

APPENDIX F

Environmental Overview





ENVIRONMENTAL ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PLAN

34 STREET FUNCTIONAL PLANNING STUDY



Prepared for:

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1.0 INTRODUCTION AND BACKGROUND

1.1 Introduction

McElhanney Consulting Services Ltd. (MCSL) was retained by the City of Edmonton (The City) to develop an Environmental Assessment (EA) and general recommendations for the proposed corridor upgrades of 34 Street from Whitemud Drive to Baseline Road, Edmonton AB. The EA is intended to identify any sensitive wildlife and fisheries species as well as habitats.

The Alberta Sustainable Resources Development (ASRD) and Fisheries and Oceans Canada (DFO) require that work conducted in and around a watercourse must avoid harmful alteration, disruption or destruction of fish and fish habitat (HADD) (Alberta Environment 2000a, 2000b; Department of Fisheries and Oceans 1991). Both provincial and federal government agencies abide by a 'No Net Loss' guiding principle for fish habitat. As such, following construction, the quantity and productive capacity of the aquatic environment, including fish and riparian habitat at and adjacent to any instream works, must be equivalent to or exceed that which existed prior to the commencement of works.

This document has been prepared to satisfy any Canadian Environmental Assessment Act requirements. The EA has been based on Valued Ecosystem Components or those environmental or socio-economic areas that have value that could potentially be affected by a proposed project.

This report provides information collected during the assessment of the proposed 34 Street Functional Planning Study project and general recommendations to ensure that ecosystems, wildlife, vegetation, fish and fish habitat values are protected, including wildlife transportation corridors. The recommendations contained within this report are, in the opinion of the author, sufficient to ensure the requirements of ASRD are met. These requirements are outlined within Part 1, Schedule 2 of the Code of Practice for Watercourses Crossing of the *Water Act* (Alberta Environment 2000a, 2000b). Furthermore, these recommendations are sufficient to meet the 'No Net Loss' guiding principle of DFO (Department of Fisheries and Oceans 1991).

1.2 Background

The City and Strathcona County understand the need for road improvements at this location; in order to accommodate future growth, facilitate smooth traffic movements to larger corridors to ensure timely and safe transportation. As stated in a MCSL Executive Summary:

'This planning study for the widening and improvement of 34 Street from Whitemud Drive to Baseline Road has been undertaken by the City of Edmonton and Strathcona County. This study includes the development of concept plans, as well as access management plans and the identification of right-of-way requirements for the ultimate widening of 34 Street. 34 Street is currently classified as an arterial roadway through

both the City of Edmonton and Strathcona County and is also a goods movement corridor, specifically designed to accommodate traffic from local and collector roads as well as to distribute traffic to higher level facilities including highways and freeways. 34 Street is a designated 24-hour truck route throughout the entire project length, a dangerous goods route specifically north of Sherwood Park Freeway, and provides a route for over-weight and over-dimensional vehicles.

This planning study is consistent with the current Transportation Master Plan (TMP) of the City of Edmonton and the Integrated Transportation Master Plan (ITMP) for Strathcona County,

The primary objective of this study was to develop concept plans for the upgrade of 34 Street between Whitemud Drive and Baseline Road from its existing two-lane undivided rural roadway standard to an ultimate urban arterial standard.'

1.3 Legislation and Permitting Requirements

The following is a list of federal, provincial and municipal environmental legislation that may or may not apply to this project.

Federal

Canada *Fisheries Act* (R.S., 1985, c. F-14)
Canada *Migratory Birds Convention Act*, 1994
Canada *Navigable Waters Protection Act* (R.S., 1985, c. N-22)
Canada *Species at Risk Act* (2002, c. 29)
Canadian *Environmental Protection Act* (1999, c. 33)
Canadian *Environmental Assessment Act* (1992, c. 37)

Provincial

Alberta *Water Act*, 2012
Alberta *Weed Control Act*, 2008
Alberta *Wildlife Act*

Municipal

City of Edmonton *Enviro-ISO 14001*

2.0 LOCATION

The section of the 34 Street Functional Planning Study that this project is concerned with, in the southeast section of the city and intersects with Whitemud Drive at the southern portion and continues north to Baseline Road (Figure 1). This area covers Township 52 Ranges 23 and 24 West of the 4 Meridian, covering approximately 6.0 km. The proposed works would involve widening the existing corridor from a two lane rural road to a minimum of a four lane urban road.

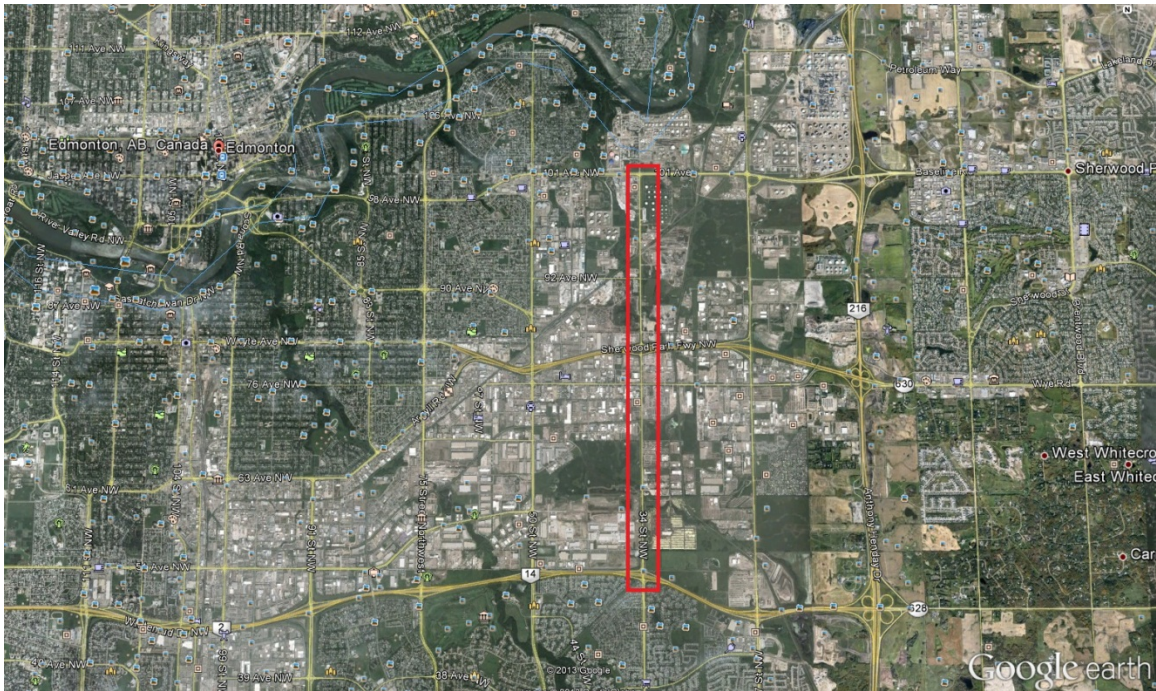


Figure 1: Project Site Location Map (general construction area boxed in red).

*modified Google Earth 2012, map not to scale

3.0 METHODOLOGY

This project was undertaken to meet the requirements of the *Code of Practice for Watercourse Crossings* (Alberta Environment 2000a). As such, the data collected and methods used relate directly to those suggested in these Codes of Practice. For the purpose of this assessment “water body” was defined as per the *Guide to the Code of Practice for Watercourse Crossings, Including Guidelines for Complying with the Code of Practice* (Alberta Environment 2000b). The classification of a watercourse as ephemeral, intermittent, small permanent or large permanent was based on definitions provided by Fisher et. al. (1989).

For sampling purposes, wherever possible, each crossing location was identified as an area 20 m in width and the watercourse was divided into an ‘upstream’ portion and a ‘downstream’ portion. The upstream portion covered the area up to 100 m upstream of the upper end of each crossing location and will act as a control site for future reference assessments. The downstream portion of each crossing site is considered the Zone of Impact by ASRD and covers the area from the upstream side of the crossing location to 300 m downstream.

The methodology used to undertake the fish and fish habitat assessments was adapted from the *Reconnaissance (1:20000) Fish and Fish Habitat Inventory: Standards and Procedures, version 2.0* (Resource Inventory Committee of British Columbia 2001). The fish and fish habitat assessment included recording a UTM and legal location, channel width measurements, and substrate and cover descriptions.

Historical fish data for Fulton and Goldbar Creeks were obtained from the provincial Fisheries and Wildlife Management Information System (FWMIS) and personal communications with Daryl Watters, Fisheries Biologist with the ASRD, Edmonton (2012). Sensitive ecosystems and rare and endangered plants species data was determined using the Alberta Conservation Information Management System (ACIMS) database.

The EA is based on Valued Ecosystem Components (VECs). Under the Canadian Environmental Assessment Act (CEAA), the definition of VECs is as follows:

- Any part of the environment that is considered important by the proponent, public, scientists and government involved in the assessment process. Importance may be determined on the basis of cultural values or scientific concern (CEAA 1999).

Natural environment VEC examples include species populations that have been identified as needing protection to sustain and encourage population growth within certain areas. They include wildlife, fish, vegetation and ecosystems.

4.0 RESULTS AND DISCUSSION

Search information for wildlife and fish species for the proposed construction footprint area was generated using a 3 kilometer buffer radius from where Fulton and Goldbar Creek's cross 34 Street (Appendix A).

The resources that were consulted to determine species and ecosystems of concern that fall within the proposed development included:

- Species at Risk Act (SARA)
- Committee on the Status of Endangered Wildlife in Canada (COSEWIC)
- FWMIS
- ACIMS

4.1 Rare and Endangered Wildlife

4.1.1 Wildlife

Database searches revealed no mammal species of concern for this area. At the time of the assessment, there was evidence of browse on woody vegetation close to the engineered stormwater management ponds (Polypow) but no scat trails were observed. No ungulate winter range has been identified within the project footprint.

The site was evaluated and determined low in wildlife habitat value as the majority of the assessment area of construction lies within the already impacted road right-of-way and industrial developments.

4.1.2 Birds

Two species of birds were present on the FWMIS list; the peregrine falcon (*Falco peregrinus*) and Swainson's hawk (*Buteo swainsoni*) as potentially occurring within the same jurisdiction as the study area. Two waterfowl and one rail were listed including the green-winged teal (*Anas carolinensis*), pied-billed grebe (*Podilymbus podiceps*) and sora (*Porzana carolina*). All three species of birds are common to North America. The common yellowthroat (*Geothlypis trichas*) is a warbler that was listed on the wildlife inventory, and as its name states it is one of the most common warblers.

