search for wildlife species’ ranges was conducted for a distance of up to 1 km from the Study Area. The species’ range data were extrapolated from the following databases:

- Digital Distribution Maps of the Birds of the Western Hemisphere, version 3.0. (NatureServe 2007);
- Digital Distribution of the Mammals of the Western Hemisphere, version 3.0. (NatureServe 2007); and

Data were compiled and reviewed for species of management concern, which included any species listed as:
“At Risk,” “May Be At Risk,” or “Sensitive” under the General Status of Alberta Wild Species (GSAWS) (Government of Alberta 2010);

“Endangered,” “Threatened,” or “Species of Special Concern” under the ESCC (Government of Alberta 2014b);

“Endangered,” or “Threatened” under the provincial Wildlife Act (AWA); and

“Endangered,” “Threatened,” or “Special Concern” under the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (Government of Canada 2014) and/or the federal Species at Risk Act (SARA).

2.2 Field Methods

Soil Assessments were conducted in order to differentiate between community types (i.e., wetland versus upland). The assessment included excavating a 30 cm deep soil pit in each wetland in order to assess soil horizons, texture, depth, color and other features such as mottling and gleying. Soil horizons were determined by visual and hand analysis, and described according to the Canadian System of Soil Classification (AAFC 1998).

Vegetation Assessments were conducted to characterize plant communities in the Study Area and determine the presence of invasive species. The assessment included walking purposeful meanders in representative community types. In each community type, a floristic survey was conducted, where new plant species were recorded as they were encountered. A list of plant species was compiled for each community type; common and scientific names of observed species followed the nomenclature provided in the ACIMS List of all Species and Ecological Communities in Alberta, within the ACIMS Database (Government of Alberta 2014d). Plant management statuses and origins were obtained from the ACIMS database (Government of Alberta 2014d). The provincial Weed Control Act was consulted in determining whether any exotic plant species were listed as Noxious or Prohibited Noxious.

Wetland Assessments included locating, confirming, and delineating potential wetlands that were identified during the desktop review (prior to the site visit). Wetlands were classified according to the Canadian Wetland Classification System (National Wetlands Working Group 1997) and supplemented with the Classification of Ponds and Lakes of the Glaciated Prairie Region (Stewart and Kantrud 1971). At each wetland, a vegetation assessment was conducted in the wetland area, wildlife observations were noted, and the soil conditions were described to 30 cm. Wetlands were delineated using a recent satellite image, and wetland areas were calculated based on the field-confirmed delineations.

Wildlife Assessments were conducted to assess the Study Area for potential wildlife usage. The assessment included an opportunistic survey of incidental wildlife signs and sightings throughout the duration of the field survey; as new species were encountered they were added to a cumulative list of observed species. Habitat features such as wetlands and forested areas were surveyed in more detail, as these features are preferred wildlife habitat.

General features surrounding the Study Area, including vegetation, wetlands, watercourses, fish habitat, and other noteworthy environmental features were noted during the site visit.

2.3 Natural Areas Assessment Methods

The methodology employed to carry out the Natural Areas Assessment involved assessing the Property as a whole to determine if it qualifies as either a natural area, SNA or ESA, following the definitions presented in Section 1.2. An effects assessment using Valuable Ecosystem Components (VECs) was then carried out to determine the effects of the Project on ecological values and functions associated with the Property.
3.0 BASELINE CONDITIONS

The Project is located within the Sturgeon River Watershed, which covers 3,301 km2. Flowing east from its headwaters at Hoople Lake, it empties into the North Saskatchewan River at Fort Saskatchewan. Overall, the landscape it flows through includes urban (~4%), agricultural (~71%) and natural (~20%) areas, with the remaining area occupied by roads and other industrial developments such as oil and gas facilities (City of St. Albert 2012).

During previous Natural Areas Assessments (Spencer 1999, Stantec 2007), the Property was identified as part of Natural Area RV1, Sturgeon River, and was classified as an ESA. Portions of the Property fall within the Sturgeon River floodplain as well as the flood fringe. This includes all the wetlands on the property. The Sturgeon River is also considered a Regionally Significant Natural Area (Pedocan 1990).

The 1950 photos show that much of the Property was cleared for crop production. This area corresponds roughly with the area today occupied by grassland. In 1976, agricultural activity appears to have ceased, and a concrete factory is present on the Property’s southern border; the Property appears to have been used for material storage and/or disposal. In 1994, the grassland area was left to reclaim naturally. There was mowing in the grassland area for weed control (L. Kongsrude pers. comm. September 16, 2014). An autobody franchise was in existence to the immediate south of the larger forested natural area, which occupies the western border of the property and extends to the east. In 2004, it appears that the grassland is naturally reclaiming and the roads evident on the 1996 airphotos had been abandoned. Satellite imagery from September 2008 showed mowing activity in the grassland. In 2013, the grassland is again overgrown and not in active use. Additional narrative on the historical air photos is provided in Table 1.

Table 1: Historical Air Photo Summary

<table>
<thead>
<tr>
<th>Air Photo</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950</td>
<td>Trees have been cleared from parcel and area appears to be largely grassland; likely used for pasture; limited development around parcel</td>
</tr>
<tr>
<td>1962</td>
<td>Area is still largely grassland; some developments in adjacent properties; City tree farm just east of parcel</td>
</tr>
<tr>
<td>1965</td>
<td>Area is still largely grassland; some buildings constructed directly south of parcel; stormwater ditch constructed directly east of parcel; City tree farm expanded</td>
</tr>
<tr>
<td>1974</td>
<td>Area has been significantly disturbed; concrete plant buildings directly south of parcel; noticeable debris piles and ruts on most of parcel, likely a result of encroachment of concrete business into parcel; photo taken during spring flooding of Sturgeon River so portions of parcel are flooded; the adjacent Riel Industrial area has limited developments</td>
</tr>
<tr>
<td>1976</td>
<td>Debris piles and ruts are no longer obvious; area seems to have been left to naturally regenerate; still some buildings encroaching on south and east side of parcel</td>
</tr>
<tr>
<td>1992</td>
<td>Area appears to be largely grassland with patches of shrubs and trees; a road is evident coming from the east and appears to circle the parcel; Red Willow Trail is now constructed on northern boundary of parcel</td>
</tr>
<tr>
<td>1993</td>
<td>Area appears significantly disturbed again; a road is evident coming from the east side of the parcel; debris piles and standing water are scattered throughout the parcel; the adjacent Riel Industrial Park is now well developed</td>
</tr>
</tbody>
</table>
Table 1: Historical Air Photo Summary

<table>
<thead>
<tr>
<th>Air Photo</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>Area appears to be left to naturally regenerate; the area has some grassland areas developing and some patches of shrubs or trees; a defined low/shrub area has developed in the south west portion of the parcel; a road is still evident coming from the east but there are limited ruts throughout the parcel; on the west side of the parcel there appears to be low area with a defined vegetation edge; note on the west side of the parcel it appears that there is water seepage across the Red Willow Trail, this has been noted in recent years as well.</td>
</tr>
<tr>
<td>1998</td>
<td>Area appears to be left to naturally regenerate; further development of shrubs or trees can be seen; a road is still evident coming from the east but appears to be limited to the east side of the parcel</td>
</tr>
<tr>
<td>2000</td>
<td>Area appears to have filled in with grasses, shrubs and trees through natural regeneration; a road is still evident coming from the east but appears to continue to be limited to the east side of the parcel; note on the west side of the parcel it appears that there is standing water again on Red Willow Trail</td>
</tr>
<tr>
<td>2004</td>
<td>Area appears to continue to naturally regenerate; shrubs and trees appear to be limited to the south edge of the parcel now; a defined area of shrub/tree growth has appeared; the road from the east is only apparent as an access point, there is limited evidence of traffic on the parcel</td>
</tr>
<tr>
<td>2008</td>
<td>A large portion of the grassland area of the parcel has been mowed; City has indicated that between 2006-2010 the grassland area was mowed regularly to control Leafy Spurge, an invasive plant; shrub and tree growth on south and west portions of the parcel continue to become established; the low/shrub area in the south west area of the parcel appears more clearly defined; the road form the east is still only apparent as an access point, there is limited evidence of traffic on the parcel</td>
</tr>
<tr>
<td>2013</td>
<td>Area appears to continue to naturally regenerate; grassland area appears to be largely undisturbed except for road access from east and ruts heading north towards the Red Willow Trail; shrubs and tree growth on south and west portions of the parcel continue to become established; the low/shrub area in the south west area of the parcel continues to be clearly defined</td>
</tr>
</tbody>
</table>

In addition to the historic air photo review, a brief site history was provided by the City (L. Kongsrude pers. comm. September 16, 2014). Alberta Environment issued a directive under the Water Act to the cement plant south of the site, Westcon Precast (previously St. Albert Precast), in 2000 after receiving information from the City of St. Albert about concrete dumping that had occurred at the Property. The directive required Westcon Precast to remove the concrete, and re-grade and reclaim the site. According to the City, the dumping is believed to have occurred in the area now presently occupied by the wetlands on the Property. This means that the wetlands could have formed due to re-grading of the site during the concrete clean-up, stormwater runoff from the cement plant, and groundwater seepage.

3.1 Regional Aquatic Environment

The aquatic environment is defined by interacting organisms carrying out life processes within water. It includes lakes, ponds, rivers, creeks, and prairie potholes. The Sturgeon River is a Class C fish-bearing watercourse. While low flows and shallow lake levels provide potential habitat for Northern Pike, Walleye, and Whitefish, these same characteristics make the Sturgeon River susceptible to fish kills due to winter freezing, documented in 1998, 2002, 2004 and 2010 (City of St. Albert 2012).

According to studies carried out by the Northern Alberta Institute of Technology (NAIT) and Tetra Tech EBA (2014), overall quality of fish habitat within the Sturgeon River is poor. Total dissolved solids, total suspended solids, total phosphorus, total coliforms, and chlorides all exceeded provincial guidelines (Tetra Tech EBA 2014). Dissolved oxygen levels and flow rates are low, while nutrient and water temperatures are high (NAIT 2014). At several locations, dissolved oxygen concentrations do not meet guidelines for acute levels (5.0 mg/L) or chronic
levels (6.5 mg/L) for fish health. High levels of sedimentation have been observed at bridge crossings, associated with winter plowing and vehicle spray (NAIT 2014), recruitment of which leads to nitrification, shallow flows and increased flood risk.

