19 January 2009
EE26289

Lovatt Planning Consultants Inc. **FINAL DRAFT**
RR1
Blackfalds, Alberta
T0M 0J0

Attention: Mr. Lance Skinner

Dear Sir:

Re: Biophysical Assessment – Preliminary Review
Highland Park: Lot 2 Block 1 NE17 39-1-W5M, Lacombe County, Alberta

1.0 INTRODUCTION

AMEC Earth & Environmental (AMEC) has prepared a Biophysical Assessment for the proposed Highland Park residential subdivision development within Lacombe County. The subject property is located on the southeast side of Sylvan Lake near the Summer Village of Birchcliff, Alberta in Lot 2 Block 1NE17 39-1-W5M (see Figure 1). The purpose of this preliminary review document was to:

- Characterize biophysical features of the subject lands, based on background information review and a field reconnaissance conducted on the 7 October 2008;
- Evaluate environmentally significant or sensitive features potentially affected by the proposed development; and
- Identify and recommended lands suitable for designation as municipal and environmental reserve, and applicable setbacks pursuant with the *Municipal Government Act* (MGA).

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CLIENT: LOVATT PLANNING CONSULTANTS	DWN BY: CMG	PROJECT: HIGHLAND PARK BIOPHYSICAL ASSESSMENT	DATE: OCTOBER, 2008
	CHK'D BY: MN		PROJECT No.: EE26289
	DATUM: NAD 83	TITLE: LOCATION PLAN	REV. No.: -
	PROJECTION: UTM Zone 12		FIGURE No.: FIGURE 1
	SCALE: 1:7,500		

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2.0 STUDY AREA OVERVIEW

2.1 LOCATION

The study area is located near the southeast edge of Sylvan Lake, just northeast of the Summer Village of Birchcliff which borders on Sylvan Lake. The proposed development land includes Lot 2 Block 1 NE17 39-1-W5M located west of Range Rd 14. Aspelund Road and Highway 20 are located one mile to the north and east of the property, respectively. Jarvis Bay Road links the site to Highway 20.

The land has been largely cleared for agriculture and consists of two plateaus on the east side of the property that are separated by a steep draw ending in a low topographic depression. Another topographic low is located in the southwest corner of the property. An ephemeral watercourse traverses the land from the northwest corner of the property to Sylvan Lake. An abandoned farm yard at the edge of a remnant treed woodlot has an approach onto the Range Rd 14. A gas pipeline right-of-way cuts through the northwest corner of the site.

2.2 CLIMATE

Based on climate data for the Sylvan Lake area, the average daily summer (May through August) temperature is 14.1°C, with a typical seasonal range from 10.4 to 16.3°C (Environment Canada 2002). Winter temperature (November through February) averages -8.4°C, with a seasonal range of -4.0 to -11.6°C. Daily winter minimum temperatures range from -9.4 to -17.4°C, with extremes as low as -43°C. The average yearly precipitation is 556 mm, with 398 mm as rainfall and 158 cm as snowfall. The most rain occurs from June to August, while snowfall is heaviest in December, January, and March.

2.3 PHYSIOGRAPHIC DESCRIPTION

The Sylvan Lake area is located in Western Plains Region between the Medicine River Plain to the south and the Buck Lake Uplands to the north (Pettapiece 1986). The Medicine River Plain is a gently undulating morainal plain. Morainal veneers and blankets overlying the Paskapoo Formation characterize the rolling Buck Lake Upland. Soils are Black or Dark Gray Chernozemics and Gray Luvisols.

Ecologically, Sylvan Lake occurs within the Dry Mixedwood Subregion of the Boreal Mixedwood Ecoregion of Alberta (Achuff 1994). Vegetation in this subregion forms a transition zone between the Central Parkland Subregion of the Parkland Natural Region and the Central Mixedwood Subregion of the Boreal Forest Natural Region. Aspen occurs in both mixed and pure stands, while balsam poplar is typically associated with aspen in depressions and along streams (Achuff 1994). White spruce and white spruce-aspen communities occur to a limited extent in the area.

2.4 METHODS

2.4.1 Spatial Boundaries

Spatial boundaries for the purposes of the biophysical assessment overview were delineated by the quarter section boundaries of the development and a 200 m buffer extending beyond the property at certain sites to account for sensitive environmental features such as wildlife habitat linkages and surface drainage patterns. Aerial photograph interpretation was also used to determine connectivity and linkages between the subject property the surrounding landscape.

2.4.2 Information Review

Maps, aerial photographs, reports and interviews were reviewed in reference to the terrestrial and aquatic environment of the study area. Information sources included:

- Vance Buckwald, Area Fisheries Biologist (FW), ASRD, Red Deer; AB; Ken Froggatt, Wildlife Technician, Red Deer; Mr. Duke Hunter, Alberta Natural Heritage Information Center, Alberta Tourism, Parks and Recreation; Mrs. Olga Lovatt, Lovatt Planning Consultants, Edmonton; and Mr. Lance Skinner, Land Owner, Sylvan Lake, AB.

- Flora and fauna species distribution and observation listings obtained from Fisheries and Wildlife Management Information System (FWMIS, formerly BSOD), Semenchuk (1992); Smith (1993); and Russell and Bauer (2000); and Alberta Natural Heritage Information Centre (ANHIC) Tracking Lists (Vujnovic and Gould 2002, ANHIC 2008). Vegetation and ecoregion classification information from NRC 2006.

2.4.3 Aerial Photo Interpretation

Aerial photograph interpretation was conducted using recent 1:40,000 black and white aerial photographs and 1:50,000 NTS maps. This was used as the initial means of delineating landscape features, wildlife habitat and vegetation communities within the project and surrounding area.

2.4.4 Field Site Reconnaissance

A site reconnaissance was conducted on 7 October 2008. The field reconnaissance included a visual inspection of the project area to facilitate identification of biophysical features and wildlife habitat within the project area including treed habitat and depressional areas. The reconnaissance was used to identify wildlife habitat within the property and to determine potential habitat linkages and movement patterns to adjacent lands.

Vegetation communities were also surveyed, and included identification of major vegetation communities, plant species composition, habitat and general appearance. Additionally, the

depressional areas were further assessed in regards to potential storm water management development.

3.0 RESULTS

3.1 BACKGROUND INFORMATION REVIEW

South Half of Property

Historical photos for the development property and surrounding area taken in 1949[1], 1969[2], 1975[3], 1983[4], 1998[5], and 2007[6] are provided in Appendix A. The aerial photograph review indicated that the lands in the southern portion of NE17 39-1-W5M were cleared for hay production prior to 1949. The south area appeared to be divided into three fields between 1949 and 1969. Relatively few changes have occurred on the south half since then, and have involved removal of small areas from hedgerow trees and amalgamation of field areas to form one large field. For the most part, this area has undergone prolonged mechanical or physical alteration of the soil surface. This area was cultivated in 2008 and planted with canola, possibly further impacting on ephemeral watercourse drainage.

