

APPENDIX I

ENVIRONMENTAL ASSESSMENT



**Environmental Assessment, Strathcona
County Property in:
Township 55, Range 21, W4M**

(Revised) DRAFT REPORT



Prepared for
CIMA
Edmonton, AB

June 29, 2012 (Revised 05 Oct 2012)

Project # 1165

Prepared by Fiera Biological Consulting

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Dan Dmytryshyn
CIMA
10235-101 Street, 4th Floor
Edmonton, Alberta
T5J 3G1

Dear Mr. Dmytryshyn:

Re: Environmental Assessment to accompany a Functional Planning Study for Developments to Roads and Interchanges Along Highway 15, East of Fort Saskatchewan.

At your request, Fiera Biological Consulting Ltd. has completed an Environmental Assessment for proposed upgrades and developments along Highway 15, between Range Road 220 and Highway 830. This Environmental Assessment study is to support a Functional Planning Study that will encompass short and long-term developments and upgrades to Highway 15 and several associated interchanges and overpasses. This assessment identifies Valued Ecosystem Components, key habitats and features, and documents the current ecological function and significance of the area. Mitigation measures, including a discussion of predicted timing restrictions, are included in the report.

We are pleased to provide you with a copy of this draft report for your consideration. If you have any questions or comments regarding the assessment or its conclusions, please contact the undersigned at your convenience.

Sincerely,
FIERA BIOLOGICAL CONSULTING LTD.

Warren Fleming, P.Biol.
Sr. Biologist

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1.0 Background

Fiera Biological Consulting (Fiera) was retained by CIMA to conduct an environmental assessment for approximately 11 km of roadway plus adjacent lands (hereafter referred to as the Study Area) in Strathcona County east of Fort Saskatchewan. Alberta Transportation is currently planning upgrades to Highway 15 and a number of interchanges and overpasses between Range Road 220 and Highway 830 north. A Functional Planning Study (FPS) is being submitted to Alberta Transportation, for short and long-term planning of the process. An understanding of the existing ecological value and risks associated with the planned disturbance is required to evaluate the environmental implications of the improvements. The environmental assessment evaluates risks to natural resources, considers permits and legislation that protect wildlife and vegetation, and offers best practices and mitigative measures to reduce impacts of development.

2.0 Study Objectives

The objectives of this Environmental Assessment were two-fold. First, to assess the ecological value of subject properties in the Study Area that may be affected by the scheduled improvements, including: consideration of ecosystems and habitats present, the number of species guilds the site is capable of supporting, patch size and shape, and connectivity of the site in the context of the surrounding ecological network, and second, to assess impacts to the ecological value of the study area as a result of development.

3.0 Study Limitations

The findings and recommendations presented in this report are based upon: (i) information from existing environmental reports, (ii) consultation with government and industry personnel familiar with the study location, (iii) information collected from literature reviews, (iv) a search of existing databases housing provincial biological information, and (v) a field assessment conducted on site.

While this report was prepared in an objective and rigorous manner, it is not intended, nor is it able to provide a completely comprehensive review of past or present environmental site conditions. Consequently, the findings and recommendations presented are intended to reduce, but will not necessarily eliminate, uncertainty regarding potential risks of developing the site on biological resources. More comprehensive studies may be required to reduce any uncertainties with respect to the specific impacts of development on biological resources.

4.0 Study Area

The Environmental Assessment was conducted in Strathcona County, and covered areas along approximately 11 km of Highway 15, where improvements are planned (see Figure 1). The adjacent land is largely agricultural, with some industrial sites and significant oil and gas development throughout. Significant stream crossings exist over highway 15, particularly Astotin Creek near Range Road 214. Small natural areas exist around the streams. Most habitat for native plants and wildlife is in small isolated patches within the agricultural landscape. The highway and a railroad line on the north side of the highway have been present in their current location for many decades.

5.0 Regulatory Review

Development within the study area is subject to municipal, provincial, and federal legislation, guidelines, and policies. As such, the Environmental Assessment conducted by Fiera and subsequent recommendations were developed with consideration of the following regulatory documents as they relate to the protection of wildlife, vegetation, and aquatic resources on the subject property.



5.1 Strathcona County – Strategic Plan

The Strathcona County Strategic Plan was developed to serve as the foundation on which the County's three-year Business Plans and annual budgets are developed (Strathcona County, 2009a). The plan ensures a sound process for the planning of governance, community development, and service exists. Strategies for Environmental Sustainability include, encouraging the implementation of conservation easements, identifying, preserving and protecting natural features, and encouraging development initiatives that demonstrate the wise and best use of land.

5.2 Bylaw 1-2007: Municipal Development Plan

The Strathcona County Municipal Development Plan (MDP) was approved in May 2007 and sets out guidelines for growth and development over the next 20 years (developed (Strathcona County, 2007a). The plan includes a long-term land use framework within which current and future development may take place. County-wide environmental conservation is addressed in Section 8 under Environmental Management. The environmental management objectives of this plan are to:

- 1) Minimize the impact of human activity and development on the natural environment
- 2) Sustain, and improve upon the quality of water, land, air, and natural resources
- 3) Increase community awareness regarding the impact of activity on the natural environment
- 4) Promote environmentally friendly programs such as recycling and composting,
- 5) Encourage the use of conservation easements and other tools to protect the environment

Some of the principals laid out in the MDP include:

- Protect the environmentally significant areas identified by the County as High Priority Environmental Management Areas, and through the conservation of environmentally sensitive lands such as the North Saskatchewan River Valley, the Beaver Hills Moraine and all water bodies;
- Promote higher densities and more compact developments in appropriate locations to lessen encroachment onto agricultural lands or natural habitat and to reduce sprawl;
- Discourage further clearing or development in areas where native vegetation is important for soil conservation, water resource protection or wildlife habitat; and
- Encourage the conservation, protection and restoration of areas identified as Low Priority Environment Management Areas through the use of conservation easements and educational programs

5.3 Policy SER-009-032: Biophysical Assessment

As part of the Strathcona County Municipal Handbook, and the County of Strathcona Strategic Plan, there are several conservation goals to protecting the integrity of natural resources while providing opportunities for recreation and use and that will benefit the community (Strathcona County, 2010). Goals include maintaining viable sustainable populations of native plants and wildlife in their natural habitats, identifying a network of conservation areas to promote the sustainable use of native habitat and restoring and rehabilitating degraded ecosystems.