Of the listed species, there is very little risk that the proposed development would have any impact. The peregrine falcon inhabits open wetlands and nest in cliffs but has established themselves in cities using bridges and tall buildings. The Swainson's hawk can be found in open to semi-open country; deserts, grasslands and wild prairies. This hawk is not particular about nesting sites using a variety of locations including: isolated trees or bushes, riparian areas, around abandoned homesteads even in the ground or ledge. The water fowl, rail and migratory song birds could possibly be found utilizing the stormwater ponds and the surrounding habitat, none were observed at the time of the assessment.

One bird nest was identified on the right bank of Fulton Creek before it entered Polypow, closer examination will need to be conducted to determine whether or not it is active (Photograph 1). No raptors were observed.

The sites were evaluated and determined low in bird habitat value for the falcon and hawk as the majority of the assessment area of construction lies within the already impacted road right-of-way with industrial developments. Habitat was present in the newly developed Polypow and City stormwater ponds for waterfowl and rails but this area was outside of the construction footprint.

Canada geese (*Branta canadensis*) were observed using the City stormwater pond and magpies (*Pica pica*) were adjacent to the assessment areas with vocalizations identified as ravens (*Corvus* sp.) and red-winged blackbirds (*Agelaius phoeniceus*).

In order to address nesting migrants if trees need to be removed, there are two options under the federal Migratory Birds Convention Act (Environment Canada 1994). If harvesting occurs prior to the beginning of the migratory bird breeding period on May 1, no nesting migrants will be disturbed. If delays are encountered and the wood is not removed before May 1, a breeding bird survey can be completed to determine if nesting has initiated within the proposed development area, and whether it involves migrants. If so, site specific protections, such as no disturbance buffers, can be used. If several nests are identified, harvesting may be delayed until after fledging has occurred (approximately July 31).



Photograph 1: Nest observed on Fulton Creek, view to the northwest.

4.1.3 *Amphibians*

Database searches revealed no amphibian's species of concern for this area and the site was evaluated and determined to have moderate amphibian habitat values in and around the wetland complexes but a majority of the assessment area of construction still lies within the already impacted road right-of-way and industrial developments.

4.2 Fisheries Assessment Results

Table 1. Assessment Results and Crossing Plan Summary

MCSL Crossing Number	Watercourse Type	Channel Width at Proposed Crossing Site (m)	Legal Description	Nearest mapped CoP water body*
1	Small Permanent	2.0	25-52-23-W4M	North Saskatchewan River
2	Small Permanent	2.0	30-52-23-W4M	North Saskatchewan River

*CoP Code of Practice

4.2.1 Crossing 1: Watercourse Summary

Watercourse Name: Fulton Creek

Watercourse Type: Small Permanent

Alberta Code of Practice Classification: NA within Edmonton City limits

Restrictive Activity Period: NA within Edmonton City limits

Legal Description: 25-52-23-W4M

UTM Co-ordinates: 12 U 341219.95 m E 5930379.72 m N (NAD83)

Fish Habitat Summary:

Assessment Date: 30 April 2013

Overall Fish Habitat: Moderate

Potential for Fish Presence: Low to Nil

Fish Data

The provincial FWMIS database shows that there are no known species recorded for this watercourse, which has been confirmed by Daryl Watters, ASRD in Edmonton (Appendix A, Government Communication).

Fish Habitat: Upstream of the Proposed Road Upgrade Site (20 m)

Approximately 20 m upstream of the proposed road upgrade site, the watercourse was undefined and flowed through a treed industrial property on the east side of 34 Street (Photographs 2 and 3). The flooded area was directed to a 1000 mm culvert and overflow culvert under the road access into the industrial property, the south shoulder of the driveway was failing (Photographs 3). The outlet of the driveway culverts directed water at a 90 degree turn into a 1500 mm culvert that crossed 34 Street (Photograph 4). The channel and wetted widths were approximately 15 m, respectively. The channel bottom characteristics were obscured by fast flowing turbid water. The banks were provided by the road shoulder and composed of construction materials like gravels. Gradient was 0.5% and crown closure was 80%. Abundant overhanging and instream vegetation was present. Upland vegetation and riparian composition can be found in Section 4.3.

Fish Habitat: Proposed Road Upgrade Site

At the proposed road upgrade site the watercourse was defined by the road shoulder, driveway access and industrial property and flowed into the existing 1500 mm culvert crossing 34 Street (Photograph 5). The channel and wetted width were approximately

3 m wide with all other characteristics, including riparian and upland vegetation were similar to those upstream.

Fish Habitat: Downstream of the Proposed Road Upgrade Site (100 m)

Immediately downstream of the culvert outlet the watercourse was defined and flowed in a meander that paralleled the road for approximately 50 m before converging with Polypow stormwater ponds (Photographs 7 to 10). The banks were vertical to sloped and composed of fines and gravels. On the right bank, before entering the ponds, Fulton Creek could continue along the original channel.

Fish and Fish Habitat Summary

Overall fish habitat was poor with a low to nil potential for fish presence at all times of the year. Spawning habitat was not observed and rearing habitat consisted of cover provided by overhanging and instream vegetation. The stormwater management ponds could provide overwinter habitat.



Photograph 2: Fulton Creek, 20 m upstream, upstream view.



Photograph 3: Fulton Creek, 20 m upstream, downstream view to driveway access.



Photograph 4 Fulton Creek, failed drive access, right bank view.



Photograph 5: Fulton Creek, driveway access culvert outlets, upstream view.



Photograph 6: Fulton Creek, at the 34 Street culvert inlet, downstream view.



Photograph 7: Fulton Creek, at the 34 Street culvert outlet, upstream view.



Photograph 8: Fulton Creek, at the 34 Street culvert outlet, downstream view.



Photograph 9: Fulton Creek, confluence to Polypow stormwater ponds, upstream view.



Photograph 10: Fulton Creek, confluence to Polypow stormwater ponds, downstream view.

Watercourse Crossing Method: Permanent Round Bottomed Culvert

Construction using the recommendations described below should have no significant impacts on fish or fish habitat at the crossing site or downstream and will meet the requirements of clause (a) in Part 1, Schedule 2 of the *Alberta Code of Practice for Watercourse Crossings* (Alberta Environment 2000b) and the “No Net Loss” requirements of the DFO (Department of Fisheries and Oceans 1991).

Timing

Construction timing has yet to be determined.

Description of Proposed Works

To be completed – based on final concept plans

Isolation Area

If flowing water or large amounts of standing water are present at the time of construction, an isolation area will be established to minimize or eliminate water flow through the crossing site in order to dry the scheduled instream work area prior to commencement of construction. The isolation area will be maintained throughout the entire culvert installation process. A dam or barrier will be placed temporarily across the channel at a suitable location upstream of the proposed work site to stop water flow. Depending on site conditions, such as a low channel gradient, a downstream dam may be required to prevent water from flowing back into the work site. The upstream and downstream barriers can be constructed of sand bags and tarps, steel plates, wooden planking or any other materials that are not hazardous (non-toxic) to fish and fish habitat. Where possible, suitable natural features such as beaver dams or frozen debris jams can be incorporated into the barriers to reduce construction efforts, as long as these natural features are not disturbed and/or remain in original condition.

Water initially contained within the isolation area may naturally drain out, although a second pumping system may be required to de-water the isolation area and possibly continually remove water throughout the entire construction process. Water removed from the isolation area must be released at a location and in a manner that either prevents water from re-entering the watercourse or allows suitable filtering and/or settling of sediment out of the water before re-entry into the watercourse.

Water flow will be diverted across or around the work site by a flume or pumping system to ensure downstream water flow is maintained at all times to avoid impacting downstream characteristics. All water discharged into the channel downstream of the crossing site must be done in a manner that prevents scouring of the channel bottom and minimizes sedimentation. Therefore, water must be released onto a structure or material that diffuses and slows water velocity.

Water Withdrawal

If pumps are used during construction, the ends of the intake hoses must be screened with a maximum mesh size of 2.54 mm to prevent entrainment or impingement of fish (Department of Fisheries and Oceans 1995). In addition, all discharged water must be released at a location and in a manner that either prevents water from re-entering the

watercourse or allows suitable filtering and/or settling of sediment out of the water before re-entry into the watercourse. One hundred percent of downstream flow must be maintained at all times to avoid impacting downstream fish and fish habitat.

Secondary Containment

Any gasoline powered equipment such as pumps and generators must be entirely enclosed or set within a secondary containment structure that is large enough to completely contain all harmful materials should a spill, leak or overflow occur.

Water Turbidity Monitoring

If flowing water is present at the time of construction, water turbidity must be monitored to ensure instream sedimentation is detected. Monitoring should be conducted on an hourly basis with a portable water turbidity measuring unit at a minimum of four sampling locations, including one upstream, one immediately downstream of the isolation area and two further downstream. All measurements should be recorded.

Cleaning of Vehicles, Equipment and Machinery Prior to Construction

Prior to construction, all vehicles, equipment and machinery scheduled to work in and/or along a watercourse will be inspected and found to be clean, free of leaks and in good working condition. All foreign material must be removed, including dirt, mud, debris, grease, oil, hydraulic fluid, coolant or other substances that may negatively impact the water quality of the watercourse at the crossing site or further downstream. All identified leaks must be repaired and then appropriately cleaned. Inspections, cleaning and/or servicing can occur either before the vehicle, equipment or machinery is transported into the field or can be conducted at the work site at a minimum distance of 100 m from the watercourse. All wash water runoff and/or harmful materials must be appropriately controlled to prevent entry into the watercourse including the riparian zone.

Construction Monitoring

During crossing construction, on-site monitoring will be conducted to identify potential sedimentation and possible fluid leaks from vehicles, equipment and machinery that may not be observable to the operator. A spill containment kit should be kept on site that is capable of handling twice the potential volume of a spill.

Riparian Vegetation

During construction, care should be taken to disturb as little of the natural riparian vegetation along the banks and adjacent slopes as possible. Maintaining the original established vegetation around the crossing site will aid ground stabilization and minimize potential erosion and sedimentation. Vehicles, equipment and machinery should not be located within the riparian zone, or at a minimum of 10 m from the channel, to maintain an undisturbed vegetation buffer. All trees that have to be removed from either side of the crossing site should be hand-cut at ground level with the root system retained. However, any disturbances that occur along the banks and farther up the slopes will be revegetated as soon as possible with seeding, cuttings and/or plantings to restore the riparian vegetation to original condition. If there are time constraints within the current growing season, revegetation will occur on or before June of the following year.

The standard prescribed roadway landscaping seed mixture is Canada #1 Mix which is made up of 30% Argyll Kentucky Bluegrass, 30% Kentucky Bluegrass, 30% Creeping Red Fescue and 10% annual Rye Grass.

