



November 16, 2015

FINAL SCREENING REPORT

Holmwood East Natural Area Screening Study

Submitted to:

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REPORT



Report Number: 1526165

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DRAFT



1.0 INTRODUCTION

As part of the long-term urban planning objectives, the City of Saskatoon (the City) is evaluating an area of land on the southeast boundary of the existing City limits. A component of the planning process is to identify and evaluate biophysical attributes that may need to be conserved, and/or considered as part of future developments.

In 2013, the City adopted a Wetland Policy (City of Saskatoon 2013) to guide land use and development decisions related to wetland and riparian areas. The Wetland Policy requires that a wetland inventory be developed, that includes wetland classification data based on the *Classification of Natural Ponds and Lakes in the Glaciated Prairie Region* (Stewart and Kantrud 1971) and functional assessment data based on the Minnesota Routine Assessment Methodology (MnRAM) (Minnesota Board of Water and Soil Resources 2007).

The City issued a Request for Proposal (RFP) on March 12, 2015 for the Holmwood East Natural Area Screening Study (the Project). Golder Associates Ltd. (Golder) was retained by the City to complete a natural area screening study for the defined study area to delineate and describe important natural areas or features, and heritage sites. In Phase I of the Project, a desktop review of the study area was completed that examined heritage sensitivities, soils, vegetation, wildlife, species at risk, and wetlands, with the results provided in the Holmwood Phase I Technical Memorandum (Golder 2015).

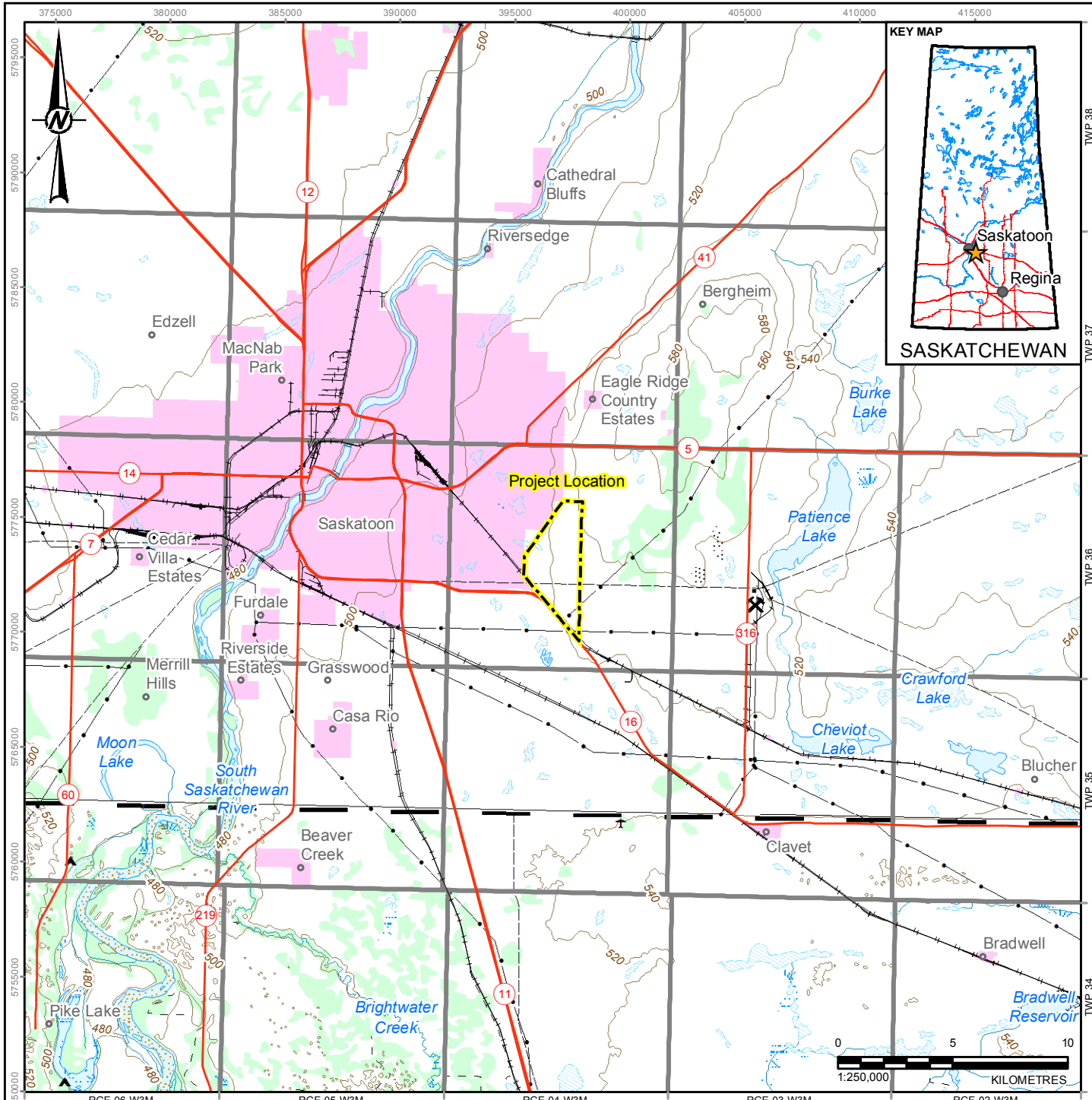
During Phase II of the Project, vegetation, wildlife, and habitat field surveys were conducted during the summer of 2015. These surveys focused primarily on wetlands, wooded patches, shelterbelts, and remnant native grassland that may be suitable for or support listed species. Also, a prioritized list of wetlands based on their wetland classification (Stewart and Kantrud 1971) was subjected to a more detailed functional assessment using the MnRAM (Minnesota Board of Water and Soil Resources 2007).

For the purpose of this report, all species identified by the Saskatchewan Conservation Data Centre (SKCDC), the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), and Schedule 1 of the *Species at Risk Act* (SARA) will be referred to as “listed species”. Specific rankings and/or designations for a species are provided in relevant tables contained within this report.

The information provided in this report will assist the City in identifying areas that are suitable for urban development and which areas should be protected and preserved from development when preparing land use plans such as Sector Plans and Concept Plans.

1.1 Study Area

The general location of the study area identified by the City for field assessments of listed plant and wildlife species is shown in Figure 1. The proposed study area is located near the southeast City limits and includes the NW 10, W ½ 15, Section 16, SE 21, W ½ 22, SW 27, and portions of E ½ 09, SW 10, NE 21, SW 21, SE 28, and NW 03-36-04 W3M. All land locations within the study area, and discussed in this report, are west of the third meridian (W3M). The study area is approximately 2.4 km wide by 4.8 km long, encompassing 883 hectares (ha) of land. Land tenure within the study area is privately owned. The study area is located in the Minichinas Upland and Elstow Plain Landscape Areas of the Moist Mixed Grassland Ecoregion (Acton et al. 1998).



CLIENT



PROJECT
HOLMWOOD SOUTHEAST

TITLE
GENERAL PROJECT LOCATION

CONSULTANT



YYYY-MM-DD	2015-06-01
PREPARED	SBM
DESIGN	JS
REVIEW	RK
APPROVED	ME

REFERENCE

NATIONAL TOPOGRAPHIC BASE DATA (NTDB) DATA: © DEPARTMENT OF NATURAL RESOURCES CANADA, 2007.
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NAD 83 UTM ZONE 13

PROJECT
1526165

Rev.
1

FIGURE
1

Path: G:\CLIENTS\CITY OF SASKATOON\Figures\1526165_COS_Holmwood\FIG 1 General Project Location.mxd

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2.0 VEGETATION COMMUNITIES AND LISTED PLANT SPECIES

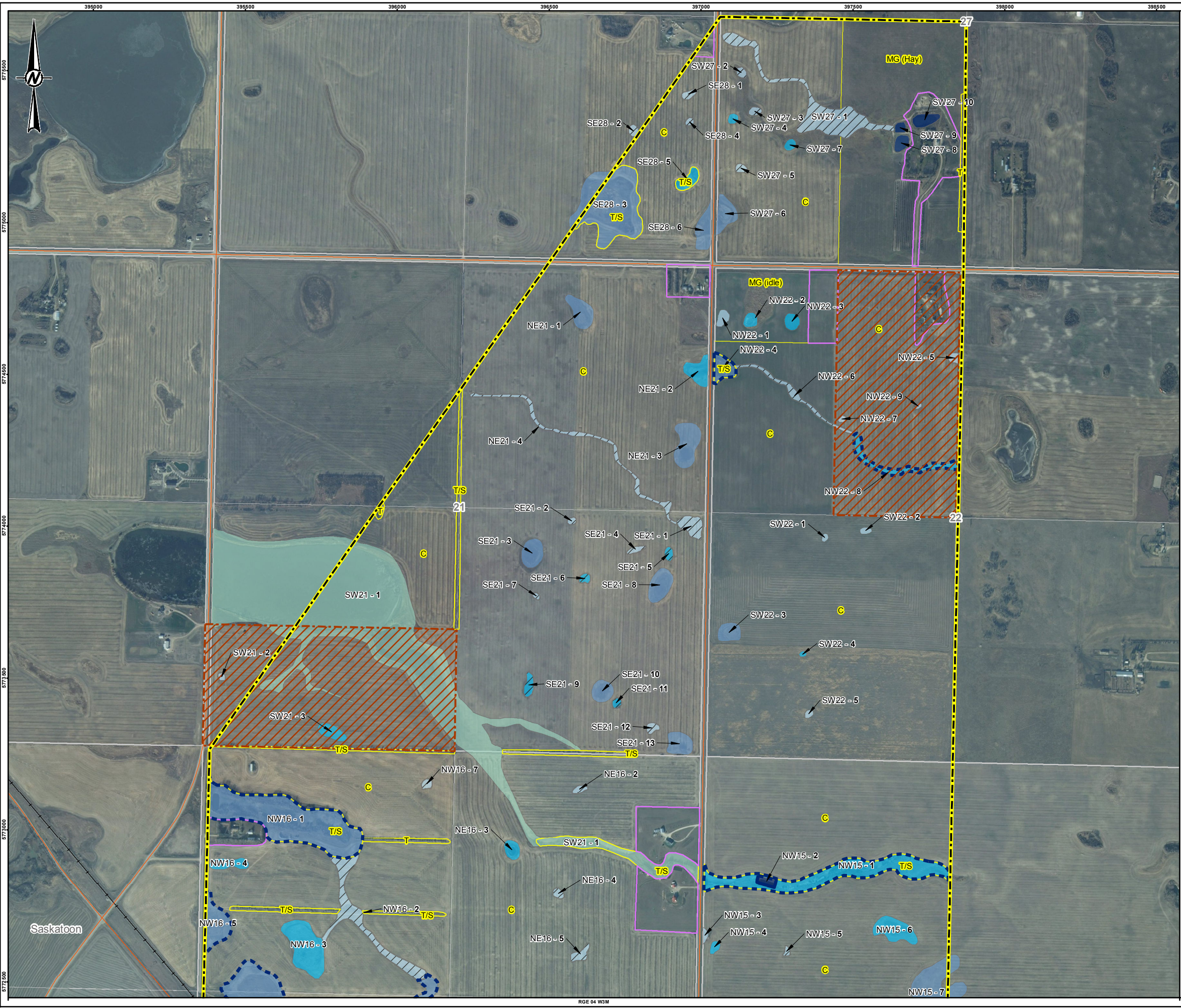
The Holmwood study area is located within the Moist Mixed Grassland Ecoregion, which represents the northern extent of open grasslands that extend from Saskatchewan south to Texas, U.S.A (Acton et al. 1998). These grasslands were historically maintained by a disturbance regime of grazing by plains bison (*Bison bison bison*), periodic drought, and fire that prevented the encroachment of trees and shrubs. Typical native grassland species of the Moist Mixed Grassland Ecoregion include several wheatgrass species, northern (*Elymus lanceolatus ssp. lanceolatus*), western (*Pascopyrum smithii*), awned (*Elymus trachycaulus ssp. subsecundus*), slender (*Elymus trachycaulus ssp. trachycaulus*), as well as needle and thread (*Hesperostipa comata ssp. comata*), and western porcupine grass (*Hesperostipa curtisetata*) (Acton et al. 1998). Plains rough fescue (*Festuca hallii*) is a grass species that occurs in mesic grassland areas and on north-facing slopes with suitable soils. Native tree and shrub species such as trembling aspen (*Populus tremuloides*), balsam poplar (*Populus balsamifera ssp. balsamifera*), and willow species (*Salix* spp.) were historically restricted to mesic areas in transition zones surrounding wetlands and in areas close to the water table.

Presently, native-dominant vegetation communities within the study area are interspersed among annual cropland and seeded modified grassland used for hay production. These native vegetation communities are usually found in small remnant patches associated with rough topography (i.e., hummocky morainal landscapes), drainages, low areas, wetlands, and other areas unsuitable for cultivation and annual crop production (Acton et al. 1998). Current native tree and shrub cover occurs in association with uncleared wetlands, while predominantly non-native tree and shrub species occur in active and non-active yard sites.

2.1 Vegetation Assessment

An initial review of the Google Earth (2015) imagery during Phase I of the Project showed limited native vegetation communities within the study area. The general vegetation community composition and structure was assessed, as well as the presence of listed vegetation species or occurrence of their preferred habitat, using a combination of road-side and pedestrian surveys conducted in the study area on August 11 and September 3, 2015, by Andrew Stewart (ecologist, Golder) and Amy Wheeler (terrestrial biologist, Golder). Using satellite and aerial imagery (Saskatchewan Geospatial Imagery Collaborative Web Mapping Service 2008-2011), representative wetland and terrestrial communities were selected in the study area for the field assessments. Pedestrian surveys were consistent with Saskatchewan Ministry of Environment (MOE) *Rare Prairie Plant Survey Protocol* (2015) and focused on areas with native plant communities or areas that had moderate to high potential to support listed species or had unique growing conditions. Ideally, two or three repeated vegetation assessments are recommended during a single growing season (MOE 2015); however, the timing of receiving landowner permission for access onto the lands within the Project study area only allowed the completion of one late-season vegetation survey per area (on either August 11 or September 3) during the growing season in 2015. Early, mid, and late-season surveys should occur between May 15 to June 20, June 21 to July 31, and August 1 to September 15, respectively (MOE 2015).

As the study area supports mostly agricultural or previously disturbed landscapes (Figure 2), the majority of the permanent vegetation communities are associated with wetlands, low areas, and isolated treed patches, active and non-active yard sites and shelterbelts. Native-dominant vegetation is generally limited to semi-permanent and permanent wetlands (i.e., wetlands that have not been cultivated), and isolated treed patches. Considering that the surface hydrological features are often the only remaining ecological habitat in an intensely modified landscape, and because these can be important habitats to both plant and wildlife species, an attempt was made to sample a variety of wetland types (e.g., ephemeral, temporary, seasonal, semi-permanent, and permanent), as defined by Stewart and Kantrud (1971).



LEGEND

- PROJECT AREA BOUNDARY
- PERMISSION TO ACCESS DENIED
- RECOMMENDED TO ASSESS USING MnRAM

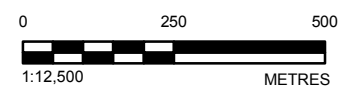
WETLAND CLASS

- II - TEMPORARY WETLAND
- II/T - TEMPORARY WETLAND - TILLED
- III - SEASONAL WETLAND
- III/T - SEASONAL WETLAND - TILLED
- IV - SEMI-PERMANENT WETLAND
- IV/V - SEMI-PERMANENT TO PERMANENT WETLAND
- V - PERMANENT WETLAND

HABITAT DELINEATION

YARD SITE

C - CROPLAND
 MG - MODIFIED GRASSLAND
 S - SHRUB
 T - TREED



REFERENCE(S)

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CLIENT **City of Saskatoon**

PROJECT **HOLMWOOD SOUTHEAST**

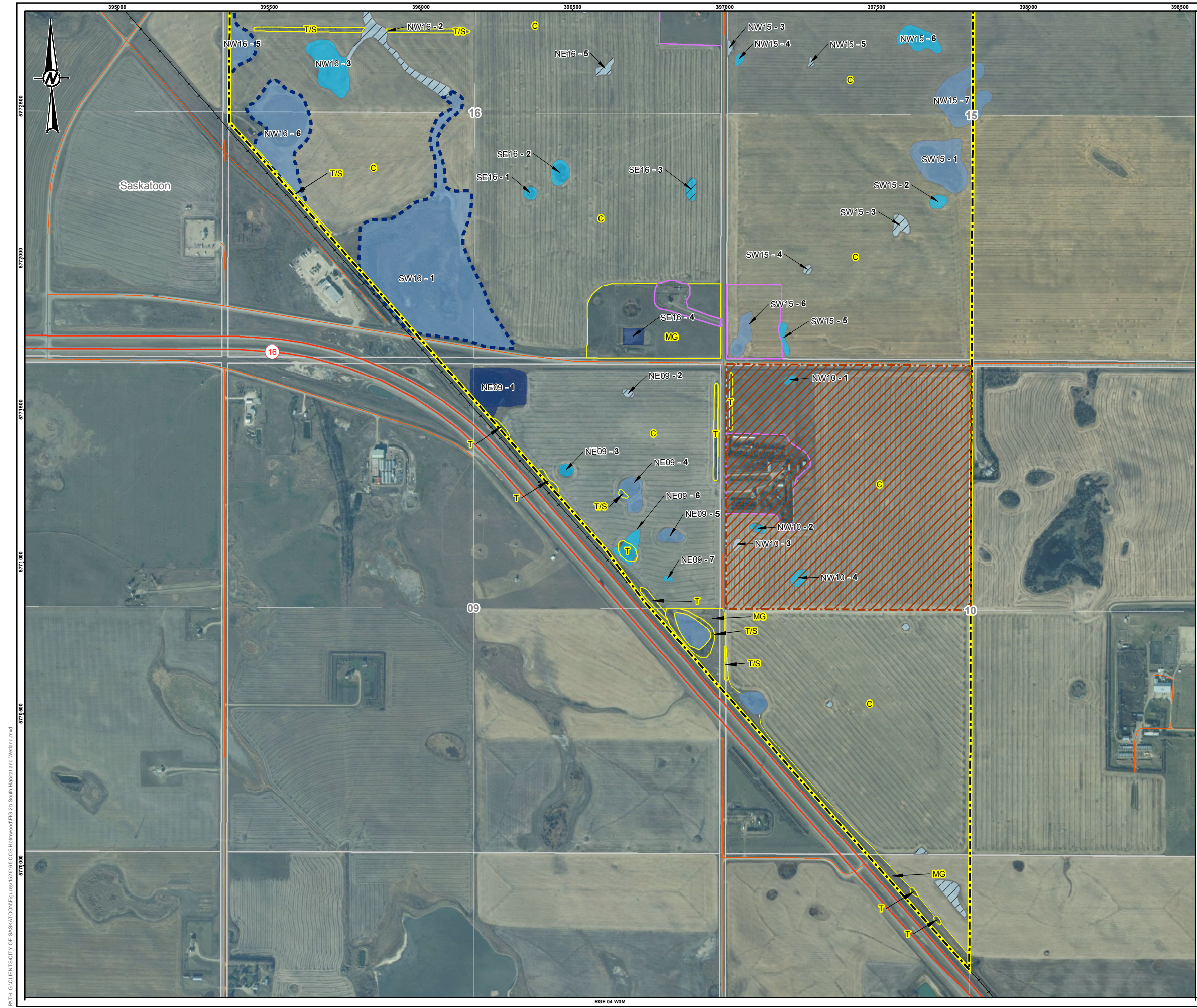
TITLE **HABITAT AND WETLAND LOCATIONS IN THE NORTH PORTION OF THE HOLMWOOD STUDY AREA**