As part of the Area Concept Plan, Area Structure Plan, Conceptual Scheme and/or subdivision application process, each proponent requires a biophysical assessment to identify potential Environmental Reserves, Municipal Reserves, Environmental Reserve Easement or Conservation Easement. The assessment should include both a desktop evaluation and detailed field assessment. The detail field assessment includes evaluation of topography, soils, information on surface and ground water, detail wetland classification, tree conservation and wildlife surveys.



5.4 Policy SER-009-036: Wetland Conservation

The conservation of the wetlands in urban and rural development areas is a priority for environmental, economic and human health in Strathcona County (Strathcona County, 2009b). The County ensures the conservation of wetlands during the process of land development, and constructing buildings and infrastructure. Strathcona County has a goal of No Net Loss of wetlands within the urban and rural areas through a balance of the rehabilitation of degraded wetlands or enhancement of healthy wetland, and the loss of wetland function to new development. No Net Loss requires proponents to work through a strict series of mitigation activities – Avoidance, Minimization, and Compensation – with clear criteria and defined outcomes, as set out by the legislation (*Water Act* and *Public Lands Act*), the Federal Policy on Wetland Conservation (1991) and the Provincial Wetland Restoration/Compensation Guide (2007).

5.5 Policy SER-008-015: Dedication of Municipal Reserve and Environmental Reserves

This policy establishes principles and procedures for the dedication of Municipal Reserves and Environmental Reserve lands in Strathcona County in order to ensure public safety and natural preservation (Strathcona County 2005). When subdivision development is proposed on environmentally sensitive lands, this policy will require the dedication of municipal reserves at 10% of the gross development areas. On these areas, the following activities are specifically prohibited:

- digging, excavation, building operations;
- unauthorized use of vehicles/off-highway vehicles;
- advertisement, promotion or execution of commercial or rental activity; fires outside of approved areas;
- unauthorized transport and placement of goods and chattels;
- the disturbance or injury of vertebrate animals;
- placement of signs; and
- disruption of natural vegetation within any Environmental Reserve.

5.6 Policy SER-0090-034: Tree Conservation During Development

This policy provides guidelines for developers to determine the protection requirements for tree conservation of trees in urban and rural areas of Strathcona County (Strathcona County 2007b). Tree conservation is regulated under the Tree Conservation Report (TCR) and Tree Protection Plan. The purpose of this policy is to reduce tree damage and loss during development, and to provide for the maintenance of trees during construction. A TCR must be prepared in conjunction with the Biophysical Assessment at the Area Structure Plan stage.

5.7 Policy SER-009-035: Tree Management

The policy ensures specific inspection and management procedures exist for the conservation of trees on County lands within the urban and rural areas of Strathcona County based on municipal, community and environmental needs (Strathcona County 2007c). This process is required after the Final Acceptance Certificate (FAC) development stages.

5.8 Policy SER-009-037: Heritage Tree Retention

This policy ensures the retention of Heritage Trees during and following land development. Construction, and infrastructure installation. (Strathcona County 2011). The purpose of the Heritage Tree Retention Policy is to identify and protect specific trees that have been planted and cultivated by people, but may also include naturally occurring trees possessing exceptional qualities, that are of community interest. Heritage Trees was those of characterized by exception



age, size, shape, special interest, location and/or history whether planted by people or naturally occurring and may include individual trees, clumps, groves, shelterbelts, tree gardens, arboretums and sites of botanical or ecological interest. Guidelines outlining criteria to assess tree as Heritage trees are included.

5.9 Weed Control Act

This act provides legal authority to deal with native and introduced weed species that affect agricultural production. In section 31 of the act, it states: “An occupant of land, or if the land is unoccupied, the owner of the land shall, as often as necessary destroy all restricted weeds located on the land to prevent the spread, growth, ripening or scattering of the restricted weeds, control, in accordance with this Act and the regulation all noxious weeds located on the land to prevent the spread, growth, ripening or scattering of the noxious weeds, and prevent the spread or scattering of nuisance weeds.”

5.10 Species at Risk Program and Species at Risk Act

Alberta has a Species at Risk Program, which was initiated as a response to the province’s commitment to the *Accord for the Protection of Species at Risk in Canada*. The intent of the Accord is to prevent species in Canada from becoming extinct as a consequence of human activity. As part of the assessment procedure, all species of concern are generally assessed and are classified as one of the following categories 1) At Risk; 2) May Be at Risk; 3) Sensitive; 4) Undetermined; and 5) Secure. Any species that is designated as “At Risk” or “May Be at Risk” undergoes a detailed status assessment and is formally designated as Endangered, Threatened, Special Concern, Data Deficient, or Not At Risk. Any species that is designated as Endangered or Threatened becomes legally protected under Alberta’s *Wildlife Act [R.S.A 2000, c.W-10]*. This legal designation prohibits the disturbance, killing or trafficking of these species, and provides immediate protection of nests and den sites. Any species that is designated as “Sensitive” after a general assessment, or as “Special Concern” after a detailed assessment becomes eligible for special management actions designed to prevent the species from becoming “At Risk”.

The Federal *Species at Risk Act (SARA)* protects listed wildlife species and their critical habitats on federal lands, but does not apply to lands held by the Province of Alberta or its private citizens unless “the laws of Alberta do not effectively protect the species or the residences of its individuals”. In this case, the Minister may issue an order in council to protect federally listed species that occur on provincial or private lands.