Evasive Species/Weed Control

Monitor planting areas for success rate of germination and for weeds bimonthly during the growing season and implement appropriate controls as needed. Controls may include re-seeding, mechanical (such as mowing or hand pulling) or chemical (herbicide) methods. When hand-pulling, care should be taken to remove the roots of the weed species. Regular mowing should occur every 30 days during and post reestablishment. Herbicides should be used only if hand pulling is not feasible (effective or cost effective). The method of application and product used should be selected to eliminate any negative impacts to desirable plant species. Pre-emergent and post-emergent herbicides may be used after one-year establishment period for new plantings has elapsed. After killing weeds with herbicide, any weeds over 5 cm tall must be removed from planting beds and disposed of properly off site.

Sedimentation and Erosion Control

Disturbance of the ground surface and soils of the banks and surrounding slopes will be minimized. The width of the construction right-of-way should be kept to a minimum within 50 m of the watercourse banks. All disturbed areas will be re-contoured to the natural pre-construction condition without causing excessive disturbance or creating large areas of exposed unstable soil. If required, temporary measures can be implemented to minimize potential erosion and sedimentation as well as aid in the re-establishment of natural vegetation. Erosion control materials will be installed on any disturbed areas. Such materials may include coco-matting, straw matting or geotextile fabric, which should be anchored (staked) in place as per manufacturers' recommendations to protect and stabilize exposed ground.

Cross-Berms and Ditches

Cross-berms and ditches control the velocity and direction of surface water flow down long and/or steep slopes. The structure can consist of a shallow ditch or swale hand-cut across the slope with the spoil material piled on the immediate downslope side of the ditch to form a low berm. The entire structure should be approximately 30 cm in height from the bottom of the ditch to the top of the berm. The ditch and berm structure should be angled in order to intercept and divert surface water into the surrounding vegetated areas and should be completely covered in erosion control materials to prevent sedimentation of the watercourse.

Silt Fences

Silt fences can be used to control surface water flow and should be installed to divert water flowing directly off of the crossing site and adjacent ground surfaces into surrounding vegetation to reduce sedimentation of the watercourse. Once installed, no gaps should be present between the bottom of the silt fences and the ground surface. If required, the lower edge of the silt fence can be dug into the ground surface or secured under the edge of adjacent erosion control materials (if present). Multiple silt fences may be used to control water flow from large receiving areas and/or particularly steep slopes.

Silt fences should be used to divert, rather than dam water flow and should be sufficiently supported to withstand high wind and water pressures.

Sandbag Berms

Another option to control surface water flow is to install temporary sandbag berms across the base of the banks or slopes. The sandbags should be wrapped with geotextile fabric with the free end of the fabric secured to the ground surface on the upslope side. No gaps should be present between the bottom of the fabric and the ground surface. Berms can be dug into the ground surface for a better seal. The berms should be wide enough to capture all the surface water flowing from the crossing site to prevent sedimentation of the watercourse.

Channel Bed Replacement

Once back-filling is complete, the entire surface from bank to bank will be capped with original excavation material and/or suitable material that provides a stable channel bottom. The material will be placed uniformly across the channel bed to prevent possible damming and/or diversion of water flow at the crossing site.

Maintenance of Fish Habitat Characteristics

Once construction is complete, the channel bed and banks must be adequately replaced in a manner that maintains original habitat characteristics. The measures are site-specific and may include the addition of various materials and/or features to the crossing site such as individual or multiple logs, woody debris piles, large boulders or pools. Features should be of the same size, quantity and location as found prior to construction. A simple sketch and/or photograph of the crossing site prior to construction can aid in the subsequent re-construction of fish habitat characteristics.

Maintenance of Fish Passage

Given the results of database searches and conversations with government fish biologists, culvert installation does not need to allow for fish passage through the crossing site.

Removal of Isolation Area

Upon completion of the crossing, the isolation area will be removed in a manner that minimizes disturbance and sedimentation of the watercourse. Pumps will be used to remove turbid water and debris from the watercourse when the isolation dams or barriers are removed. In particular, a pump will be set up on the upstream side of the downstream dam. The upstream dam can then be removed and water allowed to flow through the crossing site. This water flow will wash the sections of newly constructed channel bottom at the inlet and outlet ends of the culvert, which can then be pumped out and released into a vegetated area in a manner that does not allow unfiltered water flow back into the watercourse. Water flow can still be re-directed around the isolation area in order to maintain downstream flow. Once clean water flow has been re-established through the crossing site, the downstream dam and pump can be removed provided that associated sedimentation is expected to be minimal.

Armouring

Any portion of the channel bed and/or banks considered particularly susceptible to erosion will have armouring placed on top of the erosion control materials to aid in stabilization and protection from erosion, particularly during high water levels. Armouring should consist of rock material ('rip-rap'), that is cobble (64 to 256 mm) or preferably boulder (> 256 mm) sized and placed, at a minimum, along the bottom 1.5 m of the banks. Gaps between the armouring material should be minimized.

Post-Construction Assessment

Once construction is complete, the crossing site will be revisited after high water levels in the spring to identify any sedimentation problems and determine the risk of erosion. If excessive sedimentation and/or erosion potential are identified, a QAES should be consulted to assess the potential impacts to fish and fish habitat and provide additional recommendations.

4.2.2 Crossing 2: Watercourse Summary

Watercourse Name: Goldbar Creek

Watercourse Type: Small Permanent

Alberta Code of Practice Classification: NA within Edmonton City limits

Restrictive Activity Period: NA within Edmonton City limits

Legal Description: 30-52-23-W4M

UTM Co-ordinates: 12 U 341305.75 m E 5932991.74 m N (NAD83)

Fish Habitat Summary:

Assessment Date: 30 April 2013

Overall Fish Habitat: Moderate

Potential for Fish Presence: Low to Nil

Fish Data

The provincial FWMIS database shows that the recoded know species for this watercourse include: brook stickleback (*Salvelinus fontinalis*), fathead minnow (*Pimephales promelas*), lake chub (*Couesius plumbeus*) and spottail shiner (*Notropis hudsonius*).

Fish Habitat: Upstream of the Proposed Road Upgrade Site (50 m)

Approximately 50 m upstream of the proposed road upgrade site, the watercourse was well defined and flowed in an irregular meander with a riffle-run morphology (Photograph 11). The channel and wetted widths were 3.5 m and composition was undefined due to turbid water conditions. The banks were undercut to vertical and composed of fine sediments to gravels. Moderate amounts of undercut banks and trace amounts of instream and overhanging vegetation were present. The average gradient was 0.5% and crown closure was 0%. Vegetation description can be found in Section 4.3.

Fish Habitat: Proposed Road Upgrade Site

At the proposed road upgrade site, the watercourse characteristics were similar to those in the upstream section. The channel width narrowed to 2.0 m in order to flow through the culvert which leads to a new city stormwater pond area and a portion of the banks were armoured (Photographs 12 to 16). Trace amounts of overhanging and instream vegetation was present.

Fish Habitat: Downstream of the Proposed Road Upgrade Site (70 m)

Immediately downstream of the proposed road upgrade site, the watercourse flowed through an undersized cement box culvert, straight and in a riffle run morphology, which paralleled 34 Street (Photographs 17 and 18). Moderate amounts of boulders and undercut banks with trace amounts of instream and overhanging vegetation were present. To the west, the City stormwater management pond was being developed (Photograph 19). The watercourse continued to flow in a north direction, bordering on industrial developments. All other characteristics, including riparian and upland vegetation were similar to those upstream on the east side of 34 Street.

Fish and Fish Habitat Summary

Overall fish habitat was moderate with low to nil potential for fish presence at all times of the year. Spawning habitat was poor with no suitable gravels present within the assessment area. Rearing habitat was moderate with cover provided by overhanging and instream vegetation and undercut banks. Overwintering habitat was moderate due to the presence of the plunge pool.



Photograph 11 Goldbar Creek, 50 m upstream from the proposed crossing, upstream view.



Photograph 12 Goldbar Creek, proposed crossing site, upstream view from culvert inlet on the east side of 34 Street.



Photograph 13: Goldbar Creek, proposed crossing site, downstream view to culvert inlet on the east side of 34 Street (note overflow culvert).



Photograph 14: Goldbar Creek, proposed crossing site, culvert outlet on the west side of 34 Street, downstream view.



Photograph 15: Goldbar Creek, left bank view on the west side of 34 Street, leading to the cement box culvert within the stormwater pond system.



Photograph 16: Goldbar Creek, upstream view to the proposed crossing site, from the cement box culvert within the stormwater pond system.



Photograph 17: Goldbar Creek, upstream view to the box culvert outlet on the west side of 34 Street, watercourse parallels the road way.



Photograph 18: Goldbar Creek, downstream view to the box culvert outlet on the west side of 34 Street, watercourse parallels the road way.



Photograph 19: Goldbar Creek, 20 m downstream, upstream view on the west side of 17 Street.

Watercourse Crossing Method: Permanent Round Bottomed Culvert

Construction using the recommendations described below should have no significant impacts on fish or fish habitat at the crossing site or downstream and will meet the requirements of clause (a) in Part 1, Schedule 2 of the *Alberta Code of Practice for Watercourse Crossings* (Alberta Environment 2000b) and the “No Net Loss” requirements of the DFO (Department of Fisheries and Oceans 1991).

Timing

Construction timing has yet to be determined.

Description of Proposed Works

To be completed – based on final concept plans

Isolation Area

If flowing water or large amounts of standing water are present at the time of construction, an isolation area will be established to minimize or eliminate water flow through the crossing site in order to dry the scheduled instream work area prior to commencement of construction. The isolation area will be maintained throughout the entire culvert installation process. A dam or barrier will be placed temporarily across the channel at a suitable location upstream of the proposed work site to stop water flow. Depending on site conditions, such as a low channel gradient, a downstream dam may be required to prevent water from flowing back into the work site. The upstream and downstream barriers can be constructed of sand bags and tarps, steel plates, wooden planking or any other materials that are not hazardous (non-toxic) to fish and fish habitat. Where possible, suitable natural features such as beaver dams or frozen debris jams can be incorporated into the barriers to reduce construction efforts, as long as these natural features are not disturbed and/or remain in original condition.

Water initially contained within the isolation area may naturally drain out, although a second pumping system may be required to de-water the isolation area and possibly continually remove water throughout the entire construction process. Water removed from the isolation area must be released at a location and in a manner that either prevents water from re-entering the watercourse or allows suitable filtering and/or settling of sediment out of the water before re-entry into the watercourse.