CONSULTANT	DATE	BY
	YYYY-MM-DD	2015-11-13
	DESIGNED	JS
	PREPARED	SBM/LMS
	REVIEWED	RK
	APPROVED	ME

PROJECT NO. 1526165 REV. 5 FIGURE 2A

PATH: G:\CLIENTS\CITY OF SASKATOON\Gis\mxd\1526165\05_Holmwood\Fig 2a North Habitat and Wetland.mxd

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LEGEND

- PROJECT AREA BOUNDARY
- PERMISSION TO ACCESS DENIED
- RECOMMENDED TO ASSESS USING MnRAM

WETLAND CLASS

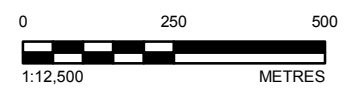
- II - TEMPORARY WETLAND
- II/T - TEMPORARY WETLAND - TILLED
- III - SEASONAL WETLAND
- III/T - SEASONAL WETLAND - TILLED
- IV - SEMI-PERMANENT WETLAND
- IV/V - SEMI-PERMANENT TO PERMANENT WETLAND
- V - PERMANENT WETLAND

HABITAT DELINEATION

- HABITAT DELINEATION
- YARD SITE

LAND USE

- C** - CROPLAND
- MG** - MODIFIED GRASSLAND
- S** - SHRUB
- T** - TREED



REFERENCE(S)

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CLIENT

PROJECT
WETLAND LOCATIONS IN THE SOUTH PORTION OF THE HOLMWOOD STUDY AREA

TITLE
HABITAT AND WETLAND LOCATIONS IN THE SOUTH PORTION OF THE HOLMWOOD STUDY AREA

CONSULTANT	DATE	REVISION
	YYYY-MM-DD	2015-11-13
	DESIGNED	JS
	PREPARED	LMS
	REVIEWED	RK
	APPROVED	ME

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The main vegetation cover type on every quarter section within the study area is annual cropland. Modified grassland used for hay production occupies the east half of the SW 27-36-04. One area of modified grassland that appears to have been left idle in 2015 was observed in the northwest portion of NW 22-36-04 W3M. The adjacent land on this quarter section is annual cropland, suggesting that the modified grassland area may have been left unseeded due to a subdivision in the quarter or due to the area being repeatedly too wet to seed in the spring. An additional area of modified grassland, wetlands and associated trees and shrubs occurs adjacent to the existing railway track in the SE 09 and SW 10-36-04.

During the August and September 2015 surveys, a total of 84 plant species were identified in the study area (Appendix A, Table A-1). Common species observed included a mixture of both introduced and native grasses and forb species. Introduced grasses include crested wheatgrass (*Agropyron cristatum*) and smooth brome (*Bromus inermis*). Native grass species were associated with wetlands and low areas, and included slough grass (*Beckmannia syzigachne*), spangletop (*Scolochloa festucacea*), and tufted hair grass (*Deschampsia cespitosa* ssp. *cespitosa*). Common native forb species included several dock species (*Rumex occidentalis*; *R. crispus*; *R. maritimus*), common water plantain (*Alisma trivale*), small yellow water-crowfoot (*Ranunculus gmelinii*), while common introduced forbs included sweet clover species (*Melilotus albus*; *M. officinale*).

The majority of the wetland habitat observed in the study area consisted of seasonal, semi-permanent, or permanent wetlands as classified by Stewart and Kantrud (1971). These wetlands support fresh wet meadow, shallow marsh, deep marsh, and shallow open water vegetation zones. Foxtail barley (*Hordeum jubatum*) and other pioneer-type vegetation species were common in fresh wet meadow zones that were regularly disturbed by cultivation during agricultural practices. Smooth brome was common as the understory in isolated patches of treed cover, along shelterbelts and in roadside ditches. Common cattail (*Typha latifolia*) and lesser duckweed (*Lemna minor*) were commonly observed in the central portions or open water zones of the wetlands. Slough grass, whitetop, Baltic rush (*Juncus balticus*), common water plantain and several sedge species (*Carex* spp.) commonly occupied the shallow and deep marsh zones. Several wetlands were surrounded with a ring of shrub species, primarily populations of willow species, rose (*Rosa woodsia*; *R. acicularis*) and trembling aspen. Other tree and shrub species, often non-native species, including hybrid poplar (*Populus* spp.) and caragana (*Caragana arborescens*), were associated with shelterbelts and yard sites within the study area.

2.2 Weed Species

Several of the vegetation species observed during the field surveys are considered weedy and/or invasive and are typically associated with wetland and field margins, and road ditches (Appendix A, Table A-1). These include noxious weeds designated under *The Weed Control Act* (2010) such as annual sow-thistle (*Sonchus asper*), perennial sow-thistle (*Sonchus arvensis*), Canada thistle (*Cirsium arvense*), annual hawks-beard (*Crepis tectorum*), round-leaved mallow (*Malva rotundifolia*), and kochia (*Kochia scoparia*). Russian thistle (*Salsola kali*), foxtail barley, creeping wild rye (*Elymus repens*), and common dandelion (*Taraxacum officinale*) are designated nuisance weed species according to *The Weed Control Act* (2010). No prohibited weeds were observed in the study area.



2.3 Listed Plant Species

No provincially tracked or federally listed plant species were observed during the field surveys; however, this does not preclude their presence in the study area. Limited, suitable habitat was observed during the field survey for all four provincially listed species (i.e., Engelmann’s spikerush [*Eleocharis engelmannii*], narrow leaved water plantain [*Alisma gramineum*], blunt leaved yellow cress [*Rorippa curvipes* var. *truncata*], and tall beggar’s tick [*Bidens frondosa*]) that were previously identified as occurring in areas adjacent to the study area.

Based on information obtained from the Saskatchewan Conservation Data Centre (SKCDC) (2015) database, and last confirmed on November 9, 2015, a single provincially listed tracked plant species, Engelmann’s spikerush was previously observed within the study area on September 8, 1965, on the north side of NW 21-36-04. In addition, three additional provincially tracked species, narrow leaved water plantain, blunt leaved yellow cress, and tall beggar’s tick were previously identified by Golder field staff during assessments for the adjacent City of Saskatoon East Sector Summer Natural Screening Area in 2011 (Golder 2011). The provincially listed plant species that have been observed in the general area and have the potential to occur within the study area are shown in Table 1. The locations of these provincially listed plant observations are provided in Figure 3. No federally listed plant species have been reported as occurring within the study area.

Table 1: Provincially Tracked Plant Species Identified within 2 km of the Project Study Area

Common Name	Scientific Name	Provincial Ranking	Preferred Habitat ¹
Narrow leaved water plantain	<i>Alisma gramineum</i>	S3	Wet to drying muddy lakeshores, mud-flats, and sloughs
Engelmann’s spikerush	<i>Eleocharis engelmannii</i>	S3	Drying, open slough bottoms and tilled field depressions
Blunt leaved yellow cress	<i>Rorippa curvipes</i> var. <i>truncate</i>	S3	Margins of prairie sloughs and moist depressions in cultivated fields
Tall beggar’s tick	<i>Bidens frondosa</i>	S3	Wet shores and ditches

¹Source: Harms et al. 1992.

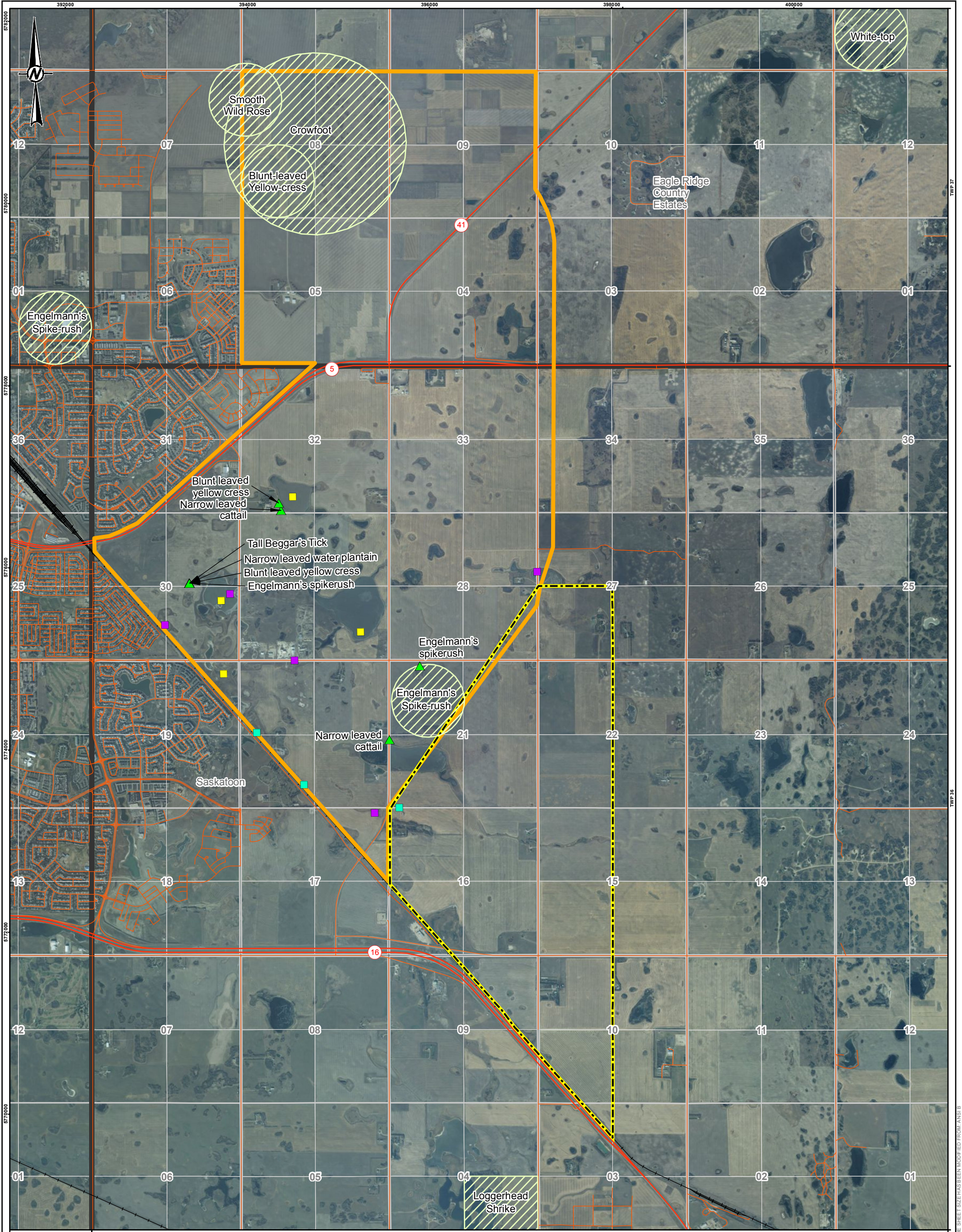
Provincial Rank Definitions

S1 Extremely Rare – 5 or fewer occurrences in Saskatchewan, or very few remaining individuals.

S2 Rare – 6 to 20 occurrences in Saskatchewan, or few remaining individuals.

S3 Rare/Uncommon – 21 to 100 occurrences in Saskatchewan; may be rare and local throughout province or may occur in a restricted provincial range (may be abundant in places).

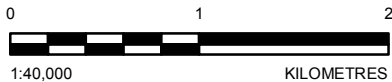
SNR – species not ranked.



- LEGEND**
- GOLDER 2011 OBSERVATIONS**
- BARN SWALLOW SIGHTING
 - HORNED GREBE SIGHTING
 - LOGGERHEAD SHRIKE SIGHTING
 - ▲ LISTED PLANT LOCATION
 - 2011 STUDY AREA BOUNDARY
 - 2015 PROJECT AREA BOUNDARY
 - HISTORICAL RARE PLANT OCCURRENCE (SKCDC)

REFERENCE(S)

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CLIENT **City of Saskatoon**

PROJECT
HOLMWOOD SOUTHEAST

TITLE
LOCATION OF LISTED PLANTS AND WILDLIFE IDENTIFIED IN THE 2011 & 2015 PROJECT AREAS

CONSULTANT		DATE	
	YYYY-MM-DD	2015-11-13	
	DESIGNED	RK	
	PREPARED	SBM/LMS	
	REVIEWED	RK	
	APPROVED	ME	

PROJECT NO. 1526165 REV. 3 FIGURE 3

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Engelmann's Spikerush

The habitat for this annual species is described as fresh shores, marshes, and disturbed places (Flora of North America 2015a) or as drying open slough bottoms and tilled field depressions (Harms et al. 1992). Spike rushes, like many sedge species, are a difficult group of plants to identify at the field level or because correct identification is often determined by characteristics that can only be observed under a microscope. As such, the distribution of less common species within this group of plants could be underestimated due to limited collection and proper identification. Its limited occurrence could also be attributed to site-specific growing conditions required on an annual basis or that suitable growing conditions for this species are found around the transitional margins of wetland depressions which, depending on annual water levels, are usually tilled or cultivated during seeding.

According to the Flora of North America (2015a), this species is documented in most states (except the eastern seaboard) and most provinces along the 49th parallel. However, in Saskatchewan and a few central States, its distribution has not been confirmed. As such, the documented occurrences of this species in the province are limited to 12 locales (Harms et al. 1992) and the lack of documentation in provinces/territories and northern states could indicate the documented locations of this species are isolated outliers along the northern fringes of its distribution.

Narrow Leaved Water Plantain

Narrow leaved water plantain is restricted in its North American distribution to the central and eastern plains regions (Flora of North America 2015b). Its distribution in Saskatchewan marks part of its known northern range. This species is similar in appearance to common water plantain (*Alisma trivale*); however, narrow leaved water plantain, has narrow, more linear leaves and the flower head is decumbent (flopped over) rather than erect (standing straight up).

Little is known about narrow leaved water plantain's preferred habitat, but it is assumed that it is similar to common water plantain. The latter is typically found in the central depressions of Class 2 or Class 3 wetlands (Stewart and Kantrud 1971), where water is shallow or dries into exposed mud flats (Harms et al. 1992). However, the species is also found around the drying mud margins or shallow standing water areas of Class 4 or Class 5 wetlands. Suitable habitat for plantain species is present around several wetlands, both within and outside the study area. It appears that the plant either establishes only occasionally or is frequently overlooked due to similarity in appearance to the commonly occurring species.

Blunt Leaved Yellow Cress

Blunt leaved yellow cress is a widespread annual species found in western and central North America with its occurrence in Saskatchewan representing part of its northern distribution. This plant is short-lived and found in terrestrial or wet, but not submerged habitat. This species can be found along muddy shores of lakes and wetlands, stream beds and banks, edges of cultivated fields, wet roadside, meadows, seepage areas, ditches, creeks, and gravel bars (Harms et al. 1992, Flora of North America 2015c).

Factors that may influence blunt leaved yellow cress occurrence could be either their site-specific growing conditions that may change on an annual basis or suitable growing conditions for this species may often occur in an area, that for the most part, is typically cultivated in most fields. This small, non-descript weedy species is also likely and easily overlooked.



Like several annuals, this species may be more abundant in some years than others, and located in an area one year and not the next, if conditions are unsuitable. Therefore, location and abundance from year to year could be highly unpredictable.

Tall Beggar's Tick

Tall beggar's tick is a widespread species in North America, with the Canadian provinces demarking the northern extent of its range (Harms et al. 1992). This annual species can be found in a variety of habitats including moist woods, meadows, thickets, fields, roadsides, railways, borders of streams, wetlands, sloughs, swamps, and ditches (Harms et al. 1992). The conditions preferred by this species are often already occupied by highly competitive perennial plant species. As an annual, suitable seed germination sites may be limited in established plant communities.

2.4 Vegetation Summary

During the 2015 survey, no rare or endangered plants, as defined by SARA and COSEWIC (2015), were observed. No provincially tracked species were identified; however, limited, suitable habitat is present in the study area for several provincially tracked species, including those discussed above. The preferred habitats are typically associated with wetlands and wetland margins. These habitat types in the study area are not limited in the region. Nonetheless, wetlands and their margins are under continuous pressure by development and agricultural practices that influence the features directly and indirectly by altering surface water flow (recharge) to the basins and/or create isolation between basins.

3.0 WILDLIFE AND WILDLIFE HABITAT

The study area is located in the Moist Mixed Grassland Ecoregion of the Prairie Ecozone. This Ecoregion reportedly supports 51 mammal species including white-tailed deer (*Odocoileus virginianus*), mule deer (*Odocoileus hemionus*), moose (*Alces alces*), coyote (*Canis latrans*), porcupine (*Erethizon dorsatum*), muskrat (*Ondatra zibethicus*), Richardson's ground squirrel (*Urocitellus richardsonii*), thirteen-lined ground squirrel (*Ictidomys tridecemlineatus*), meadow vole (*Microtus pennsylvanicus*), deer mouse (*Peromyscus maniculatus*), and masked shrew (*Sorex cinereus*) (Acton et al. 1998).

Within the study area, wetlands, modified grassland, and treed areas provide suitable habitat for mammals such as ungulates and carnivores, and avian species including songbirds and waterbirds. These habitats provide forage and thermal and escape cover for wildlife. Nesting habitat is present and trees, wetlands, and modified grassland depending on the preferences of a specific avian species. Cropland may function as additional forage, cover, and nesting habitat for some wildlife species such as the white-tailed deer (*Odocoileus virginianus*) and horned lark (*Eremophila alpestris*).

Typically, wetland habitats with greater structural heterogeneity will support a wider variety of wildlife species, as more ecological niches are available, and therefore, have a higher relative importance or "value" (Waple 1999). Parameters of the basin size and structure, and hydrological regime of each wetland dictate the types of vegetation communities and habitat associations, and ultimately, which wildlife species they will support (Environment Canada 2000).

3.1 Phase I – Desktop Assessment

The search of the SKCDC (2015) database indicated one wildlife species adjacent to the study Area. A historical record of a loggerhead shrike (*Lanius ludovicianus excubitorides*) was identified in the SE 4-36-4 W3M, approximately 2.4 km south of the study area. However, the SKCDC database did not identify whether this observation was a nest or sighting of an individual, and did not give the date or year of the observation.



Surveys performed by Golder in 2011 for the City of Saskatoon - East Sector Natural Area Screening (Golder 2011) were conducted immediately northwest of the study area. Listed wildlife observations for the East Sector Natural Area Screening (Golder 2011) include loggerhead shrike, horned grebe (*Podiceps auritus*), and barn swallow (*Hirundo rustica*) (Figure 3).