5.11 Wildlife Act

Alberta’s *Wildlife Act [R.S.A. 2000, c. W-10]* defines all wildlife in the province as Crown property. The Wildlife Act prohibits the disturbance or destruction of the nest, house, or den of certain wildlife species, in certain areas, at certain times of the year. Specifically, it prohibits the disturbance or destruction of the nests or dens of endangered and non-game species, migratory birds, and upland game birds in Alberta throughout the year. It also prohibits the disruption of snake hibernacula and bat nests from the beginning of September to the end of April.

5.12 Migratory Birds Convention Act

The *Migratory Birds Convention Act [1994, c.22]* (MBCA) is federal legislation based on an international treaty signed by Canada and the United States of America that aims to protect migratory birds from indiscriminate harvesting and destruction on federal and provincial lands. Under the MBCA, efforts should be made to provide for and protect habitat necessary for the conservation of migratory birds, and to conserve habitats that are essential to migratory bird populations, such as nesting and wintering grounds and migratory corridors. Under section 6(a) of the General Prohibitions of the *Migratory Birds Regulations C.R.C., c. 1035*, it is an offence to



“disturb, destroy or take a nest, egg, or nest shelter” of a migratory bird. Additionally, section 35(1) stipulates that “no person shall deposit or permit to be deposited oil, oil wastes or any other substance harmful to migratory birds in any waters or any area frequented by migratory birds”.

5.13 Water Act

Alberta’s *Water Act* [RSBC 1996] CHAPTER 483, includes a Code of Practice for Watercourse Crossings, which regulates all activities providing access through, across or over a watercourse and also provides a classification of water bodies in Alberta. The North Saskatchewan River is a Class C water body and accordingly any unnamed water body entering it would fall under the same classification. The unmarked water body becomes a class C for all portions or the unmapped water body. Restricted activity periods would apply to the stream from the period of September 16th to July 31st.

Further, Alberta’s *Water Act* [R.S.A. 2000, c. W-3] requires approval and/or attainment of a license before undertaking construction in a surface water body, or activities related to a water body which has the potential to impact the aquatic environment (Alberta Environment 2001). A value and function assessment of the water body should be completed prior to application for approval of the works. The specified activities requiring approval under the Administrative Guide for Approvals to Protect Surface Water Bodies (Alberta Environment 2001) include:

- Partial or complete filling of a water body for recreational, agricultural, and industrial uses, road construction, residential development, or any other purpose;
- Activities impacting or having the potential to impact (cumulative effects) the aquatic environment and involving the disturbance, alteration, or modification of a water body;
- Removal or destruction of vegetation, aquatic plants and trees within the confines of the bed and shores of a water body; draining of a water body; or re-alignment of a water body.

5.14 Fisheries Act

The *Fisheries Act* (R.S., 1985, c. F-14) was established to manage and protect fishing resources and applies to all fishing zones, territorial seas and inland waters in Canada. Subsection 35(1) is a general prohibition of harmful alteration, disruption or destruction (HADD) of fish habitat. The project is likely to require a 35(2) authorization to proceed.

5.15 Code of Practice for Watercourse Crossings

Under the provincial *Water Act* [R.S.A. 2000, c. W-3], the *Code of Practice for Watercourse Crossings (CoP)* (Alta. Reg. 205/1998) exists as a regulatory mechanism to govern activities associated with the placement of crossing structures over a water body. The objectives outlined in the *CoP* are based on the principles of sustainable water management. The activities regulated under the *CoP* include the placement, construction, installation, maintenance, replacement, or removal of a watercourse crossing, and any activities related to the placement, construction installation, maintenance, replacement or removal of a watercourse crossing. The *CoP* establishes standards to ensure that any disturbance or adverse impact to the environment that occurs as a result of the placement, maintenance, or removal of a watercourse crossing is minimized. The *Guide to Code of Practice for Watercourse Crossings* clarifies the obligations of those involved in crossing structure activities. The document outlines methodologies for biological and physical assessments, and provides a list of best management practices for the construction, operation, and monitoring of crossing structures.



6.0 Methods

6.1 Information Review, Data Collection, and Analysis

This report provides information gathered from a desktop information review, and a field reconnaissance conducted on June 14, 2012. Current and historical information and literature regarding the study area was reviewed, including: available provincial and municipal government documents, consultant reports, aerial images, photographs and maps. A Fish & Wildlife Management Information System (FWMIS) query was performed using the Internet Mapping Framework to access information regarding fish and wildlife occurrences. Alberta Tourism, Parks and Recreation was also queried using their online search tool to obtain data on rare plants and plant communities using the Alberta Conservation Information Management System (ACIMS).

Photographs, air photos and other available imagery of the study area were examined, and lands adjacent to the roads (within 200 meters) in the project area were evaluated for habitat features and quality, and categorized into a general habitat type. This included an examination of air photos of the study area from 4 decades (1967, 1976, 1987 and 2007) to distinguish and delineated distinct habitats to the extent possible. Information and photographs obtained during the field visit in June 2012 helped to confirm the existence and extent of habitat features. Each habitat is discussed with respect to impacts on local flora and fauna, and timing restrictions and buffer requirements for development and construction.

7.0 Results

7.1 Review of Historical and Current Conditions

The study area is located in a transition zone between Dry Mixedwood and Central Parkland Natural Sub-regions of Alberta. This sub-region is considered a transition zone between the Parkland Natural Region to the south and Boreal Forest Natural Region to the north. Both are characterized by short, warm summers and long, cold winters. The central Parkland is the most densely population region in Alberta. Native vegetation in the region has largely been replaced by cultivation and crop production on approximately 80% of the area. What native vegetation does persist is typically restricted to areas that are less suitable for agriculture due to topography or soil constraints, and shares the climatic and vegetation characteristics of both (Natural Regions Committee 2006). Similarly, urban and industrial development and expansion has resulted in significant habitat alterations in the region.