North Half of Property

The north portion of the property was treed forest in 1949. An ephemeral watercourse was identified in historical aerial photographs, and originates as a number of shallow, incipient surface water drainages to the north and east of the property, which collect and then flow southwest across the northern forested part of the property. By 1969, a block of forest/shrub habitat in the north central area had been cleared. This clearing had encompassed part of the ephemeral watercourse, although drainage into this area was still evident. A pipeline corridor cut through the northwest corner of the property. By 1975, additional forest clearing had occurred, removing much of the interior of the forest stand. Land northwest of the pipeline had also been cleared, as had forest adjacent to Range Rd. 14. Some regeneration of shrubs/trees was evident on lands previously cleared.

The 1983 photo indicates several regenerating treed hedgerows present within the cleared forest interior, as well as on land north of the pipeline. Clearing of regenerating shrubs/trees was evident in the north central grassland block. Treed hedgerows along the road and property lines have become more developed. An access road had been developed along the north edge of the property and extends southwest along the pipeline corridor. In 1998, treed hedgerows in the northwest corner of the property had been cleared. By 2007, the farm yard with equipment shed

1 AS152 1:40000, photo 49, 1949
2 AS1017, 1:31680, photo 295, 1969
3 AS1439, 1:31680, photo 150, 1975.
4 AS2737, 1:30000, photo 168, 1983.
5 AS4969, 1:30000, photo 123, 1998.
6 AS5408, 1:40000, photo 45, 2007.

was present on the northeast of the property. An access road was developed through the remnant forest to Range Rd 14. Hedgerows within cleared forest interior are more developed.

3.1.1 Land Use

Aerial photograph interpretation indicated that the southern half of the project area and much of the land to the east and north was cleared for agricultural purposes prior to 1949, resulting in a patchwork of agricultural land and remnant woodlots, with a wooded buffer evident along the Sylvan Lake shoreline. Additional clearing of the surrounding areas took place mainly between 1949 and 1975. The start of Birchcliff lake shore development to the south and west of the property was evident in 1969 and has continued through to 2007, with significant development occurring between 1975 and 1983. Construction of the Skinner residence to the east of the property occurred in 1992 (L. Skinner, pers. com.).

Land use of the southern half of the Highland Park property was pastureland/hayland prior to 1949. The Skinners have grazed cattle on the site from 1993 to 2007 (L. Skinner, pers. com.). In 2008, the southern field was cultivated to canola cropland. Clearing portions of the northern half of the property between 1949 and 1975 facilitated cattle grazing of the area. As with the south area, the Skinners have grazed cattle on the north area from 1993 to 2007. Construction of the farm yard on the property occurred in 2003; both an equipment shed and trailer were present on the site, although the trailer was moved across the road to the Skinner residence prior to 2007 (L. Skinner, pers. com.).

3.2 FIELD RECONNAISSANCE SURVEY

Vegetation

During the field assessment five vegetation communities/cover types were identified within the project area. Further description of these communities is provided in Section 3.7.

Wildlife

Deer are common in the area (L. Skinner, pers. com.) and deer sign (beds, pellet groups, tracks) was evident throughout the north portion of the property during the site survey. Wildlife/cattle trails were distributed throughout remnant forested habitat, and showed evidence of use by deer. Moose, although occasionally occurring on the property (L. Skinner, pers.com.), were not detected during the survey. Pocket gopher mounds were frequently observed in grassland areas, at forest edges, along portions of the ephemeral watercourse, and at cropland edges. Coyote scat was also observed on site.

Few bird species were recorded during the field reconnaissance in October due to the timing of the survey; migratory species had already moved out of the area. Black-capped chickadee, blue jay, black-billed magpie, downy woodpecker, and common raven were recorded in deciduous forest habitat. There was also evidence of woodpecker foraging (likely pileated or northern

flicker) on decadent trees, and grouse droppings were observed in forest patches. No raptor nests were observed on the property.

Wetlands, Watercourses, and Drainages

No permanent watercourses or wetlands occur on the property. An ephemeral watercourse is located within the north portion of the property. Based on air photos, it originates north and east of the property and drains southwest through mainly forest habitat to Sylvan Lake, which is located approximately 1600 m from the west edge of the property boundary. Based on vegetation characteristics of the natural drainage observed during the field reconnaissance, water is conveyed through a drainage swale or gully with an approximate 4 m width.

Based air photos, several ephemeral drainages were present in the southern portion of the property, likely conveying snowmelt to the south and west. Cultivation of this field into cropland may have impacted these drainages.

3.3 TOPOGRAPHY

The topography on the property is variable. The overall topographic relief varies from an elevation of 985 to 995 m above sea level (asl) along the eastern plateaus of the property to 965 m asl in low lying or depressional areas on the west side of the property. Portions of the property, such as farm yard and forest to the north and east of the yard, as well as the eastern portion of the canola field are near level to gently undulating. Steeper slopes are associated with the southwest corner and the southwest area of the northern portion of the property. The south forest segment occurs on a north-facing incline with an adjacent draw. Portions of the north segment of forest slopes toward an ephemeral watercourse that is maintained by a shallow gully.

3.4 BEDROCK AND SURFICAL GEOLOGY

The Sylvan Lake area is underlain by the Tertiary-Upper Cretaceous Paskapoo Formation which is characterized by a thick layer of greyish shale-sandstones and siltstones, overlying a coal seam (Hamilton et al. 1999). Underlying the Paskapoo Formation is the Upper Cretaceous Edmonton Formation, comprised of finer textured shales, sandstone, and siltstone with some coal seams and ironstone inclusions.

Surficial material surrounding Sylvan Lake consists of draped moraine on flat to undulating terrain and stagnant moraine on undulating to hummocky terrain. Draped moraine is till of even thickness up to 10 m, with minor amounts of water-sorted material and local bedrock exposures. Stagnation moraine is till of uneven thickness derived from water-sorted material, and up to 30 m thick.

3.5 HYDROLOGY

3.5.1 Permanent Watercourse or Waterbodies

No permanent watercourses or wetlands are present on the property. Snowmelt is likely to collect in depressional areas evident in the northern portion of the property, which may hold some water for short periods of time. Snowmelt is then conveyed via shallow incipient swales and ephemeral drainages to the southwest. Based on the amount of vegetation associated with these areas, much of precipitation is expected to infiltrate the ground.