Representative habitat types that could potentially support listed wildlife species (e.g., wetlands, treed cover) were selected for the field assessment by using Google Earth (2015) imagery.

3.2 Phase II – Field Assessment

Wildlife surveys consisted of roadside and pedestrian observations, with wetland and surrounding terrestrial habitat scanned with the aid of binoculars and a spotting scope, when required. Jeremi Skelton (biological technician, Golder) and Amy Wheeler (terrestrial ecologist, Golder) conducted the surveys on June 23 and 24, 2015 and September 3, 2015. Direct observations of species, as well as their detection sign (e.g., tracks, dens, burrows, nests, feeding cavities, beds, scat/pellets, digs, and browse scars) were documented and recorded. Important sightings, such as listed wildlife species, were marked using global positioning system (GPS) coordinates.

Fourteen species of birds, three species of mammals, and one species of amphibian were observed or heard during the surveys (Table 2). The most common species recorded within the study area during the surveys were American coot (*Fulica americana*) and green-winged teal (*Anas carolinensis*).

Table 2: Wildlife Species Observed During the 2015 Field Surveys for the Project

Common Name	Scientific Name	Common Name	Scientific Name
Birds			
Green-winged teal	<i>Anas carolinensis</i>	Rock pigeon	<i>Columba livia</i>
Northern shoveler	<i>Anas clypeata</i>	Blue jay	<i>Cyanocitta cristata</i>
Blue-winged teal	<i>Anas discors</i>	American coot	<i>Fulica americana</i>
Mallard	<i>Anas platyrhynchos</i>	Grey partridge	<i>Perdix perdix</i>
Canada goose	<i>Branta canadensis</i>	Black-billed magpie	<i>Pica hudsonia</i>
American goldfinch	<i>Carduelis tristis</i>	Black-capped chickadee	<i>Poecile atricapillus</i>
Northern harrier	<i>Circus cyaneus</i>	Clay coloured sparrow	<i>Spizella pallida</i>
Mammals			
Coyote	<i>Canis latrans</i>	Red fox	<i>Vulpes vulpes</i>
Deer species	<i>Odocoileus sp.</i>	-	-
Amphibians			
Boreal chorus frog	<i>Pseudacris maculata</i>	-	-

3.3 Listed Wildlife Species

Several listed wildlife species have ranges that overlap the study area, and could be supported if suitable habitat in terms of quality, distribution and size is present. Presence of listed wildlife species can often depend on weather conditions, year to year habitat changes and nearby land use. Appendix B lists the wildlife SAR that have the potential to occur in the study area, including comments on the potential for occurrence.



No listed wildlife species were observed during the 2015 surveys; however, historical records of the following three listed wildlife species have been identified within and adjacent to the study area:

- loggerhead shrike;
- horned grebe;
- barn swallow.

Locations for the historical sightings of these species are provided in Figure 3.

3.4 Wildlife Summary

During the 2015 survey, no listed wildlife, as defined by SARA and COSEWIC (2015), were observed. Wildlife habitat is fragmented and limited in quantity and quality within the study area. Suitable habitat is limited to wetlands, modified grassland, and treed cover. The study area is dominated by chronically disturbed agricultural land and has a nearly constant human presence. However, listed wildlife have been previously observed adjacent to the study area and may periodically use or travel through the Project study area. Common wildlife species that are adapted to agriculture and human presence will use the available habitat throughout the study area.

4.0 SOILS

Soils in the study area are predominantly Orthic Chernozemic soils. A general description of the characteristics of each map unit within the study area is summarized in Table 3. The Project is located within the Dark Brown Soil Zone of Saskatchewan and contains five unique Soil Map Units (Figure 4). The Hanley (39%; 230,383 hectares [ha]) and Elstow-Hanley (21%; 125,514 ha) associations are the dominant soil associations that occur within the study area.

Soil map units are defined as simple or compound units (Agriculture Canada 1982, 1991). Simple map units are delineated when one soil association represents over 85% of the polygon area. Compound map units are delineated when two soil associations occur in the same polygon as dominant (60% to 70% of the polygon area) and subdominant (25% to 30% of the polygon area). All soil polygons may have up to 15% soil inclusions of other soil types not described in the map unit; these are soils that occur within a map unit but are not extensive enough to be distinguished separately or defined as subdominant.

Table 3: Soil Associations and Map Units Encountered within the Project Study Area

Association(s) ^(a)	Map Unit ^(b)	Map Unit Description ^(c)	Parent Material ^(d)	Dominant Surface Texture(s) ^(a)
Bradwell	Br 3	Dominant soils – Orthic Dark Brown Chernozems ⁽¹⁾	Medium to moderately fine textured, moderately calcareous, sandy glacio-fluvial and lacustrine deposits overlaying glacial till	Fine Sandy Loam and Loam
		Subdominant soils – Eluviated Dark Brown Chernozems		
Elstow	Ew 3	Dominant soils – Orthic Dark Brown Chernozems	Medium to moderately fine textured, moderately calcareous silty glacio-lacustrine materials overlying glacial till	Loam
		Subdominant soils – Eluviated Dark Brown Chernozems		
Elstow-Hanley	EwHy 1	Dominant soils – Orthic Dark Brown Chernozems (Elsow)	Silty lacustrine materials	Loam and Clay Loam
		Subdominant soils – Dark Brown Solonchic ⁽²⁾ soils (Hanley)		



Table 3: Soil Associations and Map Units Encountered within the Project Study Area

Association(s) ^(a)	Map Unit ^(b)	Map Unit Description ^(c)	Parent Material ^(d)	Dominant Surface Texture(s) ^(a)
Hanley	Hy 1	<u>Dominant soils</u> – Dark Brown Solonetzic soils	Medium to moderately fine textured, moderately calcareous and saline silty glaciolacustrine materials.	Clay Loam
Scott	St 3	<u>Dominant soils</u> – Orthic Dark Brown Chernozems	Silty glaciolacustrine deposits underlain by a sand layer overlying till	Loam and Clay Loam
		<u>Subdominant soils</u> – Eluviated Dark Brown Chernozems		

^(a) A soil complex represents different soils that have developed on various parent materials and have various textures.

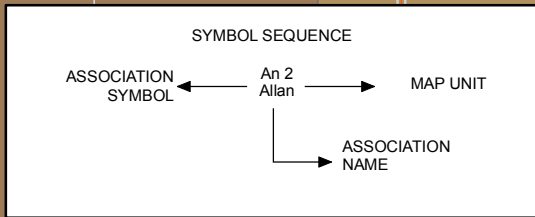
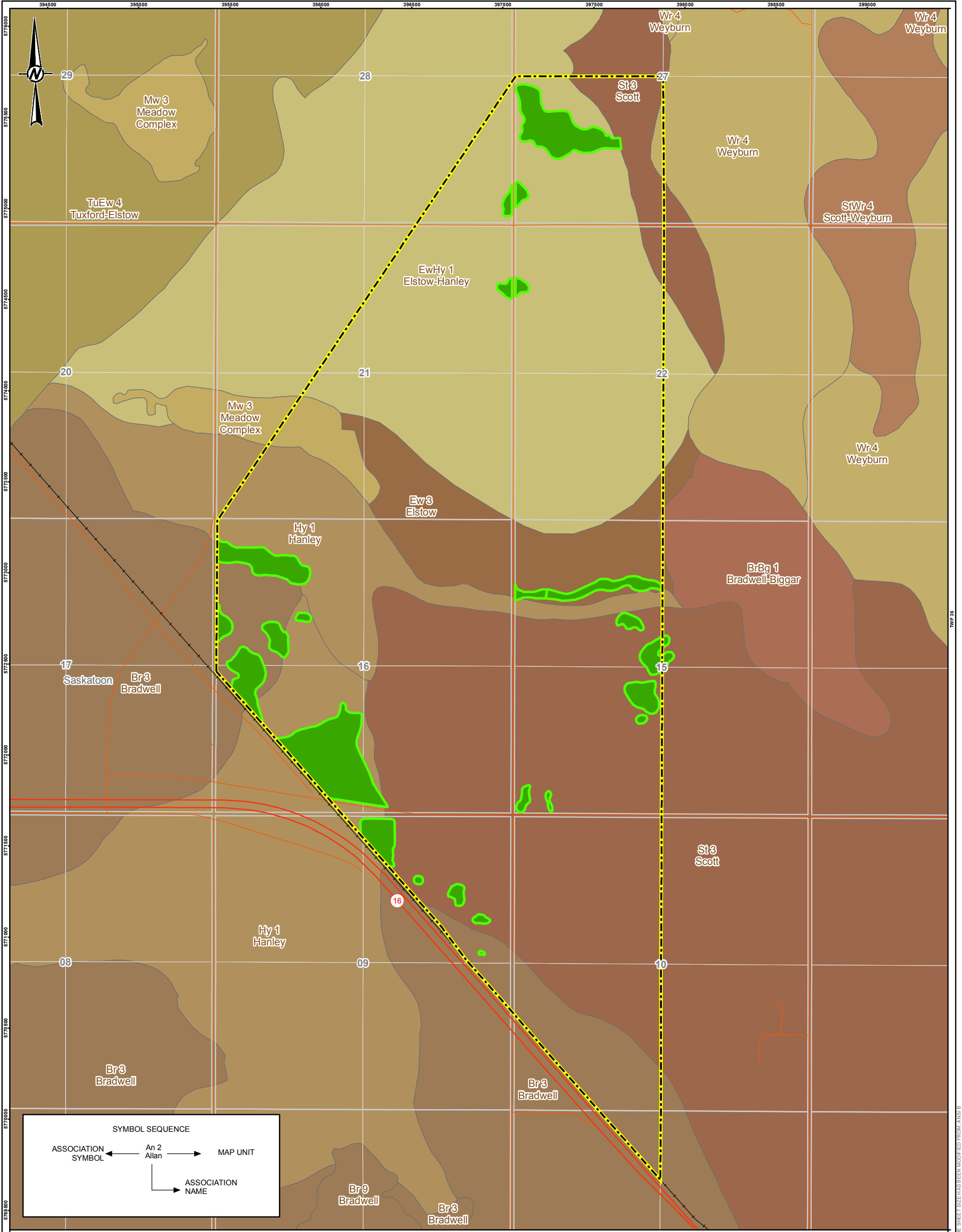
^(b) SLRU (2004).

^(c) SLRU (1997).

⁽¹⁾ Chernozem - well developed, organic matter enriched grassland soils.

⁽²⁾ Solonetzic - subsoil is saline (sodium salts)





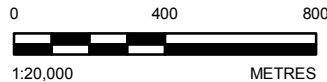
- LEGEND**
- 2015 PROJECT AREA BOUNDARY
 - MNRAM ASSESSED WETLAND

NOTE(S)

1. THE NUMBERS SHOWN WITH ASSOCIATION LABELS ARE TERMED MAP UNITS AND INDICATE DIFFERENT AND SPECIFIED COMBINATIONS OF SOIL SUBGROUP PROFILES WITHIN AN ASSOCIATION THAT ARE THE RESULT OF VARIATIONS IN TOPOGRAPHY, DRAINAGE OR ASPECT.

REFERENCE(S)

1. SOILS DATA: SASKATCHEWAN LAND RESOURCE UNIT - AGRICULTURE AND AGRI-FOOD CANADA, 2004. DIGITAL SOIL RESOURCE INFORMATION FOR AGRICULTURAL SASKATCHEWAN SKSISV2, 1:100,000 SCALE.
2. CANVEC BASE DATA: © DEPARTMENT OF NATURAL RESOURCES CANADA, 2012. ALL RIGHTS RESERVED. NAD 83 UTM ZONE 13



DRAFT

CLIENT **City of Saskatoon**

PROJECT **HOLMWOOD SOUTHEAST**

TITLE **SOIL ASSOCIATIONS ENCOUNTERED IN THE HOLMWOOD STUDY AREA**

CONSULTANT	YYYY-MM-DD	2015-11-13
	DESIGNED	JS
	PREPARED	SBM/LMS
	REVIEWED	-
	APPROVED	-

PROJECT NO. 1526165 REV. B FIGURE 4

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B



4.1.1 Agriculture Capability

Soils in the study area were rated for agriculture capability based on published soil surveys in the form of digital information obtained from the Saskatchewan Land Resource Unit (SLRU) (2004). The definitions for the agriculture capability classes and subclasses that occur in the study area are outlined in Table 4 and Table 5. Agriculture capability classes for soils in the study area range from Class 3 to Class 4. The major limitations for crop production within the agriculture capability classes include unfavourable soil structure and/or insufficient soil water holding capacity (Agriculture and Agri-Food Canada [AAFC] 2005).

Table 4: Agriculture Capability Classes for the Soils Encountered within the Project Study Area

Agriculture Capability Class	Description of Capability Class
Class 3	Soils have moderately severe limitations that restrict the range of crops or require special conservation practices, or both.
Class 4	Soils have severe limitations that restrict the range of crops or require special conservation practices, or both.

Source: AAFC et al. (2005).

Table 5: Agriculture Capability Subclasses for the Soils Encountered within the Project Study Area

Agriculture Capability Subclass	Description of Capability Subclass
Subclass D (soil structure)	Depicts adverse soil structure in the A and B horizons that affects the condition of the seed bed, prevents or restricts root growth, and moisture permeability or percolation.
Subclass M (soil water holding capacity)	Depicts an insufficient soil water-holding capacity, due to the combined effects of the textural characteristics of the top 1m and by the organic matter content of the surface horizon.

Source: AAFC et al. (2005).

4.1.2 Erosion Sensitivity

The sensitivity of soil to water and/or wind erosion is influenced by many factors including soil particle size and surface texture, organic matter content, water content, permeability, topography, slope gradient, vegetation cover, natural events (e.g., freeze-thaw, large rainfall events), and human activities that cause soil disturbance (Cruse et al. 2001; Transportation Association of Canada [TAC] 2005). Erosion involves the detachment of soil particles, transport by water or wind, and subsequent deposition (Cruse et al. 2001; TAC 2005). Water and wind erosion differ through the processes that move detached soil particles, and each process of erosion affects soil textures differently. The outcome of soil erosion is important because of potential off-site effects (Kuhn and Bryan 2004). These effects include the sedimentation of adjacent water bodies, and more importantly, the release of compounds that may be present in the sediment, which can dissolve and be released into water and potentially cause changes to water quality. Many of the factors that affect soil erosion can be controlled to some extent during construction (TAC 2005).



4.1.3 Water Erosion

The potential for water erosion of soil is affected by soil texture, organic matter content, water content, permeability, topography, slope length and gradient, and vegetation cover. Water erosion can occur during short-term construction activities, including soil handling, water transfers, slope failures, in-stream work, and construction of temporary access. The purpose of assessing water erosion potential is to determine which best management practices (BMPs) should be considered during and following construction to decrease the possibility of soil loss through water erosion.

Soil that has been disturbed or is stockpiled has the greatest risk of erosion. The water erosion potential represents the erosion risk for a given soil type when it is left un-vegetated or without other protection following construction. Water erosion potential for soil map units within the study area was determined based on the digital information obtained from SLRU (2004). These ratings are an estimation of potential erosion for an entire map unit and individual soils may occur within the area that varies from the assigned water erosion potential.

Soils within the study area are typically rated as having very low to low water erosion potential (Table 6). Areas of soil disturbed during construction are recommended to be re-vegetated following construction to reduce soil loss due to water erosion.

Table 6: Soil Sensitivities and Construction Considerations for Soils Encountered within the Project Study Area

Soil Map Unit	Agriculture Capability ^{(a)(b)}	Agriculture Capability Symbol ^{(a)(c)}	Surface stoniness ^(a)	Erosion Potentials ^{(a)(d)}	Salinity ^{(a)(e)}
Br 3	Fair	3(10)M	Unclassified	Wind – Low to Moderate	Non-saline
				Water – Very Low	
Ew 3	Fair	3(10)M	Unclassified	Wind – Low	Non-saline
				Water – Low-Dissected	
EwHy 1	Fair	3(8)M4(2)D	Unclassified	Wind – Low	Non-saline
				Water – Very Low	
Hy 1	Fair	3(8)M4(2)D	Unclassified	Wind – Low	Non-saline - Weakly saline
				Water – Very Low-Dissected	
St 3	Fair	3(10)M	Unclassified	Wind – Low	Non-saline
				Water – Very Low to Low-Dissected	

^(a) SLRU (2004).

^(b) General ranking of soil capability for the production of common field crops.

^(c) The first number indicates the capability class, the bracketed number indicates the percent of the area, and the letters indicate the subclass. Example: 3(10)M means that 100% of the area was placed in Class 3 because of limitations due to an insufficient soil water-holding capacity.

^(d) Water and wind erosion potentials are based on areas that have not had mitigation measures applied. Dissected refers to areas of shallow gullies that indicate that higher rates of erosion may occur on the steeper slopes along the edges of the dissections if they are left unprotected.

^(e) Non-saline = 0 to 2 deciSiemens per metre (dS/m); there are no visible effects of salts on the growth of crops or yield loss; weakly saline = 2 to 4 dS/m, yield of very sensitive crops may be restricted; cereal crops are generally unaffected.

Note: Ratings assigned to an area are an average for the entire map unit and individual soils may occur within the map unit that differ from the assigned rating.



4.1.4 Wind Erosion

The potential for wind erosion of soil is affected by vegetation cover, wind velocity, soil water content, soil texture, soil structure, and soil disturbance. In general, coarse (sandy) textured soils are more prone to wind erosion than finer (clay) textured soils. Sandy textured soils typically do not have a well-developed soil structure. The lack of soil structure is due to limited soil aggregation or adhesion of the soil particles and therefore, does not form larger and more stable soil aggregates. Aggregated soil particles are less likely to be moved by wind. The purpose of assessing soil susceptibility to wind erosion is to determine the types of BMPs that will be considered during and following construction to decrease the possibility of soil loss through wind erosion.

The wind erosion potential represents the erosion risk for a given soil type when it is left unvegetated or without other protection following construction. Wind erosion potential for soil map units within the study area was determined based on the digital information obtained from SLRU (2004). These ratings assigned to an area are also an estimation of potential erosion for the entire map unit and individual soils may occur within the area that varies from the assigned wind erosion potential. Soils within the study area are rated as having low to moderate wind erosion potential. A summary of the wind erosion potential for each map unit within the study area is presented in Table 6.

4.1.5 Saline Soils

Salinity extent, degree, and typical landscape positions affected by salinity for each map unit are summarized in Table 6. The soils examined within the study area are non-saline (electrical conductivity 0 to 2 deciSiemens per metre [dS/m]) and weakly saline (electrical conductivity 2 to 4 dS/m). Saline soils typically occur in depressions, sloughs, dissections, and/or runways.

4.1.6 Stoniness

Map units within the study area have unclassified surface stoniness due to these areas exhibiting variable surface stoniness (Table 6).

4.1.7 Soils Summary

Table 6 describes the attributes of each soil map unit within the study area. Water and wind erosion potentials are based on areas that have not had mitigation measures applied.

5.0 WETLANDS

5.1 Phase I – Stewart and Kantrud Wetland Classification System

For the purpose of this report, a wetland is defined as land that has the water table at, near, or above the land surface or which is saturated for a long enough period to promote wetland or aquatic processes as indicated by hydric soils, hydrophytic vegetation, and various kinds of biological activity which are adapted to the wet environment (National Wetlands Working Group 1988).