Forests occurring in the Central Parkland Natural Sub-region typically include balsam poplar (*Populus balsamifera*) and trembling aspen (*Populus tremuloides*) with occasional white (*Picea glauca*) and black spruce (*Picea mariana*), which are found together with vigorous shrub species such as common snowberry (*Symphoricarpos albus*), prickly rose (*Rosa acicularis*), and choke cherry (*Prunus virginiana*). Forest stands have diverse shrub understories and often mixedwood stands contain the following species: red-osier dogwood (*Cornus stolonifera*), low bush cranberry (*Viburnum edule*), beaked hazelnut (*Corylus cornuta*), and Saskatoon (*Amelanchier alnifolia*); while spruce dominated areas typically have understories dominated by Labrador tea (*Ledum groenlandicum*) and feather mosses.

Dominant landforms in this sub-region include undulating glacial till plains and hummocky uplands. Parent materials are dominated by medium to moderately fine glacial till (Natural Regions Committee 2006). Soils are generally classified as Black or Dark Gray Chernozems and Luvisols with Gleysols occurring on wetter sites. Agrasid describes the western-most portion of



the study area as Pointe-Aux-Pins Plain, which are black Chernozems developed on fine-textured, water-laid sediments. The eastern three quarters of the study area is Partridge Plain, with Black Chernozems developed on medium textured till. Climate is intermediate between the warm dry grasslands in the south and the cool, moist boreal forest to the north.

A portion of the study area has been identified as part of an Aquatic Environmentally Significant Area, containing Astotin Creek, which flows into the North Saskatchewan River. The creek was identified as an Environmentally Significant Area because of the presence of both focal fish species (either Arctic grayling, Bull trout, Cutthroat trout, or Goldeye), and rare fish species (those listed as species of conservation concern). In addition, the creek was identified to contain important habitat of aquatic bird species, highlighting the aquatic significance of the area.

The study area has been a highly developed anthropogenic landscape for more than 50 years. A review of the 1967 aerial photo demonstrated that more than 95% of the area was converted to agriculture, Highway 15, the railway line, and Highway 830 all existed, and only a very few woodlots remained along the Highway 15. The wetlands in the study area have been impacted by more than a half century of agriculture practices, and erosion and sedimentation from major transportation corridors. A table showing the visibility and existence of all current wetlands from the historical air photo review can be found in Appendix A.

7.2 Wildlife

Wildlife species are protected in Alberta by provincial and federal legislation. The provincial Wildlife Act and the federal Species At Risk Act protect listed species in particular, while the federal Migratory Bird Convention Act protects the nests and young of almost all avian species found in the region. With respect to development or improvement of roads in the study area, these laws primarily will impose timing restrictions on the clearing or disturbing of land during the active breeding season for birds and other animals.

The Ministry of Alberta Sustainable Resource Development’s FWMIS Internet Mapping Framework (ASRD 2008) was searched for wildlife and fish occurrence data for the areas surrounding the roadways. The query returned occurrence records for six species, of which four are listed provincially as Sensitive, May Be At Risk, or At Risk (Table 1). Two fish species ranked as Secure provincially were reported for Astotin Creek. Despite the historical impacts to the study area (i.e. industrial development and agricultural conversion), the species returned from the occurrence records are likely to utilize natural habitat in the study area, and particularly the small remnant woodlot, wetlands, and Astotin Creek. In fact a Swainson’s hawk was observed in the area during field reconnaissance. The low number of returns from the FWMIS does not suggest that no further species of interest occur there, only that no information has been reported to the ASRD database.

Table 1. All species occurrence results within a 1 km surrounding buffer (ASRD 2008, CWS 2008).

Common Name	Scientific Name	Provincial Status Rank
<i>Birds</i>		
Swainson’s Hawk	<i>Buteo swainsoni</i>	Sensitive
northern Pintail	<i>Anas acuta</i>	Sensitive
barn Swallow	<i>Hirundo rustica</i>	Sensitive
<i>Herptiles</i>		
Canadian toad	<i>Bufo hemiophrys</i>	May be at Risk
<i>Fish</i>		
brook Stickleback	<i>Culaea inconstans</i>	Secure
fathead Minnow	<i>Pimephales promelas</i>	Secure



In addition to requesting wildlife occurrence information from provincial and federal governments, a list of all provincially and federally ranked vertebrate species that have the potential to occur within the study area was compiled using current and historical general range information (McGillivray and Semenchuk 1998; Pattie and Fisher 1999; Russell and Bauer 2000; Alberta Fish and Wildlife Division 2006; COSEWIC 2005) (Table 1). The resulting list yielded a total of 21 provincially ranked species, including two species that are federally ranked, the Canada warbler and Northern leopard frog (Table 1). The Canada warbler (*Wilsonia canadensis*) is found most often in habitats located in the Boreal forest and Aspen Parkland natural regions of Alberta. They are found in willow and alder thickets, riparian shrublands and dense understory. Northern leopard frogs (*Rana pipiens*) (listed as At Risk) breeds in ponds in early spring, while there is still ice present, and inhabits springs, streams, wetlands and lakes and forages in areas where vegetation provides abundant ground cover.

Table 2. Provincially and federally listed vertebrate species that potentially utilize habitat in the study area based on range maps and habitat preferences.