3.2 Regional Terrestrial Environment

The Project site is located within the White Zone of Alberta (Government of Alberta 2008), which includes the majority of the urban, suburban and agricultural areas of Alberta. It falls within the Central Parkland Natural Subregion of the Parkland Natural Region (Natural Regions Committee 2006). This area is characterized by a mosaic of aspen (*Populus tremuloides*) and prairie vegetation on hummocky terrain. In native grasslands and natural woodlands, soils are typically Orthic Black Chernozems (O.BC) and Orthic Dark Black Chernozems (O.DBC), while Solonetzic soils dominate concave receiving sites.

Vegetation and ecosystems within the Sturgeon River Watershed have been extensively modified by agriculture and other development, so that approximately 20% of the landscape is currently classified as natural land cover types, such as forest, shrub and grasslands. The overall health of the terrestrial vegetation is considered poor, due to the extensive and intensive modification (Sturgeon River Watershed Authority 2012).

Riparian areas are characterized by vegetation that grows in response to the site conditions found in the transition zone between uplands and surface waterbodies. They perform critical ecological functions, such as reduce the impacts of flooding, retain suspended sediment, moderate temperature and filter excessive nutrient loading. Wetlands provide similar ecological functions including but not limited to the storage of surface water, flood attenuation, carbon storage and wildlife habitat. Within the Sturgeon River Watershed, the functional capacity of riparian areas and wetlands is considered poor. This assessment is based upon very limited studies; the Sturgeon River State of the Watershed Report 2012 identifies the lack of inventory and assessment of these features as a critical data gap with respect to effectively managing the landscape.

3.3 Local Aquatic Environment

The Project is located within 50 m of the southern bank of the Sturgeon River. At this location, the river is approximately 30 m wide and contains abundant aquatic vegetation (Photos 1-2). Fish species known to occur within the Sturgeon River include brook stickleback (*Culaea inconstans*), emerald shiner (*Notropis atherinoides*), fathead minnow (*Pimephales promelas*), lake chub (*Couesius plumbeus*), longnose dace (*Rhinichthys cataractae*), longnose sucker (*Catostomus catostomus*), northern pike (*Esox lucius*), river shiner (*Notropis blennius*), shorthead redhorse (*Moxostoma macrolepidotum*), spottail shiner (*Notropis hudsonius*), threespine stickleback (*Gasterosteus aculeatus*), trout-perch (*Percopsis omiscomaycus*), walleye (*Sander vitreus*), white sucker (*Catostomus commersoni*), and yellow perch (Government of Alberta 2013).

A drainage ditch (Photos 3-4), located along the eastern boundary of the Study Area, empties into the Sturgeon River and transports stormwater from the surrounding residential and industrial areas. It is possible that fish species such as stickleback, dace, shiners, minnows and suckers may use the drainage periodically during the year.

No Aquatic Environmentally Significant Areas (AESAs) were identified within the Study Area during the desktop review (Fiera Biological Consulting Ltd. 2010).
3.4 Local Terrestrial Environment

3.4.1 Terrestrial and Wetland Ecosystems

Various ecological communities were identified during field sampling (Table 2), including upland communities dominated by trees, shrubs and grasslands (Appendix A), and wetlands (Appendix B). Being in such close proximity to the Sturgeon River (within the floodline), the vegetation in the Study Area is highly influenced by interactions between terrain and river hydrology. A disturbed patch, with bare soils and cut grass is also present on the east side of the Study Area.

The Treed/Shrub area contains native upland species and has likely been affected over time by nearby development (e.g. fragmentation, introduction of native species). The grassland area was mowed in recent years for weed control (in the mid 2000’s) and was returned to grassland conditions by natural reclamation. The grassland area is also on slightly higher ground than the rest of the Study Area, therefore it is likely drier throughout the year and is likely not flooded as commonly as the lower-lying areas on site to the south and west.

The Treed/Shrub upland community occupies the upland area and occupies 0.33 ha of the Study Area. It occurs on slightly higher ground than surrounding vegetated areas, and is characterized by relatively mesic soil conditions that promote tree growth and a vigorous understory. Typically, aspen is dominant within the upper canopy, with shade tolerant white spruce occupying the lower tiers. A variable light regime promotes a diversity of species in response to light defined ecotones; 51 species were identified in the Treed/Shrub community as opposed to 19 in grassland community. In relatively low light areas, the understory contains wild sarsaparilla (Aralia nudicaulis), beaked hazelnut (Corylus cornuta), bedstraw species (Galium spp.), honeysuckle species (Lonicera spp.) and red and white baneberry (Actaea rubra). Understories in areas with access to increased light contain grasses such as wheatgrasses (Agropyron spp.), bluejoint (Calamagrostis canadensis), and awnless brome (Bromus inermis). Shrubs include various species of willow (Salix spp.) and Saskatoon berry (Amelanchier alnfolia). Several exotic plant species were observed in the Treed/Shrub community, including isolated occurrences of creeping thistle (Cirsium arvense) and scentless chamomile (Matricaria perforata); both listed as Noxious under the Weed Control Act. Due to high amounts of litterfall (especially inputs from aspen), soils are organically enriched in the upper horizons, promoting the development of thick Ah horizons. Depending on the quality and degree of organic matter eluviation from the humus form, the soil great group is either O.DB or O.DYB.

The Treed/Shrub upland community is equivalent to the Aspen Woodlot (CF1) ecosystem described in Spencer (1999), and the Remnant Trembling Aspen Upland Forest (CF1) described in Pedocan (1990). These occur on well to moderately drained upland areas throughout the City of St. Albert, as well as regionally. Mature occurrences of CF1 are considered remnants of the once-dominant upland ecosystem of the Central Parkland Subregion.

The Grassland upland community is contained within the Disturbed Areas classification described in Spencer (1999). Due to extensive anthropomorphic alteration, this area no longer represents a natural ecosystem. Although it still can potentially provide valuable habitat, it is not considered a natural area. It is 1.05 ha in size and covers approximately 52% of the site. Elevationally, it is between the Treed/Shrub upland community and the wetlands to the southwest. Soils in this area have been disturbed due to historical deposition of concrete waste from the adjacent concrete industrial facility (City of St. Albert 2014, 1976 air photos). It is unknown whether the grassland was reclaimed naturally or by human intervention following its agricultural use; however, a productive grassland is currently supported, with scarce shrub growth and no evidence of tree growth. An open light regime provides ideal conditions for graminoids which are dominated by reed canary grass (Phalaris arundinacea). In total, nineteen (19) plant species were identified, 18 of which are vascular plants. Other common species include wild vetch (Vicia americana) and Kentucky bluegrass (Poa pratensis). Creeping thistle and perennial sow-thistle
(Sonchus arvensis); both listed as Noxious under the Weed Control Act, occur sporadically. Leafy spurge (Euphorbia esula), a Noxious weed, has been found within the grassland over the last decade. The City of St. Albert has implemented a control program for leafy spurge and continues to monitor the area for infestations (Pers. Comm. 2014)

**Table 2: Upland Vegetation Communities**

<table>
<thead>
<tr>
<th>Vegetation Community</th>
<th>Area (ha)</th>
<th>Number of Species</th>
<th>Dominant Species</th>
<th>Number of Species of Management Concern</th>
<th>Number of Exotic Species</th>
<th>Photos</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treed/shrubby1</td>
<td>0.33</td>
<td>51</td>
<td>willow, aspen, white spruce, reed canary grass</td>
<td>0</td>
<td>8</td>
<td>5-6</td>
</tr>
<tr>
<td>Grassland</td>
<td>1.05</td>
<td>19</td>
<td>reed canary grass, wild vetch, Kentucky bluegrass</td>
<td>0</td>
<td>6</td>
<td>7-8</td>
</tr>
</tbody>
</table>

**Note:** 1 Plot was combined with surrounding treed areas to the southwest in order to obtain more land classification information.

Three wetland plant communities were assessed on site, including a Class II Temporary Marsh, a Class III Seasonal Marsh, and an Unconfined Flat Swamp.

The Class II Temporary Marsh (Stewart and Kantrud 1971) is approximately 0.26 ha in size and has surficial connectivity to the Class III Seasonal Marsh to the south and the Unconfined Flat Swamp to the southeast. It is likely influenced by the Sturgeon River water levels, as it is located within the Sturgeon River floodplain. The wetland was relatively dry at the time of the assessment (i.e., no open water). Soils are considered hydric and are mainly moderately stony, sandy clay mineral soils within the first 30 cm; gleying and mottling were observed throughout. The wetland is fairly hummocky, with dry patches throughout. Vegetation within the Class II Temporary Marsh is mainly characteristic of wet-meadow vegetation zones (Stewart and Kantrud 1971) (Table 2; Appendix B).

The Class III Seasonal Marsh (Stewart & Kantrud 1971) is approximately 0.25 ha in size and has surficial connectivity to the Class II Temporary Marsh to the north and the Unconfined Flat Swamp to the east. It is situated in a slight depression in the landscape and is likely influenced by the Sturgeon River water levels, as it is located within the Sturgeon River floodplain. The wetland was wet at the time of the assessment with small patches of open water. Very small amounts of mineral soils are present, with the first 30 cm being dominated by coarse-textured fluvial sediments with limited profile development. Vegetation within the Class III wetland is mainly characteristic of shallow-marsh and wet-meadow vegetation zones (Stewart and Kantrud 1971), with several small willow patches present (Table 2; Appendix B).