Stewart and Kantrud (1971) developed a system for classifying wetlands for the glaciated prairie region. This classification system was published in a document titled the *Classification of Natural Ponds and Lakes in the Glaciated Prairie Region*, and is based on categorizing a wetland basin by distinguishing the dominant vegetative species, occurring in the central or deepest portion of a wetland basin occupying 5% or more of the total wetland area being classified. Definitions of each class of wetland are provided in Table 7.



Table 7: Classes of Lakes and Wetlands in the Prairie Region

Permanency Class	Type of Class	Definition of Class	Definition of Zone	Typical Dominant Vegetation Examples
Class I (Class T)	Ephemeral (Tilled)	Ephemeral - the low prairie zone dominates the deepest part of the pond basin.	Low prairie - vegetation may occupy the central area of a pond. Surface water is maintained for only a brief period in the early spring before the bottom ice seal disappears.	<ul style="list-style-type: none"> ■ Kentucky bluegrass (<i>Poa pratensis</i>) ■ slender wheatgrass (<i>Elymus trachycaulus ssp. trachycaulus</i>) ■ Western snowberry (<i>Symphoricarpos occidentalis</i>)
		Tilled - many wetlands in cropland are tilled and can be classified as Class I to III if emergent vegetation is present.		
Class II	Temporary	Temporary - the wet-meadow zone dominates the deepest part of the wetland area. A peripheral low-prairie zone is usually present.	Wet-meadow - vegetation occupies the central areas of shallower pond basins and commonly occurs as a peripheral band in most of the deeper ponds and lakes. Water loss from bottom seepage is fairly rapid in this zone, and is maintained for only a few weeks after the spring snowmelt and occasionally for several days after heavy rainstorms in late spring, summer, and fall.	<ul style="list-style-type: none"> ■ fowl bluegrass (<i>Poa palustris</i>) ■ Baltic rush (<i>Juncus balticus</i>) ■ Sartwell's sedge (<i>Carex sartwellii</i>)
Class III	Seasonal	Seasonal - the shallow-marsh zone dominates the deepest part of the wetland area. Peripheral wet-meadow and low-prairie zones are usually present.	Shallow-marsh - vegetation dominates the central areas of pond basins that normally maintain surface water for an extended period in spring and early summer but frequently are dry during late summer and fall.	<ul style="list-style-type: none"> ■ broad-leaved water plantain (<i>Alisma triviale</i>) ■ reed canary grass (<i>Phalaris arundinacea</i>) ■ awned sedge (<i>Carex atherodes</i>) ■ water smartweed (<i>Polygonum coccineum</i>)
Class IV	Semi-Permanent	Semi-permanent - the deep-marsh zone dominates the deepest part of the wetland area. Shallow-marsh, wet-meadow, and low-prairie zones are usually present.	Deep-marsh - vegetation dominates the central areas of pond basins that maintain surface water throughout the spring and summer and frequently maintain surface water into fall and winter. Deep-marsh zones usually occur also as marginal bands that adjoin the deep permanent-open-water zones of permanent ponds and lakes.	<ul style="list-style-type: none"> ■ common cattail (<i>Typha latifolia</i>) ■ river bulrush (<i>Bolboschoenus fluviatilis</i>) ■ hardstem bulrush (<i>Schoenoplectus acutus var. acutus</i>)



Table 7: Classes of Lakes and Wetlands in the Prairie Region

Permanency Class	Type of Class	Definition of Class	Definition of Zone	Typical Dominant Vegetation Examples
Class V	Permanent	Permanent - the permanent-open-water zone dominates the deepest part of the wetland area. Peripheral deep-marsh, shallow-marsh, wet-meadow, and low-prairie zones are often present.	Permanent-open-water - ponds and lakes that maintain fairly stable water levels, is represented only by open water. Presence of vascular plants in this zone is rare.	<ul style="list-style-type: none"> ■ beaked ditchgrass (<i>Ruppia maritima</i>) ■ common cattail (<i>Typha latifolia</i>) ■ river bulrush (<i>Bolboschoenus fluviatilis</i>)
Class VI	Alkali	Alkali - the intermittent-alkali zone dominates the deepest part of the wetland area. Peripheral shallow-marsh, wet-meadow, and low-prairie zones are usually present. A deep-marsh zone is normally absent except occasionally for isolated patches near marginal seepage areas.	Intermittent alkali - highly saline shallow water that frequently alternates with exposed white alkali salt flats or salt crust. Emergent plants do not develop in this zone due to high salt content.	<ul style="list-style-type: none"> ■ beaked ditchgrass (<i>Ruppia maritima</i>) ■ red samphire (<i>Salicornia rubra</i>) ■ salt grass (<i>Distichlis spicata</i>) ■ western seablite (<i>Suaeda calceoliformis</i>)

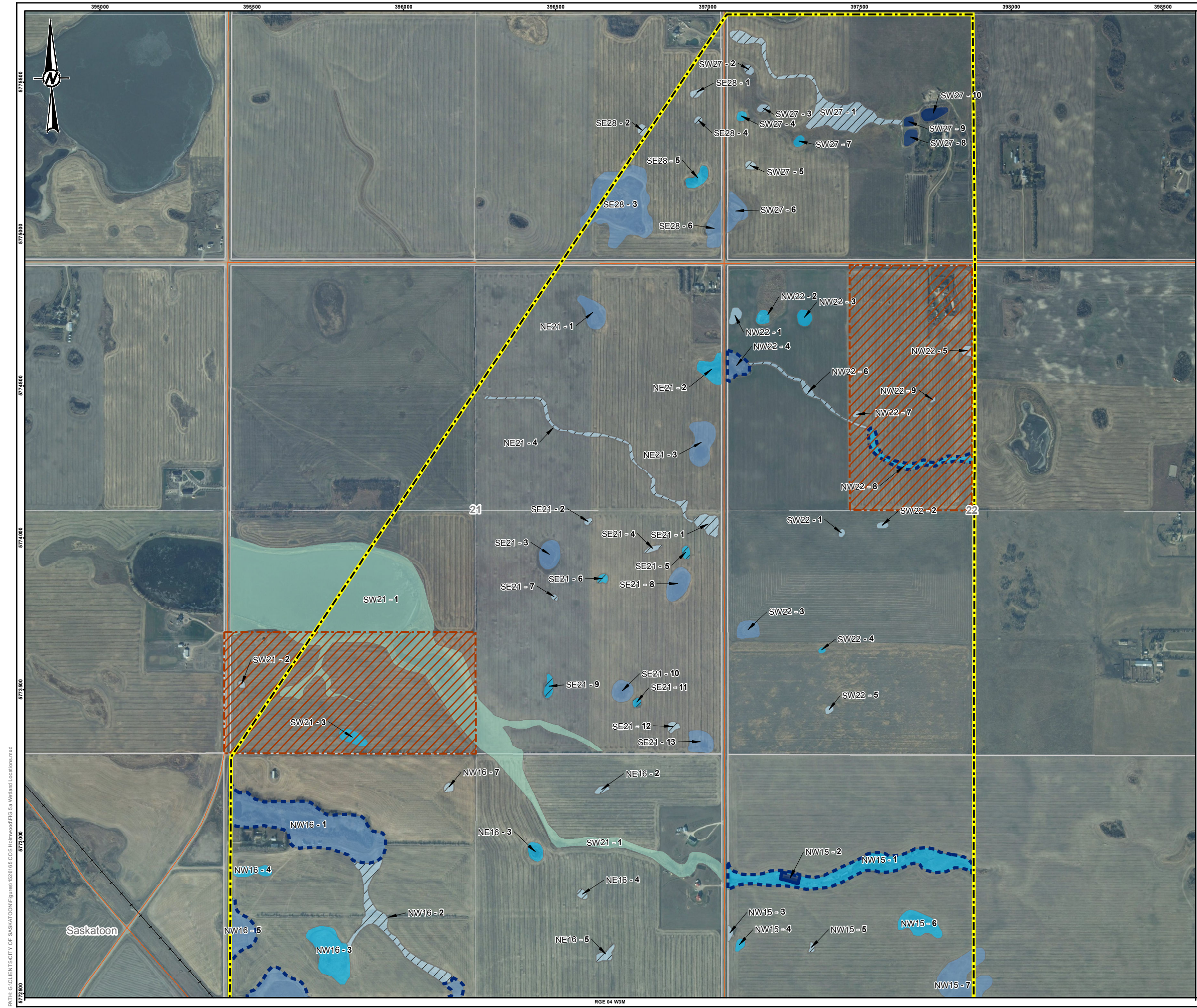
Source: Stewart and Kantrud (1971).

Note: In cultivated ephemeral, temporary and seasonal wetlands, when cover is represented by planted crops wetlands are referred to as tilled.

During Phase I, Google Earth (2015) imagery was used to identify the wetlands in the study area. Based on the characteristics or indicators that were discernable on the imagery, the wetlands were then classified using the Stewart and Kantrud (1971) Classification System. A total of 90 wetlands were identified in the study area ranging from Class 2 to Class 5. Locations of these wetlands are shown in Figure 5A and Figure 5B, and the following indicates the number of wetlands identified within each class:

- Class 2 – 33;
- Class 3 – 30;
- Class 4 – 21; and
- Class 5 – 6.

Since the majority of the study area is located on cultivated land, a large portion of the Class 2 and Class 3 wetlands appeared to be tilled (cultivated). Tilling of these wetlands may vary by year and is dependent on seasonal water levels. A total of 57 wetlands were identified as being Class 3 to Class 5 in the study area, and eight of these wetlands were recommended to be assessed using the detailed MnRAM (Minnesota Board of Water and Soil Resources 2007) (Figure 5A and Figure 5B).

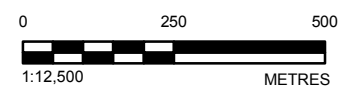


LEGEND

- PROJECT AREA BOUNDARY
- PERMISSION TO ACCESS DENIED
- RECOMMENDED TO ASSESS USING MnRAM

WETLAND CLASS

- II - TEMPORARY WETLAND
- II/T - TEMPORARY WETLAND - TILLED
- III - SEASONAL WETLAND
- III/T - SEASONAL WETLAND - TILLED
- IV - SEMI-PERMANENT WETLAND
- IV/V - SEMI-PERMANENT TO PERMANENT WETLAND
- V - PERMANENT WETLAND



REFERENCE(S)

1. FLYSASK ORTHOIMAGERY: © SGIC PUBLIC WMS, 2008-2011
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CLIENT **City of Saskatoon**

PROJECT
HOLMWOOD SOUTHEAST

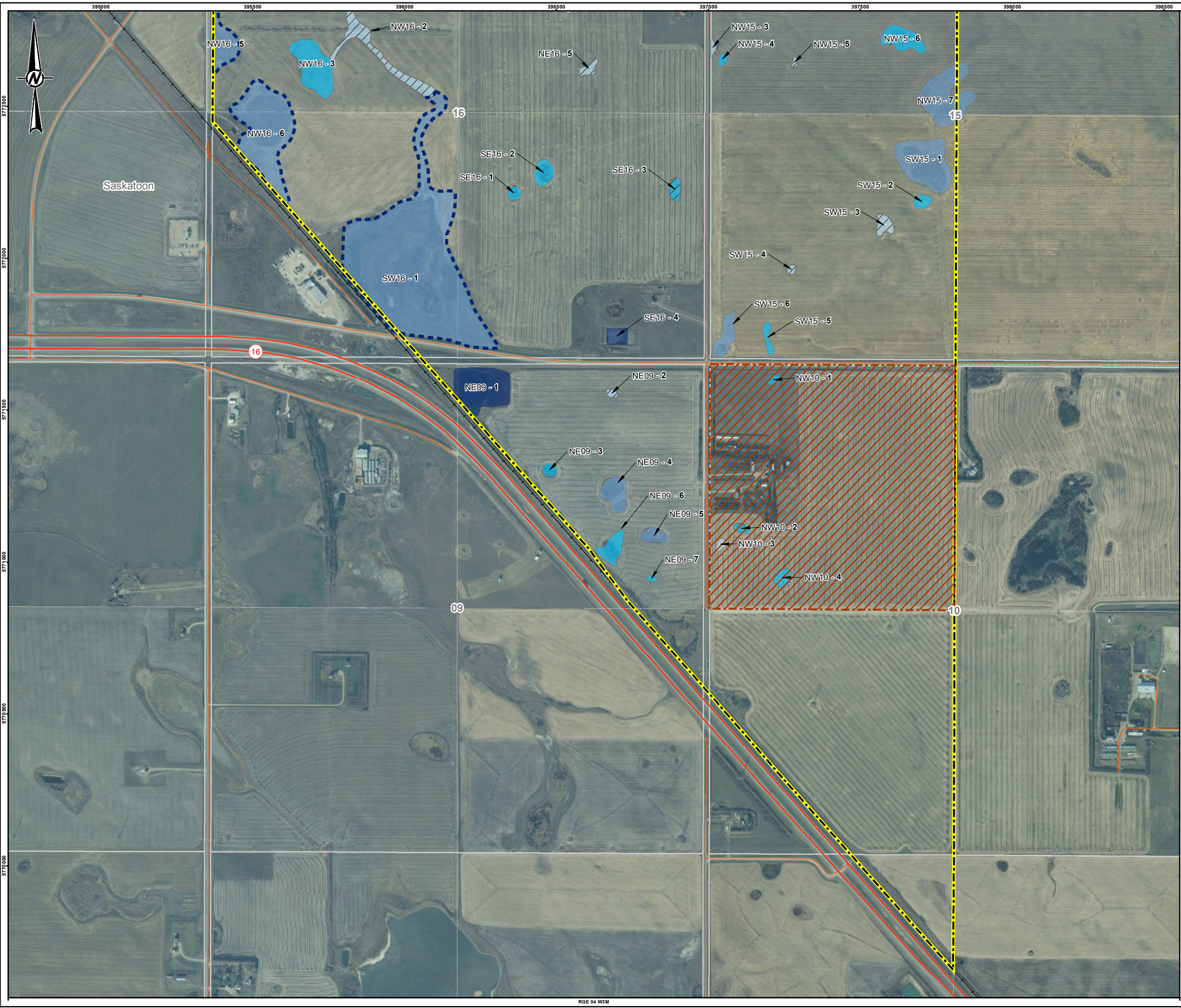
TITLE
WETLAND LOCATIONS IN THE NORTH PORTION OF THE HOLMWOOD STUDY AREA

CONSULTANT	YYYY-MM-DD	2015-11-13
	DESIGNED	JS
	PREPARED	SBM/LMS
	REVIEWED	RK
	APPROVED	ME

PROJECT NO. 1526165 REV. 5 FIGURE 5A

PATH: G:\CLIENTS\CITY OF SASKATOON\Projects\1526165\COSE_Holmwood\FIG 5a Wetland Locations.mxd

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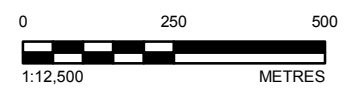


LEGEND

- PROJECT AREA BOUNDARY
- PERMISSION TO ACCESS DENIED
- RECOMMENDED TO ASSESS USING MnRAM

WETLAND CLASS

- II - TEMPORARY WETLAND
- II/T - TEMPORARY WETLAND - TILLED
- III - SEASONAL WETLAND
- III/T - SEASONAL WETLAND - TILLED
- IV - SEMI-PERMANENT WETLAND
- IV/V - SEMI-PERMANENT TO PERMANENT WETLAND
- V - PERMANENT WETLAND



REFERENCE(S)

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CLIENT **City of Saskatoon**

PROJECT
WETLAND LOCATIONS IN THE SOUTH PORTION OF THE HOLMWOOD STUDY AREA

TITLE
WETLAND LOCATIONS IN THE SOUTH PORTION OF THE HOLMWOOD STUDY AREA

CONSULTANT	DATE	REVISION
	YYYY-MM-DD	2015-11-13
	DESIGNED	JS
	PREPARED	SBM/LMS
	REVIEWED	RK
	APPROVED	ME

PROJECT NO. 1526165 REV. 5 FIGURE 5B

PATH: G:\CLIENT\CITY OF SASKATOON\Gis\mxd\1526165\COSE_Holmwood\FIG 05_South_Wetland1_Location.mxd

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5.2 Minnesota Routine Assessment Method

The MnRAM was devised soon after the passage of the *Wetland Conservation Act* (WCA) in 1991. MnRAM was developed because an interagency wetland workgroup felt that the current scientific understanding of wetlands limited the ability to predict which wetlands are ecologically significant, and therefore, determined that there was a need for a practical assessment tool that would help local authorities make informed wetland management decisions to regulate wetland impacts (Minnesota Board of Water and Soil Resources 2010).

MnRAM provides an organized, consistent procedure to inventory and document observations and conclusions about wetlands in a given area. The full MnRAM methodology has been programmed into a Microsoft Access™ database within which all data can be entered and stored (Minnesota Board of Water and Soil Resources 2010). Information is entered into the database based on 72 wetland parameters evaluated for each wetland location (Minnesota Board of Water and Soil Resources 2010). Wetland data is then easily compiled into a single, central database that allows for the flexibility to analyze the data in several different ways including:

- individual data for selected groups of wetlands;
- all wetlands within the database; or
- groups of parameters within groups of wetlands.

The MnRAM database computes a numeric ranking for each wetland based on the following wetland functions and value characteristics (Minnesota Board of Water and Soil Resources 2010):

- maintenance of characteristic vegetative diversity/integrity;
- maintenance of hydrologic regime;
- flood/storm water attenuation;
- downstream water quality;
- maintenance of wetland water quality;
- shoreline protection;
- maintenance of characteristic wildlife habitat structure;
- maintenance of characteristic fish habitat;
- maintenance of characteristic amphibian habitat;
- aesthetics/recreation/education/cultural;
- commercial uses;
- ground water interaction;
- restoration potential;
- sensitivity to storm water and urban development; and
- additional storm water treatment needs.