Common Name	Scientific Name	Provincial Status Rank	COSEWIC Rank
Mammals			
northern long-eared bat	<i>Myotis septentrionalis</i>	May be at Risk	Not Assessed
silver-haired bat	<i>Lasionycteris noctivagans</i>	Sensitive	Not Assessed
hoary bat	<i>Lasiurus cinereus</i>	Sensitive	Not Assessed
long-tailed weasel	<i>Mustela frenata</i>	May be at Risk	Not at Risk
Herptiles			
northern leopard frog	<i>Rana pipiens</i>	At Risk	Special Concern
Birds			
purple martin	<i>Progne subis</i>	Sensitive	Not Assessed
barn swallow	<i>Hirundo rustica</i>	Sensitive	Not Assessed
osprey	<i>Pandion haliaetus</i>	Sensitive	Not Assessed
bald eagle	<i>Haliaeetus leucocephalus</i>	Sensitive	Not at Risk
northern goshawk	<i>Accipiter gentilis</i>	Sensitive	Not at Risk
broad-winged hawk	<i>Buteo platypterus</i>	Sensitive	Not Assessed
northern pygmy-owl	<i>Glaucidium gnoma</i>	Sensitive	Not Assessed
barred owl	<i>Strix varia</i>	Sensitive	Not Assessed
pileated woodpecker	<i>Dryocopus pileatus</i>	Sensitive	Not Assessed
least flycatcher	<i>Empidonax minimus</i>	Sensitive	Not Assessed
eastern phoebe	<i>Sayornis phoebe</i>	Sensitive	Not Assessed
black-throated green warbler	<i>Dendroica virens</i>	Sensitive	Not Assessed
Canada warbler	<i>Wilsonia canadensis</i>	Sensitive	Threatened
western tanager	<i>Piranga ludoviciana</i>	Sensitive	Not Assessed
yellow-bellied flycatcher	<i>Empidonax flaviventris</i>	Undetermined	Not Assessed
Baltimore oriole	<i>Icterus galbula</i>	Sensitive	Not Assessed

In the June field survey five bird species were observed; red-winged black bird (*Agelaius phoeniceus*), sora (*Porzana carolina*), clay-coloured sparrow (*Spizella pallida*), Swainson's hawk (*Buteo swainsoni*), and savannah sparrow (*Passerculus sandwichensis*), and one amphibian species; boreal chorus frog (*Pseudacris triseriata*).

7.3 Habitat Types

During the desktop review and using information from the summer site visit in June 2012, a total of 23 wetlands, ranging in size from approximately 0.1 – 2.4 hectares were identified, in addition to 2 watercourse crossing locations (Table 3). None of the wetlands are considered likely to be fish bearing, and of the watercourse crossings, one (Astotin Creek) is fish habitat (see Table 3). Three of the wetlands contain open water (Wetland 1, 5, and 6), are permanent, and are likely Class 4-5 wetlands. Wetlands are often very productive habitats, supporting a high level of biodiversity that is disproportionate to their size (Gibbs 2000). Wetlands in the project area



Table 3. Wetlands (WL) and Watercourses Crossing (WC) Locations Along Roads Within the Study Area. See Figure 1 for the location of each wetland/watercourse within the Study Area.

Location	Notes	Size (ha)	Fish Habitat (Y/N)	Timing restrictions*	Field Comments	Coordinates (NAD 83, Z12)
Wetland 1	Original wetland fragmented by Hwy 15. Permanent wetland with ≈ 1 ha of open water on south side of Hwy during field survey	2.35	N	May 1 – July 31	Emergent and shrubby zones present	367774.3 5960227.9
Wetland 2	Semi-permanent wetland	0.45	N	May 1 – July 31	Emergent and shrubby zones present, with some cattails.	367278.8 5960365.7
Wetland 3	Original wetland fragmented by Hwy 15. Semi-permanent wetland with some open water present during field survey on north side	1.27	N	May 1 – July 31	Emergent and shrubby zones present.	366446.4 5960389.4
Wetland 4	Ephemeral	0.19	N	May 1 – July 31	Emergent zone present	366196.4 5960303.6
Wetland 5	Permanent wetland. Open water present in the majority of wetland during field survey.	0.72	N	May 1 – July 31	Emergent and shrubby zone present.	365106.3 5960254.7
Wetland 6	Permanent wetland. Open water present in the majority of wetland during field survey.	1.51	N	May 1 – July 31	Emergent and shrubby zone present.	364682.4 5960038.2
Wetland 7	Semi-permanent	0.21	N	May 1 – July 31	Emergent and shrubby zone present. Wetland borders to railway tracks	363156.1 5959311
Wetland 8	Drainage Ditch. Wet area look to have been created by drainage between RR and Hwy 15	1.72	N	none	Area has cattails, grass, and open water present in patches.	362070.1 5958569.6
Wetland 9	Dugout	0.67	N	none	Dugout was excavated over a small natural wetland in cattle field	363112.4 5958982.5
Wetland 10	Semi-permanent	0.21	N	May 1 – July 31	Emergent and shrubby zone present.	360385.6 5957563.6
Wetland 11	Semi-permanent	0.31	N	May 1 – July 31	Emergent zone present with some open water	360426.1 5957658.6
Wetland 12	Semi-permanent	0.79	N	May 1 – July 31		360040.2 5956902.1
Wetland 13	Ephemeral	0.59	N	May 1 – July 31		360932.9 5957485
Wetland 14	Ephemeral	0.46	N	May 1 – July 31		361189.4 5957783.4
Wetland 15	Ephemeral	0.51	N	May 1 – July 31		361932.4 5958138.9
Wetland 16	Dugout	0.40	N	none	Dugout was excavated over	362372.4



					a small natural wetland in cattle field	5958468.5
Wetland 17	Semi-permanent	0.17	N	May 1 – July 31		363632.2 5959361
Wetland 18	Ephemeral	0.11	N	May 1 – July 31		364059.2 5960014.5
Wetland 19	Ephemeral	0.19	N	May 1 – July 31		365267.6 5960443
Wetland 20	Ephemeral	0.33	N	May 1 – July 31		365473.3 5960458.4
Wetland 21	Ephemeral	0.17	N	May 1 – July 31		366224.1 5960500.8
Wetland 22	Semi-permanent	0.99	N	May 1 – July 31		366371.3 5960550.9
Wetland 23	Ephemeral	0.33	N	May 1 – July 31	Emergent zone present	366955.7 5960377.2
Water Crossing 1	Astotin Creek. Fish-bearing creek (Strahler Order 4).		Y	May 1 – July 31	Riparian area with mixed shrub and aspen habitat	363424.6 5959403.5
Water Crossing 2	Ephemeral seep. Looks to originally have been connected to wetland complex north of rail road tracks		N	none	Emergent vegetation present	362355.3 5958758.1

*all natural areas and land with vegetation are subject to restrictions during the breeding season for migratory birds, approximately May 1 – July 31. Birds of prey are protected under the Alberta Wildlife Act, and therefore have distance setbacks and timing restrictions for development during their breeding activities. Surveys for these species are recommended from mid February through July 31.



provide valuable habitat for a variety of wildlife species, and are also recognized for their ability to improve water quality, control erosion and flooding, and replenish groundwater aquifers.