Water flow will be diverted across or around the work site by a flume or pumping system to ensure downstream water flow is maintained at all times to avoid impacting downstream characteristics. All water discharged into the channel downstream of the crossing site must be done in a manner that prevents scouring of the channel bottom and minimizes sedimentation. Therefore, water must be released onto a structure or material that diffuses and slows water velocity.

Water Withdrawal

If pumps are used during construction, the ends of the intake hoses must be screened with a maximum mesh size of 2.54 mm to prevent entrainment or impingement of fish (Department of Fisheries and Oceans 1995). In addition, all discharged water must be released at a location and in a manner that either prevents water from re-entering the

watercourse or allows suitable filtering and/or settling of sediment out of the water before re-entry into the watercourse. One hundred percent of downstream flow must be maintained at all times to avoid impacting downstream fish and fish habitat.

Secondary Containment

Any gasoline powered equipment such as pumps and generators must be entirely enclosed or set within a secondary containment structure that is large enough to completely contain all harmful materials should a spill, leak or overflow occur.

Water Turbidity Monitoring

If flowing water is present at the time of construction, water turbidity must be monitored to ensure instream sedimentation is detected. Monitoring should be conducted on an hourly basis with a portable water turbidity measuring unit at a minimum of four sampling locations, including one upstream, one immediately downstream of the isolation area and two further downstream. All measurements should be recorded.

Cleaning of Vehicles, Equipment and Machinery Prior to Construction

Prior to construction, all vehicles, equipment and machinery scheduled to work in and/or along a watercourse will be inspected and found to be clean, free of leaks and in good working condition. All foreign material must be removed, including dirt, mud, debris, grease, oil, hydraulic fluid, coolant or other substances that may negatively impact the water quality of the watercourse at the crossing site or further downstream. All identified leaks must be repaired and then appropriately cleaned. Inspections, cleaning and/or servicing can occur either before the vehicle, equipment or machinery is transported into the field or can be conducted at the work site at a minimum distance of 100 m from the watercourse. All wash water runoff and/or harmful materials must be appropriately controlled to prevent entry into the watercourse including the riparian zone.

Construction Monitoring

During crossing construction, on-site monitoring will be conducted to identify potential sedimentation and possible fluid leaks from vehicles, equipment and machinery that may not be observable to the operator. A spill containment kit should be kept on site that is capable of handling twice the potential volume of a spill.

Riparian Vegetation

During construction, care should be taken to disturb as little of the natural riparian vegetation along the banks and adjacent slopes as possible. Maintaining the original established vegetation around the crossing site will aid ground stabilization and minimize potential erosion and sedimentation. Vehicles, equipment and machinery should not be located within the riparian zone, or at a minimum of 10 m from the channel, to maintain an undisturbed vegetation buffer. All trees that have to be removed from either side of the crossing site should be hand-cut at ground level with the root system retained. However, any disturbances that occur along the banks and farther up the slopes will be revegetated as soon as possible with seeding, cuttings and/or plantings to restore the riparian vegetation to original condition. If there are time constraints within the current growing season, revegetation will occur on or before June of the following year.

The standard prescribed roadway landscaping seed mixture is Canada #1 Mix which is made up of 30% Argyll Kentucky Bluegrass, 30% Kentucky Bluegrass, 30% Creeping Red Fescue and 10% annual Rye Grass.

Evasive Species/Weed Control

Monitor planting areas for success rate of germination and for weeds bimonthly during the growing season and implement appropriate controls as needed. Controls may include re-seeding, mechanical (such as mowing or hand pulling) or chemical (herbicide) methods. When hand-pulling, care should be taken to remove the roots of the weed species. Regular mowing should occur every 30 days during and post reestablishment. Herbicides should be used only if hand pulling is not feasible (effective or cost effective). The method of application and product used should be selected to eliminate any negative impacts to desirable plant species. Pre-emergent and post-emergent herbicides may be used after one-year establishment period for new plantings has elapsed. After killing weeds with herbicide, any weeds over 5 cm tall must be removed from planting beds and disposed of properly off site.

Sedimentation and Erosion Control

Disturbance of the ground surface and soils of the banks and surrounding slopes will be minimized. The width of the construction right-of-way should be kept to a minimum within 50 m of the watercourse banks. All disturbed areas will be re-contoured to the natural pre-construction condition without causing excessive disturbance or creating large areas of exposed unstable soil. If required, temporary measures can be implemented to minimize potential erosion and sedimentation as well as aid in the re-establishment of natural vegetation. Erosion control materials will be installed on any disturbed areas. Such materials may include coco-matting, straw matting or geotextile fabric, which should be anchored (staked) in place as per manufacturers' recommendations to protect and stabilize exposed ground.

Cross-Berms and Ditches

Cross-berms and ditches control the velocity and direction of surface water flow down long and/or steep slopes. The structure can consist of a shallow ditch or swale hand-cut across the slope with the spoil material piled on the immediate downslope side of the ditch to form a low berm. The entire structure should be approximately 30 cm in height from the bottom of the ditch to the top of the berm. The ditch and berm structure should be angled in order to intercept and divert surface water into the surrounding vegetated areas and should be completely covered in erosion control materials to prevent sedimentation of the watercourse.

Silt Fences

Silt fences can be used to control surface water flow and should be installed to divert water flowing directly off of the crossing site and adjacent ground surfaces into surrounding vegetation to reduce sedimentation of the watercourse. Once installed, no gaps should be present between the bottom of the silt fences and the ground surface. If required, the lower edge of the silt fence can be dug into the ground surface or secured under the edge of adjacent erosion control materials (if present). Multiple silt fences may be used to control water flow from large receiving areas and/or particularly steep slopes.

Silt fences should be used to divert, rather than dam water flow and should be sufficiently supported to withstand high wind and water pressures.

Sandbag Berms

Another option to control surface water flow is to install temporary sandbag berms across the base of the banks or slopes. The sandbags should be wrapped with geotextile fabric with the free end of the fabric secured to the ground surface on the upslope side. No gaps should be present between the bottom of the fabric and the ground surface. Berms can be dug into the ground surface for a better seal. The berms should be wide enough to capture all the surface water flowing from the crossing site to prevent sedimentation of the watercourse.

Channel Bed Replacement

Once back-filling is complete, the entire surface from bank to bank will be capped with original excavation material and/or suitable material that provides a stable channel bottom. The material will be placed uniformly across the channel bed to prevent possible damming and/or diversion of water flow at the crossing site.

Maintenance of Fish Habitat Characteristics

Once construction is complete, the channel bed and banks must be adequately replaced in a manner that maintains original habitat characteristics. The measures are site-specific and may include the addition of various materials and/or features to the crossing site such as individual or multiple logs, woody debris piles, large boulders or pools. Features should be of the same size, quantity and location as found prior to construction. A simple sketch and/or photograph of the crossing site prior to construction can aid in the subsequent re-construction of fish habitat characteristics.

Maintenance of Fish Passage

Given the results of database searches and conversations with government fish biologists, culvert installation does not need to allow for fish passage through the crossing site.

Removal of Isolation Area

Upon completion of the crossing, the isolation area will be removed in a manner that minimizes disturbance and sedimentation of the watercourse. Pumps will be used to remove turbid water and debris from the watercourse when the isolation dams or barriers are removed. In particular, a pump will be set up on the upstream side of the downstream dam. The upstream dam can then be removed and water allowed to flow through the crossing site. This water flow will wash the sections of newly constructed channel bottom at the inlet and outlet ends of the culvert, which can then be pumped out and released into a vegetated area in a manner that does not allow unfiltered water flow back into the watercourse. Water flow can still be re-directed around the isolation area in order to maintain downstream flow. Once clean water flow has been re-established through the crossing site, the downstream dam and pump can be removed provided that associated sedimentation is expected to be minimal.

Armouring

Any portion of the channel bed and/or banks considered particularly susceptible to erosion will have armouring placed on top of the erosion control materials to aid in stabilization and protection from erosion, particularly during high water levels. Armouring should consist of rock material ('rip-rap'), that is cobble (64 to 256 mm) or preferably boulder (> 256 mm) sized and placed, at a minimum, along the bottom 1.5 m of the banks. Gaps between the armouring material should be minimized.

Post-Construction Assessment

Once construction is complete, the crossing site will be revisited after high water levels in the spring to identify any sedimentation problems and determine the risk of erosion. If excessive sedimentation and/or erosion potential are identified, a QAES should be consulted to assess the potential impacts to fish and fish habitat and provide additional recommendations.

4.3 Sensitive and Non-Sensitive Element Occurrences

A search of ACIMS on 22 April 2013 indicated that there were no records for non-sensitive or sensitive element occurrences (Appendix A). This information was generalized to the level of Township, where requests have to be made for specific Sections. For no element occurrences, instructions from the ACIMS website are as follows and the data print off has been included with this information letter:

If no element occurrences (sensitive or non-sensitive) and/or no Provincial Protected Areas were found in your area, no further request is needed for most results, however please note this does **not** indicate that occurrences do not exist in this area, the absence of records could indicate that very few inventories/surveys have been done in this part of the province. Record search as follows, in case proof of search is needed at some future point:

- Print the 'Search ACIMS Map', by pressing the 'Print Page' button, printing the web page as a pdf, or taking a screen capture (it may be 'Prt Scn' or something similar)
- Save/archive the file (or paste the image into a raster/bitmap software (i.e Microsoft Paint, or Apple Paintbrush) if taking screen capture)
- Be sure 'today's date', 'date file was updated' and 'legal land location' are clearly visible in the image file.
- Save file, and retain records as needed – ACIMS does not require this file to be sent to us unless we request it.

Given that this project is to upgrade an existing road, no request was made for more information for specific Sections because there is very little to no risk that the proposed development would have any impact on plant species or ecosystem complexes.

At the time of the assessment, a majority of the plant species were still dormant or under snow cover and in order to characterize this information and additional field visit might be required. There was evidence of rose (*Rosa* sp.), alder (*Alnus* sp.) and rushes (*Juncus* sp.).

5.0 CONCLUSION

Given the historical disturbance level associated with the initial construction of 34 Street, industrial development and the increase in transportation use, the majority of the plant and wildlife species and sensitive ecosystem associations listed with FWMIS and ACIMS are very unlikely to be found within the proposed development area. Site assessments confirmed low habitat suitability for all listed plant and wildlife species, and determined that no listed ecosystem associations are present. Furthermore, the lack of any salmonid or sport fish bearing watercourses within the work footprint limits any potential impacts, but water quality will need to be monitored during construction as both watercourses lead to the North Saskatchewan River (D. Watters e-mail).