Class II and III marshes are considered to be equivalent of the Marsh (CW1) and Wet Meadow (CW2) classifications from Spencer (1999), with the primary differentiating characteristic being the presence of open water within the CW2 throughout the year.
The Unconfined Flat Swamp (National Wetlands Working Group 1997) is a 0.10 ha, connected to the surrounding Class II and III wetlands on site. It is situated on higher ground, and is drier than the surrounding wetlands; the swamp was dry at the time of the assessment. It is likely influenced by the Sturgeon River water levels, as it is located within the Sturgeon River floodplain. Soils are considered hydric and are moderately to very stony sandy clay loam mineral soils; mottling was observed throughout the first 30 cm. Vegetation within the swamp included dense willow cover and grasses (Table 3; Appendix B).

The Unconfirmed Flat Swamp is the equivalent of the Willow Wetland (CW3) in Spencer (1999).

### Table 3: Wetland Vegetation Communities

<table>
<thead>
<tr>
<th>Wetland Classification</th>
<th>Area (ha)</th>
<th>Number of Species</th>
<th>Dominant Species</th>
<th>Number of Species of Management Concern</th>
<th>Number of Exotic Species</th>
<th>Photos</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class II</td>
<td>0.25</td>
<td>6</td>
<td>reed canary grass, small bottle sedge</td>
<td>0</td>
<td>0</td>
<td>9-10</td>
</tr>
<tr>
<td>Class III</td>
<td>0.26</td>
<td>15</td>
<td>reed canary grass, small bottle sedge, water sedge</td>
<td>0</td>
<td>2</td>
<td>11-15</td>
</tr>
<tr>
<td>Unconfined Flat Swamp</td>
<td>0.10</td>
<td>10</td>
<td>sandbar willow</td>
<td>0</td>
<td>2</td>
<td>16-17</td>
</tr>
</tbody>
</table>

3.4.2 Vegetation Elements of Conservation Concern

Review of the ACIMS database revealed that five vegetation elements of conservation concern have been observed 1 to 3 km outside the Study Area boundary (Government of Alberta 2014a):

- Smooth sweet cicely (*Osmorhiza longistylis*);
- Leafy pondweed (*Potamogeton foliosus*);
- River bulrush (*Bolboschoenus fluviatilis*);
- Moss (*Leskea polycarpa*);
- Golden saxifrage (*Chrysosplenium iowense*); and
- Balsam poplar / high-bush cranberry / ostrich fern (*Populus balsamifera / Viburnum opulus / Matteuccia struthiopteris*).

No vegetation elements of conservation concern were observed during the site visit.

3.4.3 Parks, Protected Areas and Lands of Conservation Priority

The Lois Hole Centennial Provincial Park is located near Big Lake, which is approximately 1.7 km west of the site. No Crown Reservations were identified through the ACIMS database (Government of Alberta 2014a). No ESAs were identified in the desktop review (Fiera Biological Consulting 2009).
3.4.4 Wildlife

The desktop review identified a total of 218 wildlife species as having range within 1 km of the Study Area, including three amphibians, 181 bird species, and 34 mammals. Riparian woodlands, forest edges, and open areas are important habitat for birds of prey, songbirds, ungulates, and Coyotes (*Canis latrans*). Various raptor species, such as Bald Eagle (*Haliaeetus leucocephalus*), use large rivers for hunting fish whereas others, like Golden Eagle (*Aquila chrysaetos*), prefer open country. Open areas with wildflowers are also important for songbirds whose diet mainly consists of insects. Ungulates such as deer (*Odocoileus* spp.) tend to use open areas for grazing, and carnivorous mammals like Coyotes hunt for small mammals in open areas. Songbirds have potential habitat on and surrounding the site in the forms of hedgerows, willow (*Salix* spp.) thickets, forest areas, and forest edges. In addition, the wetlands on site and the Sturgeon River may provide important habitat for waterbirds, songbirds, and amphibians. Wet soil conditions around the wetlands encourage the growth of willows, robust grasses, and sedges, which are used as food and shelter by ungulates, birds, small mammals, amphibians, and arthropods.

A Wildlife Movement Monitoring program was completed just west of the site for Ray Gibbon Drive (Spencer Environmental Management Services Ltd. 2011). The program found that there were higher concentrations of wildlife activity on the north side of the Sturgeon River as compared to the south side, particularly with larger wildlife.

During the site visit, the following 17 bird species were detected on or surrounding the Study Area:

- American Coot (*Fulica americana*);
- American Crow (*Corvus brachyrhynchos*);
- American Goldfinch (*Spinus tristis*);
- Black-Capped Chickadee (*Poecile atricapillus*);
- Cedar Waxwing (*Bombycilla cedrorum*);
- Clay Coloured Sparrow (*Spizella pallida*);
- Common Raven (*Corvus corax*);
- Common Yellowthroat (*Geothlypis trichas*);
- Mallard (*Anas platyrhynchos*);
- Osprey (*Pandion haliaetus*);
- Red-Eyed Vireo (*Vireo olivaceus*);
- Red-Winged Blackbird (*Agelaius phoeniceus*);
- Savannah Sparrow (*Passerculus sandwichensis*);
- Song Sparrow (*Melospiza melodyia*);
- White-throated Sparrow (*Zonotrichia albicollis*);
- White-breasted Nuthatch (*Sitta carolinensis*); and
Yellow Warbler (Setophaga petechia).

It should be noted that amphibians and mammals were not observed during the site visit; however, suitable habitats capable of supporting both species groups are present.

Of the wildlife species identified in the range search 48 species including one amphibian, 43 birds, and four mammals are species of management concern (Appendix C). Two of these species were observed during the site visit: Osprey and Common Yellowthroat. Both species are listed as Sensitive under GSAWS (Government of Alberta 2010). No further designations or setbacks currently apply to these species in the Parkland Region.

4.0 NATURAL AREAS ASSESSMENT

This section of the assessment includes a description of the scoping process used to identify potentially affected Valued Ecosystem Components (VECs), select assessment boundaries, and identify the potential effects of the Project that are likely to arise from the Project’s interaction with selected VECs. Scoping is fundamental to focusing the Natural Areas Assessment on those ecological components that are most likely to interact with the Project.

4.1 Limitations

All field surveys can only confirm the conditions present in the Study Area at the time of the surveys. Supplemental surveys may be required where site-specific conditions may be anticipated to change following completion of the survey.

Soil assessments could only be conducted to a depth of 30 cm due to ground disturbance restrictions.

4.2 Determination of Status as a Natural Area

The Property meets the definition of a Natural Area, as described in Section 1.2. The wetlands and treed upland portions are remnant natural environments that provide habitat for native flora and fauna. Due to extensive anthropomorphic alteration in the grassland this area no longer represents a natural ecosystem.

4.2.1 Definition of Significant Natural Areas

A SNA is as defined in Section 1.2, with the additional requirements of being equal to or greater than 0.5 ha in areal extent and, because of its features or characteristics, is significant from an environmental perspective to the community of St. Albert. As well, it must have one of the following characteristics:

1. Known to support vulnerable, threatened, endangered or other special status plant or wildlife species;
2. Contains an unusual or high diversity of plants and/or animal communities;
3. Contains habitat with limited or unique representation within the community;
4. Is a viable remnants of a once larger habitat or ecosystem that is in decline;
5. Functions as a link between two or more SNAs within the jurisdiction of St. Albert, or is important to the function of the natural system;
6. Presence of distinctive or unique landforms;
7. Performs a critical hydrologic function; and/or
8. Known to be valued by community residents.

4.2.2 Definition of Environmentally Sensitive Areas

An ESA is as defined in Section 1.2, with the additional requirements of being equal or greater to 0.5 ha in areal extent and in relatively undisturbed condition. As well, it must have one of the following characteristics:

1. Provides habitat for plant or animal species sensitive to human disturbance so that the population viability is threatened when faced with disturbance;
2. Comprises old growth forest;
3. Comprises a permanent wetland;
4. Functions as a critical link between ESAs;
5. Comprises hazard lands or lands unsuitable for development in their natural state (e.g., floodplains and unstable slopes);
6. Functions as a groundwater recharge or discharge area;
7. Contains an unusual diversity of plant or animal communities due to a variety of ecotones; and/or
8. Is recognized for its value by the scientific community and is used for research purposes because of its unique properties;

These criteria were adapted from those presented in Spencer (1999). A minimum size of 0.5 ha was applied; areas below this size limit are unlikely to perform ecological functions in a manner that contributes in a meaningful way to the greater ecosystem. Sites under 0.5 ha are vulnerable to a number of pressures, including rapidly changing hydrology, sedimentation, contamination and invasive species.

4.2.3 Determination of Status as a Significant Natural Area

A checklist form, based upon Spencer (1999), was used to determine the status of each ecological community as an SNA. Past natural area inventories (Spencer 1999; Stantec 2007) were consulted in order to understand the occurrence and extent of the different types of natural areas within the City of St. Albert. As presented in Section 1.6, 91 natural areas were identified by Spencer (1999), with an additional 35 identified by Stantec (2007). Spencer (1999) identified 28 SNAs; the report does not delineate between SNAs and ESAs when presenting ecological community occurrence. However, among both SNAs and ESAs, there were 33 tree stands, 18 wetlands, 11 forested ravines and five marshes. During the 2007 update, 12 SNAs and 23 ESAs were identified (Stantec 2007). Many of these were riparian tree stands located along Carrot Creek. Differentiation between SNAs and ESAs was again not presented.