Eight small woodlots exist along the roadways where road improvements are scheduled to take place (Table 4). Some of these woodlots are associated with watercourses and wetlands, while others are woodlot adjacent to both active and old farmyards. Those near the wetlands or watercourses tend to contain balsam poplar (*Populus balsamifera*), trembling aspen (*Populus tremuloides*) and willow.

Table 4. Medium-sized Natural Area (NA) Locations Along Roads Within the Study Area (those >0.05 ha). See Figure 1 for the location of each Natural Area within the Study Area.

Location	Habitat	Size (ha)	Field Comments	Coordinates (NAD 83, Z12)
Natural Area 1	Balsam poplar grove with grass, rose, raspberry understory	0.23	Woodlot is present on an old draw or wetland adjacent to farmyard. Draw is not currently wet, likely due to drainage cut-off by the Hwy 15	369568.2 5960210.8
Natural Area 2	Aspen patch with rose, raspberry understory	0.55		361020.8 5957960.4
Natural Area 3	Woodlot with mix of Balsam poplar and elm, and willow adjacent to old farmyard	0.93		360461.3 5957349
Natural Area 5	Aspen woodlot	0.59		360321.6 5957579.5
Natural Area 6	Aspen woodlot	0.08		363491.6 5959589.6
Natural Area 10	Aspen Woodlot adjacent to old farmyard	0.67		365750.4 5960445.6
Natural Area 11	Aspen woodlot in farm field	0.72		366925.9 5960528.8
Natural Area 12	Mixed aspen/spruce woodlot adjacent to farmyard	0.53		366817.1 5960263.8

Disturbed Areas

A large proportion of the lands in the study area are highly disturbed from their natural state, primarily from agricultural activity. Watercourses, woodlots and other “natural” areas along the roadways are all potentially modified to some extent due to activities of farmers in the past (e.g. diverting water, creating dugouts, planting non-native species, etc.).

Weeds are prevalent throughout the study area due to the highly modified state that all land in the region is now in. The most commonly observed weed species were Canada thistle, common dandelion, pineapple weed and common plantain. Introduced grass and clover from the roadside seed mixes used in the rights-of-way were observed throughout woodlots and natural areas within the study zone. Clubroot is a potential issue where land is to be cleared for construction and improvements, and where re-vegetation is not planned or slow to begin. Recommendations for managing clubroot are presented in Appendix C.



Rare Plants

The Alberta Conservation Information Management System (ACIMS) was queried to provide information regarding known occurrence of rare plant species in the study area and vicinity. There were no rare plant occurrences returned for the area. Although no records appeared on the query, this does not indicate that rare plants do not exist in the area; rather, it may be a result of having very few, or no inventories completed in this area. This was not a detailed vegetation inventory, and no specific rare plant searches were conducted during field work.

8.0 Discussion

8.1 Function and Ecological Importance Assessment

Overall, the woodlots and riparian habitat within the study area have low to moderate ecological significance, due primarily to small size, isolation, invasion by non-native species, and the proximity of busy highways and agricultural development. The individual natural areas do provide habitat for a number of wildlife species, including birds, small mammals and amphibians, and have potential for harbouring rare, native plant species.

At a landscape scale, the study area is highly fragmented, with most of the land converted to agricultural use. As a result, the identified natural features (Natural Areas, wetlands, and water crossings) provide important habitat to wildlife, and may act as “stepping stone” habitat for many animals, including deer, coyotes, moose and other larger mammals. The riparian habitat associated with Astotin Creek is a key habitat feature which provides important linkages with other core natural areas along the North Saskatchewan River. The river corridor offers suitable habitat and cover for wildlife movement in an area where natural areas and movement corridors are highly limited due to agriculture and industrial conversion of the landscape.

8.2 Potential Impacts

Impacts to the natural areas along the roadways will largely consist of disturbance and/or removal of small areas of trees and shrubs during the road improvement work, which will result in an overall reduction in habitat area. There is potential to disturb wildlife, particularly birds, during important life stages such as breeding, and rearing young. This is true within the identified natural areas, and along windrows and shrubby habitat in the ditches and along the edges of agricultural fields. There is also potential to remove or disturb areas where rare native plants exist, particularly in riparian areas along watercourses. For wetlands, construction activity has the potential to reduce and fragment wetland area, in addition to resulting in declines in water quality. Given these impacts can lead to a loss of critical habitat for a variety of species, it is recommended that avoiding or minimizing impacts to wetland should be the first priority during all development. The full breakdown of impacts as outlined by Alberta Transportation’s Terms of Reference for Environmental Assessments (Alberta Transportation, 2010) is outlined below in Table 5.



Table 5. Potential environmental impacts on Valued Ecosystem Components (VEC) of road construction in the study area.