3.5.2 Ephemeral Watercourse

A naturally occurring ephemeral watercourse is located in the north portion of the property. Surface water generally drains from upper elevation sites located to the north and east of the property and are directed to the lower elevation site in the naturally forested area of the property. Based on historical aerial photograph interpretation, the watercourse drains into Sylvan Lake. The watercourse lacks field indicators of flow scour and alluvial deposition, and is delimited by a shallow vegetated gully with an estimated top-of-bank to top-of-bank width of 4 m where it is unaltered on the subject property (Appendix B, Plate 2 and 3).

Surface water drainage flows during spring runoff dependent on the amount of snowfall and phenology of snowmelt, and potentially during large rain storm events. During years when flow occurs, it generally lasts only 2-3 days (L. Skinner, pers. com.). However, in most years (60 %), snow accumulation or snow melt is too limited to support surface flow, and snowmelt occurs slowly and infiltrates into the ground (L. Skinner, pers. com.). It is expected this watercourse maintains hygric to sybhydric conditions in most years, where water is removed slowly enough to keep the water table at or near the surface for the spring growing season.

Two cross drain culvert structures convey flow to the ephemeral watercourse and are positioned at or near the historical natural watercourse flow paths. The main flow conveyance culvert which is located along the north edge of the property, where drainage continuity may be disrupted by a windrow created when the forest area was cleared. Downstream of that crossing, the area along the watercourse has been cleared, and the channel becomes undefined due to prolonged mechanical or physical alteration of the soil surface (see Figure 2 and Section 3.1 for historical aerial photograph interpretation). The second culvert structure is near the northwest corner of the property along Range Road 14. Flow conveyance within the roadway ditchline would contribute overflow runoff from adjacent lands through to the subject ephemeral drainage and ultimately to Sylvan Lake (Figure 2; L. Skinner pers com.).

3.5.3 Groundwater

Groundwater yields vary substantially throughout the Sylvan Lake area. East of the lake, yields are as low as 5-25 imperial gal/min (Alberta Research Council 1985 cited in Schreiner 1985). The south and northeast area near the lake yields approximately 25-100 imperial gal/min,

although it has been reported that the eastern edge of Birchcliff and part of the Town of Sylvan Lake yields >500 imperial gal/min (Alberta Research Council 1985 cited in Schreiner 1985).

3.6 SOIL

The Sylvan Lake area is located in a transitional zone from Black Chernozemics south of Sylvan Lake to Gray Luvisols north of the lake (Bessie and Knapik 1985). The dominant soil type in the project area is Dark Gray Luvisol on medium textured (loam, clay) till (AAF 2005). Gleysolic soils, associated with imperfectly and poorly drained sites, occur in upland depressions and along the low-lying drainages (EMA 1990).

The Benalto soil series is found throughout the property and surrounding area, and is rated as Class 3 according to the Canada Land Inventory (AAFC 1999). Class 3 soils have moderately severe limitations that restrict the range of crops or require special conservation practices.

3.7 VEGETATION

3.7.1 Community Descriptions

Vegetation communities/cover types were delineated through a combination of aerial photograph interpretation and ground confirmation during the field reconnaissance. Five vegetation communities/cover types were identified within the project area. These communities/cover types are described below. Due to the timing of the reconnaissance survey, senescence had already occurred for many herbaceous species, thus community descriptions were limited to what could be identified at that time. The distribution of vegetation communities/cover types in the project area is illustrated in Figure 2. Photo documentation is provided in Appendix B.

Upland Deciduous Forest (Ua)

Upland deciduous forest is the only forest type occurring on the property (Photo 1 – 5). Aspen is the dominant tree species, although some balsam poplar is also present and is more common in depressional/drainage areas. Downed woody debris and standing snags are abundant in some locations. The tall shrub layer is only fairly developed where present, while the low shrub layer is fair to moderately well-developed. Representative shrubs include prickly rose, saskatoon, snowberry, and beaked-hazelnut. Ground layer species include bluejoint, peavine, bunchberry, northern and sweet-scented bedstraw, Lindley's aster, wild strawberry, wintergreen, and bluegrass. On the east half of the property, this stand is relatively level, whereas on the northwest half the forest slopes towards a central, ephemeral watercourse (Photo 2 and 3). The south forest remnant is situated on a north-facing incline.

Upland Deciduous Forest Hedgerows (Ua(r))

Several hedgerows of upland deciduous forest are located within the cleared grassland area west of the yard (Photo 6 and 7). These windrows were allowed to regenerate following clearing after 1969 and prior to 1975. The hedgerows range in width from about 5 to 10 m, and are characterized by variable-aged aspen. Grasses (timothy, brome, bluegrass) are prevalent in the understory, with clover, peavine, vetch, asters, wild strawberry, and dandelion also being present. Prickly rose and snowberry are the most common shrubs associated with hedgerows.

Cleared Pasture/Grassland (Da^1)

Cleared pasture/grassland areas occur as patches in the northern half of the project (Photo 8 and 9). Characteristic grass species include timothy, brome, and bluegrass. Other species include thistle, asters, dandelion, common plantain, clover, and cow parsnip. Short prickly rose and snowberry are also present in some areas. Topographic relief and/or depressional uplands are associated with grassland areas.

Clearing of forest in the north portion of the property, leading to the presence of grassland areas, began prior to 1969 and was completed by 1975.

Cleared Cropland (Da^2)

The southern half of the property is currently under cultivation with a canola crop (Photos 10-11). Prior to 2008, this area was a cleared pasture/hayland as far back as 1949.