Within the Study Area, the ecological communities eligible for assessment to determine SNA status included the Treed/Shrub community and the wetland communities. The grassland community was not assessed, as it was not considered to be a natural area due to excessive disturbance. The wetlands were assessed together, as they provide similar ecological functions and, separately, are quite small in size. In aggregate, they comprise 0.61 ha, which exceeds the minimum size requirements for a natural area. Although the Treed/Shrub community within the Study Area is under the minimum size, it is contiguous with Treed/Shrub ecosystems outside of the Study Area. Both the Treed/Shrub community and the Wetlands community were identified as SNAs (Table 4). This is consistent with Spencer (1999).
Table 4: Significant Natural Area Determination

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Treed/Shrub</th>
<th>Wetlands Class II, Class III, Swamp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Known to support vulnerable, threatened, endangered or other special status plant or wildlife species;</td>
<td>None identified during field surveys</td>
<td>None identified during field surveys</td>
</tr>
<tr>
<td>Unusual or high diversity of plant and or animal communities</td>
<td>Not identified during field surveys. Species richness is within expected parameters for community type</td>
<td>Not identified during field surveys. Species richness is within expected parameters for community type</td>
</tr>
<tr>
<td>Habitat with limited or unique representation within the community</td>
<td>Most common natural area within St Albert</td>
<td>Marsh wetlands least common natural area within St. Albert. Meets criteria</td>
</tr>
<tr>
<td>Is a viable remnants of a once larger habitat or ecosystem that is in decline;</td>
<td>Meets criteria. Forest stands are in decline in the region. Forests function as links between ecological communities (wildlife travel corridors)</td>
<td>Meets criteria. Wetlands in decline in the region, wetlands are critical links between upland and aquatic ecosystems</td>
</tr>
<tr>
<td>Presence of distinctive or unique landforms</td>
<td>None identified during field surveys</td>
<td>None identified during field surveys</td>
</tr>
<tr>
<td>Performs critical hydrologic function</td>
<td>Does not meet criteria</td>
<td>Meets criteria. Wetlands well understood to provide critical hydrologic function, including flood mitigation</td>
</tr>
</tbody>
</table>

4.2.4 Determination of Status as an Environmentally Sensitive Area

A checklist form, based upon Spencer (1999), was used to determine the status of each ecological community as an ESA. Regional context and communities eligible for assessment were determined as in Section 4.2.4. The Wetlands community were identified as an ESA (Table 5). This is consistent with Spencer (1999).

Table 5: Environmental Sensitive Area Determination

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Treed/Shrub</th>
<th>Wetlands Class II, Class III, Swamp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provides habitat for plant or animal species sensitive to human disturbance so that the population viability is threatened when faced with disturbance;</td>
<td>Does not meet criteria</td>
<td>Does not meet criteria</td>
</tr>
<tr>
<td>Comprises old growth forest</td>
<td>Does not meet criteria</td>
<td>Does not meet criteria</td>
</tr>
<tr>
<td>Comprises a permanent wetland</td>
<td>Does not meet criteria</td>
<td>Does not meet criteria</td>
</tr>
<tr>
<td>Functions as a critical link between ESAs</td>
<td>Does not meet criteria</td>
<td>Does not meet criteria</td>
</tr>
</tbody>
</table>
Table 5: Environmental Sensitive Area Determination

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Treed/Shrub</th>
<th>Wetlands Class II, Class III, Swamp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comprises hazard lands or lands unsuitable for development in their natural state (e.g. floodplains and unstable slopes);</td>
<td>Does not meet criteria</td>
<td>Meets criteria, located within floodplain of Sturgeon River</td>
</tr>
<tr>
<td>Functions as a groundwater recharge or discharge area</td>
<td>Does not meet criteria</td>
<td>Potentially meets criteria. Marsh and swamp wetlands can be valuable for groundwater storage and release</td>
</tr>
<tr>
<td>Contains an unusual diversity of plant or animal communities due to a variety of ecotones;</td>
<td>Not identified during field surveys. Species richness is within expected parameters for community type</td>
<td>Not identified during field surveys. Species richness is within expected parameters for community type</td>
</tr>
<tr>
<td>Science recognized for its value by the scientific community and is used for research purposes because of its unique properties</td>
<td>No scientific research activity identified onsite</td>
<td>No scientific research activity identified onsite</td>
</tr>
</tbody>
</table>

4.2.5 Discussion of Natural Area Status

4.2.5.1 Treed/Shrub Community

The Treed/Shrub community is classified as a SNA because it meets the criteria of being greater than 0.5 ha, and represents an ecological community considered to be in decline regionally (Spencer 1999). Within St. Albert, both small and large aspen woodlots are being cleared or fragmented due to development. As well, aspen forests are especially vulnerable to climate change; dieback and reduced growth of some aspen forests in northwest Alberta has already been noted following drought years and insect infestations, both predicted to increase in frequency according to climate projections (Hogg et al 2003).

The sustainability of the ecological functions associated with the Treed/Shrub community are vulnerable due to development that has occurred along the all sides of the natural area (except the NE which is delineated by the Sturgeon River). The development includes industrial, residential, agricultural and recreational. Disturbances associated with these types of development include fragmentation, invasive species establishment, deposition of rubbish (including potential contaminants) soil erosion and soil compaction. The ecological community is not linked to other natural areas, greatly reducing its value as wildlife habitat. Due to all of these reasons, the ability of the Treed/Shrub community to continue to perform ecological functions is considered poor.

4.2.5.2 Wetland Community

Functioning wetlands, if greater than 0.5 ha, are, by default, classified as ESAs. Wetland function, which includes hydrological, biochemical, ecological and habitat function, is unique on the landscape, and can be affected by many types of disturbance. Within the Sturgeon River Watershed, wetland extent is estimated to be about 6.8% (NSWA 2005) of the watershed area. However, the extent of gleysolic soils is much greater, at 525 sq km or about 18% of the watershed area (Alberta Water Council 2008). Gleysols are soils with morphological features such as gleying and mottling, indicating either intermittent or continuous saturation of the soil profile during soil development. They are often associated with wetlands. The implication of the discrepancy between Gleysol and wetland extent is that wetlands appear to have been much more common in the past, with wetlands being repurposed to agriculture over the past several decades.
Wetland function at the Property is already compromised by the presence of a walking/cycling path between the wetlands and the Sturgeon River riparian area. Wetland hydrologic function, such as flood mitigation, is most likely affected as the free flow of water into and out of the wetland is interrupted by the path. Ecological and habitat function have been compromised by the dominance of reed canary grass, which is commonly associated with a decrease in plant species biodiversity (Barnes 1999). For these reason, the ability of the wetlands to continue to perform ecological functions is considered poor.

4.2.5.3 Grassland Community

Due to extensive anthropomorphic alteration of the grassland, this area no longer represents a natural ecosystem and is therefore not considered a Natural Area.

5.0 ASSESSMENT OF POTENTIAL PROJECT EFFECTS ON NATURAL AREAS

An assessment of potential Project effects is required in order to determine how the Project could impact the ecological functions and values identified at the Property, and required mitigation. Since there was no Project footprint available at the time of the assessment, much of the discussion is based upon a general conceptual Project description.

5.1 Valued Ecosystem Components

VECs are aspects of the natural environment that are valued because of their ecological, scientific, resource, socio-economic, cultural, health, aesthetic, or spiritual importance, and may have potential to be adversely affected by a proposed activity or have the potential to affect a proposed activity. VECs have the potential to interact, either directly or indirectly, with some component or activity associated with the project during planning, construction, use or maintenance activities. Identification of VECs will allow the management of potential adverse effects.

The VECs were identified using a multi-disciplinary approach and may have been identified base on: identified regulatory requirements; information derived from published and unpublished data sources; information and comment received during the engagement of local communities; and field surveys.

VECs in the natural environment may include particular habitats, environmental features, specific assemblage (community) of plants or animals, identified species of plant or animal, or an indicator of environmental health. VECs were identified by meeting one or more of the following criteria:

- Area of notable biological diversity;
- Significant habitat for locally important species;
- Significant habitat for uncommon, rare or unusual species;
- Important corridor or linkage for fish and/or wildlife movement;
- Sensitive receiving water environment;
- Species at risk;
- Notable species or species groups;
- Indicator of environmental health;
• Important component to the function of other ecosystem elements or functions;
• Component is of economic or cultural significance;
• Component is of educational, scientific, or aesthetic interest; and
• Component is of provincial, national or international significance.

A desktop review of the site resulted in the selection of a number of potential VECs (Table 6). Resources used for the review included a high resolution ECW image supplied by the client, St Albert Natural Areas Review and Inventory Addendum (Stantec 2007), St. Albert Natural Areas Sustainability Assessment (Spencer Environmental 2002), and St. Albert Natural Areas Review and Inventory (Spencer 1999).

### Table 6: Valued Ecosystem Components

<table>
<thead>
<tr>
<th>Valued Ecosystem Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil Quantity and Quality</td>
<td>Potential VECs include preventing soil loss due to erosion, and maintaining soil quality outside of the Project footprint during construction, use and maintenance.</td>
</tr>
<tr>
<td>Wetlands</td>
<td>Potential VECs include maintaining wetland extent and function during Project construction, use and maintenance.</td>
</tr>
<tr>
<td>Water Quality</td>
<td>Potential VECs include maintaining surface and groundwater quality outside of the project footprint and downstream from the Project area within the Sturgeon River during construction, use and maintenance.</td>
</tr>
<tr>
<td>Water Quantity</td>
<td>Potential VECs include maintaining water quantity by mitigating reduction in surface infiltration within the Project footprint during construction, use and maintenance.</td>
</tr>
<tr>
<td>Wildlife (SOMC)</td>
<td>Potential VECs include indirect and direct effect to species such as habitat loss and direct mortality during construction, use and maintenance.</td>
</tr>
<tr>
<td>Wildlife Habitat</td>
<td>Potential VECs for Wildlife habitat would include avoiding indirect and direct effects to species such as habitat loss and fragmentation resulting from development activities.</td>
</tr>
<tr>
<td>Fish and Fish Habitat</td>
<td>Potential VECs include direct and indirect effects to the fish habitat in the Sturgeon River as a result of deleterious substance releases during construction, use and maintenance.</td>
</tr>
<tr>
<td>Terrestrial Ecosystems</td>
<td>Potential VECs include indirect and direct effects to vegetation such as habitat loss and fragmentation from the project footprint.</td>
</tr>
<tr>
<td>Rare Plants (SOMC)</td>
<td>Potential VECs include maintaining rare plant communities and habitat</td>
</tr>
</tbody>
</table>

### 5.2 Assessment Boundaries

Assessment boundaries are designed to define the area within which direct and indirect effects of the Project are most likely to be contained. Direct effects are those associated with the project footprint, and usually result in loss (habitat loss, vegetation loss), while indirect effects are those associated with project activities, such as alterations in site hydrology resulting in the degradation of wetland function.

Traditionally, the assessment boundary would contain all proposed Project infrastructure (i.e., the Project footprint), as well as areas outside of the footprint. Since no infrastructure footprint has yet been created, the assessment boundary will be the same as the baseline Study Area (Figure 1).
5.3 Identification of Environmental Effects

Potential environmental effects are those that could reasonably be anticipated to occur in the absence of mitigation. As such, they represent the “worst case scenario” for interaction between the Project and the natural environment. In total, Tetra Tech EBA identified 47 VEC-effect types of interactions (Table 7).
### Table 7: Potential Project Effects

<table>
<thead>
<tr>
<th>Vegetation Clearing</th>
<th>Invasive Plants</th>
<th>Habitat Fragmentation</th>
<th>Soil Erosion</th>
<th>Sedimentation</th>
<th>Fill Placement</th>
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</tr>
</tbody>
</table>

**Note:** ✓ checkmark indicates reasonable potential for the Project effect and the VEC to interact
5.3.1 Soil Quantity and Quality

Soil loss commonly occurs during surface clearing activities and soil stockpiling during construction. Examples of activities that result in soil loss include soil removal or burial during clearing, soil removal during construction of Project features, and soil erosion from exposed mineral soil.

Areas where soil disturbance does not involve soil removal, burial, or large-scale erosion are described as degraded (reduction of soil quality). Soil degradation includes soil compaction, contamination (often via dust accumulation), surface erosion, and/or decreased soil fertility. Soil compaction can occur through traffic impacts on soils, equipment and soil material storage, foot traffic, and the conversion of a soil to an engineering medium to build bike park features. Typically, compaction affects vegetation establishment and growth due to decreased root penetration and soil aeration. Loss of aeration also reduces soil water storage capacity. Compaction reduces movement of water down the soil profile, resulting in increased runoff. This has the effect of increasing surface soil erosion rates and migration of soil material off site.

Soil contamination can occur due to spills of deleterious substances, such as fuel and vehicle fluids. These substances may accumulate in the soils, and lead to loss of soil fertility and increased toxicity to vegetation and soil fauna.

Wind and water erosion of soil, usually induced by soil surface disturbance or vegetation removal, can result in the loss of fertile soil horizons and may introduce sediments into watercourses. Soil fertility can also be compromised during soil salvaging operations. For example, there is a risk that soil fertility will be reduced if fertile surface soils are inadvertently mixed with infertile subsurface material (admixing).

Potential adverse effects on the VECs Soil Quantity and Soil Quality include vegetation clearing, soil erosion and fill placement. Contamination has the potential to affect Soil Quality. However, it should be noted that the soils have already been altered and impacted from previous anthropomorphic activities.

5.3.2 Wetlands

Wetland extent and function can be affected by Project development. Wetland extent is the size of the wetland, both in terms of areal extent and volume. Loss of wetland extent occurs when the wetland is disturbed or altered in such a manner that it no longer exhibits pre-existing wetland characteristics. Project effects that can result in a loss of wetland extent include infilling of the wetland, and altering flow regimes so that wetland soil characteristics (e.g., organic matter accumulation, gleying, mottling) are no longer maintained. This results in a reduction of the water storage capacity of the wetland, which can lead to increased flooding.

Wetland function is defined as a process or series of processes that a wetland performs. These include a wetland's ability to regulate water levels and attenuate flow, to filter water and improve water quality, and to provide aquatic and terrestrial habitat for wetland dependent or wetland-associated species. Wetland function is separated into four primary categories: hydrological, biochemical, ecological, and habitat (Milko 1998).

The type of project-wetland interactions that can result in loss or alteration of wetland extent and function include:

- Alterations to wetland biochemical function through sedimentation site runoff;
- Alterations to wetland ecological function through the introduction of invasive or non-native wetland plant species and loss of adjacent upland buffer areas;
• Alterations to wetland hydrological function through placing of fill material, ditching, culverting, building, and water flow alteration; and

• Alterations to wetland habitat function through fragmentation, change of vegetation structure, change of water sources, noise impacts, artificial light sources, and litter/garbage.

*Potential adverse effects on the VEC Wetland Function include invasive plants and sedimentation. Contamination has the potential to affect Wetland Function.*

### 5.3.3 Water Quality and Quantity

Potential effects to water may affect quality of both surface water and groundwater. Effects to surface water quality may occur as the result of erosion, deleterious substance spills, and application of herbicides for vegetation control during use and maintenance. Similarly, reduction of groundwater quality may result due to spills of fuel, vehicle fluids, herbicides and road salts.

Groundwater quantity and flow may be altered during construction, use and maintenance of the proposed bike park. The construction of infrastructure such as berms, ramps, tracks and jumps can decrease soil infiltration and alter hydraulic conductivity. This may result in less subsurface water and increased overland flow. Since the hydrologic functional capacity of the wetlands in the area may be compromised due to fill material, this may exacerbate existing flood risk.

*Potential adverse effects on the VEC Water Quality are limited to fill placement. Potential adverse effects on the VEC Water Quality and Quantity include vegetation clearing, invasive plants, habitat fragmentation, sedimentation, fill placement and contamination.*

### 5.3.4 Wildlife (including Species of Management Concern) and Wildlife Habitat

Habitat is defined as the suite of resources and environmental conditions (both abiotic and biotic) that determine the presence, survival, and reproduction of a population. Habitat quality can be rated by the suitability of the habitat to provide important life requisites, namely feeding and shelter. Wildlife habitat at the Project site includes food, security and thermal habitat. The combination of wetlands with potentially good forage quality in the vicinity of treed areas allows for food and security habitat to be in close proximity, thus increasing the value of the site for wildlife. Thermal habitat is provided in the forested area of the Project site, with the mature canopy providing shade in the summer months and snow interception and thermal cover during the winter.

During construction, vegetation clearing will take place, along with the use of heavy machinery to create bike park features. Potential effects on wildlife include the following:

- Habitat loss and alteration – loss of vegetation due clearing, creation of bike park features in areas that may have been used as habitat;
- Disruption of movement – caused by the removal of cover that may have been used to facilitate movement;
- Sensory disturbance – noise associated with construction and use of the bike park may result in certain species being dissuaded from using the area as habitat;
- Direct mortality – accidental death due to accidents with equipment used for clearing and site preparation (i.e., removal of trees with unidentified nests); and
- Attractants – accumulation of trash on site during construction and operations.
The Study Area is located within the ranges of several wildlife species of management concern. Possible effects to species of management concern include removal of vegetation used for nesting and roosting, removal of vegetation used by small mammals, which in turn are prey for raptors, owls, and more, and noise disturbance due to construction and use of the bike park.

Osprey and Common Yellowthroat, two species of management concern, were detected during the site visit. These species are listed as Sensitive under GSAWS. GSAWS rankings are an initial evaluation of species in Alberta, which the Endangered Species Conservation Committee (ESCC) uses to evaluate and potentially designate legally-binding conservation statuses for species under the Alberta Wildlife Act. GSAWS statuses are for guideline purposes only; however, these species should not be disturbed, if possible, as a measure of due diligence.

_Potential adverse effects on the VEC Wildlife include vegetation clearing, invasive plants, contamination and noise. Potential adverse effects on the VEC Wildlife Habitat include vegetation clearing, invasive plants, habitat fragmentation, sedimentation, fill placement, contamination and noise._

5.3.5 Fish and Fish Habitat

Fish habitat is any habitat within which one of the life processes (e.g., spawning, rearing, feeding) of fish occur. Loss of fish and fish habitat may occur if the identified drainage channel located at the Project site is altered or removed during construction of the Project. There is potential for sedimentation of the Sturgeon River if fill material is stored or placed within the floodplain. If deleterious substances are spilled within the drainage channel or the Sturgeon River, there is potential for fish mortality. Vegetation removal can potentially affect channel stability and temperature regimes.

_Potential adverse effects on the VEC Fish and Fish Habitat include sedimentation and contamination. Vegetation clearing is a potential adverse effect for Fish Habitat._

5.3.6 Terrestrial Ecosystems and Vegetation Elements of Conservation Concern

Terrestrial ecosystems are ecosystems that occur on land. They are complex interactions of abiotic (e.g., snow duration, hydrology, natural disturbance) and biotic components (e.g., nutrient-fixing mycorrhizae, disease, pollination, competition) that result in unique species composition, structure and functions. The determining factors of what characteristics an ecosystem has include climate, organisms, relief, parent material, time, and disturbance. Alteration to any of these factors results in alteration to the ecosystem.

Project construction activities may cause the removal of forested habitat within the Project area. In addition, there is a risk of introduction of invasive species to other areas of the Project, especially if mineral soil is exposed during the growing season. Soil erosion can result in the removal of the fertile fraction of the soil, reducing ecosystem productivity and biodiversity. Fill placement and the construction of Project features such as berms and trails will result in the direct loss of terrestrial ecosystems if fill is placed on terrestrial ecosystems. Soil contamination can result in reductions to ecological health, biodiversity and productivity.

No vegetation elements of conservation concern were identified during field surveys. However, once the Project footprint has been determined, it is recommended that preconstruction surveys be carried out by a qualified rare plant botanist. Mitigation of rare plant and lichen populations can involve avoidance (prevention of direct impacts and maintenance of buffer areas), transplantation, reduction of indirect impacts, and compensation. Avoidance is the only method of ensuring that direct impacts will not harm or extirpate rare plant and lichen populations (California Native Plant Society Rare Plant Scientific Advisory Committee 1998; Fahselt 2007).
6.0 MITIGATION OF PROJECT EFFECTS

The most effective mitigation strategy is avoidance. Therefore, Project design will incorporate the results of field surveys so that areas of environmental value are maintained to the greatest extent feasible. If avoidance is not feasible, implementation of Best Management Practices (BMPs) to reduce the potential for the Project to impact the natural environment in an adverse manner will be implemented.

6.1 Vegetation Clearing

Vegetation clearing will affect ecosystem function and integrity. The effects of the Project on ecosystem function and integrity can be minimized through the actions listed below:

- Identify ecosystems with low resiliency to disturbance using field survey data;
- Minimize environmental impacts to the riparian habitats, wetlands, and floodplain of the Sturgeon River;
- Adopt ecosystem-specific standard operating procedures (SOPs) for low-resilience ecosystems such as wetlands;
- Minimize all clearing dimensions during construction activities;
- Re-establish trees and grasses that are lost during construction;
- Manage riparian areas according to guidelines;
- Avoid removal of mature trees, which provide multiple ecological functions, such as diverse wildlife habitat within close proximity and carbon storage;
- Re-establish vegetation cover during restoration with special attention to the riparian zone of the Sturgeon River; and
- Establish communication procedures between on the ground employees and environmental managers to facilitate timely reporting of any incident or concern during each phase of the Project. Construction personnel will be required to communicate any concerns including erosion and sediment production, windthrow, invasive plants, unauthorized access to restricted areas (i.e. rare plant and lichen habitat).

6.2 Invasive Plants

Mitigation of invasive plant effects has the following objectives:

- Prevent invasive plant establishment through maintenance of ecosystem integrity, such that the composition, structure, function and resilience are retained.
- Avoid the introduction and spread of invasive plant through ecology based management of Project activities during all phases.
- Remove invasive plants that are present on site or become introduced according to ecosystem based management, which includes consideration of successional processes, such as, disturbance type, extent and intensity, dispersal mechanisms, site history, competition and germination. This will be completed through consultation with qualified personnel.
An ecosystem based approach to vegetation and soil management is required to effectively prevent the introduction and spread of invasive plants related to the Project. Minimizing effects to these ecological process and ultimately ecosystem integrity will reduce the likelihood of invasive plant establishment and spread. Impacts to ecosystem integrity will be minimized through the following actions:

- Identification of ecosystems with low resiliency to invasive plants;
- Development of measurable actions to determine the efficacy of the proposed management at the site level. Measurable actions should address the question of was the action carried out according to the planned management for the site. If not, why? If so, how effective was the management in achieving the stated objective(s). For example, was the site re-vegetated as recommended (i.e. appropriate timing and seed mix) and was the re-vegetation successful in terms of preventing the introduction and spread of invasive plants;
- Minimization of all clearing dimensions during construction activities as invasive species thrive in recently disturbed areas where there is little shade and competition from other plant species;
- Minimization of mineral soil exposure;
- Vehicle inspections for target invasive plants at designated prior to entry to the Project site;
- Early detection and eradication of invasive plants;
- Environmental monitoring during construction to ensure that the proposed actions are being carried out in the intended manner and that they are effective based on the performance objectives; and
- Appropriate education and training for employees and contractors with respect to invasive plants.

In the event invasive plants are identified on site, the appropriate authority will be consulted to determine if control or monitoring is required. If control is required, appropriate treatment options and timing will be addressed. The appropriate treatment for invasive plants depends on several factors, including the species involved and the size of infestation. Invasive plant species vary in their aggressiveness and ability to dominate a site, so some are inherently easier to eradicate than others. Larger infestations are also more difficult to control than smaller ones.

Potential treatment options include mechanical, biological, and chemical methods. Mechanical control adopts physical means of removal, such as pulling by hand. Biological control uses living organisms, such as insects, to control pest populations of invasive plants, and chemical control uses herbicides to reduce and eradicate plant populations.

6.3 Habitat Fragmentation

Habitat fragmentation is primarily caused by vegetation clearing and invasive plant establishment. Mitigation of habitat fragmentation is described in the relevant sections.

6.4 Soil Erosion

The primary objectives of soil erosion and sediment control are to mitigate the degradation and loss of soils due to erosion and to prevent damage to other ecological values as a consequence of soil erosion. The following goals are implicit in achieving this primary objective:

- Conserving soil quantity and quality in areas that are subject to erosion, such as cleared areas during construction and fill material imported to create Project features;
• Minimizing natural drainage disruption;
• Protecting disturbed, erodible materials in a timely manner; and
• Reducing or controlling the potential for accelerated sediment delivery into watercourses.

Vegetation cover plays a vital role in erosion control. Thus, soil and associated vegetation disturbance will be minimized where possible in both areal extent and duration. Areas where vegetation has been temporarily removed will be re-vegetated using an appropriate re-vegetation strategy (seed mix and/or planting) as soon as possible.

During construction erosion control strategies will include:

• Controlling slope erosion by terracing and/or installing fibre logs, geotextiles, erosion control mats, weed-free mulch or straw bales, or gravel bags and surface roughening, as appropriate;
• Minimizing runoff energy by limiting the length and steepness of bare, exposed slopes and by applying appropriate surface drainage techniques; and
• Stabilizing water channels and protecting channel banks with willow, rocks, gabions, or fibre mats.

6.5 Sedimentation

Some amount of soil erosion will occur, even with the erosion control strategies outlined above. Therefore, where required, sediment control measures will be implemented to ensure the capture of sediments before they are released to the receiving environment. Sediment control measures include installing and/or constructing:

• Silt fences;
• Weed-free straw bales;
• Fabric-covered triangular dikes;
• Gravel-filled burlap bags;
• Sedimentation ponds; and
• Rip-rap along channels and ditches.

6.6 Fill Placement

Minimal soil fill will be required during construction. Proper procedures for fill placement involve the salvage of productive soil (if any is occurring), placement of fill, and replacement of salvaged soil so that vegetation can be re-established. If salvaged soils include a seedbed of invasive plants it should not be used as replacement soil.

The objectives related to soil salvage and handling include retaining and preserving suitable soil available for use in reestablishment of vegetation. Targets include the following:

• Preserving adequate volumes of soil, and suitable overburden as required;
• Retain beneficial soil structure by salvaging soil under appropriate weather and soil moisture conditions;
• Retain native fertility of soils during storage by preventing mixing with lower quality material; and
- Preventing soil erosion during salvage operations and from stockpiles.
- Restricting fill to the grassland and/or the disturbed area.

Environmental protection measures are specific actions and practices that mitigate environmental damage. For soil salvage, specific measures will include the following:

- The operation will be adequately supervised and will follow a predetermined soil salvage plan;
- Soil salvage will include mineral and organic materials identified in the soil salvage plan. In practice, this means humus form (if present) materials will be salvaged and stored with the salvaged mineral soil, while excess vegetation (e.g., large tree limbs, root-balls, logs, etc.) will not be placed in the soil stockpile but may be retained for spreading as part of the final reclamation;
- Prolonged exposure of bare soil to the elements will be avoided; whenever possible, soil salvage will immediately follow vegetation clearing;
- Soil salvage will not be conducted when soils are too wet or too dry, as working in these conditions can degrade soil quality; and
- When practical, ‘bouldery’ mineral coarse fragments larger than 25 cm diameter will be separated during salvaging.

Soil and suitable overburden storage will comply with the following guidelines:

- Stockpiles will be designed to be geotechnically stable;
- Stockpiles will be located on stable foundations, on level ground where possible, outside of active floodplains and riparian areas;
- Stockpile design will incorporate setbacks to ensure materials are not inadvertently displaced outside approved areas;
- Soil and suitable overburden will be segregated in separate stockpiles; and
- Stockpiles will be surrounded by runoff diversion and collection ditch catchments and shaped in a way that will promote slow, efficient drainage of the slopes.

### 6.7 Contamination

During construction, soils are at risk to contamination from fuel and fluid spills. Mitigation of this risk will include assurance that vehicles used for construction are in good repair, and that spill kits are on site and functional.
6.8   Noise

Noise associated with the construction and use of the Project can potentially affect susceptible wildlife, reducing the use and thus value of wildlife habitat. Wildlife species are likely more susceptible to noise during the breeding season which is generally between March 15 and August 31 of each year. Clearing and construction activities should avoid this window.

6.9   Summary of Residual Effects

After mitigation measures, many of the potential effects (Table 7) will be reduced or eliminated. Six VEC-effect types of interactions remain after mitigation (i.e., residual effects; Table 8). These are mostly related to fill placement, and the associated effects on soil quality and quantity.
### Table 8: Residual Project Effects

<table>
<thead>
<tr>
<th>Vegetation Clearing</th>
<th>Invasive Plants</th>
<th>Habitat Fragmentation</th>
<th>Soil Erosion</th>
<th>Sedimentation</th>
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**Note:** 1 checkmark indicates reasonable potential for the Project effect and the VEC to interact
7.0 CONCLUSION

The Natural Areas Assessment was carried out in July of 2014. The purpose was to identify the environmental function and values present at the Property, carry out an impact assessment to identify how the Project could potentially interact with the environmental functions and values at the Property and areas at risk to migrating effects; and propose mitigation to reduce or eliminate the effects of the Project on the environment. Desktop and field baseline data were collected to characterize the natural areas at the Project site, including data on terrestrial ecosystems, wetlands, soils, vegetation, rare plants, wildlife, and the aquatic environment.

Ecological communities present at the property include various wetlands, aspen forest, and grassland. The wetlands and the aspen forest were classified as Natural Areas; the grassland was not considered a Natural Area due to anthropomorphic activity occurring. The wetlands met the criteria to classify as Environmentally Sensitive Areas and the aspen forest was classified as a Significant Natural Area.

From the baseline data, 12 potential Valued Ecosystem Components were identified. Given the general description of Project activities, eight potential effects were identified. The assessment identified 47 potential types of interactions between the Project and the environment. Once mitigation measures were applied, these types of interactions were reduced to six.
8.0 CLOSURE

We trust this report meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,
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/anm
REFERENCES


City of St. Albert. 2014. Request for Quotation: Natural Areas Assessment of 43R Riel Drive.

City of St. Albert. 2014. City Council Agenda Report. File No.:7250


Personal Communication September 2014. Leah Kongsrude, City of St. Albert


Stantec 2007 St Albert Natural Areas Review and Inventory Addendum. Draft. Prepared for the City of St. Albert. 70 pp. Prepared for the City of St. Albert.


### FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
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<tr>
<td>Figure 1</td>
<td>Natural Areas within Lot R</td>
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<tr>
<td>Figure 2</td>
<td>Natural Areas Study Area</td>
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<tr>
<td>Figure 3</td>
<td>Historical Air Photos</td>
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<tr>
<td>Figure 4</td>
<td>Topography</td>
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</table>
Natural Areas Within Lot R

Legend:
- Wetland - Class II
- Grassland
- Swamp
- Trees & Shrubs
- Wetland - Class III
- Lot R Plan 2114NY
- Study Area

Polygon | % Coverage | Total Area (Approx. Ha)
--- | --- | ---
Grassland | 52 | 1.05
Trees & Shrubs | 33 | 0.33
Wetland II | 17 | 0.26
Wetland III | 13 | 0.25
Swamp | 5 | 0.10

NATURAL AREAS ASSESSMENT
43R RIEL DRIVE, ST. ALBERT AB

NOTES:
Base data source: Imagery Valtus 2013

Scale: 1:1,000

City of St. Albert

Figure 1
Study Area shown is approximate

Cross Section and Design Flood Level

City of St. Albert

NATURAL AREAS ASSESSMENT
43R RIEL DRIVE, ST. ALBERT AB

Flood Mapping

Figure 2
LEGEND

- Study Area

NOTES

Imagery Source: Alberta Sustainable Resource Development

NATURAL AREAS ASSESSMENT

Historical Air Photo (1949)

Scale: 1:4,000

METERS

50  25  0  50  100

CLIENT

City of St. Albert

FILE NO.

ENVIND03470_Figure3a.mxd

PROJECT NO.

ENVIND03470

DATE

November 5, 2014

OFFICE

TTEBA-CAL

STATUS

ISSUED FOR REVIEW
Figure 3b

LEGEND

Study Area

NOTES
Imagery Source: City of St. Albert

NATURAL AREAS ASSESSMENT

Historical Air Photo (1950)

Scale: 1:4,000

Meters

CLIENT
City of St. Albert

FILE NO.
ENVIND03470_Figure3b.mxd

PROJECT NO.
ENVIND03470

DWN CKO APVD REV
BB MS TB 0

STATUS
ISSUED FOR REVIEW

OFFICE
TTEBA-CAL

DATE
November 5, 2014
Historical Air Photo (1962)

NATURAL AREAS ASSESSMENT

Imagery Source: City of St. Albert

Scale: 1:4,000

50 25 0 50 100 Meters

Figure 3c
Figure 3d

Historical Air Photo (1965)

LEGEND

Study Area

NOTES
Imagery Source: City of St. Albert

NATURAL AREAS ASSESSMENT

City of St. Albert

FILE NO.
ENVIND03470_Figure3d.mxd

PROJECT NO.
ENVIND03470

DATUM
NAD83

CLIENT
City of St. Albert

PROJECTION
UTM Zone 12

Scale: 1:4,000

METERS

OFFICE
TI EBA-CAL

DATE
November 5, 2014

ISSUED FOR REVIEW

TETRA TECH EBA
NATURAL AREAS ASSESSMENT

Historical Air Photo (1976)

LEGEND

Study Area

NOTES
Imagery Source: Alberta Sustainable Resource Development

Figure 3e

November 5, 2014

City of St. Albert

TETRA TECH EBA
**NATURAL AREAS ASSESSMENT**

**Historical Air Photo (1993)**

**LEGEND**

- Study Area

**NOTES**

Imagery Source: City of St. Albert

---

**PROJECT NO.**

ENVIND03470

**DATUM**

NAD83

**SCALE**

1:4,000

**METERS**

0 25 50 50 100

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**FILE NO.**

ENVIND03470_Figure3f.mxd

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**STATUS**

ISSUED FOR REVIEW

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**OFFICE**

TL EBA-CAL

**DATE**

November 5, 2014

---

**CLIENT**

City of St. Albert

---

© TETRA TECH EBA
Historical Air Photo (1996)

Imagery Source: City of St. Albert

Scale: 1:4,000

NAD83

November 5, 2014

City of St. Albert

Figure 3g
LEGEND

Study Area

NATURAL AREAS ASSESSMENT

Historical Air Photo (1998)

Imagery Source: City of St. Albert

Scale: 1:4,000

Meters

50  25  0  50  100

Figure 3h
LEGEND

- Study Area

NOTES
Imagery Source: City of St. Albert

NATURAL AREAS ASSESSMENT

Historical Air Photo (2000)

Scale: 1:4,000

City of St. Albert

Figure 3i
Figure 3j

NATURAL AREAS ASSESSMENT

Historical Air Photo (2004)

NOTES
Imagery Source: ©2014 Google, DigitalGlobe

LEGEND
- Study Area

Scale: 1:4,000

METERS

0 100

PROJECT
ENVIND03470

DATUM
NAD83

CLIENT
City of St. Albert

OFFICE
TI EBA-CAL

DATE
November 5, 2014

Issued for Review

Natural Areas Assessment

Imagery Source: ©2014 Google, DigitalGlobe
Figure 3k

NATURAL AREAS ASSESSMENT

Historical Air Photo (2008)

SCALE: 1:4,000

NOTES
Imagery Source: ©2014 Google, DigitalGlobe

LEGEND

Study Area

Client: City of St. Albert

File No.: ENVIND03470_Figure3k.mxd

Project No.: ENVIND03470

Date: November 5, 2014

Office: TI EBA-CAL

APVD: 0

Status: ISSUED FOR REVIEW
LEGEND

Study Area

Figure 3l

Historical Air Photo (2013)

Imagery Source: Valtus Imagery Services

Scale: 1:4,000

NOTES

Imagery Source: Valtus Imagery Services

CLIENT

City of St. Albert

STATUS

ISSUED FOR REVIEW

OFFICE

Ti EBA-CAL

DATE

November 5, 2014

METERS

0 25 50 75 100

FILE NO.

ENVIND03470_Figure3l.mxd

Scale: 1:4,000

DATUM

NAD83

PROJECTION

UTM Zone 12

APVD

TB

TETRA TECH EBA

REV

0

CB

MS

ENVIND03470

ENVIND03470

BB
PHOTOGRAPHS

Photo 1  Sturgeon River
Photo 2  Sturgeon River
Photo 3  Drainage ditch on eastern edge of Study Area
Photo 4  Drainage ditch on eastern edge of Study Area
Photo 5  Treed/Shrub upland community
Photo 6  Treed/Shrub upland community
Photo 7  Grassland community
Photo 8  Grassland community
Photo 9  Class II Wetland with reed canary grass and small bottle sedge
Photo 10  Class II Wetland with reed canary grass and small bottle sedge
Photo 11  Class III Wetland with reed canary grass, small bottle sedge, and water sedge
Photo 12  Class III Wetland with reed canary grass, small bottle sedge, and water sedge
Photo 13  Class III Wetland with reed canary grass, small bottle sedge, and water sedge
Photo 14  Class III Wetland with reed canary grass, small bottle sedge, and water sedge
Photo 15  Class III Wetland with reed canary grass, small bottle sedge, and water sedge
Photo 16  Swamp with sandbar willow
Photo 17  Swamp with sandbar willow
**Photo 1:** Sturgeon River.

**Photo 2:** Sturgeon River.
Photo 3: Drainage ditch on eastern edge of Study Area.

Photo 4: Drainage ditch on eastern edge of Study Area.
Photo 5: Treed/Shrub upland community.

Photo 6: Treed/Shrub upland community.
Photo 7: Grassland community.

Photo 8: Grassland community.
Photo 9: Class II Wetland with reed canary grass and small bottle sedge.

Photo 10: Class II Wetland with reed canary grass and small bottle sedge.
Photo 11: Class III Wetland with reed canary grass, small bottle sedge, and water sedge.

Photo 12: Class III Wetland with reed canary grass, small bottle sedge, and water sedge.
Photo 13: Class III Wetland with reed canary grass, small bottle sedge, and water sedge.

Photo 14: Class III Wetland with reed canary grass, small bottle sedge, and water sedge.
Photo 15: Class III Wetland with reed canary grass, small bottle sedge, and water sedge.

Photo 16: Swamp with sandbar willow.
Photo 17: Swamp with sandbar willow.
APPENDIX A
UPLAND VEGETATION ASSESSMENT RESULTS
## Appendix A: Upland Vegetation Assessment Results

<table>
<thead>
<tr>
<th>Vegetation Community</th>
<th>Scientific Name</th>
<th>Common Name</th>
<th>SRANK</th>
<th>GRANK</th>
<th>Origin</th>
<th>Weed Control Act</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Acer negundo</strong></td>
<td>Manitoba maple</td>
<td>S2?</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Achillea millefolium</strong></td>
<td>common yarrow</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Antirrhinum spp.</strong></td>
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<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Anthus incana ssp. tenuifolia</strong></td>
<td>river alder</td>
<td>S5</td>
<td>G7T5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Amelanchier alnifolia</strong></td>
<td>saskatoon</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Anemone canadensis</strong></td>
<td>Canada anemone</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Arctostaphylos uva-ursi</strong></td>
<td>wild sarsaparilla</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Bromus inermis</strong></td>
<td>awnless brome</td>
<td>SNA</td>
<td>G5TNR</td>
<td>Exotic</td>
<td>Noxious</td>
<td></td>
</tr>
<tr>
<td><strong>Calamagrostis canadensis</strong></td>
<td>bluejoint</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Circum arvense</strong></td>
<td>creeping thistle</td>
<td>SNA</td>
<td>GNR</td>
<td>Exotic</td>
<td>Noxious</td>
<td></td>
</tr>
<tr>
<td><strong>Comus stolonifer</strong></td>
<td>red-osier dogwood</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Corylus cornuta</strong></td>
<td>beaked hazelnut</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Eryngium angustifolium</strong></td>
<td>common fireweed</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Euonymus japonica</strong></td>
<td>showy aster</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fragaria virginiana</strong></td>
<td>wild strawberry</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Geum aleppicum</strong></td>
<td>yellow avens</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Heracleum lanatum</strong></td>
<td>wild parsnip</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lathyrus ochroleucus</strong></td>
<td>cream-colored vetching</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lonicerella dioica</strong></td>
<td>twining honeysuckle</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Amaranthus retroflexus</strong></td>
<td>bracted honeysuckle</td>
<td>S5</td>
<td>G5T4TS</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Maianthemum canadense</strong></td>
<td>wild lily-of-the-valley</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Matricaria perforata</strong></td>
<td>scentless chamomile</td>
<td>SNA</td>
<td>GNR</td>
<td>Exotic</td>
<td>Noxious</td>
<td></td>
</tr>
<tr>
<td><strong>Medicago sativa</strong></td>
<td>cow peas</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Petasites frigidus var. palmatus</strong></td>
<td>palmate-leaved coltsfoot</td>
<td>S5</td>
<td>G7T5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Picea glauca</strong></td>
<td>white spruce</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Plantago major</strong></td>
<td>common plantain</td>
<td>SNA</td>
<td>G5</td>
<td>Native</td>
<td>Exotic</td>
<td></td>
</tr>
<tr>
<td><strong>Polysarcopus occidentalis</strong></td>
<td>buckbrush</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Symphyotrichum puniceum</strong></td>
<td>purple-stemmed aster</td>
<td>S4</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Taraxacum officinale</strong></td>
<td>common dandelion</td>
<td>SNA</td>
<td>G5</td>
<td>Native</td>
<td>Exotic</td>
<td></td>
</tr>
<tr>
<td><strong>ThalictrumUTHVENULOSUM</strong></td>
<td>veinly meadow rue</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Trifolium hybridum</strong></td>
<td>alpine clover</td>
<td>SNA</td>
<td>GNR</td>
<td>Exotic</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Vicia americana</strong></td>
<td>wild vetch</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Viola canadensis</strong></td>
<td>western Canada violet</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Viburnum opulus</strong></td>
<td>high-bush cranberry</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Symphyotrichum ciliolatum</strong></td>
<td>Lindley's aster</td>
<td>S4</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Bromus inermis</strong></td>
<td>awnless brome</td>
<td>SNA</td>
<td>G5TNR</td>
<td>Exotic</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Calamagrostis canadensis</strong></td>
<td>bluejoint</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Comandra umbellata</strong></td>
<td>bastard toadflax</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Elymus trachycaulus</strong></td>
<td>slender wheatgrass</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Geum aleppicum</strong></td>
<td>yellow avens</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hordoneum jubatum</strong></td>
<td>foxtail barley</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Phalaris arundinacea</strong></td>
<td>reed canary grass</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Phleum pratense</strong></td>
<td>timothy</td>
<td>SNA</td>
<td>GNR</td>
<td>Exotic</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Picea pungens</strong></td>
<td>blue spruce</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Plantago major</strong></td>
<td>common plantain</td>
<td>SNA</td>
<td>G5</td>
<td>Native</td>
<td>Exotic</td>
<td></td>
</tr>
<tr>
<td><strong>Poa pratensis</strong></td>
<td>Kentucky bluegrass</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Prunus virginiana</strong></td>
<td>choke cherry</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Rumex occidentalis</strong></td>
<td>western dock</td>
<td>S5</td>
<td>G5T5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Solidago canadensis</strong></td>
<td>Canada goldenrod</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
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<td></td>
</tr>
<tr>
<td><strong>Sonchus arvensis</strong></td>
<td>perennial sow-thistle</td>
<td>SNA</td>
<td>GNR</td>
<td>Exotic</td>
<td>Noxious</td>
<td></td>
</tr>
<tr>
<td><strong>Symphyotrichum pilosum</strong></td>
<td>purple-stemmed aster</td>
<td>S4</td>
<td>G5</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Taraxacum officinale</strong></td>
<td>common dandelion</td>
<td>SNA</td>
<td>G5</td>
<td>Exotic</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Vicia americana</strong></td>
<td>wild vetch</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
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**Grassland**

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>SRANK</th>
<th>GRANK</th>
<th>Origin</th>
<th>Weed Control Act</th>
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<tr>
<td><strong>Bromus inermis</strong></td>
<td>awnless brome</td>
<td>SNA</td>
<td>G5TNR</td>
<td>Exotic</td>
<td>Noxious</td>
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<tr>
<td><strong>Calamagrostis canadensis</strong></td>
<td>bluejoint</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
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<tr>
<td><strong>Comandra umbellata</strong></td>
<td>bastard toadflax</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
</tr>
<tr>
<td><strong>Elymus trachycaulus</strong></td>
<td>slender wheatgrass</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
</tr>
<tr>
<td><strong>Geum aleppicum</strong></td>
<td>yellow avens</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
</tr>
<tr>
<td><strong>Hordoneum jubatum</strong></td>
<td>foxtail barley</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
</tr>
<tr>
<td><strong>Phalaris arundinacea</strong></td>
<td>reed canary grass</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
</tr>
<tr>
<td><strong>Phleum pratense</strong></td>
<td>timothy</td>
<td>SNA</td>
<td>GNR</td>
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<tr>
<td><strong>Picea pungens</strong></td>
<td>blue spruce</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
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<td><strong>Plantago major</strong></td>
<td>common plantain</td>
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<tr>
<td><strong>Poa pratensis</strong></td>
<td>Kentucky bluegrass</td>
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<td>G5</td>
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<tr>
<td><strong>Prunus virginiana</strong></td>
<td>choke cherry</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
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<tr>
<td><strong>Rumex occidentalis</strong></td>
<td>western dock</td>
<td>S5</td>
<td>G5T5</td>
<td>Native</td>
<td></td>
</tr>
<tr>
<td><strong>Solidago canadensis</strong></td>
<td>Canada goldenrod</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
</tr>
<tr>
<td><strong>Sonchus arvensis</strong></td>
<td>perennial sow-thistle</td>
<td>SNA</td>
<td>GNR</td>
<td>Exotic</td>
<td>Noxious</td>
</tr>
<tr>
<td><strong>Symphyotrichum pilosum</strong></td>
<td>purple-stemmed aster</td>
<td>S4</td>
<td>G5</td>
<td>Native</td>
<td></td>
</tr>
<tr>
<td><strong>Taraxacum officinale</strong></td>
<td>common dandelion</td>
<td>SNA</td>
<td>G5</td>
<td>Exotic</td>
<td></td>
</tr>
<tr>
<td><strong>Vicia americana</strong></td>
<td>wild vetch</td>
<td>S5</td>
<td>G5</td>
<td>Native</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX B
WETLAND VEGETATION ASSESSMENT RESULTS
### Appendix B: Wetland Vegetation Assessment Results

<table>
<thead>
<tr>
<th>Wetland Classification</th>
<th>Scientific Name</th>
<th>Common Name</th>
<th>% Cover</th>
<th>GSAWS</th>
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<tbody>
<tr>
<td>Class II</td>
<td>Carex utriculata</td>
<td>small bottle sedge</td>
<td>25</td>
<td>Secure</td>
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<tr>
<td></td>
<td>Equisetum arvense</td>
<td>common horsetail</td>
<td>2</td>
<td>Secure</td>
</tr>
<tr>
<td></td>
<td>Equisetum scirpoides</td>
<td>dwarf scouring-rush</td>
<td>5</td>
<td>Secure</td>
</tr>
<tr>
<td></td>
<td>Phalaris arundinacea</td>
<td>reed canary grass</td>
<td>35</td>
<td>Secure</td>
</tr>
<tr>
<td></td>
<td>Salix exigua</td>
<td>sandbar willow</td>
<td>5</td>
<td>Secure</td>
</tr>
<tr>
<td></td>
<td>Salix spp.</td>
<td>willow</td>
<td>2</td>
<td>-</td>
</tr>
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<tr>
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<tr>
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<td>Equisetum scirpoides</td>
<td>dwarf scouring-rush</td>
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<td>Poa pratensis</td>
<td>Kentucky bluegrass</td>
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APPENDIX C
WILDLIFE SPECIES OF MANAGEMENT CONCERN WITH POTENTIAL TO OCCUR IN STUDY AREA
### Appendix C: Wildlife Species of Management Concern with Potential to Occur in Study Area

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>GSAWS</th>
<th>ESCC</th>
<th>AWA</th>
<th>COSEWIC</th>
<th>SARA</th>
<th>Gov’t of AB Setback</th>
<th>CWS Setback</th>
<th>Habitat</th>
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<td>American Bittern</td>
<td>Botaurus lentiginosus</td>
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<tr>
<td>Black-bellied Plover</td>
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<td>Common Nighthawk</td>
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<td>Northern Harrier</td>
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<tr>
<td>Northern Goshawk</td>
<td>Accipiter gentilis</td>
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<tr>
<td>Black-capped Chickadee</td>
<td>Poecile atricapillus</td>
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<td>Red-tailed Hawk</td>
<td>Buteo jamaicensis</td>
<td>Sensitive</td>
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<tr>
<td>Great Horned Owl</td>
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</tr>
<tr>
<td><em>Note: setback distances depend on timing and level of disturbance</em></td>
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### Amphibians

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<th>CWS Setback</th>
<th>Habitat</th>
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<tbody>
<tr>
<td>American Toad</td>
<td>Bufo americanus</td>
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<tr>
<td>Councilman's Salamander</td>
<td>Ambystoma texanum</td>
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<tr>
<td>Great Plains Toad</td>
<td>Bufo cognatus</td>
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### Fishes

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<th>Gov’t of AB Setback</th>
<th>CWS Setback</th>
<th>Habitat</th>
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<td><em>Note: setback distances depend on timing and level of disturbance</em></td>
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### Mammals

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<td><em>Note: setback distances depend on timing and level of disturbance</em></td>
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### Insects

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<th>AWA</th>
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<tbody>
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<td><em>Note: setback distances depend on timing and level of disturbance</em></td>
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</tbody>
</table>

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**Note:**
- **GSAWS** - General Status of the Alberta Wild Species
- **ESCC** - Endangered Species Conservation Committee
- **AWA** - Alberta Wildlife Act
- **COSEWIC** - Committee on the Status of Endangered Wildlife in Canada
- **SARA** - Species At Risk Act
- **Gov’t of AB Setback** - Government of Alberta 2011