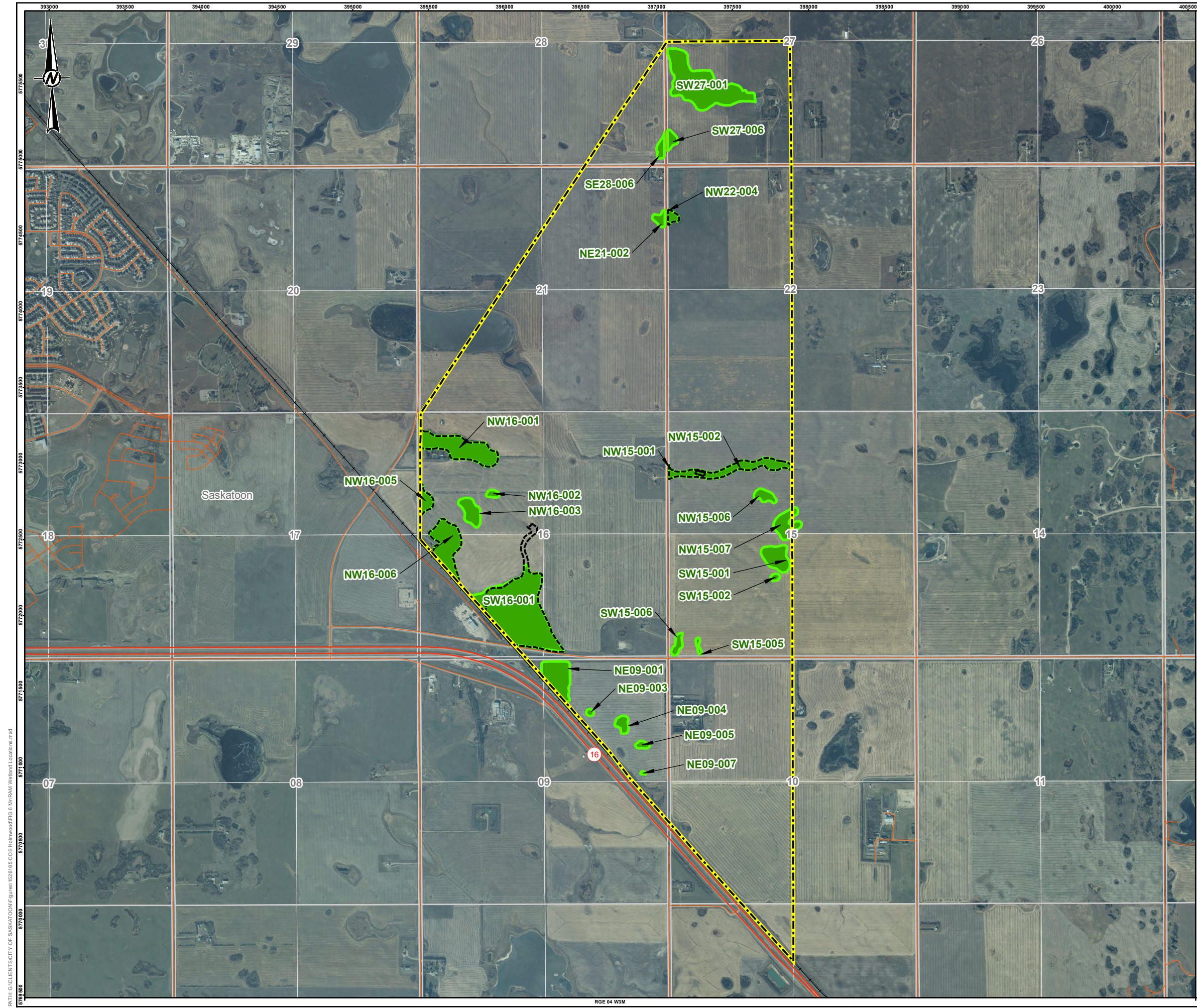
Because wetlands are part of an ecological system, and may change based on seasonal or annual water conditions, care should be taken to use these results under guidance from individuals experienced in wetland conservation and management.

5.3 Phase II – Detailed Wetland Analysis Minnesota Routine Assessment Results

During Phase 1 of the Project, Golder identified a total of 90 wetlands in the study area; however, only a portion of those were classified using the MnRAM due to lack of landowner access. A portion of the 90 wetland basins initially identified were cultivated and seeded to annual crops in 2015. These wetlands are likely ephemeral in nature, but with their alteration by cultivation, are unlikely to function as wetlands. These wetlands did not support wetland vegetation, and therefore, were not assessed using the MnRAM.

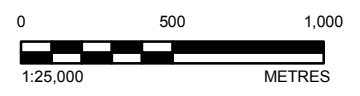
On June 23 and 24, 2015 and September 3, 2015, Golder used the MnRAM to assess the function of twenty-four wetlands supporting wetland vegetation. The June survey focused on high priority wetlands, Class III to V based on Stewart and Kantrud (1971), whereas the September survey focused on lower priority wetlands, Class I and II, and all wetlands in areas where landowner access had not been previously available.

A total of 1 Class II/Tilled, 1 Class II/III/Tilled, 9 Class III, 12 Class IV and 1 Class V wetlands were classified using the MnRAM system and the locations are shown in Figure 6. The summary results of the MnRAM assessment are provided in Appendix C. A table listing wetland identification (ID), Stewart and Kantrud (1971) Classification, MnRAM Wetland Management, Universal Transverse Mercator (UTM) location, wetland size (in acres), drainage area size (in acres), soils code and photo number for each wetland is provided in Appendix D. Representative photographs of each wetland are provided in Appendix E. All wetland locations within the study area are west of the third meridian (W3M).



LEGEND

- PROJECT AREA BOUNDARY
- RECOMMENDED SURVEY LOCATION
- MnRAM ASSESSED WETLAND



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 NAD 83 UTM ZONE 13N

CLIENT

PROJECT
 HOLMWOOD SOUTHEAST

TITLE
**LOCATION OF MnRAM ASSESSED WETLANDS
 IN THE HOLMWOOD STUDY AREA**

CONSULTANT	DATE
	YYYY-MM-DD 2015-11-13
	DESIGNED JS
	PREPARED SBM/LMS
	REVIEWED -
	APPROVED -

PATH: G:\CLIENTS\CITY OF SASKATOON\Gis\mxd\1526165\COSE_Holmwood\Fig 6 MnRAM Wetland Locations.mxd

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

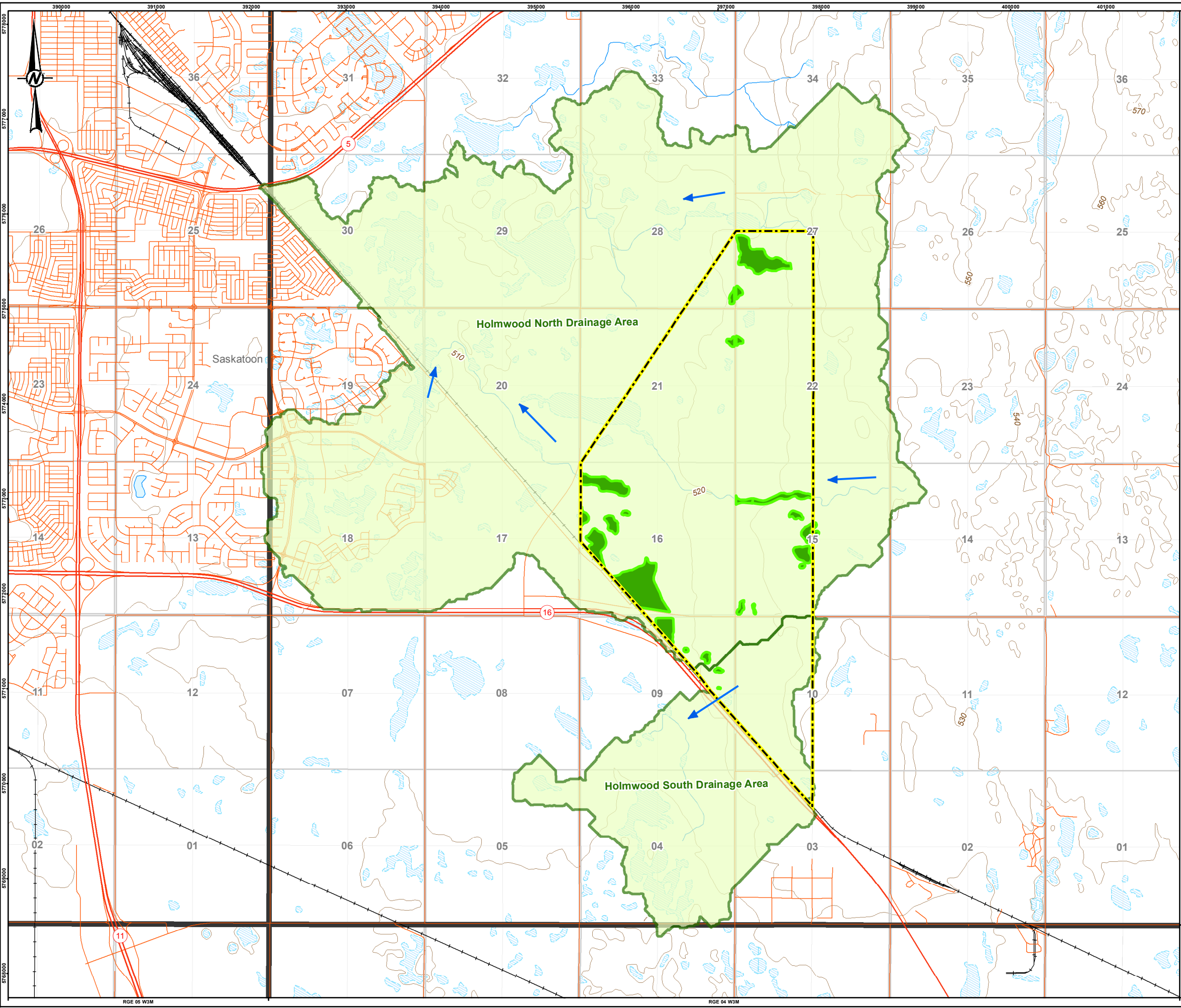


5.4 Wetland Hydrology






Saskatoon and the surrounding area are within the South Saskatchewan River basin. The wetlands within the study area are part of two watersheds (Figure 7). Most of the wetlands included in the MnRAM wetland classification (i.e., a total of 22 wetlands) are within the northern watershed. Runoff that occurs in this drainage generally flows west towards the edge of the City, but it is not known if this water is currently managed by the existing stormwater system. For the two wetlands at the south end of the study area, runoff generally flows southwest, crosses Highway 16 through a series of culverts, and contributes to a large permanent wetland about 1 km southwest of the highway.

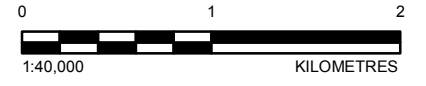
The MnRAM wetland classification and functional assessment considers wetlands in the context of their hydrological function and characteristics of their drainage basins (including the catchment areas, soil type, slope, and man-made features that have altered their natural drainage patterns). Prairie wetlands usually receive runoff from their contributing drainage areas from snowmelt during the spring freshet. If wetland water levels and/or the groundwater table are high, surface runoff may occur between wetlands during spring runoff; runoff from wetlands during the summer or fall months rarely occurs except during wet periods or after heavy rainfall events. The land cover in a wetland's drainage plays an important role in how much runoff enters the wetlands; for example, wetlands in cultivated areas usually receive more runoff from their catchments than wetlands in catchments planted with grass (van der Kamp et al. 2003).

The watershed boundaries for wetlands in the Study area Boundary are delineated using the light detection and ranging (LiDAR) digital elevation model (DEM) data provided by the City (Schultz 2015, pers. comm.), national hydrological network road, wetland, stream, and topography data (Geobase 2015), and runoff flow paths are checked using Google Earth imagery. No hydrology-related ground-truthing was completed by Golder for this Project. The drainage areas for individual wetlands included in the assessment were estimated using Green Kenue software application from the National Research Council of Canada (NRCC 2014). Additional effort may be needed by the City to verify if wetland drainage areas in the study area are affected by the location of local roads and culverts and construction on the outskirts of the City. Wetland drainage areas for the study area are provided in Figure 8A and Figure 8B.



LEGEND

-  FLOW DIRECTION
-  CONTOUR (m)
-  PROJECT AREA BOUNDARY
-  MnRAM ASSESSED WETLAND
-  WATERSHED BOUNDARY



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 NAD 83 UTM ZONE 13N

CLIENT



PROJECT
 HOLMWOOD SOUTHEAST

TITLE
**WATERSHED BOUNDARIES FOR
 THE HOLMWOOD STUDY AREA**

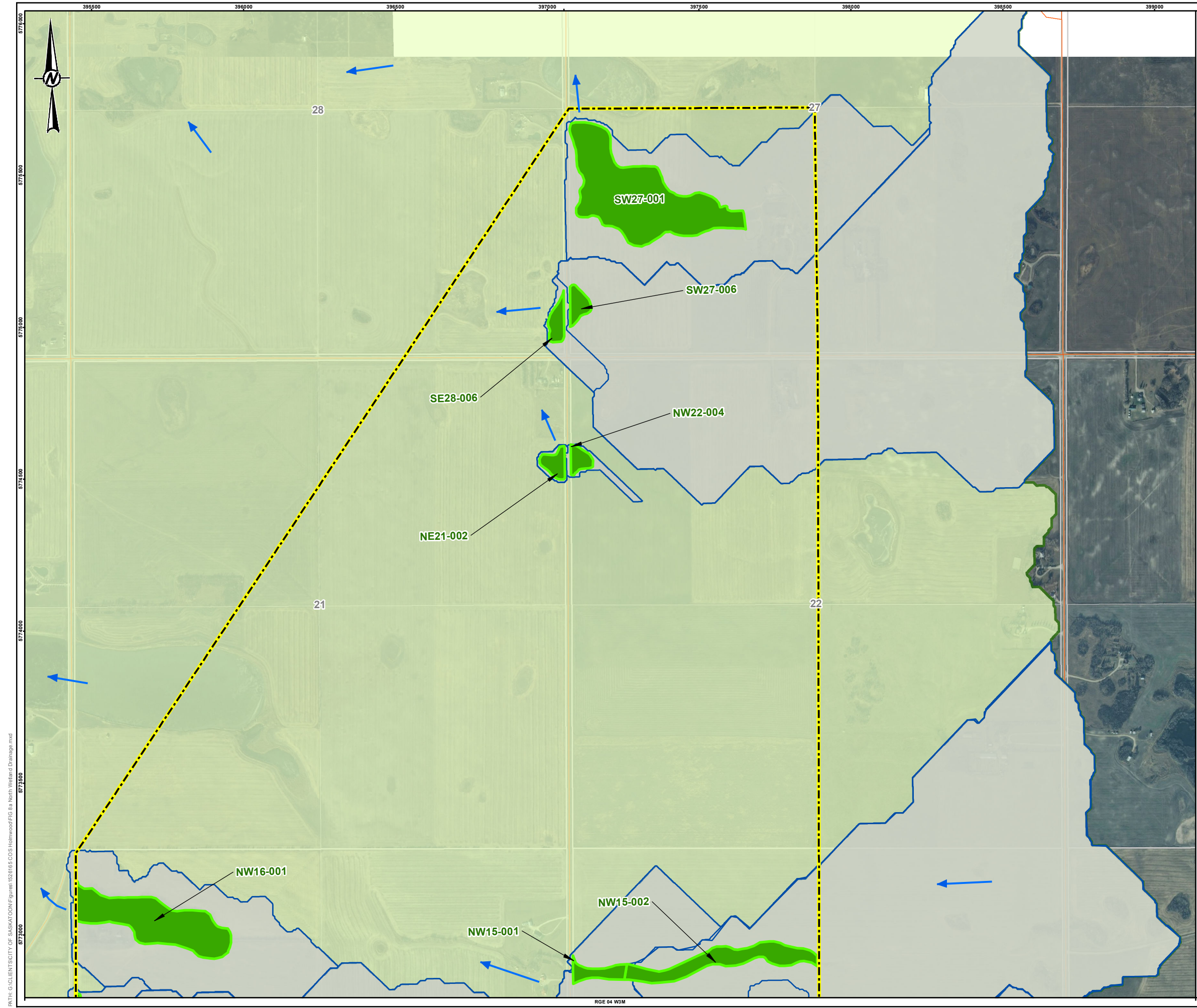
CONSULTANT	YYYY-MM-DD	2015-11-13
DESIGNED	JH	
PREPARED	SBM/LMS	
REVIEWED	-	
APPROVED	-	








PROJECT NO. 1526165 REV. D FIGURE 7

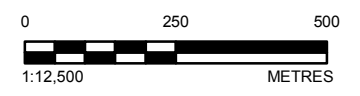
PATH: G:\CLIENTS\CITY OF SASKATOON\GIS\mxd\1526165\05_Holmwood\FIG 7 Watershed Boundaries.mxd

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM A4 (1189mm x 841mm) TO A5 (841mm x 1189mm)



LEGEND

-  FLOW DIRECTION
-  PROJECT AREA BOUNDARY
-  MNRAM ASSESSED WETLAND
-  WETLAND DRAINAGE AREA
-  WATERSHED BOUNDARY



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CLIENT 

PROJECT
 HOLMWOOD SOUTHEAST

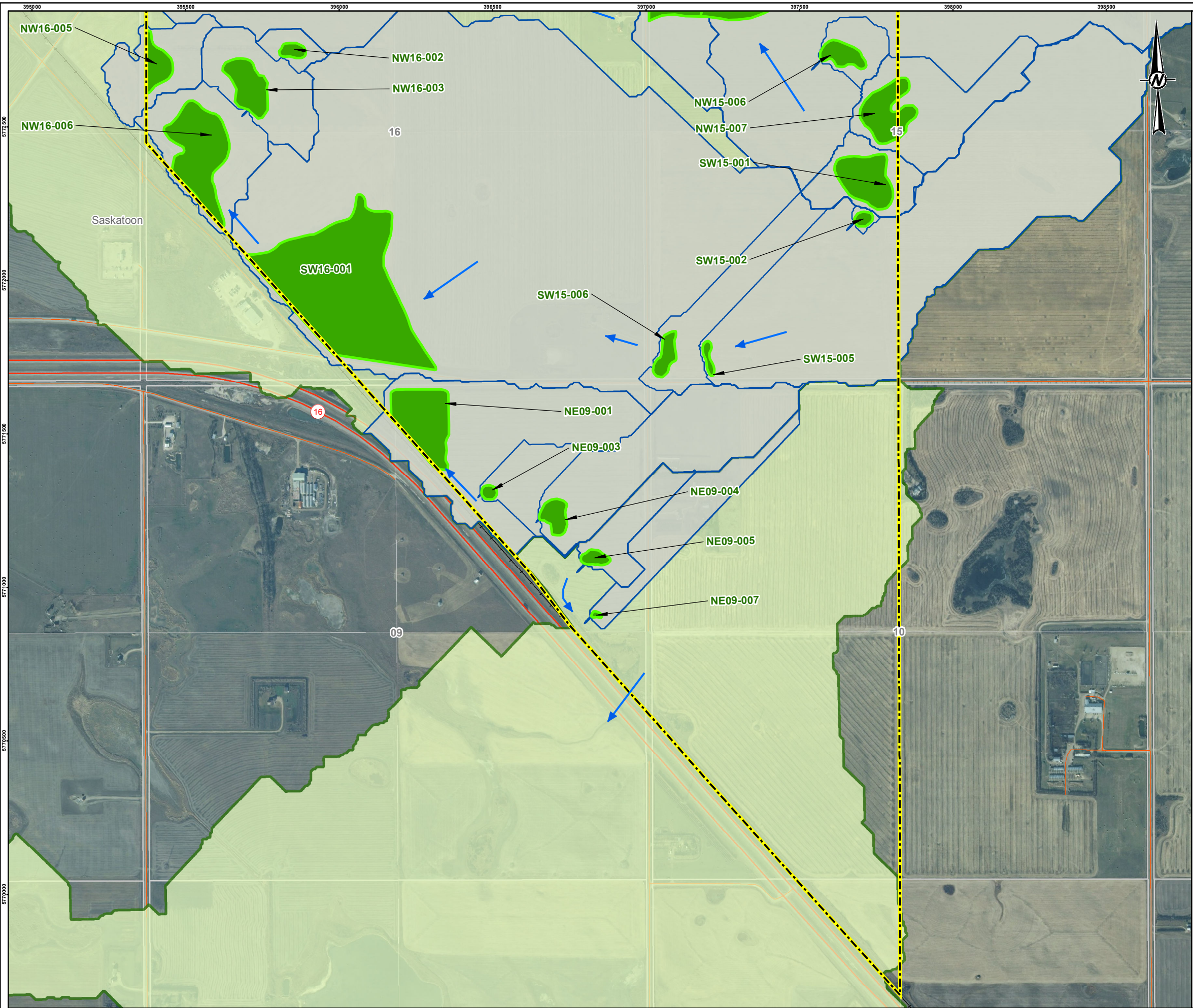
TITLE
**WETLAND DRAINAGE AREAS FOR SELECTED
 MNRAM WETLAND ASSESSMENT LOCATIONS IN
 THE NORTH PORTION OF THE HOLMWOOD STUDY AREA**

CONSULTANT	YYYY-MM-DD	2015-11-13
DESIGNED	JH	
PREPARED	SBM/LMS	
REVIEWED	-	
APPROVED	-	






PROJECT NO. 1526165 REV. C FIGURE 8A

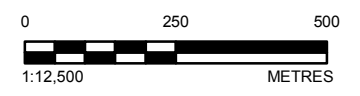
PATH: G:\CLIENTS\CITY OF SASKATOON\Projects\1526165\COSE Holmwood\FIG 8a North Wetland Drainage.mxd

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM A4 (210x297mm) TO A5 (148x210mm)



LEGEND

-  FLOW DIRECTION
-  PROJECT AREA BOUNDARY
-  MnRAM ASSESSED WETLAND
-  WETLAND DRAINAGE AREA
-  WATERSHED BOUNDARY



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CLIENT 

PROJECT
 HOLMWOOD SOUTHEAST

TITLE
**WETLAND DRAINAGE AREAS FOR SELECTED
 MNRAM WETLAND ASSESSMENT LOCATIONS IN THE
 SOUTH PORTION OF THE HOLMWOOD STUDY AREA**

CONSULTANT	YYYY-MM-DD	2015-11-13
	DESIGNED	JS
	PREPARED	SBM/LMS
	REVIEWED	-
	APPROVED	-

PROJECT NO. 1526165 REV. D FIGURE 8B

PATH: G:\CLIENTS\CITY OF SASKATOON\Projects\1526165\COSE Holmwood\FIG 8B South Wetland Drainage.mxd

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM A4 (210x297mm) TO A5 (210x148.5mm)



6.0 HERITAGE SENSITIVITIES

The study area is largely characterized by an anthropogenically disturbed landscape that has been extensively modified (e.g., cultivation, road/infrastructure construction and use, and occupied dwellings). The heritage desktop screening was completed for the Project utilizing the database for previously recorded heritage resources maintained by the Heritage Conservation Branch (HCB), as well as the Tourism, Parks, Culture and Sport – HCB on-line screening tool. The results of the HCB database query indicate that there are no known heritage resources that would be in conflict with the study area. A search of the Tourism, Parks, Culture and Sport - HCB on-line screening tool revealed that the quarter sections within the study area are not heritage sensitive, no further screening by the HCB is required, and a Heritage Resource Impact Assessment is not required (Appendix F).

7.0 SASKATCHEWAN HOMESTEAD INDEX RESULTS

A desktop screening for homestead records within the study area was completed using the Saskatchewan Homestead Index (SHI) (2015). The SHI database lists homestead files that are available at the Saskatchewan Archives (SHI 2015) and files applicable to the study area are provided in Table 8. The SHI database provides names of people that from 1872 to 1930 took part in the homestead process in the area that is now the province of Saskatchewan (SHI 2015).

Table 8: Saskatchewan Homestead Index Results for the Holmwood Study Area

File Name	Land Location (W3M)	Name	Comments
679186	NW 10-36-04	Hoge, William	-
1150776	NE 10-36-04	Patience, William Uriah	-
1339656	SE 16-36-04	Herman, Wilbur F.	-
		Temperance Colonization Society	-
1339656	NE 16-36-04	Ryan, John Robert	-
		Temperance Colonization Society	-
183980		Temperance Colonization Society	-
183980	N ½ 6-36-04	Lasher, Wesley J.	-
183980		Temperance Colonization Society	-
1339656	W ½ 16-36-04	Temperance Colonization Society	-
771692	NW 22-36-04	Hunter, William W.	-
602133	SW 22-36-04	Ross, Vital	Transferred to Kershaw, William
602133	SW 22-36-04	Kershaw, William	Transferred from Ross, Vital
537194	SE 28-36-04	Evans, John	-

Source: SHI 2015.

8.0 CONSIDERATIONS AND RECOMMENDATIONS

Appropriately timed, site-specific, pre-development surveys are recommended to identify the presence/absence of listed wildlife species prior to development, particularly in areas that support native wildlife habitat or where listed wildlife species have been previously identified. Suitable wildlife habitat areas present in the study area include wetlands, modified grassland (hayland), and treed cover. Additionally, if construction takes place within the breeding bird season for the area, April 15 to August 31 (Environment Canada 2014), pre-construction nest searches should be conducted in potential habitat, as it is illegal to harm the nests, eggs, or young of the majority of migratory breeding birds under the *Migratory Birds Convention Act*.



If listed plant or wildlife species, or protected migratory bird nests are identified in areas targeted for development, it is recommended that development activity take place outside the applicable setback distances described in the Petroleum Industry Activity Guidelines for Wildlife Species at Risk in the Prairie and Northern Region (Environment Canada 2009), the Activity Set-back Distance Guidelines for Prairie Plant Species at Risk (Environment Canada 2011), and/or in the Saskatchewan Activity Restriction Guidelines for Sensitive Species (Saskatchewan Ministry of Environment 2015). An alternative to activity restrictions may include enhancing other suitable habitat in the immediate area and/or designating appropriate green spaces or conservation easements. Any potential alternatives would need to be discussed with and agreed upon by Environment Canada and the Saskatchewan Ministry of Environment prior to development.

The federal Canada *Wildlife Act* and the provincial Saskatchewan *Wildlife Act* apply to the study area and all individuals in the sense that wildlife (i.e., wild animals and plants) are protected as a public resource and permits for hunting, trapping, research, and other activities related to wildlife and their habitat are required under the Acts; however, the development of the study area is not anticipated to harm wildlife or trigger any specific prohibitions in these Acts. Land that is considered wildlife habitat for species at risk may be acquired and protected by the federal or provincial government; however, there is no the land currently designated under the *Wildlife Protection Act* within the study area (SKCDC 2015).

Under the provincial *Environmental Management and Protection Act* (i.e., Saskatchewan Environmental Code), the development of the study area is not anticipated to adversely affect water or air quality, or other aspects of the environment under the Act. Permits are required for the construction of water treatment and distribution works, and sewage collection and treatment works that may be a component of the development within the study area.

Federal Acts that do not apply to the study area include the *Fisheries Act* and the *Navigable Waters Protection Act*. The study area does not support any recreational, commercial, or aboriginal fisheries, and development is not anticipated to harm any fish habitat. *The Navigation Protection Act*, which replaces the *Navigable Waters Protection Act*, is not applicable to the study area, as the closest navigable waterway is the South Saskatchewan River located 8.5 km west of the study area.

An Aquatic Habitat Protection Permit (AHPP) will be required if development is to take place in or near wetlands. An application for an AHPP should be submitted to the Saskatchewan Ministry of Environment as early as possible for approval prior to construction. An AHPP will provide guidelines to be followed during the development. Some general recommendations for good soil handling practices during construction include:

- Soil handling should be confined to the designated rights-of-way and work areas.
- Topsoil should be removed and stored separately from the spoil.
- Topsoil or spoil piles, or any other materials should not be stored in wetlands.



General recommendations for work near wetlands that are to be conserved include:

- Appropriate setback distances between the wetland boundary and work area should be clearly marked or flagged for avoidance.
- Minimize traffic in wetlands to only that required for construction.
- Sediment barriers should be installed immediately after initial ground disturbance at the following locations:
 - within the work area at the edge of the boundary between wetland and upland; and
 - along the edge of the work area where it slopes toward a wetland, to protect any adjacent, off right-of-way wetlands.

9.0 SUMMARY AND CONCLUSION

Considering that the study area is largely characterized by an anthropogenically disturbed landscape that has been extensively modified (e.g., cultivation, road/infrastructure construction and use, and occupied dwellings), the natural habitat quality for both vegetation and wildlife has been adversely affected. In addition to historical and direct removal of large, inter-connected tracts of habitat, several of the remaining vegetation communities support introduced species that were intentionally planted (e.g., trees in shelterbelts and yard sites, smooth brome along roadside ditches) or became established through colonization. Similar changes related to vegetation cover includes the seeding of large tracts of land to a homogenous, monoculture community comprised of agronomic forage and cereal crop species, which may be fallow during some years.

Further, the existing urban neighbourhoods in proximity to the study area likely have direct and indirect sensory disturbance effects, primarily associated with noise and light (e.g., artificial light can alter or disrupt habitat use by wildlife species with nocturnal and crepuscular activity patterns).

Major roads, such as Highway 16 that borders the south boundary of the study area can also function as movement barriers for small mammals, reptiles, and amphibians. These may also function as higher risk mortality zones for larger mammals including mesopredators (i.e., medium sized predators such as skunk [*Mephitis mephitis*], racoon [*Procyon lotor*], red fox [*Vulpes vulpes*], and coyote [*Canus latrans*]), ungulates, and avian species that either need to cross the roadway to disperse to new or alternative habitat, or that utilize the road sides for forage, browse, scavenging and reproduction, thereby making them more susceptible to interactions with vehicles.

As discussed above, although the natural habitat for plants and wildlife has been extensively modified in the study area and is influenced by surrounding land use, limited, suitable habitat still persists for numerous species. These habitats are largely associated with the dispersed, often isolated wetland complexes. However, the lack of connectivity between the wetland patches may result in or increase the potential for local extinctions (i.e., lack of connectivity of habitats can impair recruitment, in and outward migration, function as a movement/distance barrier or increase predation risk when leaving cover to travel between patches) and creation of metapopulations (i.e., a small population occupying a habitat patch). In regards to the study area and surrounding landscape, metapopulations may be more applicable to small mammals, reptiles, amphibians and invertebrates with relatively lower mobility. The lack of connectivity between suitable habitat patches is important in ecological processes such as predator-prey interactions and the activity of pollinators.



The landscape that currently characterizes the study area appears to be mostly suited to highly mobile taxa (e.g., birds) and species that are considered habitat generalists (i.e., can utilize or adapt to a variety of habitat types and conditions). In addition to birds, terrestrial species that are likely to use the habitat matrix in the study area are mesopredators or scavenger species such as raccoon, skunk, red fox, and coyote. These are wildlife species that can quickly become adapted to human presence and associated sensory disturbance.

When considering the maintenance or establishment of isolated habitat patches and their long-term management, an important factor in determining which species will continue to use a patch is the connectivity and interactions between surrounding patches (Bierregaard and Stuffer 1997).

It also needs to be recognized that development within the study area will likely result in the permanent displacement of some wildlife species. For example, loggerhead shrike require large open habitats for foraging and will not adapt or habituate to urban settings. During development, some wildlife species that are displaced from the remaining habitats in the study area may migrate to other suitable habitat in the region, which could lead to over-crowding at these alternate locations. However, alternate habitat crowding is typically observed shortly after fragmentation or removal of the habitat in the area of question, but is followed by relaxation in the subsequent year (Debinski and Holt 2000).

Remnant patches of useable habitat persist that are utilized by a variety of wildlife species and provide suitable growing conditions for numerous plants. The persistence of biological populations to continue to inhabit patchy landscapes within an urban setting is still characterized by many unknowns and is open to debate. Albeit, research continues to enhance this knowledge and efforts should be employed to apply sound ecological principles as part of the planning process.

The full MnRAM database for this Project will be submitted to the City electronically, as there are a number of different ways that the data can be queried and analyzed. The City will then have the ability to summarize the data depending on the attributes desired for a specific planning purpose, or to incorporate it into a current database.



10.0 CLOSURE

We trust that this technical memorandum meets your current needs. Please contact Robin Kusch (robin_kusch@golder.com, (306) 667-1174, or (306) 227-2626) should you have any questions.

GOLDER ASSOCIATES LTD.

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Principal, Energy Resources Group

AS/ALW/DJ/jlb

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APPENDIX A

List of Plants Observed within the Study Area

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HOLMWOOD EAST DESKTOP REVIEW

Table A-1: Plant Species Observed During the 2015 Surveys within the Project Study Area

Common Name	Scientific Name	Common Name	Scientific Name
GRAMINOIDS			
Crested wheatgrass	<i>Agropyron cristatum ssp. pectinatum</i>	American manna grass	<i>Glyceria grandis var. grandis</i>
Hair grass	<i>Agrostis scabra var. scabra</i>	Foxtail barley*	<i>Hordeum jubatum ssp. jubatum</i>
Short-awn meadow-foxtail	<i>Alopecurus aequalis var. aequalis</i>	Baltic rush	<i>Juncus balticus</i>
Slough grass	<i>Beckmannia syzigachne</i>	Long-style rush	<i>Juncus longistylis var. longistylis</i>
Smooth brome	<i>Bromus inermis</i>	Green needle grass	<i>Nassella viridula</i>
Awne d sedge	<i>Carex atherodes</i>	Western wheatgrass	<i>Pascopyrum smithii</i>
Woolly sedge	<i>Carex pellita</i>	Reed canary grass	<i>Phalaris arundinacea</i>
Tufted hair grass	<i>Deschampsia cespitosa ssp. cespitosa</i>	Fowl blue grass	<i>Poa palustris</i>
Barnyard grass	<i>Echinochloa crus-galli</i>	Nuttall's salt-meadow Grass	<i>Puccinellia nuttalliana</i>
Creeping spike-rush	<i>Eleocharis palustris</i>	Hard-stemmed bulrush	<i>Schoenoplectus acutus var. acutus</i>
Canadian wild rye	<i>Elymus canadensis var. canadensis</i>	Spangletop	<i>Scolochloa festucacea</i>
Creeping wild rye*	<i>Elymus repens</i>	Green foxtail	<i>Setaria viridis var. viridis</i>
FORBS			
Broad-leaved water plantain	<i>Alisma triviale</i>	Common plantain	<i>Plantago major</i>
Red-root pigweed	<i>Amaranthus retroflexus</i>	Common knotweed	<i>Polygonum aviculare ssp. aviculare</i>
Plains sagewort	<i>Artemisia campestris ssp. caudata</i>	Rough cinquefoil	<i>Potentilla norvegica</i>
Lamb's-quarter's	<i>Chenopodium album var. album</i>	White water crowfoot	<i>Ranunculus aquatilis var. diffusus</i>
Fremont's goosefoot	<i>Chenopodium fremontii var. fremontii</i>	Small yellow water crowfoot	<i>Ranunculus gmelinii</i>
Giant-seed goosefoot	<i>Chenopodium simplex</i>	Cursed crowfoot	<i>Ranunculus sceleratus var. sceleratus</i>
Canada thistle**	<i>Cirsium arvense</i>	Curled dock	<i>Rumex crispus</i>
Annual hawks-beard**	<i>Crepis tectorum</i>	Golden dock	<i>Rumex maritimus</i>
Flixweed	<i>Descurainia sophia</i>	Western dock	<i>Rumex occidentalis</i>
Hairy willow-herb	<i>Epilobium ciliatum ssp. ciliatum</i>	Russian-thistle*	<i>Salsola kali</i>
Common horsetail	<i>Equisetum arvense</i>	Water parsnip	<i>Sium suave</i>
Devil's-paintbrush	<i>Hieracium aurantiacum</i>	Graceful canada goldenrod	<i>Solidago lepida var. salebrosa</i>
Kochia**	<i>Kochia scoparia</i>	Field sow-thistle**	<i>Sonchus arvensis ssp. arvensis</i>
Lesser duckweed	<i>Lemna minor</i>	Annual sow-thistle**	<i>Sonchus asper</i>
Sea-milkwort	<i>Lysimachia maritima</i>	Narrow-leaved Bur-reed	<i>Sparganium angustifolium</i>
Round-leaved mallow **	<i>Malva rotundifolia</i>	Narrow-leaved Meadow-sweet	<i>Spiraea alba var. alba</i>



HOLMWOOD EAST DESKTOP REVIEW

Table A-1: Plant Species Observed During the 2015 Surveys within the Project Study Area

Common Name	Scientific Name	Common Name	Scientific Name
Alfalfa	<i>Medicago sativa ssp. sativa</i>	Northern Aster	<i>Symphotrichum boreale</i>
White Sweet-clover	<i>Melilotus albus</i>	Tufted White Prairie Aster	<i>Symphotrichum ericoides var. pansum</i>
Yellow Sweet-clover	<i>Melilotus officinalis</i>	Common Dandelion*	<i>Taraxacum officinale ssp. officinale</i>
Wild Mint	<i>Mentha arvensis</i>	Common Cattail	<i>Typha latifolia</i>
Water Smartweed	<i>Persicaria amphibia var. emersa</i>	Stinging Nettle	<i>Urtica dioica ssp. gracilis</i>
Meadow Popcorn-flower	<i>Plagiobothrys scouleri var. hispidulus</i>	-	-
SHRUBS & TREES			
Manitoba maple	<i>Acer negundo var. interius</i>	Prickly rose	<i>Rosa acicularis</i>
Saskatoon	<i>Amelanchier alnifolia var. alnifolia</i>	Prairie rose	<i>Rosa arkansana</i>
Red-osier hogwood	<i>Cornus sericea ssp. sericea</i>	Wood's rose	<i>Rosa woodsii</i>
Tartarian honeysuckle	<i>Lonicera tatarica</i>	Hoary willow	<i>Salix candida</i>
Balsam poplar	<i>Populus balsamifera ssp. balsamifera</i>	Sandbar willow	<i>Salix interior</i>
Trembling aspen	<i>Populus tremuloides</i>	Bog willow	<i>Salix pedicellaris</i>
Chokecherry	<i>Prunus virginiana var. virginiana</i>	Willow species	<i>Salix spp.</i>
Wild black currant	<i>Ribes americanum</i>	Northern mountain-ash	<i>Sorbus decora</i>
Bristly gooseberry	<i>Ribes oxycanthoides ssp. oxycanthoides</i>	-	-

* = Provincially designated nuisance weed species

** = Provincially designated noxious weed species



APPENDIX B

Potential Wildlife Species at Risk within the Project Study Area

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HOLMWOOD EAST DESKTOP REVIEW

Table B-1: Federal and Provincial Listed Wildlife Species with Potential to Occur Within the Project Study area

Common Name	Scientific Name	National Status ^(a)	Provincial Status ^(b)	Habitat	Likelihood of Occurrence
Horned Grebe	<i>Podiceps auritus</i>	Special Concern	S5B	This species prefers small waterbodies (slough, wetlands, and dugout) with extensive marshy areas.	Moderate to High - suitable habitat for this species is present in the study area. Horned grebes were observed adjacent to the study area during 2011 East Sector surveys (Golder 2015).
Ferruginous hawk	<i>Buteo regalis</i>	Threatened	S4B S4M	Species prefers open grassland plains, and prairie with little tree cover (Bechard and Schmutz 1995). Nests are generally constructed in lone trees or small bluffs, but can also be constructed on the ground (Smith 1996).	Low to Moderate – study area at the northern extent of this species range. Smith (1996) this species as a confirmed breeder in adjacent National Topographic System (NTS) mapsheets.
Yellow Rail	<i>Coturnicops noveboracensis</i>	Special Concern	S3B S2M	Typically found nesting in marshes dominated by sedges, grasses, and rushes where there is little or no standing water (generally 0.0 to 12.0 cm water depth) and where the substrate remains saturated throughout the summer (Smith 1996).	Moderate - suitable habitat is present in the study area; however, this species was not observed or heard during the 2015 surveys. According to Nature Saskatchewan (2002), the closest known nesting areas include Pike Lake, Porter Lake, and North End Slough at Blackstrap Reservoir.
Piping plover	<i>Charadrius melodus</i>	Endangered	S3B	Prefers to nest on sand or gravel beaches of saline or freshwater lakes, rivers, and wetlands (Godfrey 1986).	Low - there is no suitable nesting habitat for this species found in the study area.
Burrowing owl	<i>Athene cunicularia</i>	Endangered	S2B	Burrowing owls prefer pasture land that has been grazed, but they can be found nesting in ditches and along road allowances.	Low to Moderate - suitable nesting and foraging habitat is limited the study area; however, Smith (1996) lists this species as a confirmed breeder for the 73B 1 and 2 NTS mapsheets.
Short-eared Owl	<i>Asio flammeus</i>	Special Concern	S3B S2N	Short-eared owls typically prefer open grassland and hayland. Potential nesting and foraging habitat for short-eared owls is in the low areas containing native vegetation or grassy wetland margins (Godfrey 1986; Smith 1996).	Moderate - potential habitat is present in the study area, but is limited to modified grassland and idle grassland associated with field edges, ditches and wetlands. No short-eared owls were identified during the 2015 field surveys; however, Smith (1996) lists this species as a confirmed breeder for the 73B 1 and 2 NTS mapsheets.



HOLMWOOD EAST DESKTOP REVIEW

Table B-1: Federal and Provincial Listed Wildlife Species with Potential to Occur Within the Project Study area

Common Name	Scientific Name	National Status ^(a)	Provincial Status ^(b)	Habitat	Likelihood of Occurrence
Whooping crane	<i>Grus americana</i>	Endangered	SXB S2M	Breeding habitats consist primarily of marshy or swampy areas. During migration, a variety of habitats are used, including grainfields near wetlands (COSEWIC 2012).	Low - Moderate - this species is a transient through the area in spring and fall (Smith 1996). Whooping cranes have been recorded staging in the Saskatoon area (Aberdeen, Rice Lake and South Saskatchewan River) during the fall 2014 migration (N. Skelton 2015, pers. comm.).
Trumpeter swan	<i>Cygnus buccinator</i>	Not At Risk	S3B	Rare transient in Saskatchewan, other than in the Cypress Hills and Greenwater Lake areas where it is a confirmed breeder (Smith 1996).	Low - this species would likely be a rare transient through the study area.
Common Nighthawk	<i>Chordeiles minor</i>	Threatened	S5B S5M	This species forages in the air over cities or open country. They roost in trees in open woodlands, fence posts in open areas, or on the ground. Nests on the ground in woodland openings and clearings, natural open areas, burnt lands, (Godfrey 1986; Smith 1996).	Moderate – foraging habitat is present but nesting habitat is limited within the study area. Common nighthawks were reported over the south side of Saskatoon during the 2011 breeding season (D. Weidl 2011, pers. comm.) and likely could use segments of the study area for foraging or nesting.
Loggerhead Shrike	<i>Lanius ludovicianus excubitorides</i>	Threatened	S4B	Loggerhead shrikes prefer open areas with scattered shrubby growth. They can be found in open country, savannah, and desert scrub (Godfrey 1986). They typically breed in shelterbelts and willow-ringed wetlands on the prairies (Smith 1996). In the Saskatoon area, they are partial to farmyards, shelterbelts, and rural cemeteries, favouring caraganas or Manitoba maples as nest sites (Nature Saskatchewan 2002).	Moderate to High - potential habitat in the study area is limited to planted hedgerows and tall shrub areas. Previous observations made during 2011 field surveys for East Sector Natural Area Screening (Golder 2011).



HOLMWOOD EAST DESKTOP REVIEW

Table B-1: Federal and Provincial Listed Wildlife Species with Potential to Occur Within the Project Study area

Common Name	Scientific Name	National Status ^(a)	Provincial Status ^(b)	Habitat	Likelihood of Occurrence
Barn Swallow	<i>Hirundo rustica</i>	Threatened	S5B S5M	During the breeding season, this species prefers to be in the vicinity of water for drinking, foraging, and providing mud for nest building.	High - suitable foraging and nesting habitat is found throughout the study area. In the City, barn swallows have been frequently observed in newer neighbourhoods (5 to 10 years old) when they appear to have available forage and find suitable nesting structures in covered, raised decks and below irregular protected roof lines of new homes (M. Ealey 2015, pers. comm.).
Sprague's pipit	<i>Anthus spragueii</i>	Threatened	S4B	Typically found in prairie grasslands that have been unburned and unploughed (Godfrey 1986). They prefer areas of native grassland with intermediate vegetation height and litter depth.	Low-Moderate - suitable habitat is limited in the study area. Smith (1996) lists this species as a confirmed breeder for the 73B2 NTS mapsheet.
Chestnut-collared longspur	<i>Calcarius ornatus</i>	Threatened	S5B	Typical breeding habitat includes mowed or heavily grazed short and mixed grass prairie (Hill and Gould 1997).	Low to Moderate - suitable breeding habitat is limited in the study area. Smith (1996) lists this species as a confirmed breeder for the 73B2 NTS mapsheet.
Baird's sparrow	<i>Ammodramus bairdii</i>	Special Concern	S4B	Baird's sparrows prefer ungrazed to lightly grazed native grasslands and haylands (Smith 1996).	Low to Moderate - suitable breeding habitat is limited in the study area. Smith (1996) lists this species as a confirmed breeder for the 73B2 NTS mapsheet.
Long-billed curlew	<i>Numenius americanus</i>	Special Concern	S4B S4M	Nesting habitat for long-billed curlews includes native grasslands and open grassy meadows, usually near water; however, birds have also been found nesting in cereal crops.	Low to Moderate - suitable breeding habitat is found within the study area and Smith (1996) lists this species as a confirmed breeder in adjacent NTS mapsheets. The study area is at the northern extent of this species' breeding range.



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Table B-1: Federal and Provincial Listed Wildlife Species with Potential to Occur Within the Project Study area

Common Name	Scientific Name	National Status ^(a)	Provincial Status ^(b)	Habitat	Likelihood of Occurrence
Bobolink	<i>Dolichonyx oryzivorus</i>	Threatened	S5B	Species prefers open grassland areas (Martin and Gavin 1995). Breeding habitat includes wet meadows and artificial habitats such as hayfields and grain fields, corresponding roughly with the limit of agriculture (Smith 1996).	Moderate - suitable habitat is present within the study area. Smith (1996) lists this species as a confirmed breeder for the 73B2 NTS mapsheet.
Rusty Blackbird	<i>Euphagnus carolinus</i>	Special Concern	S4B	Rusty blackbirds typically prefer wet woods and tall shrubbery around pools of water (Godfrey 1986). It is a fairly common resident of the bogs and fens of the north, and nests in trees generally near standing water (Godfrey 1986; Smith 1996).	Low – Suitable habitat is limited and this species is a transient or winter visitant for the study area.
Olive-sided Flycatcher	<i>Contopus borealis</i>	Threatened	S4	Nesting habitat includes many forest types; mixed age stands with openings and tall snags are much preferred to homogeneous forests (Smith 1996).	Low to Moderate - this species is a spring and fall migrant through the study area. Olive-sided flycatchers are often observed within City limits during migration (D. Weidl 2011, pers. comm.).
Peregrine falcon	<i>Falco peregrinus</i>	Special Concern	S1B S4M S2N	Nests on cliff ledges near good foraging areas and uses a variety of habitats ranging from Arctic tundra to deserts to cities (COSEWIC 2012).	Low to Moderate – No nesting habitat in the study area; However, Smith (1996) lists this species as a confirmed breeder for the 73B2 NTS mapsheet.
Red knot	<i>Calidris canutus rufa</i>	Endangered	S2M	Breeding range in the central parts of the Canadian Arctic (COSEWIC 2012). On migration, uses large saline lakes (Smith 1996).	Low to Moderate - recorded in study area during spring and fall migrations (Smith 1996).



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Table B-1: Federal and Provincial Listed Wildlife Species with Potential to Occur Within the Project Study area

Common Name	Scientific Name	National Status ^(a)	Provincial Status ^(b)	Habitat	Likelihood of Occurrence
Northern Leopard Frog	<i>Rana pipiens</i>	Special Concern	S3	The northern leopard frog requires a mosaic of habitat types to meet the life stages and inhabits scattered, permanent, small water bodies with emergent vegetation in the spring for breeding, and over-wintering, and moves out to the permanent wet areas, which may be adjacent to the breeding sites in summer (AFW 1991; ASRD 2003).	Moderate - potential habitat (i.e., permanent, clear wetlands and watercourses) is available but limited in the study area. Northern leopard frogs have previously been documented within the South Saskatchewan River within the City (D. Weidl 2011, pers. comm.) and in the swales north of Sutherland (M. Ealey 2015, pers. comm.).
Monarch butterfly	<i>Danaus plexippus</i>	Special Concern	S3B	Exist primarily wherever milkweed (<i>Asclepias</i> spp.) and wildflowers exist. This includes abandoned farmland, along roadsides, and other open spaces where these plants grow. Monarchs are migratory, leaving the prairies in August.	Moderate - milkweed species (<i>Asclepias</i> spp.) were not observed during 2015 surveys within the study area, however there is potential for milkweed to be present in the study area. In 2013, monarchs were observed in Saskatoon, including in the yard of a Golder biologist (M. Ealey 2015, pers. comm.).
Yellow banded bumble bee	<i>Bombus terricola</i>	Special Concern	SNR	The yellow-banded bumble bee is an excellent pollinator of potatoes, alfalfa, plants in the rose family (such as raspberries), and cranberry, as well as a wide variety of wildflowers and other crops (Xerces Society 2015).	High – Suitable habitat present in the study area.

^(a) COSEWIC (2015).

^(b) SKCDC (2015).

*Locations of listed species found in Figure 3.

AFW = Alberta Fish and Wildlife; ASRD = Alberta Sustainable Resource Development.

Provincial Rank Definitions

S1 Extremely Rare – 5 or fewer occurrences in Saskatchewan, or very few remaining individuals.

S2 Rare – 6 to 20 occurrences in Saskatchewan or few remaining individuals.

S3 Rare/Uncommon – 21 to 100 occurrences in Saskatchewan; may be rare and local throughout province or may occur in a restricted provincial range (may be abundant in places).

S4 Common – more than 100 occurrences; generally widespread and abundant, but may be rare in parts of its range.

S5 Very Common – more than 100 occurrences wide spread and abundant, but may be rare in parts or its range.



HOLMWOOD EAST DESKTOP REVIEW

SH – Historically known from Saskatchewan, but not verified recently (typically not recorded in the province in the last 20 years. Suitable habitat is thought to be still present in the province and there is reasonable expectation that the species may be rediscovered.

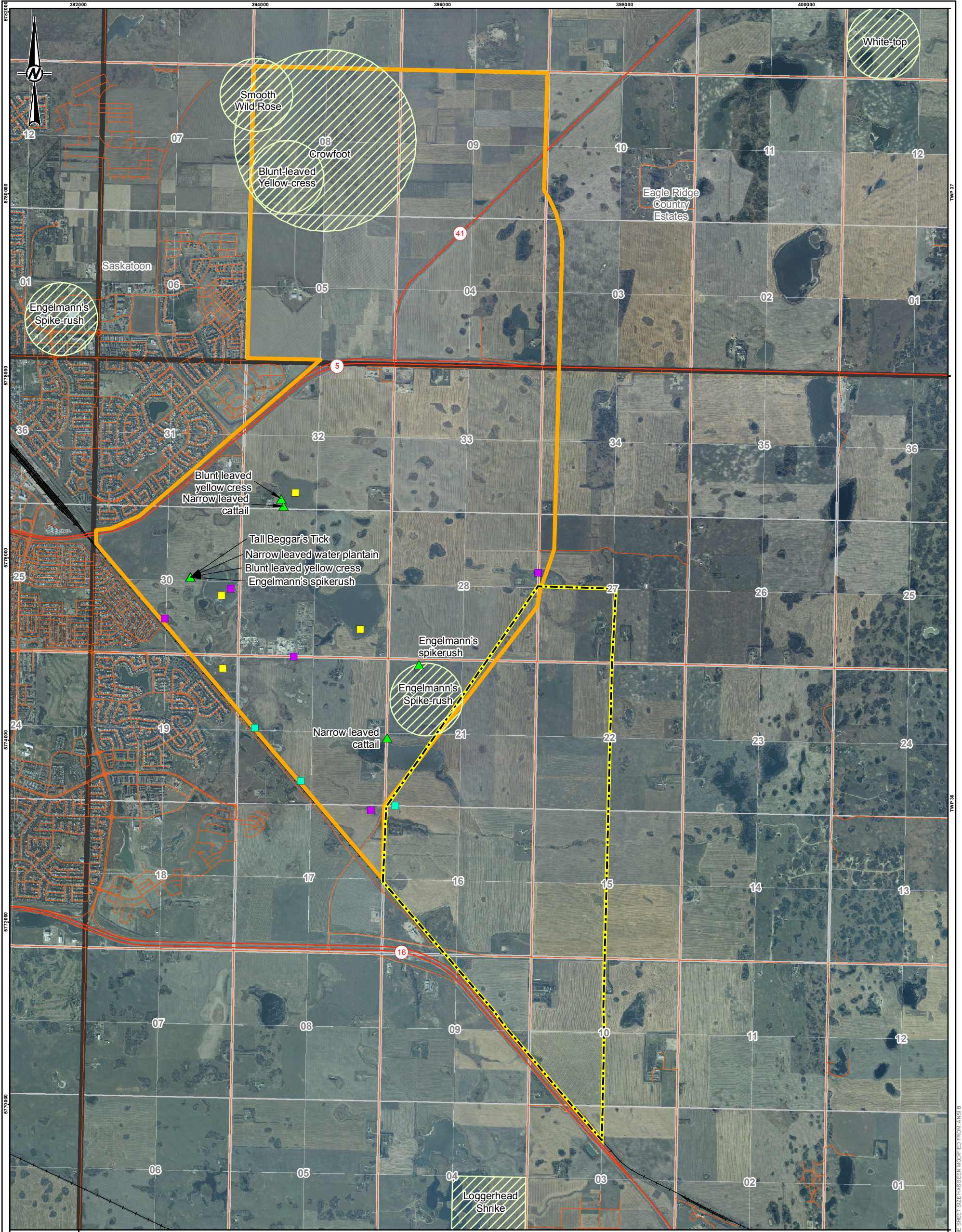
B – for a migratory species, rank applies to the breeding population in the province.

M – for a migratory species, rank applies to the transient population in the province.

N – for a migratory species, rank applies to the non-breeding population in the province.

SNR – rank is not yet assigned or species has not yet been assessed (not ranked).

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- LEGEND**
- GOLDER 2011 OBSERVATIONS**
- BARN SWALLOW SIGHTING
 - HORNED GREBE SIGHTING
 - LOGGERHEAD SHRIKE SIGHTING
 - ▲ RARE PLANT LOCATION
 - 2011 STUDY AREA BOUNDARY
 - 2015 PROJECT AREA BOUNDARY
 - HISTORICAL RARE PLANT OCCURRENCE (SKCDC)

REFERENCE(S)

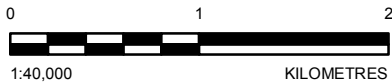
1. FLYSASK ORTHOIMAGERY: © SGIC PUBLIC WMS, 2008-2011
2. CANVEC ROADS: © DEPARTMENT OF NATURAL RESOURCES CANADA, 2012. ALL RIGHTS RESERVED. NAD 83 UTM ZONE 13N

CLIENT
CITY OF SASKATOON

PROJECT
HOLMWOOD SOUTHEAST

TITLE
LOCATION OF THE 2015 PROJECT AREA AND THE 2011 STUDY AREA

CONSULTANT	DATE
	YYYY-MM-DD 2015-06-01
	DESIGNED RK
	PREPARED LMS
	REVIEWED RK
	APPROVED ME



IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM A4 (811x1191mm) TO A3 (841x1191mm)



APPENDIX C

Summary Results of the MnRAM Assessment

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Wetland Functional Assessment Summary

COS Holmwood Wetlands Assessment

<i>Wetland Name</i>	<i>WS</i>	<i>SA</i>	<i>Location</i>	<i>Hydrogeomorphology</i>	<i>Maint. of Hydrologic Regime</i>	<i>Flood/ Stormwater/ Attenuation</i>	<i>Downstream Water Quality</i>	<i>Maint. of Wetland Water Quality</i>	<i>Shoreline Protection</i>
nw15-001	0	NA	-036-04-15-001	Depressional/Tributary (outlet but no perennial inlet or drainage entering from upstream subwatershed)	Moderate	Moderate	Moderate	Exceptional	Not Applicable
nw15-002	0	NA	-036-04-15-001	Depressional/Isolated (no discernable inlets or outlets)	High	High	High	High	Not Applicable
nw16-001	0	NA	-036-04-16-001	Depressional/Flow-through (apparent inlet and outlet), Depressional/Flow-through (apparent inlet and outlet)	High	Moderate	Moderate	High	Not Applicable
nw16-005	0	NA	-036-04-16-001	Depressional/Isolated (no discernable inlets or outlets)	High	High	Moderate	High	Not Applicable
nw22-004	0	NA	-036-04-22-001	Depressional/Isolated (no discernable inlets or outlets)	High	High	Moderate	High	Not Applicable
nw16-006	0	NA	-036-04-16-001	Depressional/Isolated (no discernable inlets or outlets)	High	High	Moderate	High	Not Applicable
sw16-001	0	NA	-036-04-16-001	Depressional/Isolated (no discernable inlets or outlets)	High	High	Moderate	Exceptional	Not Applicable
ne21-002	0	NA	-036-04-16-001	Depressional/Isolated (no discernable inlets or outlets)	High	High	Moderate	Exceptional	Not Applicable
nw15-007	0	NA	-036-04-16-001	Depressional/Isolated (no discernable inlets or outlets)	High	High	Moderate	Exceptional	Not Applicable
nw15-006	0	NA	-036-04-16-001	Depressional/Isolated (no discernable inlets or outlets)	High	High	Moderate	Exceptional	Not Applicable
sw15-001	0	NA	-036-04-16-001	Depressional/Isolated (no discernable inlets or outlets)	High	High	Moderate	High	Not Applicable
sw15-002	0	NA	-036-04-16-001	Depressional/Isolated (no discernable inlets or outlets)	High	High	Moderate	High	Not Applicable
sw15-005	0	NA	-036-04-16-001	Depressional/Isolated (no discernable inlets or outlets)	Moderate	High	Moderate	Moderate	Not Applicable
sw15-006	0	NA	-036-04-16-001	Depressional/Isolated (no discernable inlets or outlets)	Moderate	High	Moderate	Moderate	Not Applicable
sw27-006	0	NA	-036-04-16-001	Depressional/Isolated (no discernable inlets or outlets)	High	High	Moderate	High	Not Applicable
se28-006	0	NA	-036-04-16-001	Depressional/Isolated (no discernable inlets or outlets)	High	High	Moderate	High	Not Applicable
sw27-001	0	NA	-036-04-16-001	Depressional/Isolated (no discernable inlets or outlets)	High	High	High	High	Not Applicable
nw16-002	0	NA	-036-04-16-002	Depressional/Isolated (no discernable inlets or outlets)	High	High	Moderate	Moderate	Not Applicable
nw16-003	0	NA	-036-04-16-003	Depressional/Isolated (no discernable inlets or outlets)	High	High	Moderate	High	Not Applicable
ne09-007	0	NA	-036-04-16-007	Depressional/Isolated (no discernable inlets or outlets)	High	High	Moderate	Moderate	Not Applicable