MCSL is pleased to offer this Environmental Assessment as a reference during the planning phase of the proposed road upgrade along 34 Street.

Regards,

Patty Burt, B.Sc.H., R.P. Bio., P. Biol.
Senior Project Manager
McElhanney Consulting Services Ltd.

6.0 REFERENCES

Alberta Environment. 2000a. Code of Practice for Watercourse Crossings. Water Act-Water (Ministerial) Regulation. Queen's Printer. Edmonton, Alberta.

Alberta Environment, 2000b: Guide to the Code of Practice for Watercourse Crossings, Including Guidelines for Complying with the Code of Practice. Queen's Printer. Edmonton, Alberta.

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Committee on the Status of Endangered Wildlife in Canada. www.cosewic.gc.ca

Department of Fisheries and Oceans, 1991: Canada's Fish Habitat Law. Ottawa, Ontario.

Department of Fisheries and Oceans, 1993: Land Development Guidelines for the Protection of Aquatic Habitat. Ottawa, Ontario.

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Environment Canada, 1994. Migratory Birds Convention Act. Ottawa, Ontario.

Fisher, G.L., A.G.H. Locke and B.C. Northey, 1989: Stream Crossing Guidelines: Operational Guidelines for Industry. Alberta Forestry, Lands and Wildlife. Edmonton, Alberta.

National Geographic. 2008. Field Guide to the Birds of Western North America. Washington DC.

Species at Risk Act. www.sararegistry.gc.ca.

Resource Inventory Committee, 2001: Reconnaissance (1:20000) Fish and Fish Habitat Inventory for British Columbia: Standards and Procedures. 2001.

7.0 APPENDIX A – GOVERNMENT DATABASE SEARCHS

Fish and Wildlife Management Information System

Species Summary Report

Species present within the current buffer extent:

Wildlife Inventory

COMMON YELLOWTHROAT
GREEN-WINGED TEAL
LONG-TAILED WEASEL
PEREGRINE FALCON
PIED-BILLED GREBE
SORA
SWAINSON'S HAWK

Fish Inventory

Layer not visible.

Buffer extent

Centroid (X,Y): 606490, 5928090
Central Meridian: -115.0
Centroid (Qtr Sec Twp Rng Mer): SW 30 52 23 4
Buffer radius: 3 kilometers

[http://xnet.env.gov.ab.ca/...=false&extent=buffer&x=606490.3475923&y=5928090.763654393&buffer=3&conv=1000&ATS=SW 30 52 23 4\[4/22/2013 2:24:19 PM\]](http://xnet.env.gov.ab.ca/...=false&extent=buffer&x=606490.3475923&y=5928090.763654393&buffer=3&conv=1000&ATS=SW 30 52 23 4[4/22/2013 2:24:19 PM])

Government Communication

Patty Burt

From: Daryl Watters <Daryl.Watters@gov.ab.ca>
Sent: Wednesday, May 30, 2012 8:09 AM
To: Patty Burt
Subject: RE: FMIS request

Hi Patty.....The FWMIS database would house all available data for the two creeks. I'm not aware of any additional data quod for addition to the database.
From a local perspective, Fish and Wildlife manages both watercourses for water quality and does not consider either watercourse to be fish bearing.
Goldbar Creek serves an important function for delivery of good quality water to the North Sask. River. Because the creek empties to the NSR in a Class A sturgeon habitat, quality of delivered water is important. Fulton Creek and the Fulton Creek wetland do not appear to support fish; however, ultimately deliver water to the NSR so maintenance of water quality is also an important consideration in project planning.
Hope this helps.

Cheers,

Daryl

Daryl Watters
Fisheries Biologist
ASRD- Fisheries Management
Twin Atria Bldg.
#111, 4999-98 Ave.
Edmonton
T5B 2X3

ph 780-415-1332
fax 780-499-8463
cell 780-499-8463
e-mail daryl.watters@gov.ab.ca

From: Patty Burt [mailto:pburt@mcelhanney.com]
Sent: Tuesday, May 29, 2012 3:57 PM
To: Daryl Watters
Subject: FMIS request

Afternoon Daryl

I am looking for any fish information SRD might have for Fulton and Goldbar Creeks in the vicinity of where they cross 17th Street between Whitemud and Knightsbridge Road. I have used the Fish and Wildlife Public site and am just expanding my search for any local knowledge.

17-52-23-W4M and 29-52-23-W4M

Thank for any help in advance.

Alberta Conservation Information Management System

Search ACIMS Data

1

Select Requester: *

Consultant

2

Select Reason for Request: *

Environmental Assessment

3

SEC TWP RGE MER

25 052 24 W4M

Submit

(option)

[Convert Lat/Long to Township](#)

Layers

☒ Element Occurrences
(part one, non-sensitive)

☒ Element Occurrence
(part two, sensitive)

☐ Protected Areas

☐ Crown Reservation/Notation

* Required

Note: If the map is not displaying 'Refresh' your browser by pushing F5 or Ctrl-R (on PC) or Cmd-R (on Mac)

[Print Page](#)

Requestor: Consultant

Reason for Request: Environmental Assessment

SEC: 25 TWP: 052 RGE: 24 MER: 4

Date: 4/22/2013

Table of Results

Sensitive EOs: 0 (Data Updated: November 2012)

M-RR-TTT	EO_ID	ECODE	S_RANK	SNAME	SCOMNAME	LAST_OBS_D
No Sensitive EOs Found: Next Steps - FAQs #13						


Non-sensitive EOs: 0 (Data Updated: November 2012)


M-RR-TTT-SS	EO_ID	ECODE	S_RANK	SNAME	SCOMNAME	LAST_OBS_D
No Non-sensitive EOs Found: Next Steps - FAQs #13						

PPA: 0 (Data Updated: Jan. 2011)

M-RR-TTT-SS	Park Name			Type	IUCN
No PPAs Found: Next Steps - FAQs #13					

Note:

 Sensitive
EOs:
Data
is
generalized
to
the
Township
level
Information
about
EOs
in
a
specific
Section
within
the
Township
must
be
requested

 PPA
A
100m
buffer
has
been
placed
around
all
Protected
Areas

©
1995

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2013

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of
[Alberta](#) | [Copyright](#)
and
[Disclaimer](#) |
[Privacy](#) |
[Accessibility](#)

<http://www.tpr.alberta.ca/parks/heritageinfocentre/datarequests/searchdata.aspx>

4/22/2013

Search ACIMS Data

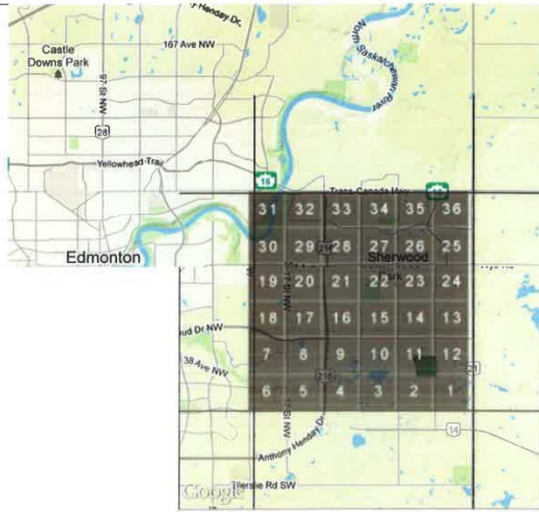
1 Select Requester: *
Consultant

2 Select Reason for Request: *
Environmental Assessment

3 SEC TWP RGE MER
30 052 23 W4M Submit
(option)
[Convert Lat/Long to Township](#)

- Layers**
- ☒ Element Occurrences (part one, non-sensitive)
 - ☒ Element Occurrence (part two, sensitive)
 - ☐ Protected Areas
 - ☐ Crown Reservation/Notation

* Required



Note: If the map is not displaying 'Refresh' your browser by pushing F5 or Ctrl-R (on PC) or Cmd-R (on Mac)

Date: 4/22/2013

Requestor: Consultant
Reason for Request: Environmental Assessment
SEC: 30 TWP: 052 RGE: 23 MER: 4

Table of Results

Sensitive EOs: 0 (Data Updated: November 2012)

M-RR-TTT EO_ID ECODE S_RANK SNAME SCOMNAME LAST_OBS_D

No Sensitive EOs Found: Next Steps - [FAQs #13](#)

Non-sensitive EOs: 0
(Data Updated: November 2012)

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

No Non-sensitive EOs Found: Next Steps - [FAQs #13](#)

PPA: 0
(Data Updated: Jan. 2011)

M-RR-TTT-SS Park Name Type IUCN

No PPAs Found: Next Steps - [FAQs #13](#)

Data Note:

<http://www.tpr.alberta.ca/parks/heritageinfocentre/datarequests/searchdata.aspx>

4/22/2013

Alberta TPR - ACIMS Data Search

Page 2 of 2

sensitive
EOs:
Data
is
generalized
to
the
Township
level.
Information
about
EOs
in
a
specific
Section
within
the
Township
must
be
requested.

 PPA:
A
100m
buffer
has
been
placed
around
all
Protected
Areas.

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<http://www.tpr.alberta.ca/parks/heritageinfocentre/datarequests/searchdata.aspx>

4/22/2013

8.0 APPENDIX B - GENERAL RECOMMENDATIONS REGARDING WORKS IN AND AROUND A WATERCOURSE

8.1 Fisheries and Oceans Canada / Alberta Environment

- All projects that occur in and around a water body and may potentially impact fish and/or fish habitat should be reviewed and approved by DFO and ASRD prior to the commencement of works. Depending on the nature of the project, the works will either be covered by the Operational Position Statement or will require review and/or approval through a DFO Letter of Authority. As well, the submission of a Code of Practice notice under the Water Act to ASRD would either be a Notice or reviewed for approval.
- All mitigation measures and/or compensation must be implemented to the satisfaction of DFO and ASRD.
- All changes in plans, specifications, or operating conditions that have the potential to adversely affect fish or fish habitat should be re-submitted to DFO and ASRD for review and approval in writing prior to implementation.