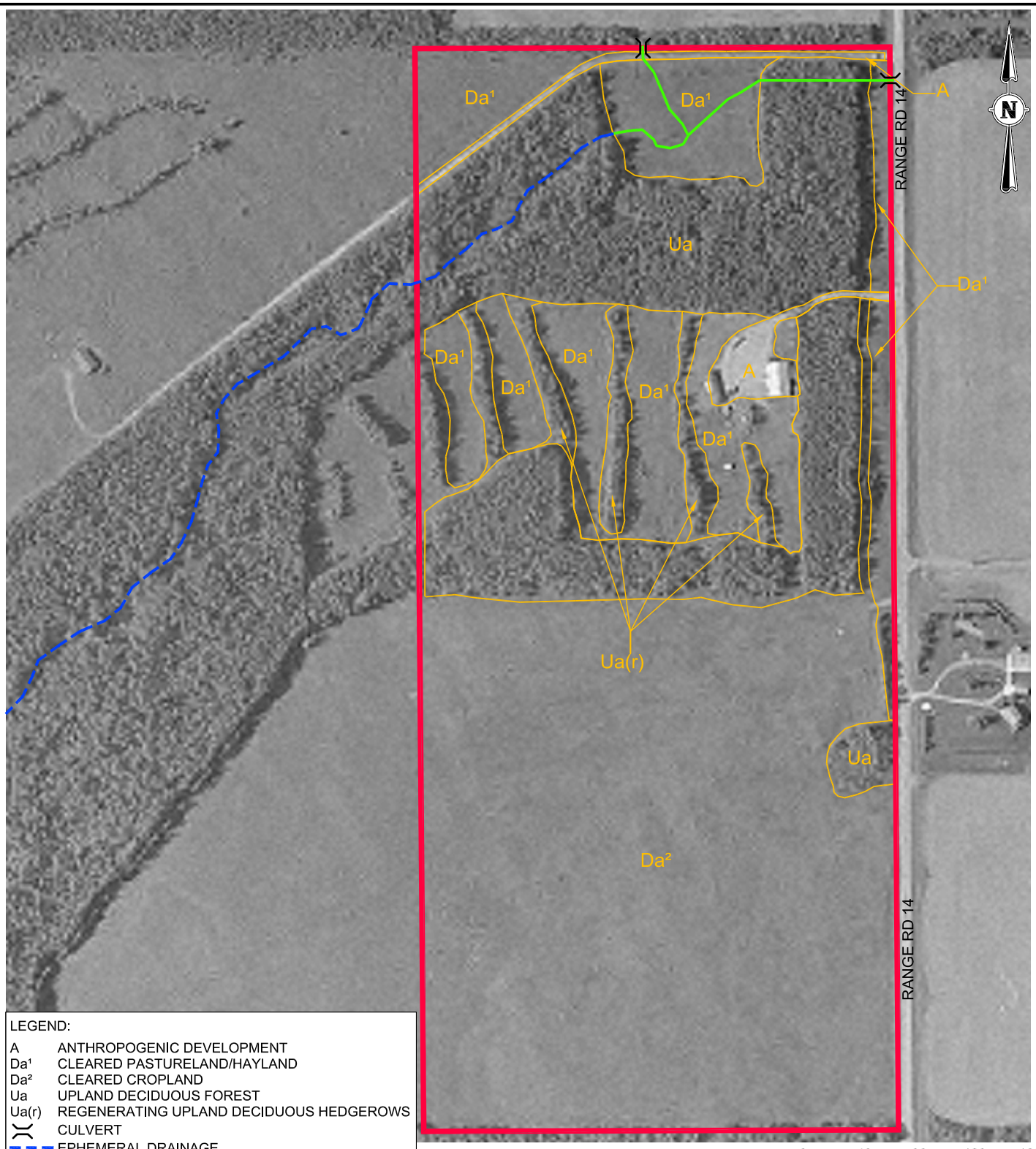
Anthropogenic Development (A)

An abandoned farm yard is located near the central east edge of the north half of the property. An equipment shed and gravel yard are present, and there is evidence of past structures in this area.

3.7.2 Rare Plants

Few rare plants have been recorded in the vicinity of Sylvan Lake. Golden saxifrage (*Chrysoplenium iowense*) has been recorded along streams in birch-balsam poplar forest in the Sylvan Lake Natural Area (ANHIC 2008, Griffiths and Griffiths 1987). Uncommon plants previously identified from the Sylvan lake area include lady-fern, shield fern, and woodland anemone (Griffiths and Griffiths 1987; Sweetgrass Consultants Ltd. 1988, 1990).

Rare plants have not been recorded on or adjacent to the proposed development property (ANHIC 2008), likely because surveys have not been conducted on site. There is some potential for rare plants to occur along the ephemeral watercourse and adjacent forested habitat. The remainder of the site has been highly disturbed from agricultural practices and the potential for rare plants presence is considered to be low.



LEGEND:

A	ANTHROPOGENIC DEVELOPMENT
Da¹	CLEARED PASTURELAND/HAYLAND
Da²	CLEARED CROPLAND
Ua	UPLAND DECIDUOUS FOREST
Ua(r)	REGENERATING UPLAND DECIDUOUS HEDGEROWS
	CULVERT
	EPHEMERAL DRAINAGE
	UNDEFINED/ALTERED DRAINAGE

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DWN BY: CMG
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PROJECT:
HIGHLAND PARK
BIOPHYSICAL ASSESSMENT

TITLE:
VEGETATION COMMUNITIES
AND COVER TYPES

DATE: OCTOBER, 2008
PROJECT No.: EE26289
REV. No.: -
FIGURE No.: FIGURE 2

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3.8 WILDLIFE

3.8.1 Birds

The Sylvan Lake area provides habitat for a diverse assemblage of terrestrial and water-dependent birds. Over 125 species of birds were recorded at Sylvan Lake and in the surrounding area during surveys conducted as part of the Alberta Breeding Bird Atlas project (Semenchuk 1992). Interior forest nesting species, however, are expected to occur less commonly in the study area because of the limited remaining natural habitat and the lack of wetlands on the property. Cropland dominates the south half of the property, and has low habitat value for birds, overall. Forest habitat on the north half of the property is largely fragmented, reducing the site's capability to support breeding migratory birds and year round residents.

Bird species representative of deciduous forests in the Sylvan Lake area include least flycatcher, western wood pewee, American robin, red-eyed vireo, northern oriole, house wren, warbling vireo, white-throated sparrow, black-capped chickadee, yellow-bellied sapsucker, hairy woodpecker, ovenbird, white-breasted nuthatch, red-breasted grosbeak, and ruffed grouse (Griffiths and Griffiths 1987). Characteristic bird species of willow habitats include alder flycatcher, house wren, cedar waxwing, and yellow warbler (Griffiths and Griffiths 1987), while the song sparrow and clay- colored sparrow occur in shrubby habitats along drainages and in open areas, as well as along forest edges. EMA (1990) noted that terrestrial species diversity was greatest along drainage courses and in transitional zones between willow and upland forest cover.

Raptors known to occur in the Sylvan Lake area include the red-tailed hawk, Swainson's hawk, northern harrier, American kestrel, merlin, prairie falcon, peregrine falcon, osprey, bald eagle, great horned owl, great gray owl, and short-eared owl (EMA 1990, Semenchuk 1992). However, osprey, bald eagle, and falcons are unlikely to occupy the study area.

Common wintering species in the general area include black-capped chickadee, Bohemian waxwing, evening grosbeak, house sparrow, black-billed magpie, rock dove, and boreal chickadee (Christmas Bird Count). Less abundant or periodic wintering species include great horned owl, snowy owl, blue jay, brown creeper, dark-eyed junco, snow bunting, pine grosbeak, white-winged crossbill, and European starling.

3.8.2 Fish

There are no fish-bearing watercourses on the property.

Sylvan Lake currently supports five species of sport fish including northern pike, walleye, perch, lake whitefish, and burbot (V. Buckwald, pers. com.). White suckers are also present in Sylvan Lake, as are a number of forage species including spottail shiners, brook stickleback, fathead minnows, emerald shiner, and Iowa darter (Mitchell and Prepas 1990, Carson and Allen 2001).

3.8.3 Herptiles

Amphibians likely to occur in the general area of the proposed project include wood frog, boreal chorus frog, and tiger salamander (Griffiths and Griffiths 1987; Russell and Bauer 2000). The western toad and Canadian toad have also been recorded in the vicinity of Sylvan Lake in recent years, and there have been historic records of the northern leopard frog in the general area (C. Kendell, pers. com).

Two reptiles, the red-sided and wandering garter snakes, may occur in the study area. Both species are uncommon and inhabit suitable habitats in the vicinity of ponds, lakes, marshes, dugouts, and streams (Russell and Bauer 2000).

3.8.4 Invertebrates

Insects are normal components of healthy upland forests, and are essential to biodiversity. Insects feed birds, and create habitat diversity by burrowing in standing snags and large woody debris that then can be habitat for many other species of animals, plants, fungi and other organisms (Royal British Columbia Museum 2002). Invertebrates are highly specialized with very specific habitat requirements. Therefore they can be very sensitive indicators of environmental change (Kozoloff 1990). Additionally invertebrates can be lost (extirpated) from a site through seemingly small changes in management of their habitat.

3.8.5 Mammals

Over 30 species of mammals potentially occur in the general area of the project (Smith 1993; Pattie and Fisher 1999). The majority of these species are small mammals including rodents (e.g., deer mouse, red-backed vole, meadow vole, jumping mouse), shrews, and bats. Deer are common, as are coyotes and snowshoe hare (Griffiths and Griffiths 1987). Other terrestrial mammals occurring in the Sylvan Lake area include moose, striped skunk, short-tailed weasel, least weasel, porcupine, red fox, woodchuck, and pocket gopher (Pattie and Fisher 1999, Griffith and Griffith 1987).

3.8.6 Rare, Threatened, and Endangered Species

The ANHIC and FWMIS database were queried, Alberta Sustainable Resource Development personnel were interviewed, and other consultant reports were reviewed to identify sensitive wildlife species previously recorded in the study area and surrounding lands. Range maps and habitat preferences were also used to determine the potential for species of concern to inhabit the general region. These species are listed in Appendix C and are discussed below.

Birds

The short-eared owl is listed as "*May Be At Risk*" in Alberta (ASRD 2006) and of "*Special Concern*" by COSEWIC (2007) and occurs in the region. It is a species of the open country, inhabiting meadows, clearings, pastures, burn areas, and bogs, occurring more frequently near wetlands. Several other owl and raptor species listed as "*Sensitive*" in Alberta have been recorded in the region (Semenchuk 1992, Griffiths and Griffiths 1982), and some of these may periodically inhabit the property, including northern harrier and Swainson's hawk.

The common nighthawk has recently been listed as "*Threatened*" by COSEWIC (2007) as the result of population declines. In Alberta this species is considered to be "Sensitive". The common nighthawk inhabits dry coniferous forest, open deciduous forest, meadows, grasslands, and barren rocks.

A variety of other migratory species considered to be "*Sensitive*" in Alberta that may inhabit the study area are listed in Appendix C, Table C-1. These species are protected under the *Migratory Birds Convention Act.* The pileated woodpecker and sharp-tailed grouse are also considered "*Sensitive*" in Alberta and may inhabit the study area. In Alberta, the *Wildlife Act* provides protection for individual endangered or threatened and non-game animals (passerine birds), as well as their house, nest or den.

Fish

No fish species of concern reside in Sylvan Lake.

Herptiles

Two amphibian species of concern that may occur in the study area are the Canadian toad (*Bufo hemiophrys*) listed as "*May Be At Risk*" and the western toad (*Bufo boreas*), listed as "*Sensitive"* (AENV 2000b) and of "*Special Concern*" by COSEWIC (2007). The red-sided garter snake and wandering garter snake, also listed as "*Sensitive*", are the only reptiles with a range that overlaps the study area. Garter snakes may be found in a variety of habitats, generally occurring near water (Russell and Bauer 2000).

Mammals

Mammals of concern that may inhabit the study area include the northern long-eared bat and long-tailed weasel, which are listed provincially as "*May Be At Risk*." The northern long-eared bat is uncommon over its range and occupies forested areas close to water bodies, relying on large, decadent trees for roosting (Caceres and Pybus 1997, AENV 2000). It has been recorded in the region. The long-tailed weasel inhabits open country, including grasslands and open forests. The hoary bat and silver-haired bat, considered to be "*Sensitive*" in Alberta, may also occur within the study area. No sign of badgers (*Sensitive*) was observed on the property.

3.8.7 Habitat Connectivity Buffers

Habitat fragmentation in the study area is readily apparent as the largely cleared or otherwise heavily altered landscape. The northern half of the subject property maintains an expansive upland forest community that has been largely conserved as native forest. This native forest cover is recognized as Key Ungulate Habitat (EMA 1990), and is identified as an Environmentally Sensitive Area in the Sylvan Lake Management Plan (2000) (see also Section 3.9). Through the interpretation of aerial photographs and direct field observation, it is recognized that these habitats are linked by transitional habitats such as fencerows, shelter belts, forested road allowances, riparian buffers and wetlands, as well as areas of adjacent, expansive native forest. This mosaic of landscape elements and habitat patches has several ecological functions. Firstly, they serve as habitat refuges or parts of habitat patches for certain wildlife species, and secondly as habitat linkages or wildlife corridors that allow wildlife species to move from one patch to the other, and between natural habitat reserves in the regional landscape.

3.9 ENVIRONMENTALLY SIGNIFICANT/SENSITIVE AREAS

The property occurs near the southeast shoreline of Sylvan Lake. Sylvan Lake is considered a regionally Environmentally Significant Area in Lacombe County (Sweetgrass Consultants Ltd. 1988). Characteristics of the lake and adjacent lands which contribute to this designation include: isolated backshore aspen-poplar woodlands, willow and wet meadow communities; diverse assemblage of terrestrial breeding birds in woodland and shrubland areas; key white-tailed deer wildlife habitat on the east shore; and regionally uncommon species are present in the surrounding habitats (e.g., lady-fern, shield-fern, woodland anemone, Philadelphia vireo). The lake also supports important spawning area for several fish species.

The northern portion of the development property occurs within lands identified as Key Ungulate Habitat (EMA 1990), and is identified as an Environmentally Sensitive Area in the Sylvan Lake Management Plan (2000). The Key Ungulate Habitat extends west to Sylvan Lake. Maintaining forest habitat, and habitat connectivity between these areas, is recognized as important to protect and conserve key habitat components that will contribute to the long-term sustainability of habitat connectivity between Sylvan Lake, and the transitional uplands region.

4.0 RESERVE DESIGNATION

The *Municipal Government Act* (1998) outlines the roles of municipal government and sets guidelines concerning proposed developments. The *Municipal Government Act* (MGA) also outlines the criteria for lands that are to be set aside by the owner through a number of conservation mechanisms including environmental reserve/environmental reserve easement (ER/ERE), municipal reserve (MR) and/or conservation easement (CE).

The *Lacombe County Municipal Development Plan* (2007) or MDP, and *Lacombe County Land Use Bylaw* (August 28, 2007) also outline requirements for designation of reserve lands and conservation of natural features. Further, provincial and municipal regulations and policies outline development guidelines to protect significant stands of trees, drainage courses, wildlife corridors, and identified environmentally significant areas (Lacombe County, 2000).

Applicable regulations, policies and guidelines set out by provincial and municipal agencies that were applied as the basis for delineating applicable environmental reserves, and municipal reserves and/or conservation easements are summarized in Table D1, Appendix D.

4.1 OBJECTIVES

The ephemeral watercourse located in the north portion of the property is recognized as a naturally occurring drainage applicable to the MGA, section 664(1)(a). The watercourse does not support a defined channel or discernable high water mark, although surface water drainage flows during spring runoff and potentially during peak storm events. The County of Lacombe has indicated that a 30 m set back is applicable to the ephemeral watercourse pursuant to Section 7.2 of the MDP, although the application to ephemeral watercourses is under review at the time of writing (Watson pers. comm.). [7]

For water management purposes, it is recognized that prolonged mechanical or physical alteration of the watercourse within the cleared areas has resulted in a poorly defined section of drainage channel. It is recognized that channel restoration may be required to restore natural flow conveyance capacity from the existing cross drain culvert crossings (see Section 3.5.1) to the natural undisturbed section of confined drainage downstream. Drainage restoration may also be required to minimize potential flooding of residential lots that may occur due to existing unconfined drainage conditions. It will be important to confirm if an approval may be required for such works pursuant the Alberta *Public Lands Act* and *Water Act*.

The implementation of a drainage restoration plan is also recognized as an important opportunity to re-establish and/or enhance a vegetated buffer adjacent to the proposed development to maintain long-term connectivity of the property to adjacent wildlife habitat linkages and native forest communities (see also Section 4.2). A functional vegetated buffer

[7] Under section 7.4, subdivision and development applications adjacent to watercourses may be required to prepare an engineering and/or geotechnical analysis to determine the high water mark and/or top of bank of the subject watercourse and also determine an adequate setback from the top of bank based on oil conditions and slope stability

would provide thermal and security cover for wildlife and would enhance the function of the corridor as a habitat linkage for wildlife moving between adjacent habitat patches. This is based on the northern portion of the development property occurring within lands identified as Key Ungulate Habitat (EMA 1990), and as an Environmentally Sensitive Area in the Sylvan Lake Management Plan (2000).

4.2 ENVIRONMENTAL RESERVE/ENVIRONMENTAL RESERVE EASEMENT

Environmental Reserve (ER) is land claimed by the County subdivision process that conserve naturally occurring features such as a swamp, ravine, coulee, natural drainage and land that is subject to flooding pursuant to the MGA, and are therefore considered to be undevelopable lands. Pursuant to Section 664 of the MGA, lands can also be designated as environmental reserve easement (ERE) for the protection and enhancement of the environment rather than dedicating land as environmental reserve. Land designated as ERE remains in private ownership, rather than public ownership as in the case with ER.

The historic watercourse route (based on aerial photograph interpretation) was used as a basis to calculate the recommended ER/ERE. Based on aerial photograph interpretation, the subject watercourse contained within the property consists of an approximate 167 m length of undisturbed ephemeral watercourse and an approximate 276 m length within the altered drainage area (see Figure 2). Based on this information, the recommend ER/ERE area of **2.835 ha** area of is based on the following and as summarized in Table 1:

1. The ephemeral watercourse encompassing the top-of-bank to top-of-bank width estimated to average 4 m for its entire length is recommended for designation as ER pursuant with Section 664(1)(a) of the MGA. Based on the drainage restoration plan, this ER potentially totals 0.177 ha.

2. A strip of land, not less than 6 metres in width adjacent to the top of bank on either side over the entire length of the ephemeral watercourse ER is recommended for designation as ER pursuant with Section 664(1)(c) of the MGA. Based on the drainage restoration plan, this ER potentially totals 0.532 ha.

3. An ER/ERE modifier of an additional 24 m setback along the designated ER outlined in (1.) and (2.) above is recommended to comply with the setback policy of 30 m from the top of bank to the lot line pursuant with Section 7.2 of the MDP. Based on the drainage restoration plan, this ER/ERE potentially totals 2.126 ha.

4.3 MUNICIPAL RESERVE

The Section 666(2) of the MGA states that in addition to the designated ER/ERE, not more than an additional 10% of the developable land of a subdivision development may be required as municipal reserve (MR). Further, under pursuant to Section 13.5 *Lacombe County Municipal Development Plan* (2007), where, the County will take MR lands only where such land is identified as being required by an approved Area Structure Plan for a multi-lot country residential subdivision, or to protect a unique or environmentally significant feature from being disturbed for development purposes. Based on the recommended 2.835 ha of ER/ERE, the gross developable lands are estimated to be 24.615 ha. Therefore, the 10 % land area considered applicable to MR designation is estimated to be **2.462 ha**.

For the purposes of the integrating natural areas and maintaining/restoration of habitat connectivity at a broader landscape level, the recommended objective of designating MR is to encourage the designation, location and management of habitat areas that will conserve key buffers between or through the proposed development property, and adjacent ER/ERE/MR lands (proposed, existing or future), the forested corridor along Sylvan Lake and forest woodlots/habitat linkages to the north and east of the property.

Although wildlife movements may not be well defined under the existing conditions, riparian corridors, lowlands with riparian vegetation, and areas with topographic variation form landscape features that traditionally maintain wildlife movement corridors for resident and wide ranging wildlife. As such, it is recommended that, wherever possible, MR be incorporated as outlined below:

a.) lands adjacent to the ephemeral watercourse ER/ERE;
b.) the steeper south-, southwest- and north-facing; and/or
c.) the lower relief draw between the north and south upper terraces on the property.

4.4 CONSERVATION EASEMENT (CE)

Based on the biophysical features found within the project area, no lands are recommended to be designated as Conservation Easements. Sensitive environmental features such as the ephemeral watercourse are identified as ER lands for protection.

5.0 CONCLUSIONS

The property consists of primarily disturbed/cultivated farmland with some patches of remnant upland deciduous forest. No discernable natural environmental features were identified on the south half of the property. The north portion of project area has been identified as Key Ungulate Habitat and is considered an Environmentally Sensitive Area within the Sylvan Lake Management Plan (Lacombe County 2000). The ephemeral watercourse draining through these lands is recognized as a naturally occurring drainage applicable to the MGA, section 664(1)(a).

The objective of the biophysical assessment was to assess the location and function of environmentally significant/sensitive areas to be preserved within ER setbacks. MR areas were delineated to buffer ERs from potential development and activities and to provide connectivity between ERs and other areas of significant habitat, not only on the property but with surrounding adjacent lands (i.e., adjacent reserves and easements). Table 1 summarizes the recommended ER and MR areas.

Table 1: Environmental and Municipal Reserve Areas

Reserve Type	Reserve Location	Area (ha)
Total Lands within Titled Boundary		**27.450**
Environmental Reserve	ephemeral watercourse[1]	0.177
	top of bank setback[2]	0.532
	supplemental 24 m setback[3]	2.126
	Total	**2.835**
Gross Developable Lands		**24.615**
10 % of developable lands (to be allocated to MR)		**2.462**

Note: 1. Estimated 4 m top of bank width; 2. 6 m setback width adjacent to the top of bank on either side of the ephemeral watercourse; 3. Assuming supplemental 24m setback bank on either side of the ephemeral watercourse to accommodate total 30 m setback from top of bank to lot line.

6.0 CLOSURE

We trust that the preliminary information contained within this report satisfies your requirements. Should you have any questions, please contact the undersigned at your earliest convenience.

Respectfully submitted,

AMEC Earth & Environmental

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Wildlife Biologist

Reviewed by:

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APPENDIX A

Historical Air Photographs

1949

1969

CLIENT: LOVATT PLANNING CONSULTANTS	DWN BY: CMG	PROJECT: HIGHLAND PARK BIOPHYSICAL ASSESSMENT	DATE: OCTOBER, 2008
	CHK'D BY: MN		PROJECT No.: EE26289
	DATUM: NAD 83	TITLE: HISTORICAL AIR PHOTOGRAPHS 1949 AND 1969	REV. No.: -
	PROJECTION: UTM Zone 12		FIGURE No.: PHOTOS 1
	SCALE: N.T.S		

AMEC Earth & Environmental
5681-70 STREET, EDMONTON, ALBERTA, T6B 3P6
PHONE 780-436-2152, FAX 780-435-8425

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1975

1983

CLIENT: LOVATT PLANNING CONSULTANTS	DWN BY: CMG CHK'D BY: MN	PROJECT: HIGHLAND PARK BIOPHYSICAL ASSESSMENT	DATE: OCTOBER, 2008 PROJECT No.: EE26289
AMEC Earth & Environmental 5681-70 STREET, EDMONTON, ALBERTA, T6B 3P6 PHONE 780-436-2152, FAX 780-435-8425	DATUM: NAD 83 PROJECTION: UTM Zone 12 SCALE: N.T.S	TITLE: HISTORICAL AIR PHOTOGRAPHS 1975 AND 1983	REV. No.: - FIGURE No.: PHOTOS 2

1998

2007

CLIENT: LOVATT PLANNING CONSULTANTS	DWN BY: CMG	PROJECT: HIGHLAND PARK BIOPHYSICAL ASSESSMENT	DATE: OCTOBER, 2008
	CHK'D BY: MN		PROJECT No.: EE26289
	DATUM: NAD 83	TITLE: HISTORICAL AIR PHOTOGRAPHS 1998 AND 2007	REV. No.: -
AMEC Earth & Environmental 5681-70 STREET, EDMONTON, ALBERTA, T6B 3P6 PHONE 780-436-2152, FAX 780-435-8425	PROJECTION: UTM Zone 12		FIGURE No.: PHOTOS 3
	SCALE: N.T.S		

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APPENDIX B

Photo Documentation

Plate 1: Upland deciduous forest (aspen) north of abandoned farm yard.

Plate 2: Ephemeral drainage gully within forest in the northwest part of the property

Plate 3: Ephemeral drainage gully within forest in the northwest part of the property.

Plate 4: Deciduous dominated forest (aspen) south of abandoned farm yard.

Plate 5: Upland deciduous forest (aspen) east of abandoned farm yard.

Plate 6: Deciduous (aspen) windrow within cleared forest (grassland) area.

Plate 7: Deciduous (aspen) windrow.

Plate 8: Grassland depression north central area of property.

Plate 9: Grassland depressional area in between treed windrows, potential SWMF site.

Plate 10: Canola field on south half of property.

Plate 11: Southwest corner of canola field; potential SWMF site.

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PHONE 780-436-2152, FAX 780-435-8425

PROJECT: Highland Park Biophysical Assessment

CLIENT: Lovatt Planning Consultants

TITLE: APPENDIX B: PHOTO DOCUMENTATION

FIGURE B

APPENDIX C

Wildlife Species of Concern

Table C-1: Species of Concern Potentially Found in the Vicinity of the Development Project

Common Name	Scientific Name	Provincial Status[1]	Federal Status[2,1]	General Habitat Preferences[3]
Amphibians and Reptiles				
Canadian toad	Bufo hemiophrys	May Be At Risk		Breed in the shallows of lakes, ponds, marshes, ditches and other temporary bodies of water.
Western toad	*Bufo boreas*	Sensitive	Special Concern*	Found near ponds, streams, rivers, and lakes.
Red-sided garter snake	*Thamnophis sirtalis*	Sensitive		Broad habitat preferences include forest, farm, or near water.
Wandering garter snake	*Thamnophis elegans vagrans*	Sensitive		Near ponds, lakes, dugouts, streams.
Avifauna				
Short-eared owl	*Asio flammeus*	May Be At Risk	Special Concern*	Open country including grasslands, wet meadows and cleared forests.
Swainson's hawk	*Buteo swainsoni*	Sensitive		Open fields, grasslands and agricultural areas.
Northern harrier	*Circus cyaneus*	Sensitive		Marshes, meadows, and cultivated fields.
Sharp-tailed grouse	*Tympanuchus phasianellus*	Sensitive		Open habitats, mostly grasslands, grassy meadows and agricultural areas
Common nighthawk	*Chordeiles minor*	Sensitive	Threatened	Meadows, grasslands, open forest.
Pileated Woodpecker	*Dryocopus pileatus*	Sensitive		Older, mature forest, particularly where there are large dead or dying trees deciduous trees.
Eastern phoebe	*Sayornis phoebe*	Sensitive		Open wooded areas, often in the vicinity of streams or lakes.
Purple martin	*Progne subis*	Sensitive		Communal bird houses; tree cavities.
Barn swallow	*Hirundo rustica*	Sensitive		Human structures in rural areas.
Least flycatcher	*Empidonax minimus*	Sensitive		Open deciduous or mixed woodland.
Northern oriole	*Icterus galbula*	Sensitive		Open deciduous woods, preferring edge habitat.
Mammals				
Long-tailed weasel	*Mustela frenata*	May Be At Risk	Not at Risk	Open country forages in aspen parkland and open forests.
Northern Long-eared bat	*Myotis septentrionalis*	May Be At Risk		Forested and sometimes bushy habitat close to water.
Hoary bat	*Lasiurus cinereus*	Sensitive		Near open grassy areas in coniferous and deciduous forests.
Silver-haired bat	*Lasionycteris noctivagans*	Sensitive		Forested habitat.

[1] Provincial Status (ASRD 2006)
[2] Federal Status (COSEWIC 2008)
[3] Semenchuk 1992; Fisher and Acorn 1998; Patty and Fisher 1999; Russell and Bauer 2000
*Species on the federal Species At Risk Act (SARA2003; updated 2006) list

APPENDIX D

Summary of Applicable Regulatory Requirements and Guidelines for Environmental and Municipal Reserve Lands

Table D: Summary of Recommended Environmental and Municipal Reserve Lands and Applicable Regulatory Requirements and Guidelines for the Highland Park Development

Legislation	Environmental Reserve(ER)/ Environmental Reserve Easement (ERE)	Municipal Reserve (MR)
Municipal Government Act[1]	664(1) A subdivision authority requires the owner provide part of the land as environmental reserve if it consists of: (a) a swamp, gully, ravine, or coulee or natural drainage course, (b) land that is subject to flooding, or is unstable. (c) a strip of land, not less than 6 metres in width, abutting the bed and shore of any lake, river, stream or other body of water for the purpose of (i) preventing pollution, or (ii) providing public access to and beside the bed and shore.	666(1) A subdivision authority may require the owner of a parcel of land that is subject of a proposed subdivision (a) to provide part of that parcel of land as municipal reserve, school reserve, or municipal and school reserve 666(2) the amount of land required under subsection (1) may not exceed the percentage set out in the municipal development plan, which may not exceed 10% of the parcel of land less the land required to be provided as ER/ERE
Lacombe County Municipal Development Plan[2]	4.0 Residential Development 4.5 Residential Conservation (Cluster) Subdivision Design. Areas particularly suited to conservation (cluster) subdivision design include, but are not necessarily limited to, natural features such as woodlands, stream corridors, steep slopes, wetlands, shorelands, ridge tops, wildlife corridors and critical species habitat. 7.0 Environmental Management 7.2 Environmental Setbacks from Waterbodies and Watercourses. The County shall, as a condition of subdivision approval, require an environmental reserve or environmental reserve easement of not less than 30 m in width from the high water mark of waterbodies and/or the top of bank of watercourses to the lot line. A greater setback may be required by the County based on recommendations of a geotechnical study undertaken by a qualified professional. 7.5 Environmental Reserve Dedication. Lacombe County shall require reserve dedication in accordance with provisions of the Municipal Government Act. Wherever possible, environmental reserves shall be linked with municipal reserves to create continuous greenways with enhanced public access. 7.8 Hazard Lands: No development shall be allowed in areas prone to flooding, erosion, subsidence or any other natural hazard, unless a geotechnical investigation prepared by a qualified professional describes how the development could proceed without harm to the property or environment.	13.5 County will take MR lands only where such land is identified as being required by an approved Area Structure Plan for a multi-lot country residential subdivision, or to protect a unique or environmentally significant feature from being disturbed for development purposes
Lacombe County Land-Use Bylaw		17.2(3)(1)A lot that is to be used as a site for a residence shall have an area of at least 0.51 ha (1.25 ac) but less than 1.01 ha (2.50 ac). Council may at its discretion reduce the minimum lot size requirement if additional open space is provided in excess of the maximum reserve dedications under the Act. Any reduction of lot size shall be calculated on the basis that a decrease of 0.02 ha (0.05 ac) may be permitted for every additional 1% of the gross developable land which is provided as open space to the extent that no lot shall be smaller than 0.30 ha (0.75 ac) in size. For the purposes of this Bylaw, gross developable land shall be considered as the land that is available for development after road widening; environmental reserve (or reserve easement) and public utility lots are deducted from the titled area.

<table>
<tr><td>Legislation</td><td colspan="3">Environmental Reserve(ER)/ Environmental Reserve Easement (ERE)</td><td>Municipal Reserve (MR)</td></tr>
<tr><td>Sylvan Lake Management Plan 2000 Update[3]</td><td colspan="4">3.2.1 Lake Development Area: Policy Directions

2(a) the integrity of the natural environment and ecosystems is protected, sustained and if possible, enhanced. Development will not be permitted if it detrimentally affects an environmentally sensitive area.

2. (h) development is designed to protect significant stands of trees, drainage courses, wetlands, wildlife corridors or other natural features through the dedication of reserves, the use of conservation or environmental reserve easements or other means acceptable to the local municipality.

5. where feasible to do so, a clustered pattern of development will be encouraged to minimize the impact of the development on both lakeshore and upland areas, leaving the majority of any natural areas undisturbed.

3.2.2 Environmentally Sensitive Areas
1) as a general requirement, development on or adjacent to lands that are identified as being environmentally sensitive shall be restricted to those uses which are compatible with the environmental conditions, or will be made to do so through measures undertaken to mitigate any resulting negative environmental impact.</td></tr>
<tr><td rowspan="3">Sustainable Resource Development Recommended Guidelines for Minimum Environmental Reserve /Easement Widths (2007)[4]</td><td colspan="3">Standard Recommended Minimum Width for ER/ERE</td><td rowspan="3">Use bylaw to regulate tree cutting within a defined distance from feature to maintain riparian vegetation and drainage.</td></tr>
<tr><td>Water Feature</td><td>Minimum ER Width</td><td>Additional Consideration/ER Modifier</td></tr>
<tr><td>Ephemeral Watercourse (no defined channel)</td><td>N/A</td><td></td></tr>
<tr><td>Public Lands Act</td><td colspan="4">With certain exceptions the Crown can exert ownership over the beds and shores of all permanent and naturally occurring wetlands whether they are located on public or private lands</td></tr>
</table>

Table References:

1. Government of Alberta. 1998. Municipal Government Act. Accessed online January 18, 2008: http://www.qp.gov.ab.ca/Documents/acts/M26.CFM.
2. Lacombe County Municipal Development Plan Bylaw 818/96. Lacombe County online version accessed on September 23, 2008: http://www.lacombeounty.ab.ca/county/pdf/MDP
3. Sylvan Lake Management Plan. 2000. Accessed September 23, 2008: http://www.lacombecounty.com/content/content_planning/plans/sylvan_mp2000.pdf
4. .Alberta Sustainable Resource Development. 2007. Sustainable Development Standard Recommendations to Municipal Subdivision Referrals (Includes Recommended Minimum Environmental Reserve Widths). Online version accessed on January 21, 2008: http://municipalaffairs.alberta.ca/documents/ms/landusepoliciesmga.pdf