VEC	Potential Project Effect	Mitigation Measures	Effect Characteristic	Residual Effect
Vegetation	<ul style="list-style-type: none"> Removal of natural vegetation, including both isolated trees and existing woodlots 	<ul style="list-style-type: none"> Minimize activity in vegetated zones as possible, particularly in the established woodlots Re-vegetate disturbed areas with native species Use best practices to avoid runoff of soils prior to re-vegetation 	<ul style="list-style-type: none"> Construction activity will have localized short-term negative impacts on vegetation. Rapid re-vegetation of disturbed areas should occur given proper mitigation measures 	<ul style="list-style-type: none"> Long-term effects will be local and negligible
Wildlife	<ul style="list-style-type: none"> Removal of wildlife habitat. This can be both the clearing of terrestrial vegetation (i.e. woodlots), and changes to wetlands through draining or water diversions 	<ul style="list-style-type: none"> Minimize activity around all wetlands as possible. Avoidance is the primary mitigation strategy Timing restrictions for all clearing of land apply during the breeding season for migratory birds, approximately May 1 – August 31, as advised by Canadian Wildlife Service. 	<ul style="list-style-type: none"> Construction activity will have localized short-term negative impacts on wildlife. Wildlife may avoid or abandon habitat close to, or directly impacted by construction. If habitat loss is minimal (both in terms of woodlot and wetland area lost) the impacts of habitat loss to wildlife will be minor 	<ul style="list-style-type: none"> Long-term effects will be local and negligible with proper mitigation measures
Wetlands	<ul style="list-style-type: none"> Removal/Filling/ Drainage of wetlands 	<ul style="list-style-type: none"> Under the Provincial Water Act, compensation is required for all disturbed wetlands. In addition, Strathcona County requires strict mitigation activities under their Wetland Conservation Policy (Avoidance, Minimization, and Compensation) 	<ul style="list-style-type: none"> Construction activity has the potential to directly impact several wetlands. These wetlands may be entirely drained, or have significant reductions in area. The changes implemented directly in the road expansion zone will be permanent, while short-term impacts due temporary draining and increased runoff will be temporary 	<ul style="list-style-type: none"> Long-term effects will be local and negligible with proper mitigation measures
Fisheries	<ul style="list-style-type: none"> Disturbance of fish habitat 	<ul style="list-style-type: none"> Construction activity around riparian areas, and particularly Astotin Creek will require proper management of sedimentation, runoff away from the water courses, and correct installation of any outfalls, culverts or bridges (as per Code of Practice for Outfall Structures on Water 	<ul style="list-style-type: none"> Increased sedimentation and runoff from construction activity can severely reduce the quality of fish habitat if improperly managed in the short-term. Maintenance of fish habitat and stream connectivity requires the careful installation of any water 	<ul style="list-style-type: none"> Given the existing water crossing, long-term effects will be local and negligible with proper mitigation measures



		Bodies)	crossing or outfall structures. If properly installed and maintained the impact will be short-term and negligible.	
Surface Hydrology	<ul style="list-style-type: none"> Increased sedimentation and runoff into surface waters 	<ul style="list-style-type: none"> See Fisheries above 	<ul style="list-style-type: none"> See Fisheries above 	<ul style="list-style-type: none"> See Fisheries above
Water Quality	<ul style="list-style-type: none"> Decrease in water quality 	<ul style="list-style-type: none"> Proper management of sedimentation and runoff away from all water courses and wetland is crucial. Runoff can be a major source of contaminants (i.e. excess nutrients, road salt, heavy metals) flowing into wetlands and watercourses. The long-term viability of wetlands as wildlife habitat, and in providing their role as natural filters and sponges for terrestrial runoff and flood water depends on maintaining water quality 	<ul style="list-style-type: none"> Sustained long-term declines in water quality will reduced the habitat quality of wetlands and water-courses at a local scale. 	<ul style="list-style-type: none"> Long-term effects will be local and negligible if proper mitigation measures
Noise	<ul style="list-style-type: none"> Disturbance to wildlife 	<ul style="list-style-type: none"> The temporary noise from construction activities may negatively impact wildlife breeding activity and behaviour. Activity near wetlands and natural areas should be minimized in the breeding season (May 1 – August 31). 	<ul style="list-style-type: none"> The impact of construction noise will be short-term and minor. 	<ul style="list-style-type: none"> No long-term impacts are anticipated



8.3 Recommendations for Additional Assessments or Studies

The environmental assessment conducted here was preliminary. This assessment is not meant to stand alone in meeting the full scope of studies required in the Biophysical Assessment Guidelines for Strathcona County (Strathcona County, 2010), or Alberta Transportation's Terms of Reference for Environmental Evaluation (2011). Detailed evaluation of wetlands (including delineation, classification and mitigation), may be required within the Study Area. Moreover, in order to remain compliant with government guidelines and legislation, there is potentially a need to conduct further field assessments depending on the time of year, the type of habitat being considered, and the extent of proposed disturbance. The following additional surveys should be considered under various conditions:

- Timing restrictions for all development and clearing of land apply during the breeding season for migratory birds, approximately May 1 – August 31, as stated in the federal Migratory Bird Convention Act. In the event that clearing must occur within this time, a qualified professional biologist should be retained to conduct detailed nest searches. During most of the breeding season, only small areas (< 1 ha) should be considered for this approach.
- Several species of owls are known to nest in the vicinity of the study area, and these birds of prey are protected under provincial legislation. There are development setbacks of a minimum of 100 metres from all active nests, and it is recommended that surveys for owls be conducted prior to any development that will affect wooded areas within the study area between mid February and late June, to ensure owls are not present.
- There is potential for amphibians that are considered species of concern to inhabit many of the wetlands and streams present in the study area (boreal toad, Canadian toad, northern leopard frog). Surveys for the presence/absence of these species are recommended during the potential for active breeding (mid April – June 30), in all wetlands that may be subject to disturbance as a result of construction activities.
- Timing restrictions will apply regarding fish habitat associated with watercourse crossing 1 (Astotin Creek).

9.0 Summary

This environmental assessment outlines current and historical conditions, potential impacts, and possible mitigation and regulatory solutions for proposed improvements along 11 km of roadways in Strathcona County, east of Edmonton. The overall area is located in a transition zone between Dry Mixedwood and Central Parkland, forest, but has been highly modified by agricultural activity. Remaining natural areas include a number of small woodlots, wetlands and one major riparian area and water course that crosses the road.

Disturbance to Natural Areas that may occur during road improvements are generally temporary, or involve removal of small areas of shrubby or forested areas immediately adjacent to the roads. However, under Strathcona County's Municipal Handbook there are several policies regarding tree conservation, and environmental reserves (Section 5.0) which may need to be considered and/or addressed prior to commencing road construction. In addition, there are timing restrictions resulting from protection of birds and nests during the breeding season are the primary concern for mitigation.