8.2 Machinery and Equipment

- All gasoline powered equipment such as pumps, generators and associated fuel should be stored entirely within a secondary containment structure area located at least 100 m from a watercourse. Containment should have 110% capacity relative to the volume of fuel being stored and be large enough to completely contain all harmful materials should a spill, leak or overflow occur. Trucks carrying large fuel containers should be parked within the containment area.
- Prior to entering within 100 m of a watercourse, all equipment and machinery scheduled to work in and/or along a watercourse should be inspected and found to be clean, free of leaks and in good working condition. As such, all equipment and machinery should have all foreign material removed including dirt, mud, debris, grease, oil, hydraulic fluid or other substances that may impact the water quality or the fish and fish habitat values of the watercourse. As well, all identified leaks will be repaired and then appropriately cleaned. Such inspections, cleaning and/or servicing can occur either before the equipment or machinery is transported into the field or at the work site. Any cleaning and/or servicing of equipment and machinery at the work site should not be conducted in or along a watercourse. Rather, all such works should occur at least 100 m from the watercourse with any runoff controlled to ensure wash materials and/or other substances do not enter the riparian zone or the channel of the water body.
- Machinery and equipment should not be located within the riparian zone or at a minimum of 10 m from the channel, to maintain an undisturbed vegetation buffer along the edge of the watercourse.

8.3 Construction

- All work activities should meet or exceed the construction standards outlined in “Fish Habitat Protection Guidelines and Procedures for Watercourse Crossings in Alberta” (Alberta Transportation, 2001) and “Watercourse Crossings” (Canadian Pipeline Water Crossing Committee, 1999).
- During construction, onsite monitoring will be conducted to identify potential sedimentation and possible fluid leaks from vehicles, equipment and machinery that may not be observable to the operator.
- An emergency spill response kit should be on site at all crossing locations prior to construction. The containment kit should be large enough to handle twice the maximum spill possible.
- Every reasonable effort should be made to minimize the duration of instream work within the proposed schedule of construction. Downstream flow should be maintained at all times.
- Disturbance to the bed and banks of the stream should be minimized and confined to the immediate work site. Any stream banks and approaches to the watercourse disturbed by any activity related to the work project should be stabilized, re-vegetated and reclaimed as soon as possible.
- Effective, short term and long term sediment and erosion control measures should be installed before starting work to prevent the entry of sediment into the watercourse. These measures should be inspected regularly during construction and afterwards to ensure that they are functioning properly and are maintained and/or upgraded as required until vegetation has been re-established on the disturbed area. Sediment should not be released into any waters frequented by fish.
- All spoil materials from construction activities should be deposited, whether temporarily or permanently, above the high water mark of the water body and in such a manner that does not allow entry into the riparian zone or the channel of any water body.
- Where water is pumped from fish habitat, water intakes must be appropriately screened according to DFO’s ‘Freshwater Intake End of Pipe Fish Screen Guideline’ (1995) in order to prevent the entrainment or impingement of fishes during pump operation. Gasoline powered pumps or generators and associated fuel must be enclosed or set within secondary containment large enough to contain all harmful materials should a spill, leak or overflow occur.
- Should the need for dewatering arise, water should be released into a well vegetated area or settling basin and not directly into the watercourse. Water returning to the watercourse should be equal to or exceed the background water quality of the watercourse.

8.4 Reclamation

- All disturbed areas should be reclaimed. Reclamation measures can include use of geotextile fabrics, matting, sandbags, barriers or fences, as well as seeding and planting of disturbed areas with native vegetation.
- Good housekeeping should be practiced with all temporary structures and any equipment or materials associated with construction should be removed following construction completion.
- The bed and bank should be returned to their original pre-construction configuration. Any equipment involved in reclamation activities and operating near any watercourse should be free of external grease, oil, mud or fluid leaks. All fuelling, lubricating and servicing (including repairs and maintenance) of equipment and machinery should be conducted at least 100 m from a water body to ensure that deleterious substances do not enter any watercourse.
- Once construction and reclamation are complete, the bed and banks of the channel at the crossing site should be revisited after high water levels in the spring to identify any sedimentation problems and determine the risk of erosion. If excessive sedimentation and/or erosion potential are identified, additional recommendations may be required.

Appendix D – User Checklists

The checklist presented in this section is designed as a tool to highlight the important questions that must be answered when designing a wildlife passage and to provide a place to organize the information obtained during the process. Section references have been provided throughout the checklist should additional information be required for a specific question.

Some of the items that will be helpful to have in advance of completing this checklist are:

- A shadow map of the project overlain on the most recent aerial photo of the area
- Existing and future land use maps (e.g. ASP and NSP concept maps) to get an understanding of surrounding land uses
- Wildlife collision data (from MVCIS)
- Search local wildlife databases (see Section 3.2.4.1 of Guidelines)

Transportation engineers may have difficulty answering some questions with certainty. As a result, it is strongly advised that the process of designing a wildlife passage be a joint effort between both ecologists and engineers. Please note that if “unknown” or “suspected” is checked for any of the questions additional study may be required.

To ensure that a project is not delayed due to missing information, it is highly recommended that this checklist be completed and submitted to the Office of Biodiversity in conjunction with any proposed wildlife passage at concept and reconfirmed at the design phase of the project.

A) PROJECT DESCRIPTION

Project: 34 Street: WMD to Baseline Road Concept Planning
Road Type: Arterial
Date: April 30, 2013
Location: Within project limits
Fulton Creek, Goldbar Creek

APPENDIX D – USER CHECKLISTS

A.1 CURRENT ROAD CONDITION

Current number of lanes	<u>2</u>	Lanes
Current Traffic Speed	<u>60</u>	Km/Hr
Current Traffic Volume (average annual daily traffic)	<u>17,000</u>	AADT
Current Peak Hour Traffic Volume (number of vehicles in peak hour)	<u>1,500</u> a.m. <u>2,000</u> p.m.	
Culverts with dry passage area	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Culverts without dry passage area	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Retaining walls	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Jersey barriers and/or noise barriers	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Number of wildlife collisions in the last 5 years	<u>7</u>	
Number of deer collisions in the last 5 years	<u>0-7</u>	data does not specify
Other:		

A.2 PROPOSED ROAD UPGRADES

Proposed number of lanes	<u>4-6</u>	Lanes
Proposed Traffic Speed	<u>60</u>	Km/Hr
Projected Traffic Volume	<u>40,000</u>	AADT
Projected Peak Hour Traffic Volume (number of vehicles in peak hour)	<u>3,500</u> a.m. <u>4,000</u> p.m.	
Proposed Culverts with dry passage area	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Proposed Culverts without dry passage area	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Retaining walls	<input type="checkbox"/> Yes	<input type="checkbox"/> No <input checked="" type="checkbox"/> TBD
Jersey barriers and/or noise barriers	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Other:		

A.3 IDENTIFY PROPOSED LAND USE

Check any of the land uses that will apply to both the project area and adjacent area. Assess both current and future land uses. Please refer to Section 3.2.1 for additional information

Residential	<input type="checkbox"/>	Industrial	<input checked="" type="checkbox"/>
Commercial	<input type="checkbox"/>	Institutional	<input type="checkbox"/>
Agricultural	<input type="checkbox"/>	Conserved/Natural Area	<input checked="" type="checkbox"/>
Rights-of-way	<input checked="" type="checkbox"/>	Water Bodies	<input checked="" type="checkbox"/>

A.4 PROJECT AREA SHADOW PLAN

Please attach project area shadow plan to this checklist



B) HABITAT DESCRIPTION

B.1 IDENTIFY ECOLOGICAL COMPONENTS WITHIN PROJECT AREA (i.e. within a 100m buffer)

Indicate whether any of the following ecological components are located in the project area and will be affected by the proposed activity. Refer to Section 3.2.2 for assistance

North Saskatchewan River (NSR)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Water courses (excluding the NSR)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Natural Areas (Geowest 1993, Spencer 2006)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Wildlife corridors (refer to question B.3)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Wetlands (natural or constructed)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Lakes	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Woodland (i.e. a freestanding unit of trees that is >0.5 ha)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No

B.2 IDENTIFY ECOLOGICAL COMPONENTS OF ADJACENT AREA (i.e. > 100m from project)

Indicate whether any of the following ecological components are located on land adjacent to the proposed activity. Refer to Section 3.2.2 for assistance

North Saskatchewan River (NSR)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Water courses (excluding the NSR)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Natural Areas (Geowest 1993, Spencer 2006)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Wildlife corridors (refer to question B.3)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Wetlands (natural or constructed)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Lakes	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Woodland (i.e. a freestanding unit of trees that is >0.5 ha)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No

B.3 IDENTIFY POTENTIAL WILDLIFE CORRIDORS

A corridor may be present if your project area contains one of the following:

Linear landscape features (Ridges, valleys, rivers, sharp breaks in vegetative cover)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Identified Natural Areas (within 1 km of the project)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Water bodies (wetlands, lakes, rivers, streams)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Known migratory pathways	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Hedgerows, shelterbelts, windbreaks	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Greenways (a corridor of undeveloped land preserved for recreational use or environmental protection)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No

Please note that some corridors are more important ecologically than others and will have greater wildlife use. For example, a natural riparian corridor will likely have a greater diversity and frequency of wildlife use than a greenway. Please refer to Section 3.2.2 for additional resources that may be used to identify wildlife corridors.



suspected

APPENDIX D – USER CHECKLIST

B.4 IDENTIFY HABITAT IN THE PROJECT AREA

Referencing the ecological components outlined above, please indicate the types of habitat located within 100m of the project area

Riparian (interface between land and a river or stream)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
Permanent Water Body (Stream/Lake)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
Wetland/Slough/Marsh	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
Trees or Forested Land	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
Grassland/Pasture Land/ Hay Field	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown

Please note: Each habitat type identified above has a corresponding species list found in Appendix B.
If "unknown" is checked future studies will be required

B.5 IDENTIFY CONFLICTS WITH HABITAT

Wildlife-vehicle conflicts may occur if the project area involves the items listed below:

Natural Area within 1 km	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
Upland-Wetland Habitat is Bisected	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Unknown
Wetland-Wetland Habitat is Bisected	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Unknown
Riparian Habitat is Bisected (i.e. North Saskatchewan River Valley and any of its Tributaries)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
The project has high speed (>50 km/hr)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
The project has high traffic volume (non-local roads)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown

Wildlife mitigation will likely be required if yes is checked; additional studies may be required if unknown is checked

B.6 HABITAT: SUMMARY

Will the activity have a substantial adverse effect by habitat modifications on sensitive natural areas identified in local or regional policies or regulations?

☐ Yes ☒ No ☐ Unknown

Will the activity have an adverse effect on locally or provincially significant wetlands through removal, filling, hydrological interruption, or others activities?