Wetland Functional Assessment Summary

COS Holmwood Wetlands Assessment

<i>Wetland Name</i>	<i>WS</i>	<i>SA</i>	<i>Location</i>	<i>Hydrogeomorphology</i>	<i>Maint. of Hydrologic Regime</i>	<i>Flood/ Stormwater/ Attenuation</i>	<i>Downstream Water Quality</i>	<i>Maint. of Wetland Water Quality</i>	<i>Shoreline Protection</i>
ne09-005	0	NA	-036-04-16-005	Depressional/Isolated (no discernable inlets or outlets)	High	High	Moderate	Moderate	Not Applicable
ne09-004	0	NA	-036-04-16-004	Depressional/Isolated (no discernable inlets or outlets)	High	High	Moderate	High	Not Applicable
ne09-003	0	NA	-036-04-16-003	Depressional/Isolated (no discernable inlets or outlets)	High	High	Moderate	High	Not Applicable
ne09-001	0	NA	-036-04-16-001	Depressional/Isolated (no discernable inlets or outlets)	High	High	Moderate	Moderate	Not Applicable



APPENDIX D

MnRAM Assessed Wetlands – Summary Table

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Wetland Classification (1)	Wetland Management (2)	Easting (13U)	Northing (13U)	Wetland Area (Acres)	Drainage Area (Acres)	Soils (3)	Photo Names
4	Manage 1	5771484	396211	8.832467992	21.83	St L 2, HyCL2, BrL2	Photo 41, 42
4	Preserve	5771274	396475	0.456991786	1.13	StL2	Photo 40
4	Manage 1	5771154	396687	1.866022797	4.61	StL2	Photo 38, 39
4	Manage 1	5771053	396743	0.869318602	2.15	StL2	Photo 36, 37
2T	Manage 2	5770869	396797	0.133994169	0.33	BrL2	Photo 35
4	Preserve	5774532	397014	1.406220439	3.47	EwHyCL2	Photo 35
4	Preserve	5772831	397047	1.801084839	4.45	HyCL2, EwL3	Photo 27, 28
4	Preserve	5772830	397264	7.863764006	19.43	HyCL 2, EwL3	Photos 22 to 26
4	Preserve	5772689	397667	2.177015313	5.38	StL2	Photo 20, 21
4	Preserve	5772547	397729	5.817482806	14.38	StL2	Photo 18, 19
4	Preserve	5771840	395977	14.79939966	36.57	HyCL2, BrFL2	Photo 33, 34
4T	Manage 2	5772710	395869	0.834444674	2.06	HyCL2	Photo 44, 45
3T	Manage 1	5772576	395666	4.340698322	10.73	BrFL2, HyCL2	Photo 43
4	Preserve	5772686	395387	2.609784384	6.45	BrFL2	Photo 32
4	Preserve	5772488	395418	11.42011671	28.22	BrFL2, HyCL2	Photo 31
4	Preserve	5774487	397083	1.201503831	2.97	EwHyCL2	Photo 11 & 12
4	Preserve	5774982	396994	1.465286936	3.62	EwHyCL2	Photo 6, 7
4	Preserve	5772212	397778	5.951890876	14.71	StL2	Photo 16, 17
4	Preserve	5772112	397704	0.55245339	1.37	StL2	Photo 15
4	Manage1	5771638	397181	0.562442609	1.39	StL2	Photo 13
5	Preserve	5771639	397020	1.599488426	3.95	StL2	Photo 14
4	Preserve	5771840	395977	40.90983127	101.09	StL2, HyCL2	Photo 29, 30
4	Preserve	5775602	397117	25.70846789	63.53	StL3, EwHyCL2	Photos 1, 2, 3
4	Preserve	5775057	397058	1.491772638	3.69	EwHyCL2	Photos 4, 5



APPENDIX E

Holmwood Wetland Photoplates

DRAFT



APPENDIX E
Holmwood Wetland Photos



Photo 1: Looking east at wetland SW 27-36-04-001 from the north end of the wetland basin on August 11, 2015.



Photo 2: Looking north at wetland SW 27-36-04-001 from the north end of the wetland basin on August 11, 2015.



APPENDIX E
Holmwood Wetland Photos



Photo 3: Looking west at wetland SW 27-36-04-001 from the north end of the wetland basin on August 11, 2015.



Photo 4: Looking southeast at wetland SW 27-36-04-006 from the northwest end of the wetland basin on August 11, 2015.



APPENDIX E
Holmwood Wetland Photos



Photo 5: Looking south at wetland SW 27-36-04-006 from the north end of the wetland basin on August 11, 2015.



Photo 6: Looking southwest at wetland SE 28-36-04-006 from the north end of the wetland basin on August 11, 2015.



APPENDIX E

Holmwood Wetland Photos



Photo 7: Looking south at wetland SE 28-36-04-006 from the middle of the wetland basin on August 11, 2015.



Photo 8: Looking northwest at wetland NE 21-36-04-002 from the east end of the wetland basin on August 11, 2015.



APPENDIX E
Holmwood Wetland Photos



Photo 9: Looking east at wetland NE 21-36-04-002 from the west end of the wetland basin on August 11, 2015.



Photo 10: Looking west at wetland NE 21-36-04-002 from the east end of the wetland basin on August 11, 2015.



APPENDIX E
Holmwood Wetland Photos



Photo 11: Looking northeast at wetland NW 22-36-04-004 from the west side of the wetland basin on August 11, 2015.



Photo 12: Looking west at wetland NW 22-36-04-004 from the east side of the wetland basin on August 11, 2015.



APPENDIX E

Holmwood Wetland Photos



Photo 13: Looking north at wetland SW 15-36-04-005 from the south end of the wetland basin on August 11, 2015.



Photo 14: Looking north at wetland SW 15-36-04-006 from the south end of the wetland basin on August 11, 2015.



APPENDIX E
Holmwood Wetland Photos



Photo 15: Looking south at wetland SW 15-36-04-002 from the north end of the wetland basin on August 11, 2015.



Photo 16: Looking north at wetland SW 15-36-04-005 from the south end of the wetland basin on August 11, 2015.



APPENDIX E
Holmwood Wetland Photos



Photo 17: Looking south at wetland SW 15-36-04-005 from the north end of the wetland basin on August 11, 2015.



Photo 18: Looking north at wetland NW 15-36-04-007 from the south end of the wetland basin on August 11, 2015.



APPENDIX E
Holmwood Wetland Photos



Photo 19: Looking south at wetland NW 15-36-04-007 from the north end of the wetland basin on August 11, 2015.



Photo 20: Looking north at wetland NW 15-36-04-006 from the south end of the wetland basin on August 11, 2015.



APPENDIX E
Holmwood Wetland Photos



Photo 21: Looking south at wetland NW 15-36-04-006 from the north end of the wetland basin on August 11, 2015.



Photo 22: Looking north at wetland NW 15-36-04-002 from within the wetland basin on August 11, 2015.



APPENDIX E

Holmwood Wetland Photos



Photo 23: Looking at a water control structure in wetland NW 15-36-04-002 from within the wetland basin on August 11, 2015.



Photo 24: Looking west at wetland NW 15-36-04-002 from within the wetland basin on August 11, 2015.



APPENDIX E
Holmwood Wetland Photos



Photo 25: Looking east at wetland NW 15-36-04-002 from north of the wetland basin on August 11, 2015.



Photo 26: Looking west at wetland NW 15-36-04-002 from north of the wetland basin on August 11, 2015.



APPENDIX E
Holmwood Wetland Photos



Photo 27: Looking west at wetland NW 15-36-04-001 from south of the wetland basin on August 11, 2015.



Photo 28: Looking east at wetland NW 15-36-04-001 from south of the wetland basin on August 11, 2015.



APPENDIX E
Holmwood Wetland Photos



Photo 29: Looking west at wetland SW 16-36-04-001 from the southwest end of the wetland basin on August 11, 2015.



Photo 30: Looking east at wetland SW 16-36-04-001 from the southwest end of the wetland basin on August 11, 2015.



APPENDIX E
Holmwood Wetland Photos



Photo 31: Looking east at wetland NW 16-36-04-006 from the west end of the wetland basin on August 11, 2015.



Photo 32: Looking east at wetland NW 16-36-04-005 from the west end of the wetland basin on August 11, 2015.



APPENDIX E
Holmwood Wetland Photos



Photo 33: Looking east at wetland NW16-36-04-001 from the west end of the wetland basin on August 11, 2015.



Photo 34: Looking south wetland NW 16-36-04-005 from the northwest end of the wetland basin on August 11, 2015.



APPENDIX E
Holmwood Wetland Photos



Photo 35: Looking north at wetland NE 09-36-04-007 from the south end of the wetland basin on September 3, 2015.



Photo 36: Looking east at wetland NE 09-36-04-005 from the west end of the wetland basin on September 3, 2015.



APPENDIX E
Holmwood Wetland Photos



Photo 37: Looking east at the center of the wetland basin of wetland NE 09-36-04-005 on September 3, 2015.



Photo 38: Looking southwest at the fresh wet meadow of wetland NE 09-36-04-004 with old building materials from the south side of the wetland basin on September 3, 2015.



APPENDIX E

Holmwood Wetland Photos



Photo 39: Looking northwest at wetland NE 09-36-04-004 from the northeast end of the wetland basin on September 3, 2015.



Photo 40: Looking northwest at wetland NE 09-36-04-003 from the southeast end of the wetland basin on September 3, 2015.



APPENDIX E
Holmwood Wetland Photos



Photo 41: Looking northeast at wetland NE 09-36-04-001 from the south end of the wetland basin on September 3, 2015.



Photo 42: Looking south at the fresh wet meadow of wetland NE 09-36-04-001 from the south end of the wetland basin on September 3, 2015.



APPENDIX E

Holmwood Wetland Photos



Photo 43: Looking northeast at wetland NW 16-36-04-003 from the southwest end of the wetland basin on September 3, 2015.



Photo 44: Looking northwest at wetland NW 16-36-04-002, which was seeded to an annual crop, from the southwest end of the wetland basin on September 3, 2015.



APPENDIX E
Holmwood Wetland Photos



Photo 45: Looking west at wetland NW 16-36-04-002 from the east end of the wetland basin on September 3, 2015.



APPENDIX F

Tourism, Parks, Culture and Sport - HCB on-line Heritage Sensitivities Screening Results

DRAFT



PARKS, CULTURE AND SPORT

ABOUT PARKS, CULTURE AND SPORT

Inquiry was made on April 30, 2015 at 8:14 AM

You are inquiring about the heritage sensitivity of the following land location:

Quarter-section:

NW

Section:

9

Township:

36

Range:

4

Meridian:

3

This quarter-section is NOT heritage sensitive.

It is not necessary to submit the project to the Heritage Conservation Branch for screening. These results can be printed for submission to other regulatory bodies (e.g. Saskatchewan Environment, Saskatchewan Industry and Resources). Please email arms@gov.sk.ca if you have any questions.

Inquiry was made on April 30, 2015 at 8:14 AM

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PARKS, CULTURE AND SPORT

ABOUT PARKS, CULTURE AND SPORT

Inquiry was made on April 30, 2015 at 8:13 AM

You are inquiring about the heritage sensitivity of the following land location:

Quarter-section:

NE

Section:

9

Township:

36

Range:

4

Meridian:

3

This quarter-section is NOT heritage sensitive.

It is not necessary to submit the project to the Heritage Conservation Branch for screening. These results can be printed for submission to other regulatory bodies (e.g. Saskatchewan Environment, Saskatchewan Industry and Resources). Please email arms@gov.sk.ca if you have any questions.

Inquiry was made on April 30, 2015 at 8:13 AM

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PARKS, CULTURE AND SPORT

ABOUT PARKS, CULTURE AND SPORT

Inquiry was made on April 30, 2015 at 8:14 AM

You are inquiring about the heritage sensitivity of the following land location:

Quarter-section:

SE

Section:

9

Township:

36

Range:

4

Meridian:

3

This quarter-section is NOT heritage sensitive.

It is not necessary to submit the project to the Heritage Conservation Branch for screening. These results can be printed for submission to other regulatory bodies (e.g. Saskatchewan Environment, Saskatchewan Industry and Resources). Please email arms@gov.sk.ca if you have any questions.

Inquiry was made on April 30, 2015 at 8:14 AM

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PARKS, CULTURE AND SPORT

ABOUT PARKS, CULTURE AND SPORT

Inquiry was made on April 30, 2015 at 8:14 AM

You are inquiring about the heritage sensitivity of the following land location:

Quarter-section:

NW

Section:

10

Township:

36

Range:

4

Meridian:

3

This quarter-section is NOT heritage sensitive.

It is not necessary to submit the project to the Heritage Conservation Branch for screening. These results can be printed for submission to other regulatory bodies (e.g. Saskatchewan Environment, Saskatchewan Industry and Resources). Please email arms@gov.sk.ca if you have any questions.

Inquiry was made on April 30, 2015 at 8:14 AM

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PARKS, CULTURE AND SPORT

ABOUT PARKS, CULTURE AND SPORT

Inquiry was made on April 30, 2015 at 8:15 AM

You are inquiring about the heritage sensitivity of the following land location:

Quarter-section:

SW

Section:

10

Township:

36

Range:

4

Meridian:

3

This quarter-section is NOT heritage sensitive.

It is not necessary to submit the project to the Heritage Conservation Branch for screening. These results can be printed for submission to other regulatory bodies (e.g. Saskatchewan Environment, Saskatchewan Industry and Resources). Please email arms@gov.sk.ca if you have any questions.

Inquiry was made on April 30, 2015 at 8:15 AM

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PARKS, CULTURE AND SPORT

ABOUT PARKS, CULTURE AND SPORT

Inquiry was made on April 30, 2015 at 8:15 AM

You are inquiring about the heritage sensitivity of the following land location:

Quarter-section:

NW

Section:

15

Township:

36

Range:

4

Meridian:

3

This quarter-section is NOT heritage sensitive.

It is not necessary to submit the project to the Heritage Conservation Branch for screening. These results can be printed for submission to other regulatory bodies (e.g. Saskatchewan Environment, Saskatchewan Industry and Resources). Please email arms@gov.sk.ca if you have any questions.

Inquiry was made on April 30, 2015 at 8:15 AM

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You are inquiring about the heritage sensitivity of the following land location:

Quarter-section:

SW

Section:

15

Township:

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Range:

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Meridian:

3

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PARKS, CULTURE AND SPORT

ABOUT PARKS, CULTURE AND SPORT

Inquiry was made on April 30, 2015 at 8:16 AM

You are inquiring about the heritage sensitivity of the following land location:

Quarter-section:

NW

Section:

16

Township:

36

Range:

4

Meridian:

3

This quarter-section is NOT heritage sensitive.

It is not necessary to submit the project to the Heritage Conservation Branch for screening. These results can be printed for submission to other regulatory bodies (e.g. Saskatchewan Environment, Saskatchewan Industry and Resources). Please email arms@gov.sk.ca if you have any questions.

Inquiry was made on April 30, 2015 at 8:16 AM

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PARKS, CULTURE AND SPORT

ABOUT PARKS, CULTURE AND SPORT

Inquiry was made on April 30, 2015 at 8:16 AM

You are inquiring about the heritage sensitivity of the following land location:

Quarter-section:

NE

Section:

16

Township:

36

Range:

4

Meridian:

3

This quarter-section is NOT heritage sensitive.

It is not necessary to submit the project to the Heritage Conservation Branch for screening. These results can be printed for submission to other regulatory bodies (e.g. Saskatchewan Environment, Saskatchewan Industry and Resources). Please email arms@gov.sk.ca if you have any questions.

Inquiry was made on April 30, 2015 at 8:16 AM

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PARKS, CULTURE AND SPORT

ABOUT PARKS, CULTURE AND SPORT

Inquiry was made on April 30, 2015 at 8:17 AM

You are inquiring about the heritage sensitivity of the following land location:

Quarter-section:

SE

Section:

16

Township:

36

Range:

4

Meridian:

3

This quarter-section is NOT heritage sensitive.

It is not necessary to submit the project to the Heritage Conservation Branch for screening. These results can be printed for submission to other regulatory bodies (e.g. Saskatchewan Environment, Saskatchewan Industry and Resources). Please email arms@gov.sk.ca if you have any questions.

Inquiry was made on April 30, 2015 at 8:17 AM

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PARKS, CULTURE AND SPORT

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Quarter-section:

SW

Section:

16

Township:

36

Range:

4

Meridian:

3

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PARKS, CULTURE AND SPORT

ABOUT PARKS, CULTURE AND SPORT

Inquiry was made on April 30, 2015 at 8:17 AM

You are inquiring about the heritage sensitivity of the following land location:

Quarter-section:

SE

Section:

21

Township:

36

Range:

4

Meridian:

3

This quarter-section is NOT heritage sensitive.

It is not necessary to submit the project to the Heritage Conservation Branch for screening. These results can be printed for submission to other regulatory bodies (e.g. Saskatchewan Environment, Saskatchewan Industry and Resources). Please email arms@gov.sk.ca if you have any questions.

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PARKS, CULTURE AND SPORT

ABOUT PARKS, CULTURE AND SPORT

Inquiry was made on April 30, 2015 at 8:18 AM

You are inquiring about the heritage sensitivity of the following land location:

Quarter-section:

NW

Section:

22

Township:

36

Range:

4

Meridian:

3

This quarter-section is NOT heritage sensitive.

It is not necessary to submit the project to the Heritage Conservation Branch for screening. These results can be printed for submission to other regulatory bodies (e.g. Saskatchewan Environment, Saskatchewan Industry and Resources). Please email arms@gov.sk.ca if you have any questions.

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You are inquiring about the heritage sensitivity of the following land location:

Quarter-section:

SW

Section:

22

Township:

36

Range:

4

Meridian:

3

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