Finally, under the Water Act and Fisheries Act approval is required before undertaking construction on a surface water body (primarily wetlands in the Study Area) which has the potential to impact the aquatic environment, and which has the potential to cause harmful alteration, disruption or destruction of fish habitat. Both a value and function assessment of impacted wetlands (Water Act requirement), and a 35(2) authorization (Fisheries Act requirement) will likely be need to be completed prior to application for approval of the project.

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Figure 1. Study Area for Environmental Assessment in Strathcona County, and the location of wetlands, water crossings, and natural areas





Appendix A – Historical Air Photo Review

Table 5. Results of historical aerial photo review. Wetlands were visible in the years marked with check marks.

Location	Wetland Visible					Notes
	1967	1976	1987	1996	2007	
Wetland 1	✓	✓	✓	✓	✓	
Wetland 2	✓	✓	✓	✓	✓	
Wetland 3	✓	✓	✓	✓	✓	
Wetland 4	✓		✓	✓	✓	
Wetland 5	✓	✓	✓	✓	✓	
Wetland 6	✓	✓	✓	✓	✓	
Wetland 7		✓		✓	✓	
Wetland 8	✓				✓	
Wetland 9		✓			✓	Dugout excavated between 1996 & 2007
Wetland 10		✓	✓	✓	✓	
Wetland 11	✓	✓	✓	✓	✓	
Wetland 12	✓	✓	✓		✓	
Wetland 13	✓	✓		✓	✓	
Wetland 14	✓	✓		✓	✓	
Wetland 15	✓	✓			✓	
Wetland 16	✓	✓	✓	✓	✓	Dugout excavated between 1996 & 2007
Wetland 17	✓	✓	✓	✓	✓	
Wetland 18		✓			✓	
Wetland 19	✓	✓			✓	
Wetland 20	✓				✓	
Wetland 21	✓		✓	✓	✓	
Wetland 22	✓	✓	✓	✓	✓	
Wetland 23	✓		✓		✓	
Water Crossing 1	✓	✓	✓	✓	✓	
Water Crossing 2		✓			✓	



Appendix B – Site Photographs





Photo 1: Looking west from Hwy 830N junction at east end of study site.



Photo 2: Looking west along highway 15. Typical agriculture/highway transition near east end of study site.





Photo 3: Looking south into NA1. Vegetation includes balsam poplar, willow species, prickly rose, raspberry, saskatoon and Canada thistle, interspersed with roadside grasses.



Photo 4: Looking back east from railroad tracks along highway 15.





Photo 5: Looking west from RR 211.



Photo 6: Part of Wetland 1, looking SW off highway 15. This wetland occupies both sides of the highway, joined by culvert.





Photo 7: Looking west along highway 15 from RR 211.



Photo 8: Wetland 5, south side of highway 15. Typical of a number of small depressions within cultivated fields along route.





Photo 9: Looking west along railroad tracks from RR 213. Highway 15, bending to the south-west, is on the left. Ditches are highly modified throughout this area and to east.



Photo 10: Looking southwest at junction of highways 15 and RR 214. Railroad tracks at right of frame, within willows. Ditches and drainage are highly modified here.





Photo 11: Looking south at highway 15 from railway bridge, just east of RR 214. Astotin Creek.



Photo 12: Looking north through culvert under highway 15 on east side of RR 214. Astotin Creek.





Photo 13: Wetland 7. Highly influenced by highway and railroad. Possibly man-made.



Photo 14: Wetland 8. West end of “wetland” that forms the ditch on the north side of highway 15 between the highway and the railroad.





Photo 15: Wetland 9.



Photo 16: Construction zone at RR 220, west end of study area. No apparent Natural Areas are visible from outside construction.



**Appendix C – Management Practices for Consturction Sites
in Areas of risk for Clubroot Disease Contamination.**

Clubroot Disease: Construction Site Management Practices

Clubroot was first identified in Alberta in 2003, and has since been found in rural municipalities around Edmonton and elsewhere in the province. Infestations are particularly devastating to canola crops, and no economically feasible method of controlling an established infestation has been found. As such, management practices focus on the prevention and limitation of infestation. The following management practices are aimed at preventing construction worksites from becoming contaminated, and preventing a pre-existing contamination from being spread from a construction worksite. Three primary means of prevention are advocated: Worker knowledge; identification of “hot spots”; and, Equipment Cleaning.

Component	Mitigative measures
General	Ensure that all workers on site are aware of the risk of clubroot disease contamination, how it is transmitted, and equipment cleaning protocols.
	Compartmentalise the work site to minimize contamination within the work area. In agricultural areas, the quarter-section makes a convenient compartment unit – take measures to prevent contamination from one quarter-section to another.
	Ensure all vehicles, quads and equipment driving on topsoil or involved with topsoil handling activities, are cleaned before and after leaving the site.
	Recognize that field approaches, headlands and low, wet areas are potential hot spots for clubroot disease and avoid these areas to the extent possible.
	Minimize traffic between quarter-sections and in wet weather (when soil tends to stick and track onto other sites). Be extra cautious about soil transfer on slightly wet soil and avoid working in very wet soil conditions.
Foot Traffic	When travelling on foot, clean footwear and any equipment (e.g. shovels) that are in contact with topsoil between cultivated quarter-sections.
Vehicles and Equipment	Shovel or knock-off as much soil as possible and sweep or brush off any fine soil particles on trucks, quads and equipment before moving between cultivated fields (i.e. at changes in land use and/or road crossings) along the right-of-way.
	Clean equipment involved with clearing/brushing and topsoil handling with compressed air at designated weed cleaning stations and power wash stations before allowing them to move to a new quarter-section, or leave to a new site.
	Where clubroot disease is confirmed, disinfect equipment that has direct contact with soil, before moving to a new quarter section. Alberta Agriculture and Rural Development recommends 1-2% bleach-water mixture. Disinfectant solution is to be misted on mechanically cleaned or washed equipment so that the surface remains wet for 15 minutes.

Adapted from: CAPP 2008; Hartman 2011; APMC 2008.

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