☐ Yes ☒ No ☐ Unknown

*Please note: Checking 'Yes' or 'Unknown' to one or more of the questions stated above, may result in the requirement for further biological studies and/or correspondence with various governing agents to determine regulatory requirements

-opportunity to improve
→ existing road is already an adverse effect



C) WILDLIFE

C.1 ECOLOGICAL DESIGN GROUP - EDG (i.e. major species groupings that are categorized according to the type and frequency of mitigation that will be effective)

Please identify the Ecological Design Group(s) located in the project area (Refer to Section 4.3.1)

Large Terrestrial (e.g. moose, deer)	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> Suspected	<input type="checkbox"/> Unknown
Medium Terrestrial (e.g. coyote, rabbit)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Suspected	<input type="checkbox"/> Unknown
Small Terrestrial (e.g. weasel, vole)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Suspected	<input type="checkbox"/> Unknown
Amphibian (e.g. toad, salamander)	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> Suspected	<input type="checkbox"/> Unknown
Aquatic (e.g. fish, mollusks)	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Suspected	<input type="checkbox"/> Unknown
Aerial Mammal (e.g. bats)	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> Suspected	<input type="checkbox"/> Unknown
Scavenger Birds (e.g. raven, magpie)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Suspected	<input type="checkbox"/> Unknown
Birds of Prey (e.g. hawks, owls)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Suspected	<input type="checkbox"/> Unknown
Water Birds (e.g. shorebirds, waterfowl)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Suspected	<input type="checkbox"/> Unknown
Ground Dwelling Birds (e.g. grouse)	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Suspected	<input checked="" type="checkbox"/> Unknown
Other Birds (e.g. woodpeckers, songbirds)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Suspected	<input type="checkbox"/> Unknown

If suspected or unknown is checked, please refer to Appendix B for additional studies. Consult an ecologist for assistance.

C.2 RARE AND PROTECTED SPECIES

Please identify any rare or protected species (Red and Blue Listed or COWSEWIC Listed) (see Section 3.2.4.1 for further information on identifying species with status.)

If any rare or protected species have been identified additional studies will be required to determine specific crossing requirements. Regulatory agencies must be contacted if rare or protected species are identified.

C.3 WILDLIFE NEEDS AND PREFERENCES

Please identify any specific needs that are required by the Ecological Design Group(s). (Refer to Section 4.3.2 for group information and Appendix B species information)

Ecological Design Group	Primary Habitat			Veg. cover for movement		Openness/line of sight		Passage Type	
	Wetland	Upland	Both	Yes	No	High	Low	Wet	Dry
1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special requirements:									

as per discussions, this section should be considered for a re-write to a reference table with a checkbox for project consideration



APPENDIX D – USER CHECKLIST

2)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special requirements:							
3)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special requirements:							
4)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special requirements:							
5)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special requirements:							
6)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special requirements:							
7)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special requirements:							
8)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special requirements:							

If any rare or protected species have been identified additional studies will be required to determine specific crossing requirements. Regulatory agencies must be contacted if rare or protected species are identified.

C.4 IDENTIFY PHYSICAL BARRIERS (Existing)

Please identify the presence of any potential barriers to wildlife movement

High traffic speed (>50 km/hr, see Section 3.3)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Suspected	<input type="checkbox"/> Unknown
High traffic volume (i.e. arterial roads for fast moving wildlife, local roads for slow moving wildlife, Section 3.3)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Suspected	<input type="checkbox"/> Unknown
Perched culverts (see Section 3.3.4)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Suspected	<input type="checkbox"/> Unknown
Insufficient water depth for aquatic passage (i.e. water is not deep enough for organism to physically pass)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Suspected	<input type="checkbox"/> Unknown <input checked="" type="checkbox"/> seasonal
Water velocity in excess of upstream and downstream velocity	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Suspected	<input type="checkbox"/> Unknown <input checked="" type="checkbox"/> seasonal
Culverts without dry passage area	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Suspected	<input type="checkbox"/> Unknown <input checked="" type="checkbox"/> seasonal
Undersized Culverts (not physically large enough to accommodate EDG or becomes blocked with debris)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Suspected	<input type="checkbox"/> Unknown
Retaining walls	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Suspected	<input type="checkbox"/> Unknown
Traditional jersey barriers and/or noise barriers	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Suspected	<input type="checkbox"/> Unknown
Other	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Suspected	<input type="checkbox"/> Unknown

Please note: These barriers will affect different EDGs in different ways. Some barriers may not be applicable to your project (e.g. Jersey barriers may not be a barrier if only Large Terrestrial species are present)



C.5 WILDLIFE AND TRANSPORTATION CONFLICTS

Will the activity have a ~~substantial~~ adverse effect by habitat modifications on any species with status identified in local or regional policies or regulations? ☒ Yes ☐ No ☐ Unknown

Will the activity interfere with previously existing wildlife corridors? *already interferes* ☐ Yes ☐ No ☐ Unknown

Will the activity interfere with the movement of any resident or migratory fish species? *opportunity for improvement* ☐ Yes ☐ No ☐ Unknown

Will the activity interfere with the movement of any non-fish wildlife species? *opportunity for improvement* ☐ Yes ☐ No ☐ Unknown

Please note: Checking 'Yes' or 'Unknown' to one or more of the questions stated above, may result in the requirement for further biological studies and/or correspondence with various governing agents to determine regulatory requirements

C.6 WILDLIFE: SUMMARY

a) Please summarize whether a conflict will exist between the project and wildlife in the area? (Refer to Section 3.3.5) ☒ Yes ☐ No

b) Can this conflict be avoided (Refer to Section 3.4)? For example, can the road be realigned to avoid the habitat feature that is attracting wildlife passage? ☐ Yes ☒ No

c) Is there reason to believe that providing mobility through this area will be beneficial and sustainable? If "no," please explain. ☐ Yes ☒ No

Mainly industrial land uses w heavy truck volumes

Wildlife mitigation will be required if "no" is checked for 3.6b or "yes" is checked for 3.6c.

D) PROPOSED SOLUTIONS

Please indicate what types of solutions will be used to mitigate for the disturbance to wildlife in the project area (include activities for before, after, and during project implementation).

Retention of existing habitat ☒ Yes ☐ No

Habitat protection during construction ☒ Yes ☐ No

Ensuring functionality of wildlife corridors during construction ☒ Yes ☐ No

Wildlife passage (continue with Section E of this checklist) ☒ Yes ☐ No

Restoration or enhancement of existing habitat (provide initial recommendations in Section F of this guideline) ☒ Yes ☐ No

Management Plan → *Construction phase* ☒ Yes ☐ No

Monitoring → *post construction / long-term* ☒ Yes ☐ No

Please note: plans for proposed solutions are to be described in greater detail at detailed design phase

APPENDIX D – USER CHECKLIST

E) POTENTIAL MITIGATION OPTIONS TO MINIMIZE WILDLIFE - TRANSPORTATION CONFLICTS

E.1 IDENTIFY APPROPRIATE MITIGATION (Section 4.0 and Checklist 12.2 of guidelines)

a) Please indicate which mitigation possibilities meet the ecological, transportation, and regulatory requirements for your project (refer to Section 4.4 and 4.5). This table corresponds to Table 4.4 and is designed to help determine what mitigation options meet the needs of wildlife and transportation as well as regulatory requirements. If an option does not meet all three then a discussion with interested parties may be required to prioritize the proposed mitigation strategy. More than one mitigation option may meet all three requirements. In this case, the best option should be chosen or a combination of several should be considered.

Mitigation Tool (Section of Guidelines)	Needs and/or Requirements			Consider for Project	N/A
	Ecological	Transportation	Regulatory		
Signage and/or Reflectors (4.5.1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Fencing (4.5.2)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Altered Lighting (4.5.3)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Altered Sight Lines (4.5.4)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Public Education (4.5.5)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Traffic Calmed Areas (4.5.6)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Reduced Speed Limits (4.5.7)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Wildlife "Crosswalk" (4.5.8)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Diversions Methods (4.5.9)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Reduce/Remove Roadkill (4.5.10)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Vegetation Management (4.5.11)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Noise Barriers (4.5.12)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Curb Improvements (4.5.13)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Closed Bottom Culvert (4.5.14)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Amphibian Tunnel (4.5.14)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Open Bottom Culvert (4.5.14)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Box Culvert (4.5.14)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Bridges (4.5.15)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Tunnel/Overpass (4.5.16)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Passage Required for multiple species (4.6)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

b) Please identify the crossing mitigation(s) that will BEST meet all the requirements



E.2 MITIGATION SIZE

If culvert or bridge-like structures are selected, please calculate the size of mitigation required. This will vary depending on the Ecological Design Group (EDG) and the size of the road. Use the openness calculation to help assess mitigation size (Refer to Section 4.3.3)

Openness = $\frac{\text{Height} \times \text{Width}}{\text{Length}}$	Openness Ratio (m)				
	Large Terrestrial	Medium Terrestrial	Small Terrestrial	Amphibian	Aquatic
	1.5	0.4	≤0.4	0.16	Encompasses entire channel width

EDG Preferred Openness

Structure Length

Structure Width

Structure Height

Planning stage: identify minimum openness ratio of 0.4 for future design stages

E.3 MITIGATION FREQUENCY

If the project area encompasses a large portion of the EDGs home range, several structures may be required to reduce vehicle-wildlife collisions and provide habitat connectivity. Please refer to Section 4.3.5 for assistance in determining if multiple structures are required and how close they must be placed.

F) IDENTIFY POTENTIAL LOCATIONS FOR HABITAT RESTORATION

Please identify any possibilities for restoration of habitat and connectivity. This could include restoring portions of a damaged creek or re-planting trees. Refer to Section 3.2.3.

G) COST-BENEFIT ANALYSIS

A cost-benefit analysis may be completed to determine the relative need for a structure. Please note that a cost-benefit analysis may not adequately reflect the value of important habitat and rare species. Please refer to Section 4.3.6 for additional information









H) REGULATORY CHECKLIST

This checklist provides a summary of common legislation that may be applicable to the project. Additional legislation may apply depending on the area. Please refer to Appendix C for additional information on regulatory requirements.

I) IMPORTANT REFERENCE TABLES

The reference tables below have been taken directly from the main body of the Wildlife Passage Engineering Design Guidelines. They are reproduced here only for ease of reference.

Table 4.1 - Species and Design Groups Summary

Design Group*	Example	General Habitat Information
 Large Terrestrial	1. Moose ** 2. Deer	Need forested area for cover, and ungulates require considerations for grazing needs. Primary ungulate activity occurs at dawn or dusk. Ungulate activity near roads peaks during the fall and spring. Ungulates are more aggressive and less cautious during the fall rut.
 Medium Terrestrial	1. Porcupine 2. Coyote 3. Rabbit	Mixture of habitat requirements: Porcupines require forested habitat; badgers require open habitat; and coyotes or hares may live in either.
 Small Terrestrial	1. Mouse 2. Red Squirrel 3. Weasel	Mixture of habitat requirements: Red squirrels require forested habitat, while ground squirrels require open habitat. Weasels and some mice may inhabit either.
 Amphibians	1. Canadian toad 2. Tiger salamander	Requires moist substrates and semi- permanent to temporary water for tadpole stage depending on species. Also need access between lowland and upland habitat for feeding and dispersal.
 Aquatic	1. Lake Sturgeon 2. Northern Pike 3. Longnose Sucker 4. Mollusks	Need aquatic habitats with flow velocities low enough to allow for upstream movement and dispersal. Substrate in habitat must allow for cover and resting locations, and appropriate substrate may be needed for breeding. Access to overwintering habitats for most fish is essential. For mollusks, substrates must be conducive for attachment.
 Aerial Mammals	1. Little Brown Bat 2. Northern Long-eared Bat	Require feeding and nesting locations with access in between. Nesting site needs vary by species. Nesting sites must remain undisturbed during winter hibernation.
 Scavenger Birds	1. Raven 2. Crow 3. Magpie	Need sufficient habitat for nesting and safe foraging. Most populations are not at risk; however their overpopulation may put other species at risk.
 Birds Of Prey	1. Red Tailed Hawk 2. Great Horned Owl	Requirements vary; many species require relatively undisturbed nesting sites, while others may nest near human habitation. Require safe foraging habitat, and safe migration routes and destinations.

A single species may fall into more than one Ecological Design Group.

*Please be advised that these groupings are very general and that variations in requirements for each species within the design groups may exist. Also note that these groupings do not take into consideration feeding habitat, breeding habitat, or seasonality.

** Moose may be more common on the outskirts of the City while deer are more common in the river valley.

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Design Group*	Example	General Habitat Information
 Water Birds	1. Seasonal Ponds: Mallard, Shorebirds 2. Permanent Water: Golden Eye, Bufflehead	Require open water and/or appropriate shoreline for feeding and nesting, varying by species. Most are ground-nesting and thus require safe, undisturbed sites for nesting. Nesting habitat requirements varies by species. Require safe migration routes and destinations.
 Ground Dwelling Birds	1. Gray Partridge 2. Sharp-tailed Grouse	Require safe open habitats for foraging and nesting. Nesting requires safe open grassy or shrubby areas. Require safe migration routes and destinations. Ground nesting birds should be included in this category during nesting season.
 Other Birds	1. Downy woodpecker (Core Forested) 2. Black Capped Chickadee (Edge/Woodland) 3. Grasshopper Sparrow (Grassland) 4. Red-winged Blackbird (Wetland)	Requirements vary significantly by species. Most species require at least some forested habitat for nesting and perching, although some are ground nesting or nest in wetland vegetation or shrubs. Most are migratory and require safe migration routes and destinations.

Table 4.4 - Mitigation Summary Table

Option	Mitigation	Ecological Requirements	Transportation Requirements
1	<u>Signage and/or Reflectors</u>		Lower volume roads. If it is going to be used on roads with higher volume or speed, it should be combined with other mitigation.
2	<u>Fencing*</u>	   	Can be used on any road but may not be cost effective for minor roads.
3	<u>Altered Lighting*</u>	     	ALL
4	<u>Altered Sight Lines</u>	  	Multi-use trails. May also be used if sight of human activity deters use of a crossing
5	<u>Public Education</u>	      	ALL
6	<u>Traffic Calmed Areas</u>	      	Suitable for roads with average speed below 50km/hr or in an area with high bird breeding densities.

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7	Reduced Speed Limits		Useful in areas of high wildlife-vehicle collisions
8	Wildlife “Crosswalk”		Roads with low traffic volume. Should be used in conjunction with signs.
9	Diversionsary Methods	 <i>Other birds using bridges as habitat</i>	Effective for bridges and any road with wildlife foraging along the right-of-way
10	Reduce/Remove Road kill		Suitable for all roads
11	Vegetation Management		Suitable for all roads
12	Noise Barriers		Roadway that is near valuable nesting habitat for birds (eg. near a wetland). Note: this will behave as a barrier to terrestrial wildlife.
13	Curb Improvements		Useful in all areas where small wildlife may be trapped on the road.
14	Closed Bottom Culvert[†]		Suitable for roads crossing minor drainage channels. May also be used in areas without drainage to assist small and medium terrestrials. In areas with drainage, ledges on the sides may be used to accommodate some terrestrial species.
15	Amphibian Tunnel		Any road running bisecting wetland-upland habitat or wetland-wetland habitat
16	Open Bottom Culvert^{**}		Suitable for roads crossing minor drainage channels. May also be used in areas without drainage to assist small and medium terrestrials.
17	Box Culvert^{**}		Suitable for roads crossing larger drainage channels. May also be used in areas without drainage to assist small and medium terrestrials
18	Bridges^{**}		Requires grade separation
19	Tunnel/Overpass		Effective in sensitive natural areas, areas without grade separation, areas where the terrain on either side of the road is higher than the road.

* Should be complementary to other mitigation and not used as a stand alone treatment

** Improvements are required for more than one Ecological Design Group to benefit from this crossing

[†] Should only be used in areas that do not have critical fish habitat or species at risk. Stream widths must be less than 2.5 m and gradients less than 6%.



Project: 34 Street Functional Planning Study**COE Design Project Manager: Natalie Lazurko, P.Eng.****Project Description: Planning of 6 kilometres of future arterial road in the City of Edmonton and Strathcona County**

Federal Agency	Federal Regulation	Requirement	Applicable Y/N	Completed or Received Date	Comments and Restrictions / Conditions to be Followed
Fisheries and Ocean Canada (previously DFO) (Federal)	Fisheries Act	Notification to regulators to verify concept before detailed design	Y	N/A	Required for Fulton Creek and Gold bar Creek crossings in future project phases
		Fisheries Request for Review Form required	Y	N/A	
		Fish Presence Assessment required	Y	N/A	
		Operational Statements (OS) Review	N/A		May be required based on outcomes of the fish presence assessment
		Notification Form if OS applicable	N/A		
		Application Letter if OS not applicable	N/A		
		Authorization or Letter of Advice obtained	N/A		
		Fish Habitat Compensation Plan required	N/A		
Transport Canada (Federal)	Navigable Waters Protection Act (NWPA)	Notification to regulators to verify concept before detailed design	Y	N/A	Required for Fulton Creek and Gold bar Creek crossings in future project phases
		Review Minor Works and Waters Order (MWWO)	Y	N/A	
		Application required	N/A		My be required based on Regulator
		Approval/Work Assessment obtained	N/A		
Canadian Environmental Assessment Agency (Federal)	Canadian Environment Assessment Act (CEAA)	Notification to regulators to verify concept before detailed design	Y	N/A	
		Environment Assessment (EA) required	Y	N/A	
Environment Canada (Federal)	Migratory Birds Convention Act (MBCA)	Restrictions on Work Activities (between May 1-August 31 general rule of thumb)	Y	N/A	Applicable for construction phases
		Field Assessment (Nest Sweep) required before or during construction	Y	N/A	
	Species at Risk Act (SARA)	Search of ACIMIS, FWMIS and COSEWIC	Y	Apr-13	Peregrine Falcon and Swanson's Hawk identified as species at risk potentially in the area - project will not impact
		Field Assessment required	Y	May-13	
		Permit or Agreement required	Y	N/A	Required for future project phases
		Restrictions on Work Activities	N/A		

Provincial Agency	Provincial Regulation	Requirement	Applicable Y/N	Completed or Received Date	Comments and Restrictions / Conditions to be Followed
Alberta Environment (Provincial)	Water Act	Notification to regulators to verify concept before detailed design	Y	N/A	Required for Fulton Creek and Gold bar Creek crossings in future project phases
		Codes of Practice (CP) review	Y		
		Notification sent if CP applicable	Y		
		Approval/License Required if CP is not applicable	Y		
		Wetland Assessment required	Y		
		Compensation Plan required	unknown		
		Restricted Activity Periods (RAPs) applicable	Y		Neither creek is identified as fish bearing, however potential does exist
	Environmental Protection and Enhancement Act (EPEA)	Consultation with Regulators	Y	Apr-13	Alberta Environment - no additional work required at the planning level
		Screening Report or Environment Impact Assessment (EIA) required	Y	Apr-13	Environmental Overview completed, Impact Assessment not completed
		Public consultation required	N/A		Unknown - based on EIA outcomes
Alberta Culture and Community Spirit (ACCS) (Provincial)	Historical Resources Act (HRA)	Notification to regulators to verify concept before detailed design	Y	Jun-12	Clearance letter received February 19, 2013
		Consultation with First Nations required	N		
		Consultation with accredited archaeologist	Y	Jun-12	
		Statement of Justification notification required	Y	Jun-12	
		Historical Impact Assessment (HRIA) required	N		Not Required based on results from the HRO
		Clearance Letter received from ACCS	Y	Jul-12	
Sustainable Resource Development (Provincial)	Public Lands Act	Temporary Field Authorization (TFA) or License of Occupation (LoC) required	N/A		During construction phases, field access and access over public right-of-ways will be required
	Wildlife Act	Wildlife Assessment required	Y		Future project phases
		Restriction on activities	N/A		During construction phases

Municipal	Municipal Regulation	Requirement	Applicable Y/N	Completed or Received Date	List All Restrictions or Conditions to be Followed
Municipal (City of Edmonton)	COE Tree Management Policy	Notification to COE - Community Services	Y		Impacted trees to be surveyed and discussed with City Forrester
	Community Standards Bylaw	Noise Exemption Permit required	N		There are no residential areas that will require a noise bylaw exemption
	River Valley Bylaw	Site Location Study required	Y	Jul-12	
		Initial Project Review (IPR) Report required	N/A		Environmental Overview completed, Impact Assessment not completed
		Environmental Screening Report (ESR) required	Y		
		Environmental Impact Assessment (EIA) required	Y	N/A	
	Contaminated Sites	COE - Engineering Services consultation required	Y	Jan-13	No identified contaminated sites within the road right-of-way as per provided reports from COE. Adjacent sites to be surveyed as part of a Phase 1 Assessment in future project phases
		Phase 1 or 2 Assessment required	Y	N/A	
	Sewer Bylaw	Permit required to discharge site effluent into Storm / Combined / Sewer	N		
	Erosion & Sedimentation Control	Permanent ESC Design required	Y	N/A	During construction phases
	Wildlife Passage Design Guidelines	Wildlife Passage Design required	Y	N/A	For both Gold Bar and Fulton Creek, including a 0.4 area ratio for passage as well as a dry passage area

Completion Verification**Completed By:** Ryan Betker, McElhanney Consulting**Date:** 20-Jun-13

Comments:
