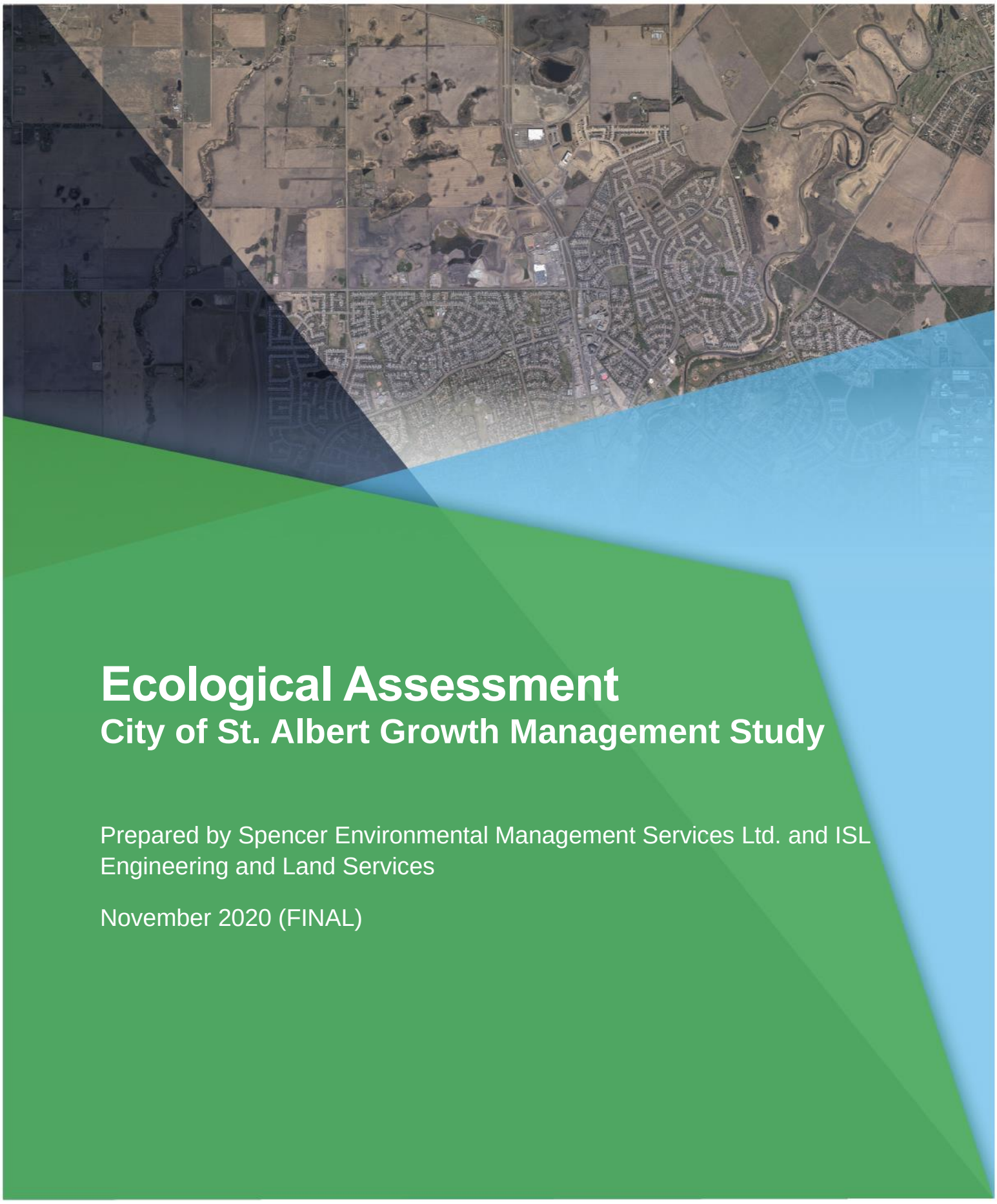
APPENDIX E
2020 Ecological Assessment

THIS PAGE LEFT INTENTIONALLY BLANK



Ecological Assessment

City of St. Albert Growth Management Study

Prepared by Spencer Environmental Management Services Ltd. and ISL Engineering and Land Services

November 2020 (FINAL)

Table of Contents

1.0 Background 4

1.1 Ecological Assessment Objectives 4

2.0 Ecological Assessment Study Area 5

3.0 Methods 6

4.0 Natural Area Inventory Update 7

4.1 Methods 7

4.2 Results 8

5.0 Ecological Network 9

5.1 Methods 9

5.2 Results 9

6.0 Potential Environmental Reserve 10

6.1 Methods 10

6.2 Results 13

7.0 Potential Conservation Reserve 14

7.1 Methods 14

7.2 Results 15

8.0 Crown Claimable Wetlands 16

8.1 Methods 16

8.2 Results 16

9.0 Identification of Ecological Constraints 18

9.1 Methods 18

9.2 Results 18

9.3 Ecological Constraints Conclusions and Considerations 22

10.0 Ecological Assets Interaction with Ecological Constraints 24

10.1 Methods 24

10.2 Results 25

11.0 Overall Conclusions 27

12.0 References 28

List of Tables

Table E.1: Natural Areas in the City of St. Albert, 2014 vs. 2017 8
Table E.2: Summary of Semi-permanent and Permanent Wetlands Conditions 17

List of Maps

Following Page

Map E.1: Ecological Assessment Study Area 5
Map E.2: Natural Area Inventory 2017 Update 8
Map E.3: Ecological Network 2017 Update 9
Map E.4: Potential Environmental and Conservation Reserves in the MPAA 13
Map E.5: Potential Crown Claimed Areas in the MPAA 16
Map E.6: Ecological Constraints Study Area 18
Map E.7: Environmental Site Assessment Repository Locations 18
Map E.8: Oil and Gas Pipelines, Wells and Facilities 19
Map E.9: Properties of Concern 21
Map E.10: Ecological Constraints and Natural Areas Overlay 25

List of Appendices

Appendix E.1: Ecological Constraints Environmental Site Assessment Location Inventory
Appendix E.2: Ecological Constraints Well Inventory
Appendix E.3: Ecological Constraints Pipeline Inventory
Appendix E.4: Ecological Constraints Oil and Gas Facilities Inventory

1.0 Background

ISL Engineering and Land Services Ltd. (ISL) has been retained by the City of St. Albert (the City) to complete a Growth Management Study (GMS) and supporting technical studies for the City's forthcoming annexation of lands from Sturgeon County. The technical studies are intended to identify opportunities, challenges and mitigation measures required for a successful annexation. Requirements for the technical studies included an Ecological Assessment (EA) that identifies ecological connectivity, assets, and liabilities in the maximum potential annexation area in relation to the City of St. Albert, Sturgeon County, and the Edmonton Metropolitan Region. The study was to build on a Natural Areas Assessment 2015 Update undertaken by the City of St. Albert. Undertaking an EA as part of the GMS is in keeping with the City's consistent regard for the natural environment in all planning endeavours and the commensurate need to be fully aware of ecological constraints and encumbrances on lands of annexation interest. ISL's assembled multi-disciplinary team included Spencer Environmental Management Services Ltd. (Spencer Environmental) as ecological subject matter lead. ISL retained responsibility for the ecological liabilities component of the EA. This Ecological Assessment document represents the combined efforts of ISL) and Spencer Environmental.

1.1 Ecological Assessment Objectives

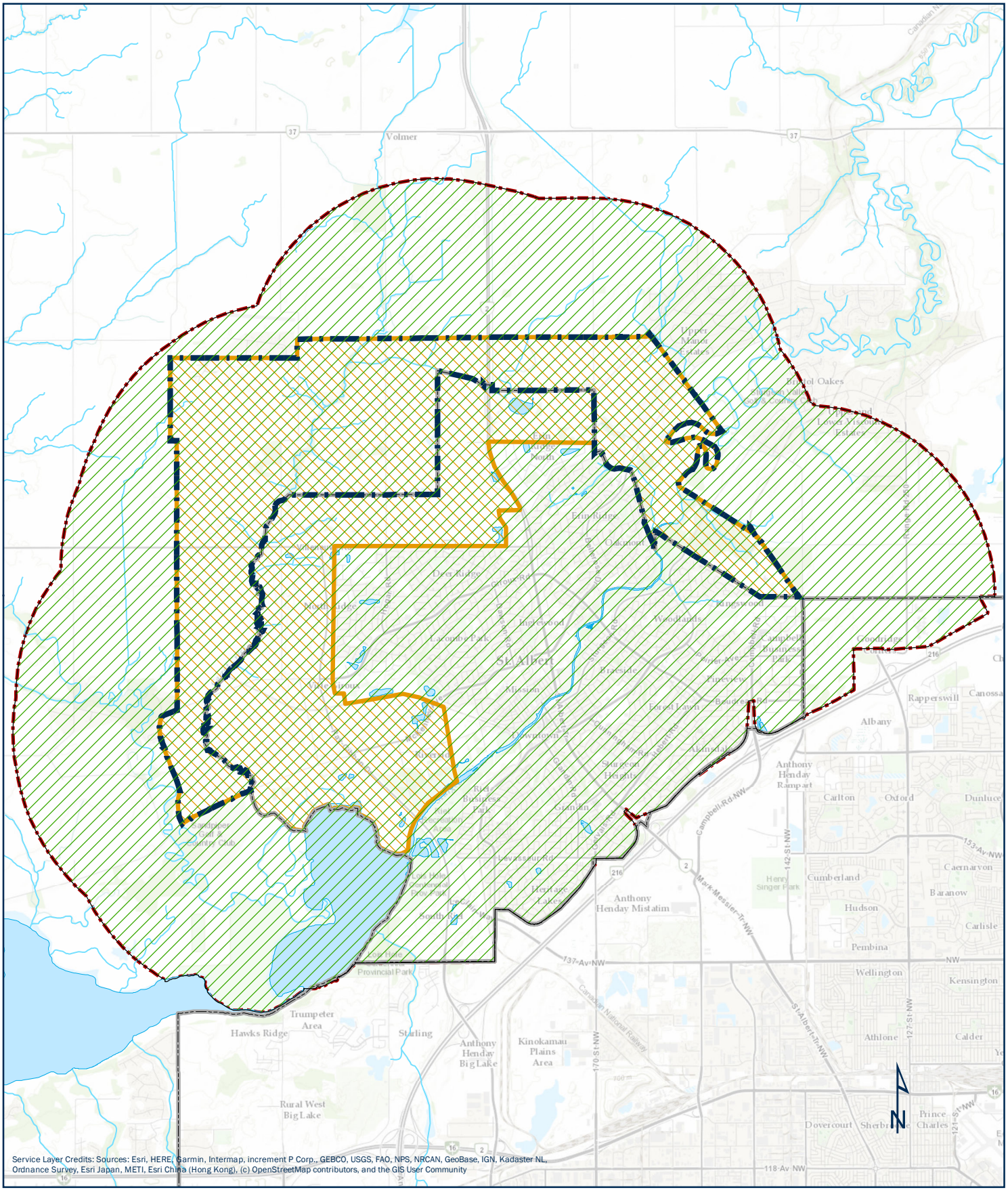
The City's Invitation to Tender for the project identified two core EA objectives. The first core objective was to prepare an Ecological Network map for the City of St. Albert, proposed annexation area, and interface with the surrounding area. The second core objective was it identify, within the Maximum Potential Annexation Area (MPAA):

- potential environmental reserve including lands subject to flooding, wetlands, and ravines and slopes;
- potential conservation reserve;
- areas that could be subject to Crown claim; and
- ecological constraints related to contaminated sites and oil and gas infrastructure (i.e. environmental concerns that may function as constraints to future development).

One additional objective was identified as part of this study. The City of St. Albert last completed a Natural Area inventory in 2015. To ensure that the EA deliverables relied on the most recent information available, it was first necessary to update the City's Natural Area inventory.

2.0 Ecological Assessment Study Area

To meet the study objectives, the EA study area was required to include existing City of St. Albert lands, the MPAA and some surrounding lands. The precedent Ecological Network mapping for the City's Natural Areas Assessment 2015 Update (Spencer Environmental) covered the City St. Albert and a full 3 km buffer. The entirety of that study area coincidentally includes all lands within the MPAA. The 2015 dataset was therefore a suitable base for use in this analysis. The 2015 study area was therefore adopted as the EA study area (Map E.1) and all data analyses covered the full study area. For report maps, the buffer in that study area was clipped to show a slightly smaller adjacent buffer to the west, north and east of the MPAA. This presentation adjustment was necessary to enable a map scale that best illustrates features of interest on City and MPAA lands. For some analyses (e.g., potential Crown wetlands), results are only shown for subsets of the study area (e.g., MPAA lands). Where warranted, the study area is described in the relevant methods sections of this report. The full GIS datasets for the overall study area will be provided to the City.



Date: 2020-12-02 Document: J:\115100\15167_St_Albert_Growth_Study_Annexation\02_CADD\25_GIS\251_Figures\05_Ecological_Assessment\Spencer_Maps\09Nov2019_EP778_COSA_GMS_EA_Maps\15167_GMS_EA_Map_E1_final_201202.mxd

City of St. Albert Cultivate Life

- Ecological Assessment Study Area for Growth Management Study
- Maximum Potential Annexation Area
- Ecological Constraints Study Area
- Municipal Boundary
- 2015 NA Inventory Overall Study Area
- Hydrology

0 0.3 0.6 1.2 1.8 2.4 km

3TM114-83 1:80,000

ST. ALBERT GROWTH MANAGEMENT STUDY: ECOLOGICAL ASSESSMENT

MAP E.1: ECOLOGICAL ASSESSMENT STUDY AREA

3.0 Methods

The EA was a desktop exercise that relied heavily on data generated for the City of St. Albert by Spencer Environmental (2015). Additional resources included available GIS data generated/ provided by the City and ISL; relevant open datasets; interviews with City staff; desktop aerial photography analysis; and information generated through the GMS public engagement program.

The remainder of this report is organized by analyses undertaken to satisfy objectives. For each section, detailed analytical methods employed are provided, followed by the analysis results.

4.0 Natural Area Inventory Update

4.1 Methods

The Natural Area inventory was a desktop exercise that used high resolution, true colour aerial photography from spring of 2017. Much of the photography was provided by the City of St. Albert; however, where required, we also used City of Edmonton 2017 aerial photography to provide full coverage of the study area. Year 2017 was the most recent colour aerial photography available at the outset of this study. This update therefore reflects changes on the landscape that were realized between 2014 and spring of 2017.

The following analytical steps were taken:

- We overlaid the 2015 Natural Area inventory boundaries on the 2017 aerial photography. Through a systematic review of the full study areas, typically at a scale of 1:1,000, we identified discrepancies between mapped 2015 Natural Area boundaries and those apparent in the aerial photography. Where discrepancies were noted, Natural Area boundaries were adjusted to reflect the changed 2017 boundary.

- To update the 2015 "Planned (Future) Loss of Site" dataset, we consulted available GIS data illustrating the land development concept for approved but not as yet implemented area structure plans (ASPs). Similarly, planned loss sites identified in 2015 that have since been removed were eliminated from the dataset.

- All GIS analyses were completed by a professional biologist with over 10 years of experience in desktop ecological aerial photography interpretation.

- The update addressed all Natural Area boundaries in the overall EA study area.

Consistent with all previous City of St. Albert Natural Area inventories dating back to 1999, this 2017 natural area inventory update continues to refer to three natural areas within the City's boundaries as belonging to one of three categories:

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

- **Environmentally Sensitive Area (ESA):** an undisturbed or relatively undisturbed natural area equal to or greater than 0.5 ha that, because of its features, characteristics or ecological functions, is significant and is highly sensitive to most forms of disturbance (i.e. its values and functions would be significantly altered by natural or human-caused disturbance such as development of surrounding lands or human use of the site).

- **Natural Area (NA):** a natural area that does not meet the criteria of SNA or ESA.

Consistent with the 2015 mapping exercise, natural sites outside of the City's current boundaries were identified as Uncategorized Natural Areas.

4.2 Results

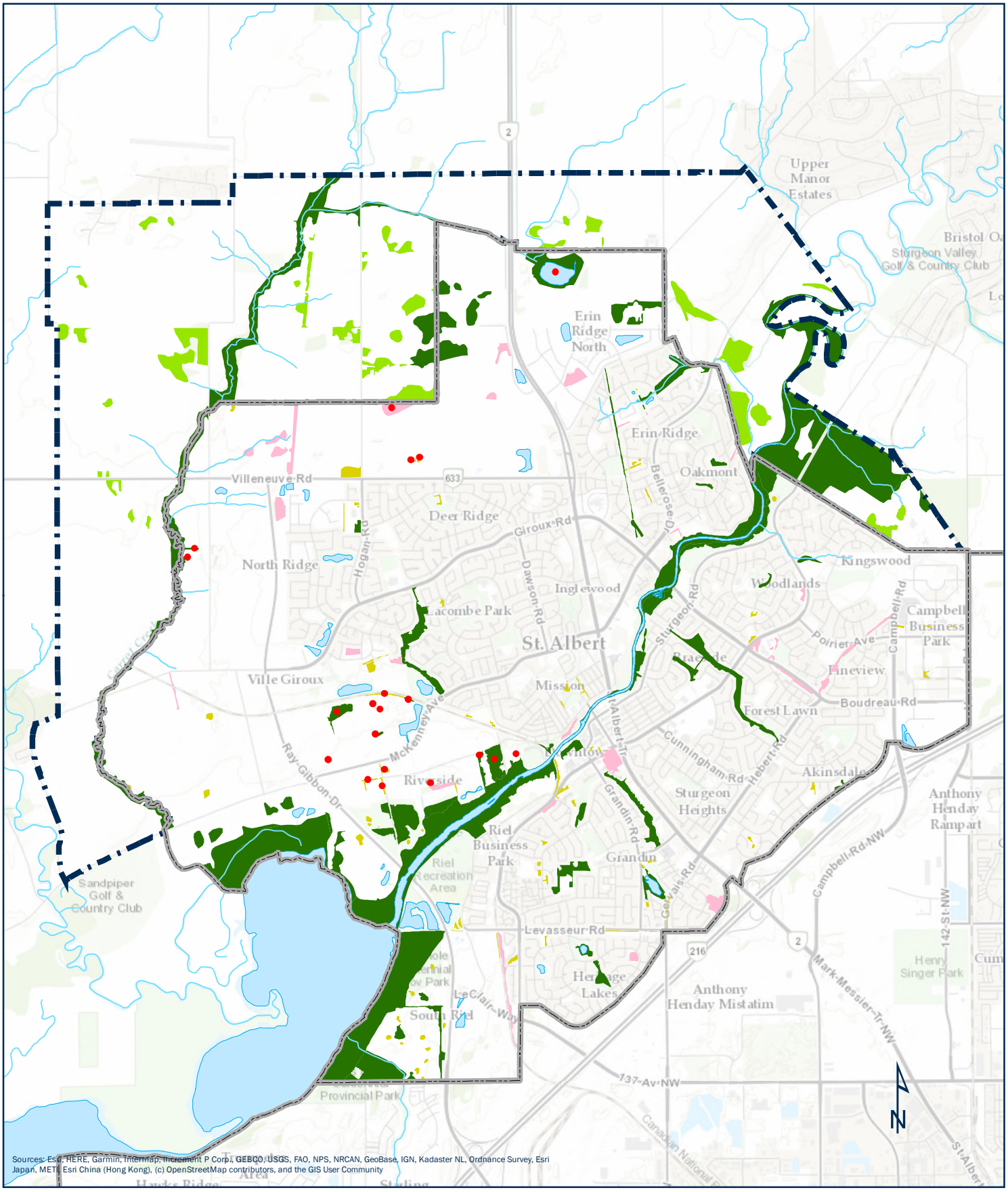
Map E.2 illustrates the updated Natural Area inventory. Focussing on lands that are of most relevance to the GMS, Map E.2 illustrates the updated Natural Area inventory within the MPAA and within the current City of St. Albert boundaries.

Within the City's current boundaries, the 2017 inventory update includes a total of 185 natural areas (sites) scattered throughout the City having a combined total area of 463.1 ha (Table E.1). Using the same approach to measuring the total natural area extent within the City, the inventory in 2015 included a total of 195 sites for a combined total area of 468.2 ha. Between 2014 and 2017 – the dates of the aerial photographs used to inform the inventories – this represents a decrease of 10 sites for a combined total loss of approximately 5.1 ha. The majority of sites completely lost between 2014 and 2017 had been identified in 2015 as natural areas planned for loss. Most of the lost sites were small Natural Areas and were concentrated in developing areas within the Riverside ASP and South Riel ASP lands.

Table E.1: Natural Areas in the City of St. Albert, 2014 vs. 2017

Inventory Date	No. of Sites	Area (ha)
2014	195*	468.2[1]
2017	185	463.1

[1] These values differ from those reported in the Natural Area Assessment 2015 Update (Spencer Environmental) resulting from different approaches used to calculate Natural Area extent within City boundaries.



Date: 2020-12-02 Document: J:\15\00\15167_St_Albert_Growth_Study_Annexation\02_CAD\25_GIS\251_Figures\05_Ecological_Assessment\Spencer_Maps\09Nov2019_EP778_COSA_GMS_EA_Maps\15167_GMS_EA_Map_E2_final_201202.mxd

City of St. Albert Cultivate Life

- Environmentally Sensitive Area (ESA)
- Significant Natural Area (SNA)
- Natural Area (NA)
- Uncategorized NA
- Planned (Future) Loss of Site
- Municipal Boundary
- Maximum Potential Annexation Area
- Hydrology

0 0.2 0.4 0.8 1.2 1.6 km

3TM114-83 1:55,000

ST. ALBERT GROWTH MANAGEMENT STUDY: ECOLOGICAL ASSESSMENT

MAP E.2:
NATURAL AREA INVENTORY
2017 UPDATE

5.0 Ecological Network

5.1 Methods

Early in the GMS, the City provided feedback that Administration had generally been pleased with the Ecological Network map prepared in 2015. Accordingly, the 2015 approach to network component identification and presentation was retained and as before, the area considered in analysis was the overall EA study area. Ecological Network mapping updates included: incorporation of the updated (2017) Natural Area inventory into the Ecological Network and explicit identification of the most important ecological corridors as "Landscape Linkages". Landscape Linkages were defined as discernible linear features or near-continuous arrays of single or clustered natural features that are presumed, based on configuration and the presence of semi-permeable habitat gaps to function as a landscape level corridor.

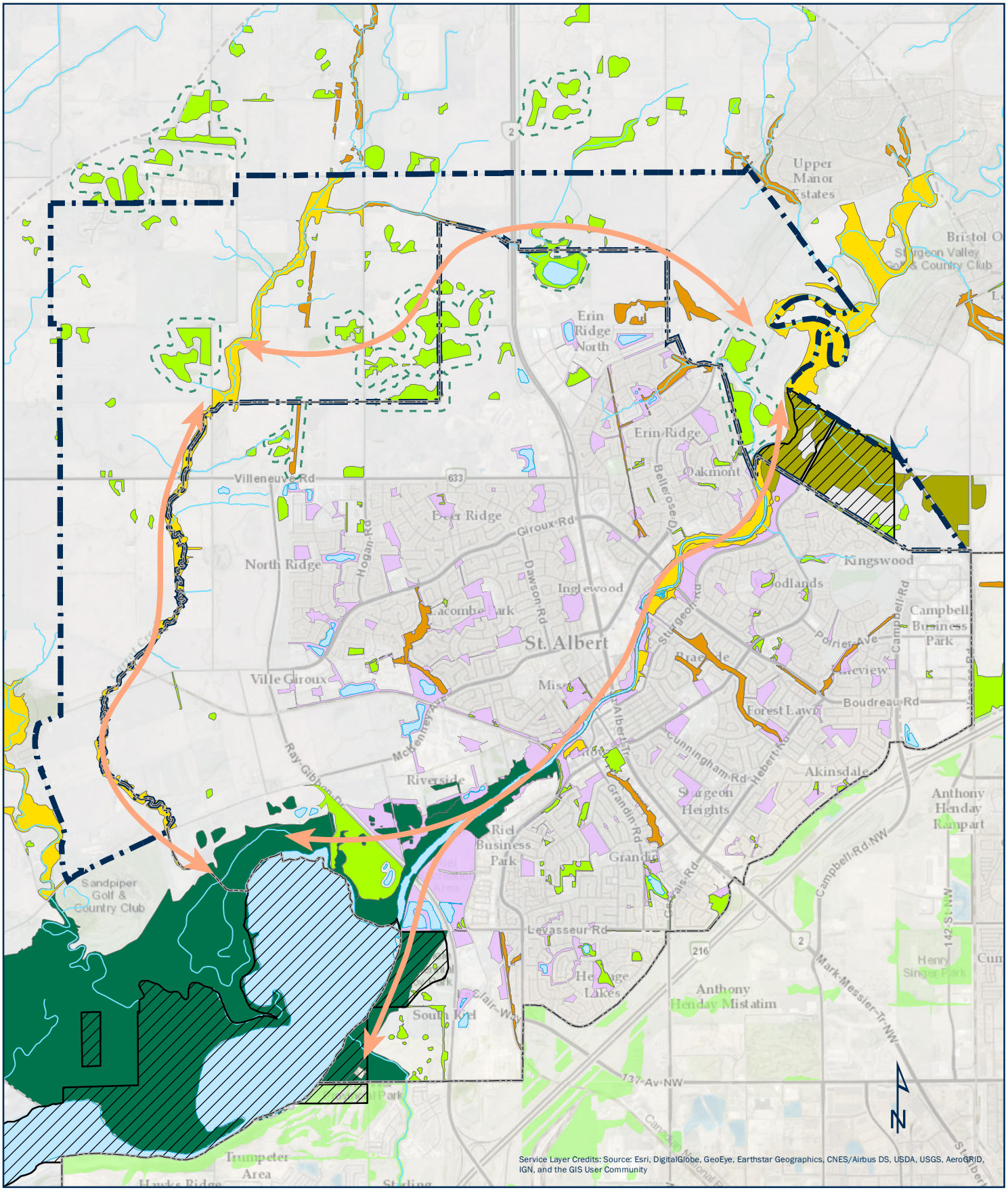
For a detailed description of methods used to identify the 2015 Ecological Network and how the City's Ecological Network relates to the surrounding landscape, see *Part 1: Natural Area Inventory Update and Status Report* of the Natural Areas Assessment 2015 Update (Spencer Environmental).

5.2 Results

Map E.3 presents the updated Ecological Network. Updated features include three identified Landscape Linkages, shown conceptually: 1) through the core of the City along the Sturgeon River valley; 2) along the west side of the City by way of Carrot Creek and its associated ravine; and 3) roughly arcing around and through the north edge of the existing City boundary, comprising mapped natural areas, important stepping stone clusters and undeveloped agricultural lands.

Of particular relevance to the MPAA is the Landscape Linkage around the north edge of the City. Spencer Environmental (2015) describes this linkage as a "*loose configuration of Important Stepping Stones and [Local Ecological Corridors] that forms an arc straddling the northern boundary of the City between the area of the Sturgeon River and [River Lot] 56 in the east and the northern reaches of Carrot Creek in the west. Although not comprised of contiguous natural areas, this configuration of ecological network components may provide higher ecological connection between Carrot Creek and Sturgeon River Regional Ecological Corridors, creating an alternative connection that exists in addition to the nexus of the two Regional Ecological Corridors at Big Lake*." These natural areas, and the ecological connectivity function they provide, will be an important consideration for the City as part of annexation discussions and, into the future, as urban development expands into these areas. In this same area, a tributary watercourse to Carrot Creek extends east/west along the City's current north boundary.

This surface water feature has the potential to be integrated as part of future development and, through restoration and/or naturalization efforts, could play an important ecological connectivity function within the MPAA.



Date: 2020-12-02 Document: P:\Active Projects\EP-778 CoSA Growth Management Study\Materials\GIS\09Nov2019_EP778_COSA_GMS_EA_Maps\15167_GMS_EA_Map_E3_final_201202_v104.mxd

City of St. Albert Cultivate Life

0 0.2 0.4 0.8 1.2 1.6 km

3TM114-83 1:55,000

- Regional Core Area
- Local Core Area
- Regional Ecological Corridor
- Local Ecological Corridor
- Stepping Stone
- Important Stepping Stones
- Municipal Boundary
- Maximum Potential Annexation Area
- Overall Study Area (2015 Network)
- Parks and Protected Areas Alberta
- Edmonton Natural Areas (2010)
- Landscape Linkages
- Park
- Hydrology

ST. ALBERT GROWTH MANAGEMENT STUDY: ECOLOGICAL ASSESSMENT

MAP E.3:
ECOLOGICAL NETWORK
2017 UPDATE

6.0 Potential Environmental Reserve

Section 664(1) of the Municipal Government Act (MGA) states that a municipality "may require the owner of a parcel of land that is the subject of a proposed subdivision to provide part of that parcel of land as environmental reserve if it consists of

> *(a) a swamp, gully, ravine, coulee or natural drainage course,*
>
> *(b) land that is subject to flooding or is, in the opinion of the subdivision authority, unstable, or*
>
> *(c) a strip of land, not less than 6 metres in width, abutting the bed and shore of any body of water."*

A municipality's right to acquire environmental reserve (ER) therefore has potential to impact the developable land base of a subject parcel, particularly in cases where large natural features are present that meet the MGA's criteria for ER. For this reason, and because ER lands have the potential to become valuable natural municipal assets, identification of potential ER in the MPAA has relevance to the GMS.

6.1 Methods

While floodplains, wetlands, riparian areas, gullies, ravines and steep slopes (i.e. potentially unstable lands) may all meet at least one of the above-noted MGA criteria, identification of specific physical features that will be considered as potential ER required clarification of terms and refinement or development of additional, more specific ER criteria, followed by GIS analysis to identity lands meeting those criteria. Criteria refinement/development was undertaken in consultation with City Administration.

Referencing the MGA criteria, the City has determined that the following specific criteria shall be used to identify lands within the MPAA that are potential ER. Identification of potential ER was undertaken for MPAA lands only.

1. "Ravines" were defined as small valleys that contain, or have the potential to contain, a natural drainage course. The outer edge or upslope limit of ravines were identified as the marked break in slope (or top of bank) using available contour data. Contour data within the City was available at 0.5 m increments while contour data outside the City of St. Albert was available only at 2 m intervals. Delineation of ravine limits outside of the City boundaries was, therefore, comparatively coarse relative to the more detailed delineation possible within the City's boundaries.

2. Potentially "unstable" lands were identified as naturally steep slopes equal to or steeper than 15%. ISL provided Spencer Environmental with the required LiDAR analysis to identify these lands.

3. Wetlands and associated wetland buffers have potential to be ER but not all wetlands will qualify. The Natural Areas Assessment 2015 Update determined that all wetlands located in the MPAA are either riverine, lacustrine or depressional mineral wetlands (non-peatlands). Riverine and lacustrine wetlands meet the criterion of “a strip of land… abutting the bed and shore of a body of water” and were therefore deemed to qualify as potential ER.

   All depressional wetlands are, by definition, subject to flooding, but not all are equally suited to serve as ER in a built environment. Depressional wetlands can be characterized as temporary, seasonal, semi-permanent, or permanent and comprise either marsh, shallow open water, or swamp wetlands. Semi-permanent marshes as well as semi-permanent and permanent shallow open water wetlands were deemed to qualify as potential ER for the following reasons:

   a. they typically support standing water both seasonally and interannually and are relatively easily discernable on the landscape;

   b. they are typically well-suited to integration into an urban stormwater management system;

   c. they are high functioning with respect to runoff retention (flood prevention);

   d. they support highly visible wildlife; and

   e. they hold the potential to also be claimed by the Crown under the *Public Lands Act* and therefore extra-jurisdictional to municipal development.

   On that basis, semi-permanent marshes, and semi-permanent and permanent shallow open water wetlands within the MPAA were deemed to qualify as potential ER. Further, the City established that those wetlands would be delineated using the outer, upslope wetland boundary (i.e. the ecological wetland boundary).

   The identification and delineation of all semi-permanent marshes and semi-permanent and permanent shallow open water wetlands within the MPAA was completed through analysis of digital aerial photography using relevant Alberta Environment and Parks (AEP) Wetland Policy (2013) directives. Analysis included photographs from 1974, 1977, 1989, 2001, 2005, 2007, 2008, 2009, 2011, 2012, 2014, 2015, 2016, and 2017.

   Further, in recognition of the ecological and flood retention value of wetland buffers, the City determined that all potential ER wetlands would be granted a buffer of 30 m, applied to the outer wetland boundary, to be included as ER. A wetland buffer width of 30 m is often referenced (e.g., City of Edmonton 2006) as the minimum buffer width necessary to provide a number of valued ecological functions and is also a width that has precedence as having been successfully applied as ER in other municipalities.

Temporary and seasonal wetlands were *not* deemed to qualify as potential ER for the following reasons:

a. Examination of remote imagery indicated that, within the MPAA, those wetlands are typically small in size and would present considerable challenges to successfully integrate into urban development while also retaining their natural character; and

b. Small temporary and seasonal wetlands have relatively low flood retention value.

4. "Land that is subject to flooding" will have potential to be ER.

   Lands adjacent to the two watercourses present in the MPAA, and associated tributaries, were deemed to have potential to be subject to flooding and so were the focus of this analysis. Specific lands along these watercourses subject to flooding and therefore qualifying as potential ER were identified using the following geospatial data files provided by the City:

   a. For Sturgeon River:

      - ScheduleG_DesignatedFloodLine (within City boundaries)
      - SturgeonValley_1974WaterLevel (downstream/east of City boundaries)

        Where these data files overlapped, the file showing the greater extent of flooding was used.

   b. For Carrot Creek:

      - ScheduleG_DesignatedFloodLine (within City boundaries)
      - As there is currently no flood line delineated for the County side of Carrot Creek, a combination of aerial photography and contour data was interpreted to identify lands subject to potential flooding (i.e. relatively flat lands supporting floodplain vegetation) and, in turn, to delineate a flood line that is comparable to that which exists for the City side of the Creek.

All identified potential ER criteria were applied on MPAA lands separately and the results were then compiled to create a single layer representative of all potential ER. The potential ER analysis focused on the MPAA, however, in cases where potential ER features straddled the boundary of the MPAA, the full extent of the feature was delineated. For this exercise, the provincially owned lands in River Lot 56 were identified as such but were also subject to this analysis, since that parcel is wholly within the MPAA and is bounded on two sides by privately owned MPAA land.

To account for planning decisions that have been approved by Council but not yet implemented, lands identified as potential ER but also identified as being planned for development in approved statutory plans, or otherwise indicated to be slated for development by City Administration, were identified as an Expected/Planned Loss.

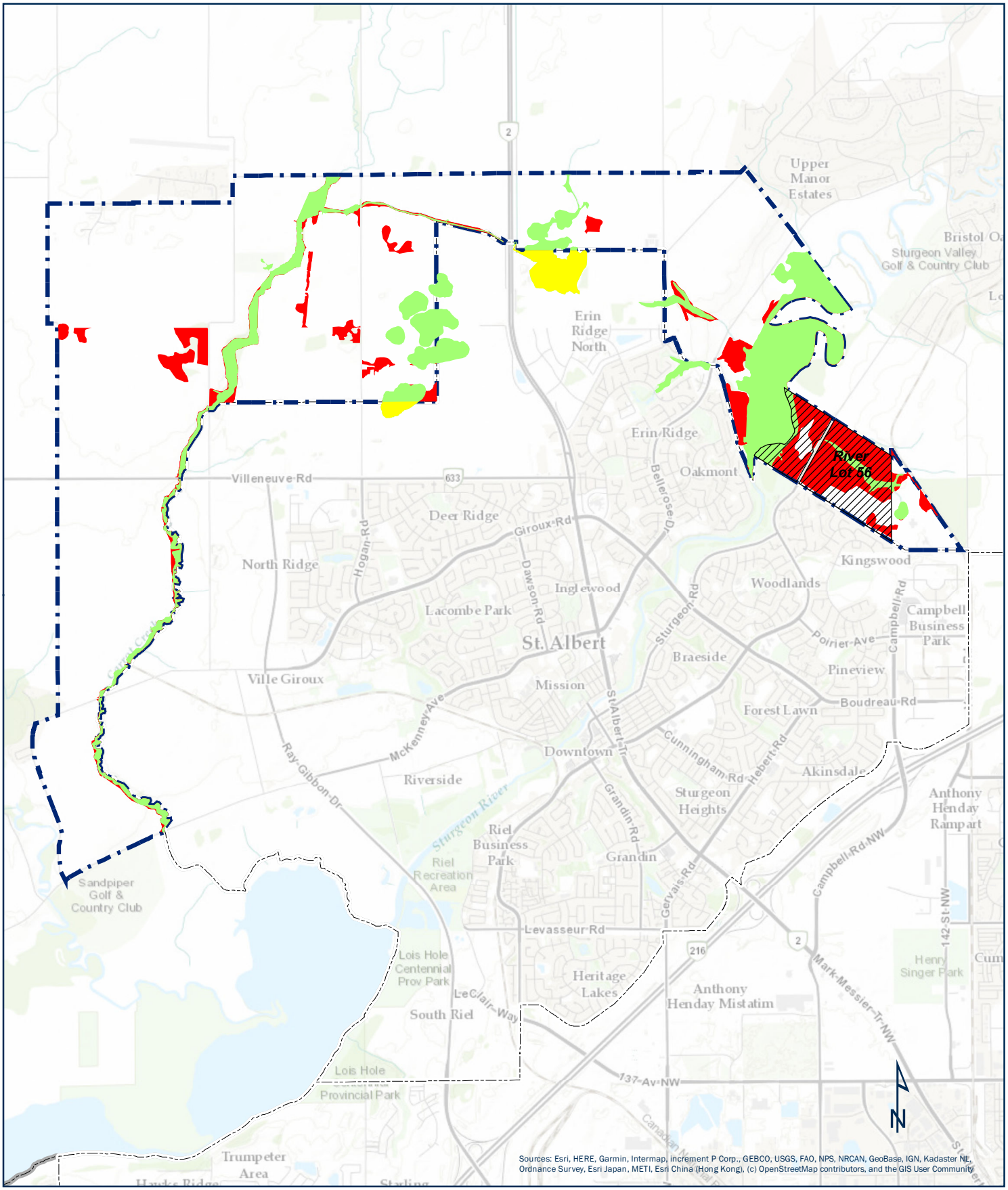
6.2 Results

The areas of potential ER in the MPAA are generally associated with either the Sturgeon River, Carrot Creek, or associated tributaries; several isolated wetlands and four steep-sided ravines (Map E.4).

The “land subject to flooding” criterion accounts for the single largest contribution of potential ER within the MPAA, combining for a total of 256 ha. The Sturgeon River floodplain alone accounts for 117 ha (46%) of that total. Other lands subject to flooding are located along Carrot Creek and its tributary along the north edge of the City’s existing boundary.

Four ravine areas were identified as potential ER: the long, continuous ravine associated with Carrot Creek, two much smaller ravines straddling the City/MPAA boundary in the northeast portion of the MPAA (one of these ravines is almost entirely located within existing City boundaries) and one ravine located almost wholly within the existing provincially protected River Lot 56. All naturally steep slopes identified through the LiDAR analysis were associated with these ravines; no other areas of naturally steep slopes were identified as potential ER.

Seven semi-permanent or permanent wetlands were identified as potential ER. Including the 30 m wetland buffer applied to each, these seven wetlands combined for a total of 33 ha within the boundaries of the MPAA. Six of these wetlands were concentrated in a relatively small area north and west of the existing City boundaries (Map E.4). Combined, these six wetlands function as an important part of the Landscape Linkage identified around the north boundary of the City (Map E.3). Four of these wetlands straddle the current City boundary, but only one overlaps with an area already subject to an ASP (i.e. Jensen Lakes ASP). The remaining potential ER wetland is the smallest and is located at the east end of the MPAA on the Poundmaker’s Lodge property.



Date: 2020-12-02 Document: J:\15100\15167_St_Albert_Growth_Study_Annexation\02_CADD\25_GIS\251_Figures\05_Ecological_Assessment\Spencer_Mapd\09Nov2019_EP778_COSA_GMS_EA_Maps\15167_GMS_EA_Map_E4_final_201202.mxd

City of St. Albert Cultivate Life

- Potential Environmental Reserve (ER)*
- Potential ER - Expected/Planned Loss**
- Potential Conservation Reserve (CR)
- Maximum Potential Annexation Area
- Parks and Protected Areas Alberta***

0 0.2 0.4 0.8 1.2 1.6 km

3TM114-83 1:55,000

* Includes 30 m buffer surrounding wetlands identified as potential ER.
** Areas of Planned/Expected Loss are planned for development in approved statutory plans or have been identified as such by City of St. Albert administration.
*** River Lot 56 is a Provincial protected area under the jurisdiction of the Government of Alberta; these lands would not be subject to potential ER or CR unless subject to municipal subdivision.

ST. ALBERT GROWTH MANAGEMENT STUDY: ECOLOGICAL ASSESSMENT

MAP E.4: POTENTIAL ENVIRONMENTAL AND CONSERVATION RESERVES IN THE MPAA

7.0 Potential Conservation Reserve

The MGA makes provision for a new municipal conservation tool. Section 664.2(1) of the MGA states that the City "may require the owner of a parcel of land that is the subject of a proposed subdivision to provide part of that parcel of land to the municipality as conservation reserve if

> *(a) in the opinion of the subdivision authority, the land has environmentally significant features,*
>
> *(b) the land is not land that could be required to be provided as environmental reserve,*
>
> *(c) the purpose of taking the conservation reserve is to enable the municipality to protect and conserve the land, and*
>
> *(d) the taking of the land as conservation reserve is consistent with the municipality's municipal development plan and area structure plan.*

MGA sections 664.2(2) and 664.2(3) further outline that:

> *(2) Within 30 days after the Registrar issues a new certificate of title under section 665(2) for a conservation reserve, the municipality must pay compensation to the landowner in an amount equal to the market value of the land at the time the application for subdivision approval was received by the subdivision authority.*
>
> *(3) If the municipality and the landowner disagree on the market value of the land, the matter must be determined by the Land Compensation Board.*

Accordingly, a municipality's right to purchase conservation reserve (CR) has the potential to impact the developable land base of a subject parcel. For this reason, and because CR lands have the potential to become valuable natural municipal assets, identification of potential CR in the MPAA has relevance to the GMS.

7.1 Methods

Identification of land qualifying as CR first required more definition around CR criteria, particularly regarding what qualifies as 'land that has environmentally significant features' and then required application of specific criteria. In response, within the context of the above statutory authority granted by the MGA, and in consultation with City administration, we developed the following specific criteria to identify lands that qualify as potential CR within the MPAA.

1. Natural Areas (identified in the 2018 City of St. Albert inventory update) that do not meet the established ER criteria (see above), but do meet one of the following criteria for environmental significance:

a. Wooded upland habitat at least 1 ha in size;

b. Temporary or seasonal wetlands at least 1 ha in size; or

c. Identified as an important ecological stepping stone or corridor.

2. Mapped Natural Areas (or portions thereof) that do not meet ER criteria but do share a boundary with identified potential ER lands.

All identified potential CR criteria were applied to the MPAA lands separately and the results were then compiled to create a single layer representative of all potential CR. For this exercise, the provincially owned lands in River Lot 56 were identified as such but were also subject to this analysis, since that parcel is wholly within the MPAA and is bounded on two sides by privately owned MPAA land.

7.2 Results

Application of the above criteria to Natural Areas in the MPAA resulted in the identification of a combined total of 138 ha of potential CR within the MPAA (Map E.4). Most of the identified CR met the criterion of “adjacent to ER”, particularly in the east end of the MPAA where large contiguous areas of woodland are located adjacent to the Sturgeon River floodplain. Importantly, many of these lands are already protected within the provincially protected River Lot 56 (69 ha). Outside of this protected area, the MPAA does include four significant woodlands for which CR would be a valid conservation mechanism. These woodlands, two along the west edge of the Sturgeon River floodplain and two a short distance west of Carrot Creek, represent the largest areas within the MPAA that would qualify as CR. Elsewhere, the criterion of lands adjacent to ER often resulted in the identification of small slivers of upland habitat adjacent to wetlands or ravines. Although these small areas may not hold substantial significance in their own right, their protection through the implementation of CR would enhance the sustainability and add ecological/conservation value to the adjacent lands taken as ER. When mapped at a scale finer than City wide, the value of these additional conservation lands would be more apparent.

Several Natural Areas scattered through the northern portion of the MPAA met the habitat patch size threshold for environmental significance and qualify as potential CR. Only one area – a narrow woodland strip connecting to the Carrot Creek ravine – was identified as potential CR specifically for its function as a local ecological corridor.

8.0 Crown Claimable Wetlands

Section 3 of the *Public Lands Act* provides the legislative authority for having the ownership of permanent and naturally occurring bodies of water held by the provincial Crown. The Crown's ownership claim to a wetland is limited only to those water features which meet the criteria of being a naturally occurring, permanent body of water (Government of Alberta 2016).

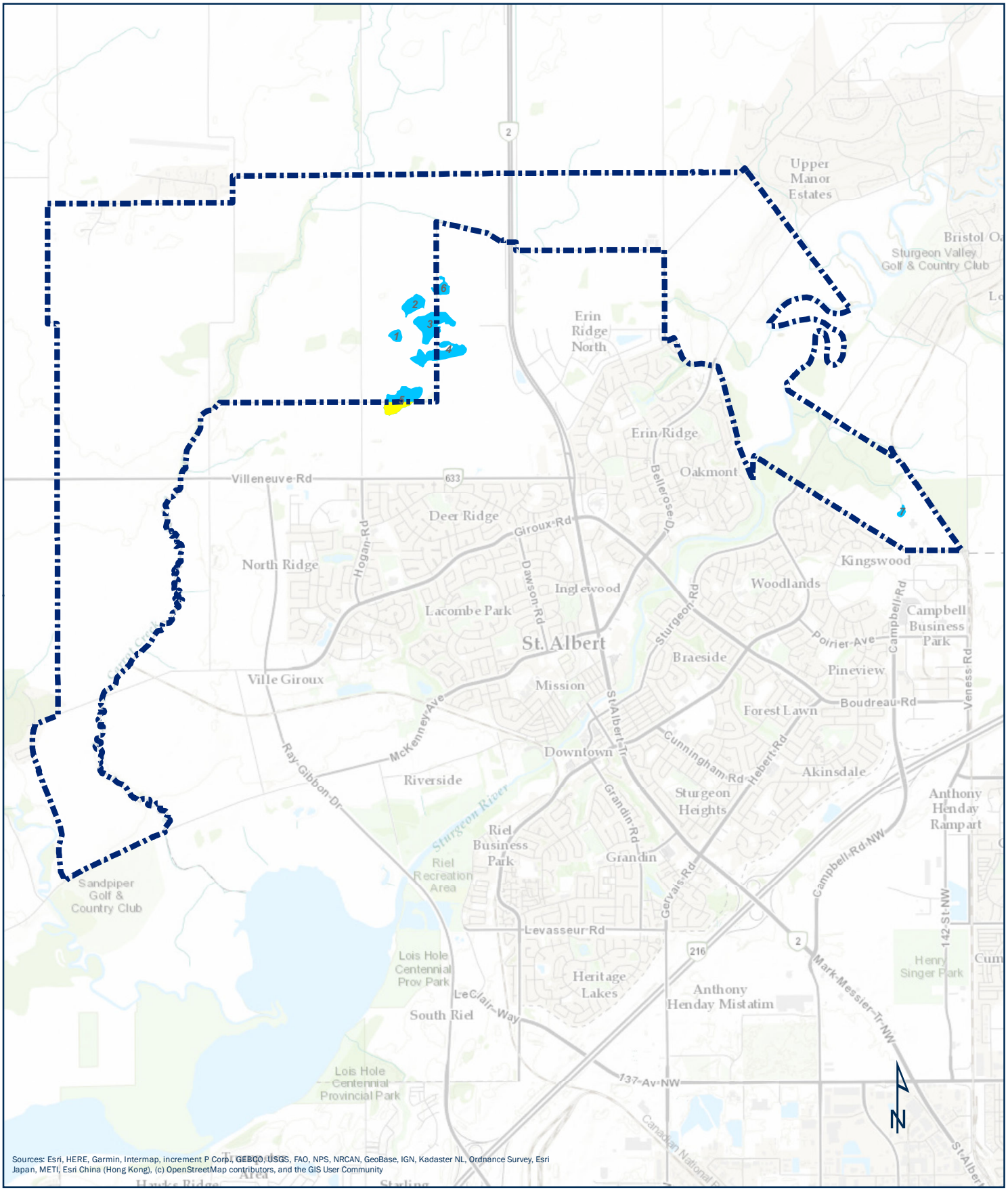
Because any Crown claimed wetland would be extra-jurisdictional to municipal development, identification of potential Crown claimed wetlands in the MPAA has relevance to the GMS.

8.1 Methods

All semi-permanent marshes and semi-permanent and permanent shallow open water wetlands within the MPAA that were identified as potential ER were subject to further analysis to assess their potential to be claimed by the Crown in accordance with the *Public Lands Act*. Analysis was completed using historical aerial photographs from 1974, 1977, 1989, 2001, 2005, 2007, 2008, 2009, 2011, 2012, 2014, 2015, 2016, and 2017, with a particular focus on all available late summer and fall aerial photographs to assess water permanence and the presence of a definable bed and shore in accordance with AEPs *Guide for Assessing Permanence of Wetland Basins* (2016).

8.2 Results

All seven semi-permanent and permanent wetlands assessed as part of this exercise were determined to have reasonable potential to be claimed by the Crown as permanent and naturally occurring bodies of water pursuant to the *Public Lands Act* (Map E.5). Each wetland was determined to hold surface water into the fall on several occasions throughout the aerial photograph record (Table E.2) and to have a sufficiently consistent and discernible bed and shore. Official determination of ownership will require a review by Alberta Environment and Parks Water Boundaries Unit in advance of any land development applications for those lands.



Date: 2020-12-02 Document: J:\15100\15167_St_Albert_Growth_Study_Annexation\02_CAD\25_GIS\251_Figures\05_Ecological_Assessment\Spencer_Maps\09Nov2019_EP778_COSA_GMS_EA_Maps\15167_GMS_EA_Map_E5_final_201202.mxd

City of St. Albert Cultivate Life

- Maximum Potential Annexation Area
- Potential Crown Claimed Wetland*
- Expected/Planned Loss**

0 0.2 0.4 0.8 1.2 1.6 km

3TM114-83 1:55,000

* boundaries shown represent ecological wetland boundaries; the area subject to potential Crown claim would be limited to the bed and shore of the wetland delineated by an Alberta Land Surveyor

** Areas of Planned/Expected Loss are planned for development in approved statutory plans or have been identified as such by City of St. Albert administration

ST. ALBERT GROWTH MANAGEMENT STUDY: ECOLOGICAL ASSESSMENT

MAP E.5: POTENTIAL CROWN CLAIMED WETLANDS IN THE MPAA

Table E.2: Summary of Semi-permanent and Permanent Wetlands Conditions

Date	Wetland ID Number*						
	1	2	3	4	5	6	7
Aerial Photograph Review							
1950**	DV	DV	DV	DV	DV	DV	n/a
Aug 1974	DV	W	W	W	W	W	n/a
Aug 1977	DV	W	W	W	W	W	n/a
22 Sept 1989	W	W	W	W	W	W	n/a
13 Aug 2001	DV	D	D	W	W	D	n/a
May 2005	W	W	W	W	W	W	W
11 Sept 2007	n/a	W	D	W	W	DV	n/a
02 Oct 2008	DV	DV	DV	DV	DV	DV	n/a
2009	DV	D	DV	DV	DV	DV	W
Spring 2011	W	W	W	W	W	W	W
Spring 2014	W	W	W	W	W	W	W
Spring 2015	W	W	W	W	W	W	W
Spring 2016	DV	D	D	D	D	D	DV
Spring 2017	W	W	W	W	W	W	W
Additional Google Image Review							
08 Oct 2013	W	W	W	W	W	W	DV
Sept 29 2015	DV	D	D	D	DV	n/a	DV
01 Oct 2016	D	W	D	W	DV	D	D
03 Oct 2017	W	W	W	W	DV	W	DV***

* Open water visible or consistent wetland vegetation signature from Alberta Environment and Parks (2016): W = water present/inundated; D = dry; DV = dry, vegetated (consistent with wetland class); DVI = dry, vegetated (indistinguishable from surrounding uplands)
** 1950 aerial photograph is poor quality and results in uncertainty regarding wetland condition assessment
*** 03 Oct 2017 image not available; assessment made based on 16 Sept 2017 image

9.0 Identification of Ecological Constraints

9.1 Methods

The Ecological Constraints Study Area (see Map E.6) comprises the MPAA and the adjacent majority of the City's unabsorbed land supply.

The Ecological Constraints review consisted of review of two key datasets:

1. the Alberta Environment and Parks (AEP) Environmental Site Assessment Repository (ESAR) database (AEP 2018); and

2. oil and gas information obtained directly from the Alberta Energy Regulator (AER).

The Environmental Site Assessment Repository (ESAR) database provides the location (i.e. quarter section) of sites that have publicly available environmental site assessments (ESAs), and also typically provides the relevant documents. The AER databases provide the locations and information for oil and gas infrastructure such as pipelines, wells, and facilities.

Because the ESAR database is not a comprehensive list of all ESAs in the Ecological Constraints Study Area, additional information was provided by the City and included as part of the assessment.

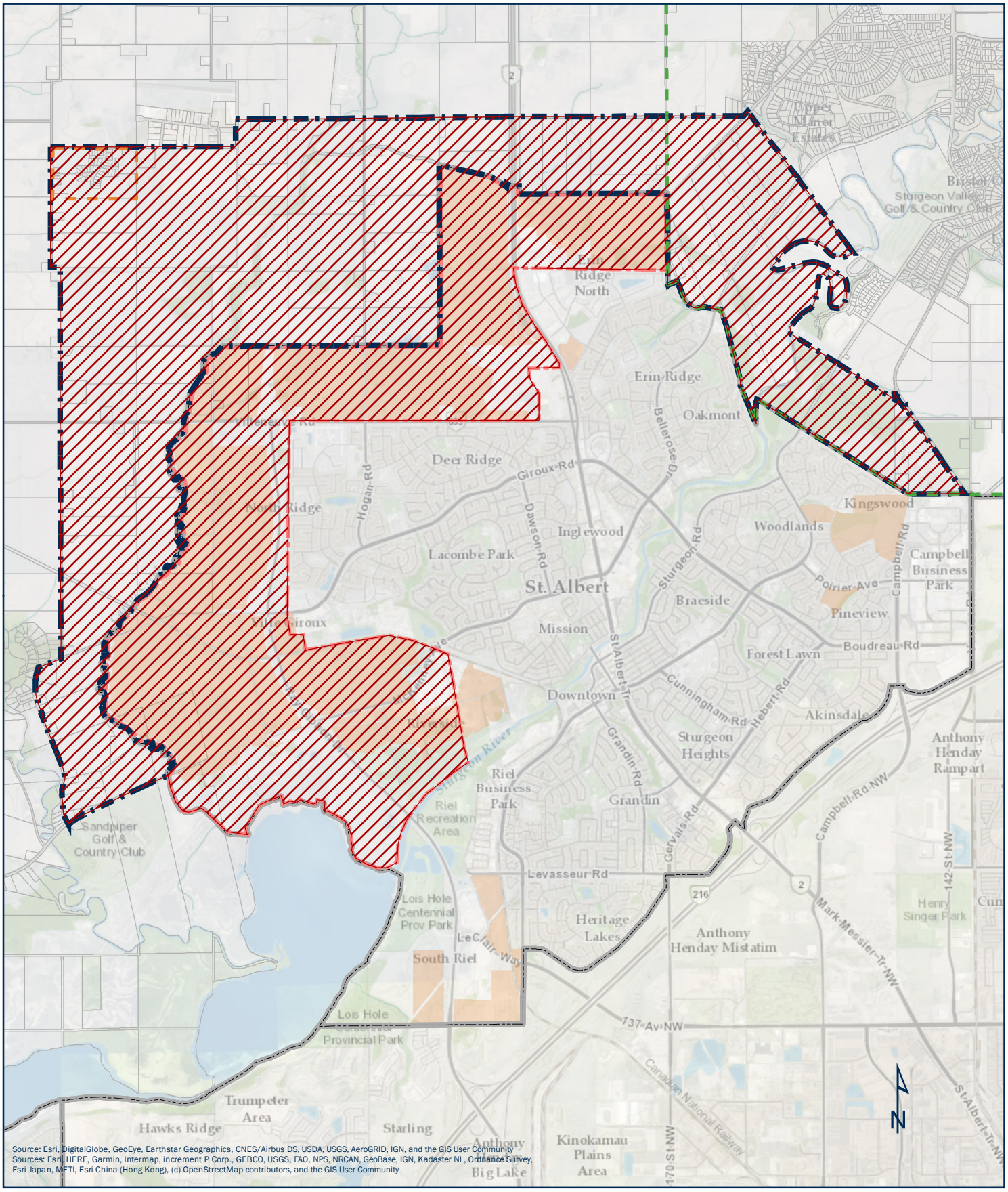
9.2 Results

9.2.1 Environmental Site Assessment Repository

There were 61 ESAR search results returned for the Ecological Constraints Study Area. Of these, all locations except three were issued a Reclamation Certificate, meaning the sites are not being actively monitored or remediated (Map E.7). The issuance of a reclamation certificate also indicates that the site is considered to be returned to its previous state and has the ability to support uses as it would have prior to the industrial operations being developed on it. The three locations that have not been issued a reclamation certificate are described below. All locations with available ESAs are summarized in **Appendix E.1**.

Produced Water / Crude Oil Pipeline Spill (Site 12, Map E.7)

A Regco Petroleum Ltd. pipeline break occurred in 2001, causing a spill of produced water and crude oil. Remediation was required for the soil in the vicinity of the spill. The spill was located in Legal Subdivisions 4 and 5 of 13-54-26-W4M (see Site 12 in Map E.7) and resulted in hydrocarbon and salt impacted groundwater, much of which had been remediated as of October 12, 2001. On October 24, 2001, further remediation work was deemed not warranted; however, groundwater monitoring would be necessary for several years.



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Date: 2020-12-02 Document: J:\15100\15167_St_Albert_Growth_Study_Annexation\02_CADD\25_GIS\251_Figures\05_Ecological_Assessment\ISL_Maps\15167_GMS_EA_Map_E6_Eco_Constraints_Study_Area_201202.mxd

City of St. Albert
Cultivate Life

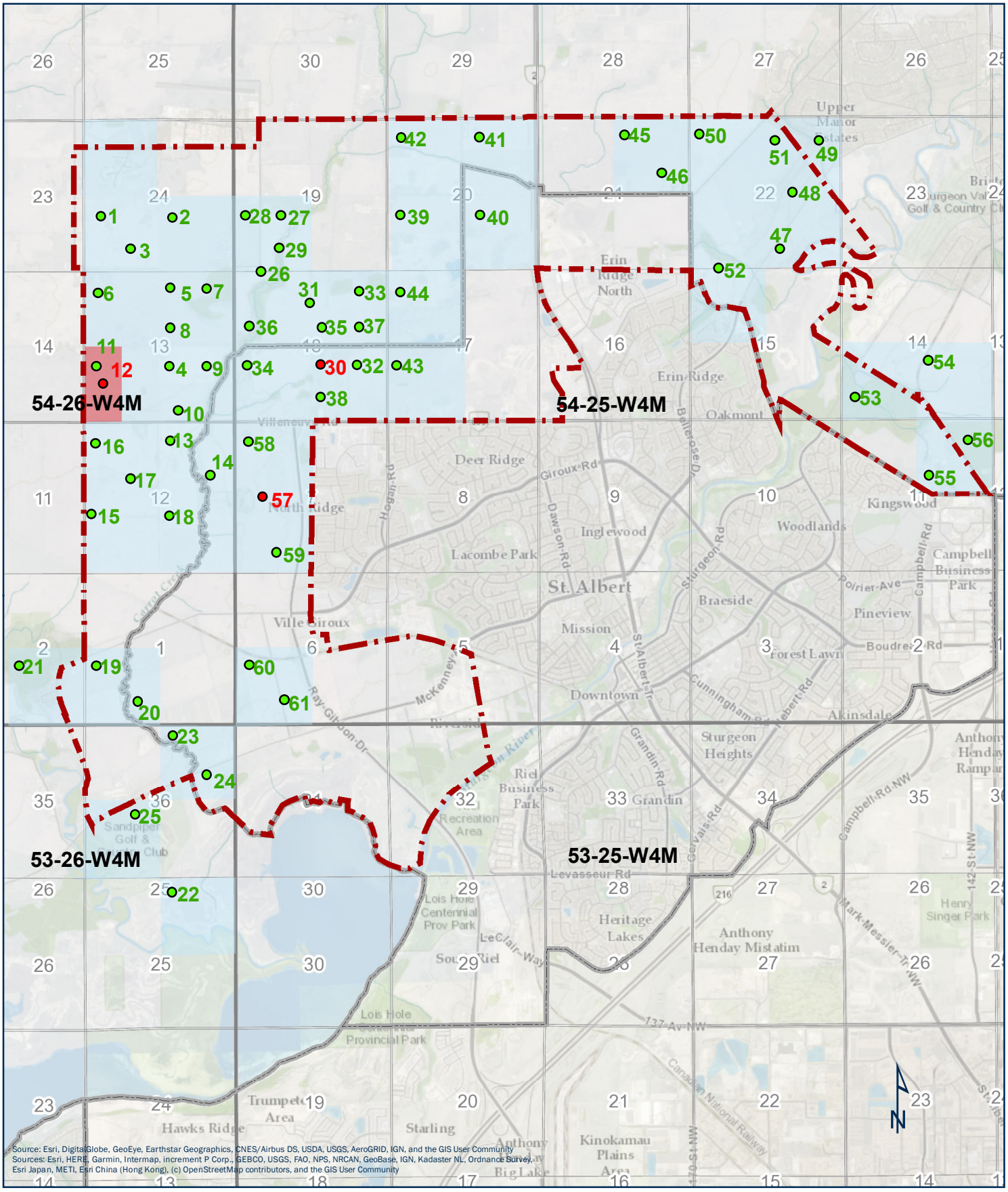
- Municipal Boundary
- Sturgeon Valley Area Structure Plan (ASP)
- Northern Lights Estates ASP
- City of St. Albert Unabsorbed Land Supply
- Maximum Potential Annexation Area
- City of St. Albert Study Area
- Ecological Constraints Study Area
- Parcel

0 0.2 0.4 0.8 1.2 1.6 km

3TM114-83 1:55,000

ST. ALBERT GROWTH MANAGEMENT STUDY: ECOLOGICAL ASSESSMENT

MAP E.6:
ECOLOGICAL CONSTRAINTS STUDY AREA



Municipal Boundary

Ecological Constraints Study Area

Environmental Site Assessment Repository (ESAR) Location

Legal Subdivisions 4 and 5 13-54-26-W4M

Reclamation Certified

Not Reclamation Certified

0 0.2 0.4 0.8 1.2 1.6 km

3TM114-83 1:55,000

ST. ALBERT GROWTH MANAGEMENT STUDY: ECOLOGICAL ASSESSMENT

MAP E.7: ENVIRONMENTAL SITE ASSESSMENT REPOSITORY LOCATIONS

On October 27, 2003, a request was made for an explanation of higher chloride levels found during the groundwater monitoring. There is no more recent information or a Reclamation Certificate on file for this location.

Given the time lapse in information available and the fact that further remediation was deemed not warranted, this location is likely not a barrier to development. However, a detailed Phase I ESA should be completed prior to any area structure plan (ASP) adoption or other development at this location. The legislated setback from a non-sour gas pipeline is generally equal to the pipeline right-of-way, depending on the level at which it has been classified by the AER (2015).

Former Dry Waste Landfill (Site 57, Map E.7)

An application for a reclamation certificate was submitted by Millennium Building Systems on February 4, 2013 for a former dry waste landfill located in the W½-7-54-25-W4M. The application was submitted in conjunction with a request to remove the associated landfill setback requirement in support of preparing the Range Road 260 ASP. The application for a reclamation certificate was reviewed on March 4, 2013; however, there is no more recent information or a reclamation certificate on file for this location.

Due to the nature of the potential contamination, this location could be a barrier to development. A Phase I ESA is recommended prior to any development at this location. The legislated setback from a non-operating landfill is generally 300 m from the disposal area (Government of Alberta 2017)

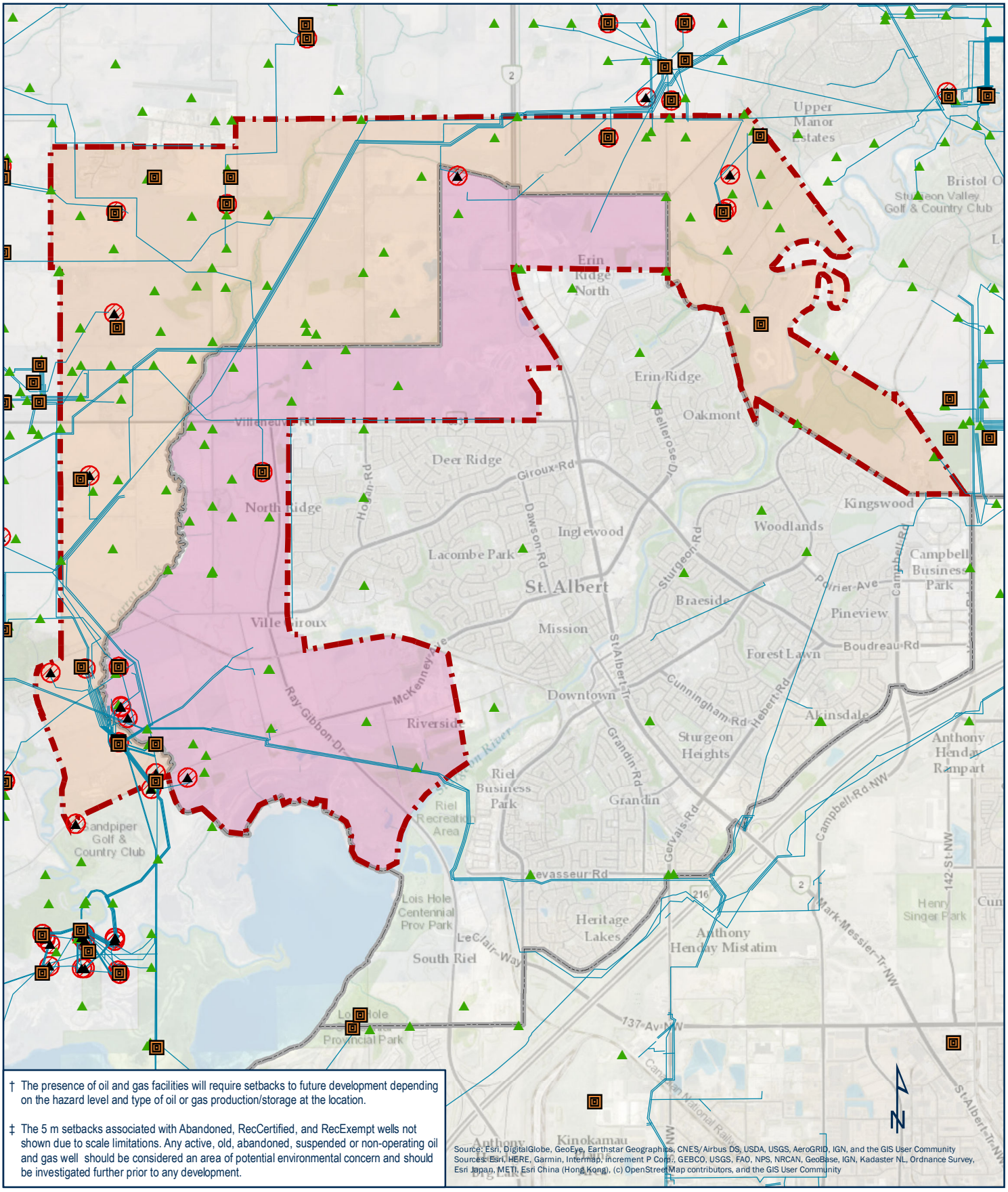
Temporary Snow Storage Facility and Compost Yard (Site 30, Map E.7)

A combined Phase I and Phase II ESA was conducted in November 2014, and a supplemental Phase II ESA was completed in October 2017 for the City's operating temporary snow storage facility and compost yard located in the SE-18-54-25-W4M. A reclamation certificate was not issued for this location because further remediation was not deemed necessary following the supplemental Phase II ESA. Therefore, it is likely not a barrier to development and the City can use its discretion prior to any development based on the current monitoring results, if any.

9.2.2 Oil and Gas Infrastructure

Oil and gas infrastructure obtained from the AER located within the Ecological Constraints Study Area is shown in Map E.8 and is summarized in the following sections.

Wells, pipelines and oil and gas facilities have legislated setbacks to development that are determined by the AER. The setback distances are classified in one of four hazard levels from Level 1 (lower hazard) to Level 4 (highest hazard) dependent on the content of sour gas, the release rates for wells and release volumes for pipelines (AER 2015). Wells that are reclamation certified or abandoned wells require a minimum of a 5 m setback, unless otherwise stated by the AER or determined by the developer in consultation with the AER (AER 2014). In the absence of readily available public information on wells that are reclamation exempt, ISL recommends matching the 5 m setback applied to wells that are reclamation certified and wells that are abandoned.



† The presence of oil and gas facilities will require setbacks to future development depending on the hazard level and type of oil or gas production/storage at the location.

‡ The 5 m setbacks associated with Abandoned, RecCertified, and RecExempt wells not shown due to scale limitations. Any active, old, abandoned, suspended or non-operating oil and gas well should be considered an area of potential environmental concern and should be investigated further prior to any development.

Municipal Boundary
Ecological Constraints Study Area
Maximum Potential Annexation Area
City of St. Albert Study Area

Facility †
Well - Abandoned / RecCertified / RecExempt
Well - All Other
100 m Well Setback ‡
Pipeline

0 0.2 0.4 0.8 1.2 1.6 km

3TM114-83 1:55,000

ST. ALBERT GROWTH MANAGEMENT STUDY: ECOLOGICAL ASSESSMENT

MAP E.8:
OIL AND GAS PIPELINES, WELLS AND FACILITIES

Date: 2020-12-02 Document: J:\15100\15167_St_Albert_Growth_Study_Annexation\02_CADD\25_GIS\251_Figures\05_Ecological_Assessment\MSL_Maps\15167_GMS_EA_Map_E8_Oil_Gas_Facilities_201202.mxd

The setback distance for any non-sour gas pipeline, drilling or producing well, or facility is equal to the pipeline right-of-way or the lease boundary. So, these are dependent on the location. However, confirmation of such should be undertaken subject to an ESA and in consultation with the licensee of the pipeline, well, or facility. As such, for non-sour wells, ISL recommends a setback of 100 m matching that of Level 1 sour gas wells until confirmed otherwise through assessment and consultation. In terms of sour facilities, as mentioned a Level 1 sour gas well has a setback of 100 m, while a Level 1 pipeline or facility has a setback equal to the pipeline right-of-way and lease boundary. A Level 2 sour gas well, pipeline and facility ranges from 100 m for a permanent dwelling or unrestricted country development to 500 m for an urban centre or public facility. A Level 3 or 4 sour gas well, pipeline and facility setback ranges from at least 100 m for a permanent dwelling, 500 m for an unrestricted country development, and 1,500 m for an urban centre of public facility (AER 2015, 2018).

Wells

The oil and gas well search returned 109 oil and gas wells within the Ecological Constraints Study Area (Map E.8). Of these, 90 wells are abandoned, reclamation certified or reclamation exempt. The remaining 19 wells could be active or are suspended. The complete list of wells within the Ecological Constraints Study Area is provided in **Appendix E.2**. For the purposes of this report, in the absence of information on individual wells, a setback of 100 m was chosen for all potentially active wells, regardless of sour gas content. All wells should be examined in more detail prior to any development around them, including determination of the setback required for each well.

Pipelines

The search returned 119 pipelines within the Ecological Constraints Study Area. Of these pipelines, 28 are operating, 36 are abandoned, and 55 are discontinued. Map E.8 illustrates the general alignments of the pipelines. Details of each pipeline, including status, substance, and location is provided in **Appendix E.3**.

Pipelines, while not necessarily barriers to development, will need to be examined individually in more detail prior to any future development in the areas. All pipelines listed in the Ecological Constraints Study Area have less than 10 moles of sour gas per kilomole of natural gas, which generally means that they are non-sour gas pipelines and will therefore have a setback equal to the pipeline right-of-way (AER 2015, 2018). However, this should be confirmed prior to future development in a specific area.

Oil and Gas Facilities

Thirty inactive oil and gas facilities were located in the Ecological Constraints Study Area. The location and details of each facility are provided in Map E.8 and **Appendix E.4** respectively. The presence of oil and gas facilities will require setbacks to future development depending on the hazard level and type of oil or gas production/storage at the location. Further investigation into any active soil and groundwater monitoring activities at the locations is recommended prior to

any future development in the areas to ensure that there are no off-site impacts from the facilities.

Even though a well site, pipeline or facility may have a valid reclamation certificate, be abandoned, or suspended, it does not ensure the former lease area is free of any contamination. Any active, old, abandoned, suspended or non-operating oil and gas pipeline, well or facility should be considered an area of potential environmental concern and should be investigated further prior to any future development in the areas.

9.2.3 Properties of Concern Provided by the City of St. Albert

Property East of Hogan Road (in the MPAA)

Due to the high number of parked cars on the south half of NW-17-54-25-W4M (see Map E.9), the City identified the potential for contamination concern. The cars could have leaking fluids that may migrate into the soil and groundwater below, particularly if not properly contained. Should the City include this site in its annexation application, an environmental site assessment will be required at the ASP preparation stage to determine if contamination is present. Note that this concern is not anticipated to preclude opportunity for future development of the site.

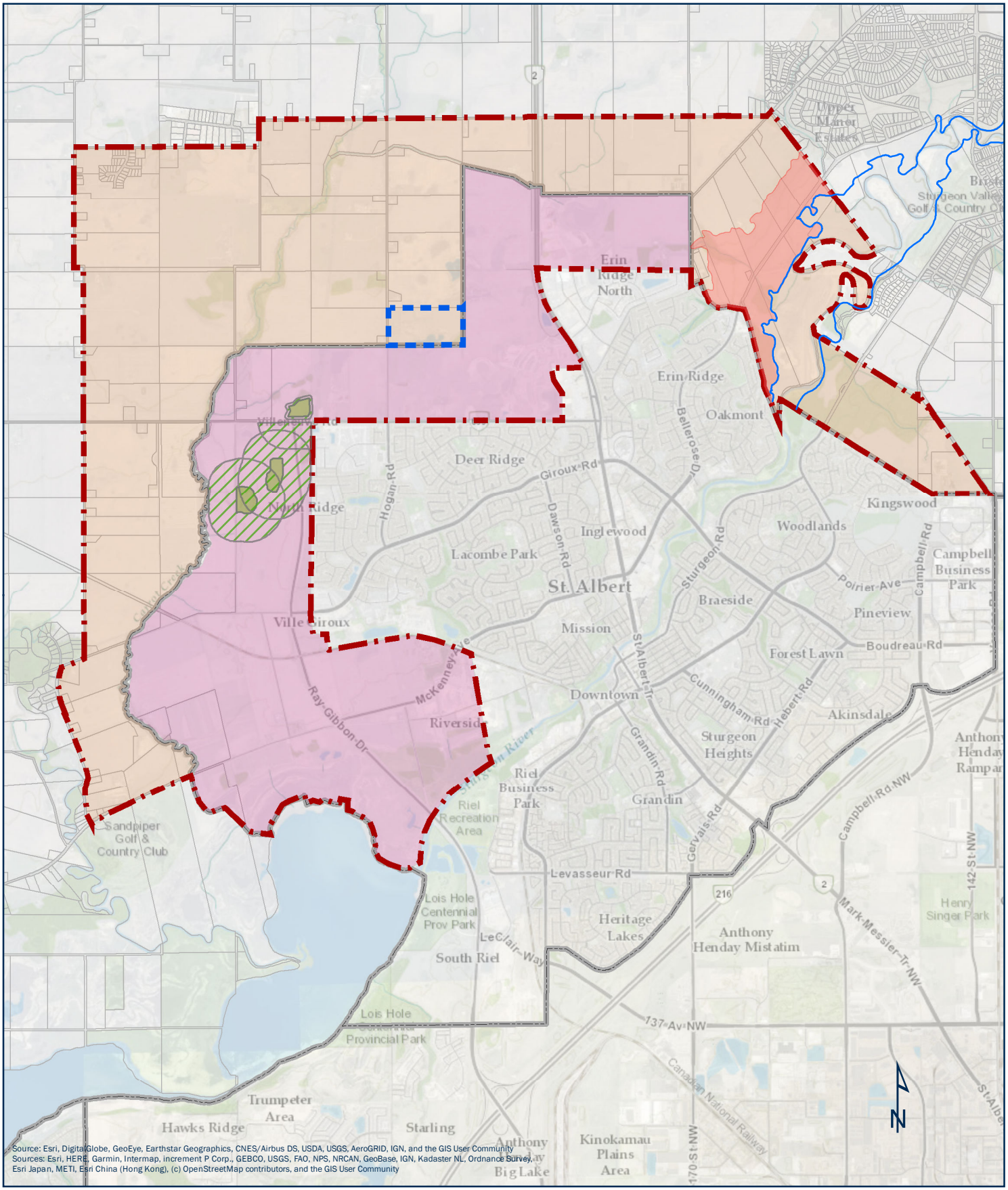
Non-Operating Landfills (in the City)

Three non-operating landfills are also indicated on Map E.9 as identified by the City. The legislated setback from a non-operating landfill is generally 300 m from the disposal area (Government of Alberta 2017). To date, the portion of the setback north of Villeneuve Road for the northernmost non-operating landfill has been relaxed by AEP to 30 m. This landfill first operated as a sand extraction pit in 1980 and then as a Class 3 landfill from 1980 to 2007. The remaining two landfills have not operated since 1996. The pit located closer to Villeneuve Road accepted organic material, metals, household waste, plastics and industrial liners, cardboard and prohibited waste. The pit closer to Range Road 260 accepted vehicles, metals concrete debris and some household waste (City of St. Albert 2015).

Northeast Portion of the MPAA

The lands in the northeast portion of the MPAA may have potential geotechnical concerns of high-water table and/or slope stability based on the City's own experience on engineering projects and building inspections within adjacent portions of the City (e.g. Erin Ridge and Oakmont). Using LiDAR data provided by the City to determine the approximate extent of greatest slope above the Sturgeon River floodplain, slope stability and high-water table constraints may exist within those lands conceptually delineated in Map E.9, but may not be limited to those lands either.

The potential geotechnical concerns do not preclude future development, however. In fact, with permission granted by Sturgeon County, the consultant team reviewed a geotechnical analysis for a portion of River Lot 37, which was prepared in support of the proposed Keys Cross ASP. River Lot 37 is in the northeast portion of the MPAA and is adjacent to Erin Ridge. The analysis indicated that development could occur subject to mitigative measures such as no irrigation, no swimming pools, etc.



Date: 2020-12-02 Document: J:\15100\15167_St_Albert_Growth_Study_Annexation\02_CADD\25_GIS\251_Figures\05_Ecological_Assessment\MSL_Maps\15167_GMS_EA_Map_E9_Properties_Concern_201201.mxd

City of St. Albert Cultivate Life

- Municipal Boundary
- Ecological Constraints Study Area
- Maximum Potential Annexation Area
- City of St. Albert Study Area
- Property East of Hogan Road
- Non-Operating Landfill
- 300m Landfill Setback Radius
- Potential Geotechnical Constraints
- Sturgeon Valley 1974 Water Level

0 0.2 0.4 0.8 1.2 1.6 km

3TM114-83 1:55,000

ST. ALBERT GROWTH MANAGEMENT STUDY: ECOLOGICAL ASSESSMENT

MAP E.9: PROPERTIES OF CONCERN

Overall, in accommodating future urban development, lands in the northeast portion of the MPAA may not have the same ease of developability, may have higher associated development costs, and may have development restrictions similar to those identified in the geotechnical analysis prepared in support of the proposed Keys Cross ASP. Ultimately, should the City include any lands within the northeast portion of the MPAA in its annexation application, detailed geotechnical and hydrogeological investigations, which are typically undertaken at the ASP preparation stage, should be completed prior to any development to confirm and understand the extents of any concerns, and ensure proper mitigative measures are undertaken. Furthermore, should the City specifically include the lands within the proposed Keys Cross ASP in its annexation application, the City will conduct its own review of the geotechnical analysis prepared for the proposed ASP to determine if further geotechnical and hydrogeological analysis is required.

9.3 Ecological Constraints Conclusions and Considerations

There are some areas of potential environmental concern throughout the Ecological Constraints Study Area, primarily related to oil and gas pipelines, wells, and facilities. A Phase I ESA is recommended prior to ASP adoption and any other development on these parcels of land to assess in detail the potential for environmental concern. The results of the Phase I ESA will guide any other future work required.

Additional considerations for the City in the future are as follows:

- The City should be cognizant that even though a well site or facility may have a valid reclamation certificate, it does not mean the former lease area is free of any contamination that occurred during the drilling, development, operation or abandonment of the well or facility.

- Historical practices during well drilling and operations included the use of unlined sumps to capture drill cuttings, well development fluids (typically hydrocarbons and salt impacted water) as well as flare pits. Used oils, contaminated fluids, and waste (both solid and liquid) were often disposed of on-site in sumps and pits. Spills and releases of hydrocarbons and salt impacted water may have occurred during drilling, development and operational activities associated with each site.

- Pipelines are typically abandoned and not removed from the ground. During operations, pipelines may have leaked without notice by the operators. Pipelines that transported liquid containing salt water are especially prone to leaking due to the corrosive nature of the brine. Often, these brine pipelines were never monitored for losses as the brine was considered a waste product. Therefore, while working around pipeline rights-of-way (ROWs), contaminated soil may be encountered. During abandonment, pipelines should have been flushed of all potential contaminants, however, it is feasible to encounter abandoned pipelines that may contain fluids. Care should be taken when working in ROWs.

- Past reclamation practices included the ‘squeezing’ of contaminated cuttings from sumps and pits across a lease site, covering with topsoil and planting with a seed mix. In agricultural environments, if crops or pasture grasses were re-established, reclamation was usually considered successful.

- However, during municipal development activities where site grading, excavation of stormwater management ponds, foundations and basements may occur, it may be possible to encounter former pits, sumps and oilfield wastes at sites that have a valid reclamation certificate or exemption.

- As per AER (2014 and 2015), the minimum setback from an abandoned or reclaimed oil and gas well is 5 m from the well head. In some instances, the well setback distance may be up to 1,500 m. The City should be aware of any wells with a greater than 5 m radius set back and if possible, understand the rationale for the decision as it may have development implications.

- The City should consider imposing a mandatory Phase II ESA of each parcel of land that contains an oil or gas well, pipeline or facility. A Phase II ESA will consist of on-site soil and groundwater investigations that, if conducted properly, will determine if contamination is present. This recommendation should reduce the potential liability that the City may incur should contaminated material be encountered. This requirement should extend to the two non-oilfield related properties as well (property east of Hogan Road and property in Northern Lights Estates).

10.0 Ecological Assets Interaction with Ecological Constraints

Ecological features, such as natural areas, if retained in a developed landscape, may generally be considered conservation/open space assets but they will also generally be undevelopable, except for certain recreational uses. Many of the ecological constraints and associated setbacks identified in Section 9.0 may also present challenges to future urban development. For these reasons, both assets and constraints are a significant consideration during annexation. There is value in considering cases where those the ecological constraints (including associated setbacks) overlap with or are located in close proximity to ecological assets. As a result of proximity, two scenarios may unfold. In combination, at the local (i.e. quarter section) scale, the ecological assets and constraints may be seen as an overall greater constraint to development, possibly also sterilizing land situated between the two, and may render that parcel of land less attractive for annexation. Conversely, retention of natural areas, especially if they qualify as ER or CR or are an important Ecological Network component, may take on greater value because the added area offered by a nearby ecological constraint setback and/or a sterilized gap would increase the total area of undevelopable land around the natural area, and therefore increase the conservation value. This approach to planning would result in enhanced ecological urban design. Accordingly, we examined the geospatial relationship between identified ecological constraints and identified ecological assets to identify possible planning synergies worth considering.

10.1 Methods

The study area for this exercise was the MPAA. Further, this analysis focussed on those ecological constraints in the MPAA identified by ISL as likely constraints to development, those having known or assumed and quantified setbacks, where the setbacks were present at a mappable scale, and the identified oil and gas facilities anticipated by ISL to likely require a setback in future and require further investigation.

Applying the above-noted criteria, the following ecological constraints were considered and mapped using ISL-generated geospatial data:

- active or suspended well site setbacks (100 m);
- landfill setbacks (300 m); and
- pipelines and areas of potential geotechnical constraints; pipeline setbacks, which were assumed by ISL to be equal to the pipeline ROW, were qualitatively considered but were not mapped since ROW widths were not known. Very closely spaced pipelines were mapped as one thicker line.

The analysis also included the geographical area conceptually identified by the City as a geotechnical concern, as it comprised a significant area that is easily mappable at the study scale.

For context, some ecological constraints identified by ISL in the adjacent undeveloped City lands were also mapped, as were facilities within a 500 m buffer surrounding the outer MPAA boundary, but those mapped facilities were not considered in the interactions analysis.

Using the above-noted criteria, the following additional ecological constraints were excluded from the analysis:

- Sites of contamination concern identified by the City but lacking established setbacks; and

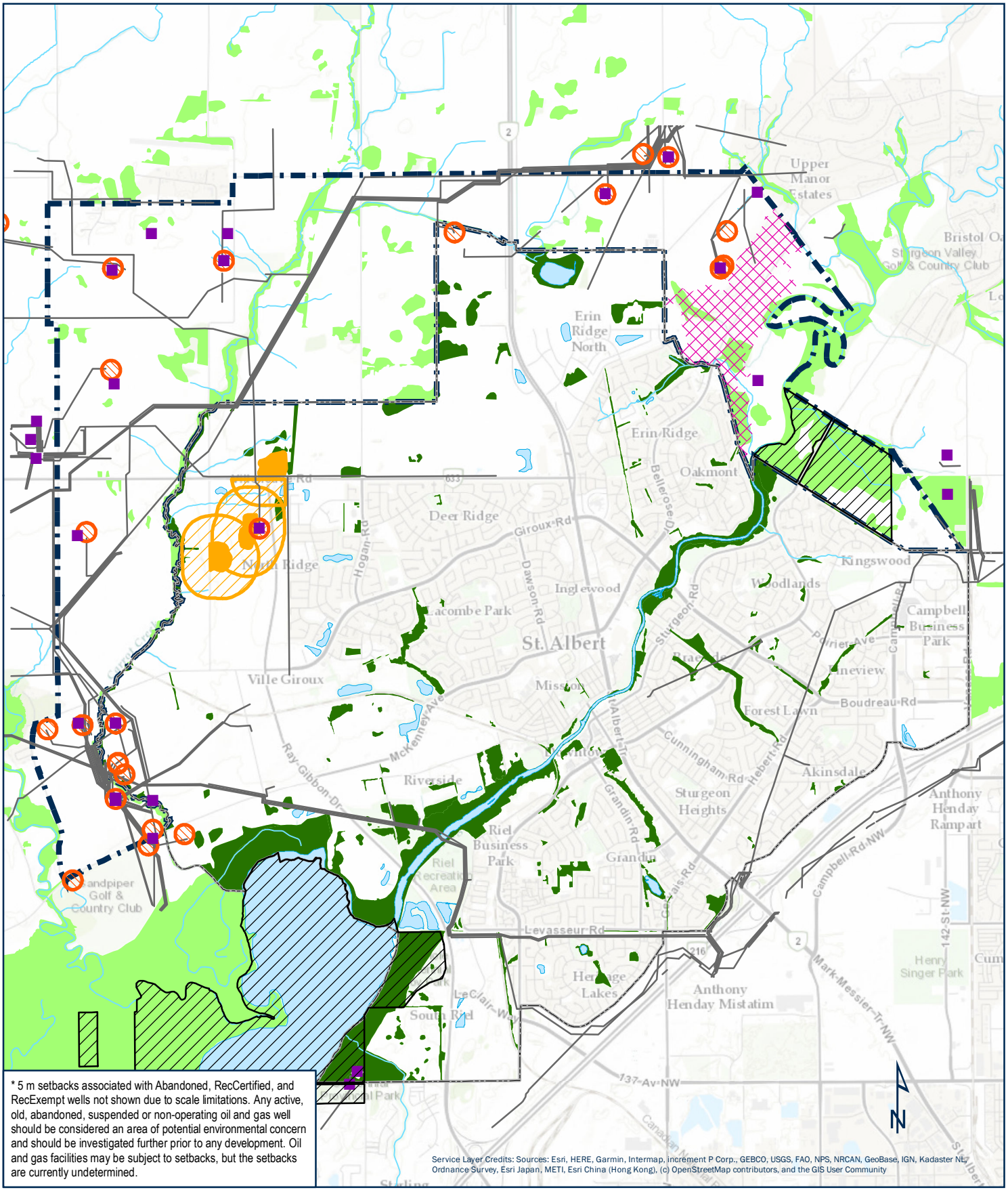
- Abandoned, reclamation certified, reclamation exempt wells having a 5 m setback. With that setback, these wells are essentially point features at this scale and although numerous, as point features, they are relatively small and widely scattered across the MPAA (Map E.8).

For simplicity, ecological assets were mapped as natural areas only. However, by referencing Maps E.3 and E.4, our analysis also considered Ecological Network components and all mapped potential ER and CR (with all feature types collectively referred to as ecological assets).

Potential synergies between the mapped infrastructure, setbacks and ecological assets were identified visually based on proximity and/or overlap. Identified synergies were not mapped but are described and discussed below.

10.2 Results

Map E.10 illustrates the geospatial relationship between select ecological constraints and natural areas. The most notable synergy within the MPAA is associated with the large area of geotechnical concern in the northeast area of the MPAA, north of the Sturgeon River. This area overlaps with four mapped natural areas that comprise two significant woodlands, a small ravine, and a naturally vegetated riparian area. Cross-referencing Map E.4 indicates that the area of geotechnical concern also overlaps partially or wholly with two areas identified as potential ER and four areas identified as potential CR. This area also forms part of the identified east-west Landscape Linkage shown on Map E.3. Lands immediately to the south of the area noted as potentially unstable form a sizeable Sturgeon River floodplain mapped as potential ER. Finally, three oil and gas facilities (including wells) are situated on the margin of the area of geotechnical concern, and a fourth is close to the south margin, within the floodplain. In combination, these features may represent a sizeable area that is undevelopable for most uses. Yet if annexed and left undeveloped, in combination, the land and mapped features could serve as a significant conservation area, effectively extending upslope from the undevelopable Sturgeon River floodplain and greatly increasing the conservation value of the river and



* 5 m setbacks associated with Abandoned, RecCertified, and RecExempt wells not shown due to scale limitations. Any active, old, abandoned, suspended or non-operating oil and gas well should be considered an area of potential environmental concern and should be investigated further prior to any development. Oil and gas facilities may be subject to setbacks, but the setbacks are currently undetermined.

Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Date: 2020-12-02 Document: J:\15100\15167_St_Albert_Growth_Study_Annexation\02_CADD\25_GIS\251_Figures\05_Ecological_Assessment\Spencer_Mapx\09Nov2019_EP778_COSA_GMS_EA_Maps\15167_GMS_EA_Map_E10_final_201202.mxd

City of St. Albert Cultivate Life

0 0.2 0.4 0.8 1.2 1.6 km

3TM114-83 1:55,000

- City of St. Albert Natural Areas
- Natural Areas (Outside City)
- 100 m Active or Suspended Well Setback*
- Oil and Gas Facilities*
- Pipeline
- Non-Operating Landfill
- 300 m Landfill Setback
- Potential Geotechnical Constraints
- Maximum Potential Annexation Area
- Municipal Boundary
- Parks and Protected Areas Alberta
- Hydrology

ST. ALBERT GROWTH MANAGEMENT STUDY: ECOLOGICAL ASSESSMENT

MAP E.10: ECOLOGICAL CONSTRAINTS AND NATURAL AREAS OVERLAY

floodplain and the functionality of both the Regional Ecological Corridor and the northern Landscape Linkage.

Within the context of a developed MPAA, pipelines and their associated undevelopable ROWs could provide for relatively lengthy open space corridors (greenways) that can also serve as linear stepping stones in an Ecological Network. Such corridors can be suitable for urban-adapted wildlife movement and do enhance an Ecological Network. Map E.10 shows several relatively long and wide pipeline corridors, with the key corridors being those located in the vicinity of Big Lake and Carrot Creek. Several pipeline ROWs near Carrot Creek are structurally connected to the creek riparian corridor, and in other locales could be functionally connected. The Carrot Creek corridor is of course an important Landscape Linkage and the City's second Regional Ecological Corridor. The wider pipeline corridor crosses Carrot Creek, which is future ER, and to the east parallels the creek and intersects the northernmost mapped Landscape Linkage, and further north intersects a mapped potential CR. This overall configuration could strengthen the Landscape Linkage function. This pipeline ROW may hinder development but has high conservation value. Similarly, the several pipelines that cross and border Carrot Creek in the south of the MPAA also have high conservation potential. Finally, some of the more distant, shorter pipeline corridors may provide opportunities for local linkages, such as between a stormwater management facility and a nearby natural feature, that could be capitalized on during future ASP initiatives.

At the south end of the MPAA, Map E.10 shows another area of synergy. A small concentration of well and other oil and gas infrastructure is located in close proximity to both the west bank of Carrot Creek (and east bank within the City) and several pipeline ROWs. This cluster of ecological constraints has potential to result in undevelopable parcels and the presence of the Carrot Creek corridor adds to development restrictions. In combination, those ecological constraints and ecological assets would increase the function of that Regional Ecological Corridor. The setbacks may also provide opportunities for restoration to native vegetation, further enhancing corridor function and possibly enhancing land base and recreational opportunity in the future Red Willow Park corridor.

Numerous other mapped well setbacks and oil and gas facilities are scattered throughout the MPAA, but most do not occur in proximity to ecological assets. Minor synergies exist where two well setbacks overlap with Carrot Creek tributaries, possibly providing incentive to retain the watercourses during development and provide for open space activities.

11.0 Overall Conclusions

This Ecological Assessment provides information and analysis for lands within the current boundaries of the City of St. Albert, the MPAA under consideration by the City of St. Albert, and, for some variables, adjacent buffer lands. The City's Natural Area inventory and Ecological Network (which also considers lands in the MPAA) have been updated. The MPAA includes numerous natural features, some of which are also potential ER, potential CR, potentially Crown-claimable wetlands, and key components of the City's Ecological Network. Carrot Creek and its associated ravine, the Sturgeon River Valley including its floodplain and adjacent large woodlands – including River Lot 56 – and scattered natural sites north of the City are the most significant of these features. Some of the features in the MPAA already form part of a provincially protected area. As a whole, these features support important Landscape Linkages and, of particular relevance to the MPAA, this includes a valuable connection that arcs around and through the north edge of the existing City boundary, comprising mapped natural areas, important stepping stone clusters, and undeveloped agricultural lands. These natural features and the opportunities and constraint`s that they may provide should be carefully considered by the City as they consider future growth.

The MPAA also includes certain areas and features of potential environmental concern related to oil and gas pipelines, wells, and facilities. In their current condition, many existing facilities and other oil and gas infrastructure would require compliance with specific development setbacks should the surrounding lands be developed. In the future, even though a well site, pipeline or facility may have a valid reclamation certificate, be abandoned or suspended, it does not ensure the former lease area is free of any contamination and, as such, any active, old, abandoned, suspended or non-operating oil and gas pipeline, well or facility should be considered an area of potential environmental concern and should be investigated further prior to consideration of any surrounding future land development. Finally, the City has identified some additional areas of environmental concern that warrant further investigation. One of these is a significant area adjacent to the Sturgeon River floodplain.

This report has identified some synergies between ecological assets and areas of concern (ecological constraints) that warrant further consideration as growth management decisions are made.

12.0 References

Alberta Energy Regulator (AER). 2015. EnerFAQs: Explaining AER Setbacks. Website: https://www.aer.ca/providing-information/news-and-resources/enerfaqs-and-fact-sheets/enerfaqs-setbacks. Updated September 2015. Accessed December 2018.

Alberta Energy Regulator (AER). 2018. Directive 056: Energy Development Applications and Schedules. October 2018.

Alberta Environment and Parks. 2015. Alberta Wetland Identification and Delineation Directive. Water Policy Branch, Policy and Planning Division, Edmonton, AB.

Alberta Environment and Parks. 2016. Guide for Assessing Permanence of Wetland Basins. Land and Forestry Policy Branch, Policy Division.

Alberta Environment and Parks, 2018. Environmental Site Assessment Repository (ESAR). Website: http://www.esar.alberta.ca/esarmain.aspx. Accessed: July 2018.

City of Edmonton. 2006. Background Report: Rationale for Guidelines for ER Dedication for Wetlands and Other Water Bodies.

City of St. Albert. 2015. Range Road 260 Area Structure Plan (Avenir & Elysian Fields). As amended February 2, 2015, Bylaw 8/2015.

Government of Alberta 2017. Municipal Government Act. Subdivision and Development Regulation. November 2017.

Spencer Environmental. 2015. City of St. Albert Natural Areas Assessment - 2015 Update. Final Report. Prepared for: City of St. Albert, St. Albert, Alberta.

Appendix E.1
Ecological Constraints Environmental Site Assessment Location Inventory

ESA Location Number	LSD	Comments
1	SW-24-54-26-W4M	Miami Oil Producers Inc. Well site and access road Reclamation Certificate issued December 2, 1975
2	SE-24-54-26-W4M	Kissinger Petroleum Ltd. SE-24-54-26-W4M Wellsite and access road Reclamation Certificate issued August 5, 1964
3	SW-24-54-26-W4M	Imperial Oil Ltd. SW-24-54-26-W4M Well site and access road Reclamation Certificate issued November 5, 1968
4	SE-13-54-26-W4M	Thunderbird Petroleum Ltd. SE-13-54-26-W4M Well site and access road Reclamation Certificate issued November 12, 1970
5	NE-13-54-26-W4M	Charles McGaha NE-13-54-26-W4M Well site and access road Reclamation Certificate issued August 5, 1965
6	NW-13-54-26-W4M	Oakland Petroleums Ltd. NW-13-54-26-W4M Well site and access road Reclamation Certificate issued May 13, 1966
7	NE-13-54-26-W4M	Sunshine Exploration Ltd. NE-13-54-26-W4M Well site and access road Reclamation Certificate issued September 6, 1968
8	NE-13-54-26-W4M	Orbit Oil and Gas Ltd. NE-13-54-26-W4M Well site and access road Reclamation Certificate issued October 21, 1981
9	SE-13-54-26-W4M	Oakland Petroleums Ltd. SE-13-54-26-W4M Well site and access road Reclamation Certificate issued September 5, 1975
10	SE-13-54-26-W4M	Oakland Petroleums Ltd. SE-13-54-26-W4M Well site and access road Reclamation Certificate issued September 21, 1967

ESA Location Number	LSD	Comments
11	SW-13-54-26-W4M	Oakland Petroleums Ltd. SW-13-54-26-W4M Well site and access road Reclamation Certificate issued September 28, 1965
12	**Legal Subdivisions 4 and 5 of 13-54-26-W4M**	**Remediation of soil in vicinity of produced water/crude oil spill from Regco Petroleum Ltd. pipeline in 2001.** **Legal Subdivisions 4 and 5 of 13-54-26-W4M** **Hydrocarbon and salt impacted groundwater.** **No reclamation certificate on file.**
13	NE-12-54-26-W4M	Gulf Canada Resources Ltd. NE-12-54-26-W4M Wellsite and access road Reclamation Certificate issued November 9, 1988
14	NE-12-54-26-W4M	Samedan oil of Canada Inc. NE-12-54-26-W4M Wellsite Reclamation Certificate issued August 1, 1972
15	SW-12-54-26-W4M	Oakland Petroleums Ltd. SW-12-54-26-W4M Well site and access road Reclamation Certificate issued June 12, 1975
16	NW-12-54-26-W4M	Wellore Resources Ltd. NW-12-54-26-W4M Wellsite and access road Reclamation Certificate issued May 24, 1984
17	NW-12-54-26-W4M	Mic Mac Oils Ltd. NW-12-54-26-W4M Wellsite and access road Reclamation Certificate issued September 6, 1968
18	SE-12-54-26-W4M	Oakland Petroleums Ltd. SE-12-54-26-W4M Wellsite and access road Reclamation Certificate issued August 26, 1981
19	Legal Subdivision 6 of 1-54-26-W4M	Imperial Oil Ltd. Legal Subdivision 6 of 1-54-26-W4M Sweet gas wellsite Reclamation Certificate issued August 29, 2012

ESA Location Number	LSD	Comments
20	SW-1-54-26-W4M	Northwestern Utilities Ltd. SW-1-54-26-W4M Gas pipeline Reclamation Certificate issued May 4, 1966
21	Legal Subdivision 7 of 2-54-26-W4M	Northwestern Utilities Ltd. Legal Subdivision 7 of 2-54-26-W4M Gas pipeline Reclamation Certificate issued February 2, 1966
22	NE-25-53-26-W4M	Imperial Oil Ltd. NE-25-53-26-W4M Wellsite Reclamation Certificate issued September 21, 1967
23	NE-36-53-26-W4M	Imperial Oil Ltd. NE-36-53-26-W4M Reclamation Certificate issued September 6, 1968
24	NE-36-53-26-W4M	Gibson Crude Oil Purchasing Co. Ltd. NE-36-53-26-W4M Pipeline Reclamation Certificate issued October 27, 1965
25	SW-36-53-26-W4M	West Canadian Oil & Gas Ltd. SW-36-53-26-W4M Wellsite and access road Reclamation Certificate issued September 6, 1968
26	NW-18-54-25-W4M SW-19-54-25-W4M	Charles McGaha NW-18-54-25-W4M SW-19-54-25-W4M Wellsite and access road Reclamation Certificate issued August 13, 1964
27	SW-19-54-25-W4M	Legal Well Strippers Ltd. SW-19-54-25-W4M Wellsite and access road Reclamation Certificate issued November 28, 1972
28	SW-19-54-25-W4M	Canadian Industrial Gas & Oil Ltd. SW-19-54-25-W4M Wellsite and access road Reclamation Certificate issued June 17, 1966

ESA Location Number	LSD	Comments
29	SW-19-54-25-W4M	Legal Well Strippers Ltd. SW-19-54-25-W4M Wellsite and access road Reclamation Certificate issued July 24, 1974
30	**SE-18-54-25-W4M**	**City of St. Albert** **Operating temporary snow storage facility and compost yard** **Phase I and II ESAs completed** **SE-18-54-25-W4M** **Remediation status: no remediation required.** **October 5, 2017**
31	N½-18-54-25-W4M	Canadian Industrial Gas Transmission Ltd. N½-18-54-25-W4M Gas pipeline Reclamation Certificate issued September 4, 1964
32	SE-18-54-25-W4M	Baloil Petroleum Ltd. SE-18-54-25-W4M Wellsite and access road Reclamation Certificate issued June 7, 1988
33	NE-18-54-25-W4M	Imperial Oil Ltd. NE-18-54-25-W4M Wellsite and access road Reclamation Certificate issued July 24, 1968
34	SW-18-54-25-W4M	Thunderbird Petroleums Ltd. SW-18-54-25-W4M Wellsite and access road Reclamation Certificate issued July 22, 1964
35	NE-18-54-25-W4M	Greywolf Exploration Inc. NE-18-54-25-W4M Wellsite and access road Reclamation Certificate issued September 15, 1998
36	NW-18-54-25-W4M	Thunderbird Petroleums Ltd. NW-18-54-25-W4M Wellsite and access road Reclamation Certificate issued October 28, 1970
37	NE-18-54-25-W4M	OSEC Petroleum Canada Ltd. NE-18-54-25-W4M Wellsite and access road Reclamation Certificate issued September 18, 1987

ESA Location Number	LSD	Comments
38	SE-18-54-25-W4M	Imperial Oil Ltd. SE-18-54-25-W4M Wellsite and access road Reclamation Certificate issued July 11, 1968
39	Legal Subdivison 4 of 20-54-25-W4M	Amax Petroleum Corporation Legal Subdivison 4 of 20-54-25-W4M Wellsite and access road Reclamation Certificate issued April 15, 1964
40	SE-20-54-25-W4M	Taylor Petroleum Operators Ltd. SE-20-54-25-W4M Wellsite and access road Reclamation Certificate issued July 10, 1968
41	NE-20-54-25-W4M	Chevron Standard Ltd. NE-20-54-25-W4M Wellsite and access road Reclamation Certificate issued July 24, 1968
42	N½-20-54-25-W4M	Taylor Petroleum Operators Ltd. N½-20-54-25-W4M Wellsite and access road Reclamation Certificate issued July 11, 1968
43	SW-17-54-25-W4M	Summit Resources Ltd. SW-17-54-25-W4M Wellsite and access road Reclamation Certificate issued October 13, 1982
44	NW-17-54-25-W4M	Rustum Petroleums Ltd. NW-17-54-25-W4M Wellsite and access road Reclamation Certificate issued October 4, 1986
45	NE-21-54-25-W4M	West Canadian Oil & Gas Ltd. NE-21-54-25-W4M Wellsite and access road Reclamation Certificate issued July 12, 1968
46	NE-21-54-25-W4M	Norcen Energy Resources Ltd. NE-21-54-25-W4M Wellsite and access road Reclamation Certificate issued August 20, 1996

ESA Location Number	LSD	Comments
47	Legal Subdivision 7 of 22-54-25-W4M	Westhills Resources Ltd. Legal Subdivision 7 of 22-54-25-W4M Wellsite and access road Reclamation certificate refused Reclamation Certificate issued No further record
48	E½ 22-54-25-W4M NW-23-54-25-W4M	Canada Northwest Energy Ltd. E½ 22-54-25-W4M NW-23-54-25-W4M Wellsite and access road Reclamation Certificate issued June 11, 1990
49	NE-22-54-25-W4M	Getty Oil Company, Ltd. NE-22-54-25-W4M Wellsite and access road Reclamation Certificate issued May 27, 1971
50	NW-22-54-25-W4M	Canadian Delhi Oil Ltd. NW-22-54-25-W4M Wellsite and access road Reclamation Certificate issued July 12, 1968
51	NE-22-54-25-W4M	Old Smoky Oil and Gas Ltd. NE-22-54-25-W4M Wellsite and access road Reclamation Certificate issued July 12, 1968
52	SW-22-54-25-W4M NW-15-54-25-W4M	Olsen Donnelly Petroleums Ltd. SW-22-54-25-W4M NW-15-54-25-W4M Wellsite and access road Reclamation Certificate issued July 11, 1968
53	SW-14-54-25-W4M	Oakland Petroleums Ltd. SW-14-54-25-W4M Wellsite Reclamation Certificate issued October 24, 1979
54	SE-14-54-25-W4M	Canada Northwest Energy Ltd. SE-14-54-25-W4M Wellsite and access road Reclamation Certificate issued July 23, 1996
55	NE-11-54-25-W4M	Regco Petroleums Ltd. NE-11-54-25-W4M Wellsite and access road Reclamation Certificate issued June 26, 2003

ESA Location Number	LSD	Comments
56	NE-11-54-25-W4M	Regco Petroleums Ltd. NE-11-54-25-W4M Wellsite and access road Reclamation Certificate issued October 20, 2000
57	**W½-7-54-25-W4M**	**Millenium Building Systems** **W½-7-54-25-W4M** **Former dry waste landfill** **Application on February 4, 2013.** **No certificate on file.**
58	NW-7-54-25-W4M	Central-Del Rio Oils Ltd. NW-7-54-25-W4M Wellsite and access road Reclamation Certificate issued September 17, 1968
59	SW-7-54-25-W4M	Mobil Oil Canada, Ltd. SW-7-54-25-W4M Wellsite and access road Reclamation Certificate issued November 10, 1971
60	SW-6-54-25-W4M	Sinopec Daylight Energy Ltd. SW-6-54-25-W4M Wellsite and access road Reclamation Certificate issued July 12, 2013
61	SW-6-54-25-W4M	Imperial Oil Ltd. SW-6-54-25-W4M Wellsite and access road Reclamation Certificate issued September 6, 1968

Appendix E.2
Ecological Constraints Well Inventory

ISL Engineering and Land Services

Licence Date	Company Name	Surface Location	License Status
1998-11-05	Sinopec Daylight Energy Ltd.(A6GD)	03-01-054-26W4	Abandoned
2017-11-01	Sinopec Daylight Energy Ltd.(A6GD)	15-36-053-26W4	Abandoned
2015-05-22	Regco Petroleums Ltd.(0FE8)	05-13-054-26W4	Abandoned
2015-05-22	Regco Petroleums Ltd.(0FE8)	04-13-054-26W4	Abandoned
2013-10-10	Tervita Corporation(0NZ1)	12-19-054-25W4	Abandoned
1999-10-03	Westhill Resources Limited(0T49)	10-15-054-25W4	Abandoned
1998-10-24	Westhill Resources Limited(0T49)	15-22-054-25W4	Abandoned
1998-10-24	Westhill Resources Limited(0T49)	07-22-054-25W4	Abandoned
2013-09-23	Pine Cliff Energy Ltd.(A1GR)	10-24-054-26W4	Abandoned
1996-12-19	ARC Resources Ltd.(0G30)	02-18-054-25W4	Abandoned
2011-06-09	Sinopec Daylight Energy Ltd.(A6GD)	06-01-054-26W4	Abandoned
2003-02-13	Cedar Creek Energy Ltd.(A7E1)	15-21-054-25W4	Amended
1950-09-22	Richard J. Churchill Limited(0333)	06-22-054-25W4	Issued
1954-03-01	Cedar Creek Energy Ltd.(A7E1)	10-20-054-25W4	Issued
1977-05-20	Westhill Resources Limited(0T49)	06-22-054-25W4	Issued
1979-04-02	Westhill Resources Limited(0T49)	11-22-054-25W4	Issued
1982-11-25	Redwater Energy Corp.(A5BF)	12-12-054-26W4	Issued
1996-08-20	Canadian Natural Resources Limited(0HE9)	16-21-054-25W4	RecCertified
1998-12-31	Canadian Natural Resources Limited(0HE9)	06-19-054-25W4	RecCertified
1998-12-31	Canadian Reserve Oil And Gas Ltd.(0071)	10-22-054-25W4	RecCertified
1998-12-31	O S E C Petroleum Canada Limited(0EH1)	10-18-054-25W4	RecCertified
1998-12-31	O S E C Petroleum Canada Limited(0EH1)	10-18-054-25W4	RecCertified
1998-12-31	Encana Corporation(0026)	05-07-054-25W4	RecCertified
1998-12-31	Legal Oil & Gas Ltd.(0036)	04-19-054-25W4	RecCertified
1998-12-31	Legal Oil & Gas Ltd.(0036)	05-19-054-25W4	RecCertified
1998-12-31	Thunderbird Petroleums Limited(0F31)	07-13-054-26W4	RecCertified
1998-12-31	Kissinger Petroleums Ltd(0D67)	08-24-054-26W4	RecCertified
1998-12-31	Thunderbird Petroleums Limited(0F31)	05-18-054-25W4	RecCertified
1998-12-31	Sedco Drilling(0X97)	12-13-054-26W4	RecCertified
1998-12-31	Canada Northwest Energy Limited(0L99)	12-13-054-26W4	RecCertified
1998-12-31	Canada Northwest Energy Limited(0L99)	06-13-054-26W4	RecCertified
1998-12-31	Thunderbird Petroleums Limited(0F31)	13-18-054-25W4	RecCertified
1998-12-31	Canada Northwest Energy Limited(0L99)	08-13-054-26W4	RecCertified
1998-12-31	Enstar Petroleum Ltd.(0J56)	11-32-053-25W4	RecCertified
1998-12-31	Samedan Oil Of Canada, Inc.(0313)	16-12-054-26W4	RecCertified
1998-12-31	Miami Oil Producers, Inc.(0G28)	03-24-054-26W4	RecCertified
1998-12-31	Canada Northwest Energy Limited(0L99)	03-12-054-26W4	RecCertified
1998-12-31	Paramount Resources Ltd.(0AW4)	04-17-054-25W4	RecCertified
1998-12-31	Canada Northwest Energy Limited(0L99)	08-12-054-26W4	RecCertified
1998-12-31	Sunoma Energy Corp.(0G31)	10-13-054-26W4	RecCertified
2000-10-20	Regco Petroleums Ltd.(0FE8)	16-11-054-25W4	RecCertified
1998-12-31	Enerplus Corporation(A5RD)	12-12-054-26W4	RecCertified
2013-07-28	Sinopec Daylight Energy Ltd.(A6GD)	06-06-054-25W4	RecCertified
1998-12-31	Rustum Petroleums Limited(0EK5)	12-17-054-25W4	RecCertified
1998-12-31	Baloil Petroleum Ltd.(0EA4)	08-18-054-25W4	RecCertified
1998-12-31	ConocoPhillips Canada Resources Corp.(A5G3)	10-12-054-26W4	RecCertified
1998-12-31	TAQA North Ltd.(A2TG)	10-18-054-25W4	RecCertified
2017-07-12	NuVista Energy Ltd.(A0A7)	10-18-054-25W4	RecCertified
2017-01-28	Regco Petroleums Ltd.(0FE8)	05-13-054-26W4	RecCertified
2017-01-28	Regco Petroleums Ltd.(0FE8)	05-13-054-26W4	RecCertified
2017-02-28	Regco Petroleums Ltd.(0FE8)	03-13-054-26W4	RecCertified
1949-11-07	Calpine Canada Resources Company(0LR8)	16-21-054-25W4	RecExempt

ISL Engineering and Land Services

Licence Date	Company Name	Surface Location	License Status
1950-10-13	Sulpetro Limited(0K21)	13-22-054-25W4	RecExempt
1950-10-14	Imperial Oil Resources Limited(0007)	04-12-054-26W4	RecExempt
1950-10-14	Imperial Oil Resources Limited(0007)	13-12-054-26W4	RecExempt
1950-10-14	Imperial Oil Resources Limited(0007)	13-07-054-25W4	RecExempt
1950-10-14	Imperial Oil Resources Limited(0007)	04-07-054-25W4	RecExempt
1950-10-14	Imperial Oil Resources Limited(0007)	09-36-053-26W4	RecExempt
1950-10-14	Imperial Oil Resources Limited(0007)	05-07-054-25W4	RecExempt
1950-10-21	Imperial Oil Resources Limited(0007)	04-05-054-25W4	RecExempt
1950-10-21	Imperial Oil Resources Limited(0007)	13-17-054-25W4	RecExempt
1950-10-21	Imperial Oil Resources Limited(0007)	04-21-054-25W4	RecExempt
1950-10-21	Imperial Oil Resources Limited(0007)	13-22-054-25W4	RecExempt
1950-10-21	Imperial Oil Resources Limited(0007)	16-10-054-25W4	RecExempt
1950-11-16	Olson-Donnelly Petroleums Ltd(0E97)	05-22-054-25W4	RecExempt
1950-12-16	Olson-Donnelly Petroleums Ltd(0E97)	03-22-054-25W4	RecExempt
1950-12-03	Imperial Oil Resources Limited(0007)	12-18-054-25W4	RecExempt
1951-01-03	BP Canada Energy Group ULC(A62D)	16-36-053-26W4	RecExempt
1951-01-03	BP Canada Energy Group ULC(A62D)	04-07-054-25W4	RecExempt
1951-01-03	BP Canada Energy Group ULC(A62D)	04-19-054-25W4	RecExempt
1951-02-13	Imperial Oil Resources Limited(0007)	09-23-054-26W4	RecExempt
1951-03-21	Imperial Oil Limited(0EX1)	06-22-054-25W4	RecExempt
1951-07-12	Chevron Canada Limited(0045)	14-31-053-25W4	RecExempt
1951-07-12	Chevron Canada Limited(0045)	15-36-053-26W4	RecExempt
1951-07-12	Chevron Canada Limited(0045)	02-12-054-26W4	RecExempt
1957-07-26	Imperial Oil Limited(0EX1)	05-24-054-26W4	RecExempt
1952-01-20	ConocoPhillips Canada Resources Corp.(A5G3)	16-01-054-26W4	RecExempt
1952-07-29	Encana Corporation(0026)	12-07-054-25W4	RecExempt
1952-09-14	Imperial Oil Limited(0EX1)	07-18-054-25W4	RecExempt
1952-08-20	Encana Corporation(0026)	06-07-054-25W4	RecExempt
1953-02-05	BP Canada Energy Group ULC(A62D)	11-12-054-26W4	RecExempt
1954-04-24	Imperial Oil Limited(0EX1)	06-06-054-25W4	RecExempt
1954-10-09	Taylor Petroleum Operators Limited(0C09)	07-20-054-25W4	RecExempt
1954-12-17	Taylor Petroleum Operators Limited(0C09)	11-20-054-25W4	RecExempt
1955-12-01	Sulpetro Limited(0K21)	15-21-054-25W4	RecExempt
1956-06-03	Imperial Oil Limited(0EX1)	16-36-053-26W4	RecExempt
1956-11-23	Sunshine Exploration Ltd(0D95)	15-13-054-26W4	RecExempt
1959-04-18	Unknown Operator/Address - Used by Field Surveilla	16-12-054-26W4	RecExempt
1959-06-14	McGaha, Charles(0003)	16-13-054-26W4	RecExempt
1961-01-11	McGaha, Charles(0003)	14-18-054-25W4	RecExempt
1961-01-07	Chevron Canada Limited(0045)	16-20-054-25W4	RecExempt
1962-08-09	Devon Canada Corporation(0K29)	04-20-054-25W4	RecExempt
1965-10-20	Sedco Drilling(0X97)	06-13-054-26W4	RecExempt
1950-10-26	Imperial Oil Limited(0EX1)	08-22-054-25W4	RecExempt
1950-12-02	Imperial Oil Resources Limited(0007)	01-30-054-25W4	RecExempt
1950-12-02	Imperial Oil Resources Limited(0007)	05-22-054-25W4	RecExempt
2009-08-20	Sinopec Daylight Energy Ltd.(A6GD)	14-36-053-26W4	Suspension
2008-09-08	Sinopec Daylight Energy Ltd.(A6GD)	06-01-054-26W4	Suspension
2016-12-04	Sinopec Daylight Energy Ltd.(A6GD)	05-01-054-26W4	Suspension
2016-06-09	Sinopec Daylight Energy Ltd.(A6GD)	10-36-053-26W4	Suspension
2011-08-10	Sinopec Daylight Energy Ltd.(A6GD)	09-36-053-26W4	Suspension
2008-09-08	Sinopec Daylight Energy Ltd.(A6GD)	03-01-054-26W4	Suspension
2012-06-27	Cedar Creek Energy Ltd.(A7E1)	11-07-054-25W4	Suspension
2016-06-03	Sinopec Daylight Energy Ltd.(A6GD)	08-02-054-26W4	Suspension
2016-06-03	Sinopec Daylight Energy Ltd.(A6GD)	11-13-054-26W4	Suspension
2015-05-13	Cedar Creek Energy Ltd.(A7E1)	05-19-054-25W4	Suspension
2006-12-05	Cedar Creek Energy Ltd.(A7E1)	06-24-054-26W4	Suspension
2014-07-08	Sinopec Daylight Energy Ltd.(A6GD)	03-01-054-26W4	Suspension
2016-06-03	Sinopec Daylight Energy Ltd.(A6GD)	03-01-054-26W4	Suspension

Appendix E.3
Ecological Constraints Pipeline Inventory

ISL Engineering and Land Services

Company Name	Licence Application Date	From	To	Length (km)	H_2S Content (mol/kmol)	Status	Substance
Sinopec Daylight Energy Ltd.	22-Aug-83	14-36-053-26W4	14-36-053-26W4	0.23	9.9	Abandoned	Oil-Well Effluent
Sinopec Daylight Energy Ltd.	4-Jun-79	05-01-054-26W4	14-36-053-26W4	0.9	9.9	Abandoned	Oil-Well Effluent
Sinopec Daylight Energy Ltd.	4-Jun-79	05-01-054-26W4	14-36-053-26W4	0.9	9.9	Abandoned	Oil-Well Effluent
Regco Petroleums Ltd.	-	09-11-054-25W4	13-12-054-25W4	1.43	0	Abandoned	Natural Gas
Cedar Creek Energy Ltd.	22-Feb-05	16-21-054-25W4	08-28-054-25W4	0.9	1.2	Abandoned	Natural Gas
Westhill Resources Limited	-	07-22-054-25W4	15-22-054-25W4	0.85	0	Abandoned	Oil-Well Effluent
Gibson Energy ULC	8-Feb-93	05-27-054-25W4	06-21-054-25W4	1.87	0	Abandoned	Crude Oil
Gibson Energy ULC	8-Feb-93	12-06-054-25W4	14-36-053-26W4	1.63	0	Abandoned	Crude Oil
Gibson Energy ULC	8-Feb-93	12-06-054-25W4	14-36-053-26W4	1.63	0	Abandoned	Crude Oil
Gibson Energy ULC	8-Feb-93	02-18-054-25W4	10-06-054-25W4	2.13	0	Abandoned	Crude Oil
Tidewater Midstream and Infrastructure Ltd.	8-Aug-96	13-36-053-26W4	10-25-053-26W4	2.07	0	Abandoned	Crude Oil
Regco Petroleums Ltd.	4-Sep-86	01-14-054-26W4	04-13-054-26W4	0.47	0	Abandoned	Salt Water
Sinopec Daylight Energy Ltd.	30-Sep-99	15-36-053-26W4	14-36-053-26W4	0.25	0	Abandoned	Natural Gas
Sinopec Daylight Energy Ltd.	4-Jan-01	09-36-053-26W4	10-36-053-26W4	0.42	0	Abandoned	Natural Gas
Sinopec Daylight Energy Ltd.	7-Jun-99	14-36-053-26W4	15-36-053-26W4	0.25	0	Abandoned	Natural Gas
Sinopec Daylight Energy Ltd.	11-Jan-90	05-01-054-26W4	14-36-053-26W4	0.58	8	Abandoned	Salt Water
Sinopec Daylight Energy Ltd.	11-Jan-90	05-01-054-26W4	14-36-053-26W4	0.58	8	Abandoned	Salt Water
1256372 Alberta Ltd.	-	06-22-054-25W4	11-22-054-25W4	0.35	0	Abandoned	Natural Gas
1256372 Alberta Ltd.	-	11-22-054-25W4	15-22-054-25W4	0.6	0	Abandoned	Natural Gas
Sinopec Daylight Energy Ltd.	9-Sep-05	06-01-054-26W4	03-01-054-26W4	0.4	9.9	Abandoned	Oil-Well Effluent
Sinopec Daylight Energy Ltd.	31-Jul-96	02-23-054-26W4	06-19-054-25W4	3.14	0	Abandoned	Natural Gas
Legal Oil & Gas Ltd.	9-Jul-08	04-19-054-25W4	05-19-054-25W4	0.31	0	Abandoned	Salt Water
Gibson Energy ULC	8-Feb-93	01-14-054-26W4	02-18-054-25W4	3.09	0	Abandoned	Crude Oil
Gibson Energy ULC	8-Feb-93	01-17-054-25W4	02-18-054-25W4	2.18	0	Abandoned	Crude Oil
Regco Petroleums Ltd.	17-Oct-05	05-13-054-26W4	01-14-054-26W4	0.86	3.7	Abandoned	Oil-Well Effluent
Regco Petroleums Ltd.	17-Oct-05	03-13-054-26W4	01-14-054-26W4	0.94	3.7	Abandoned	Oil-Well Effluent
Regco Petroleums Ltd.	6-Dec-01	05-13-054-26W4	01-14-054-26W4	0.8	3.7	Abandoned	Oil-Well Effluent
Pine Cliff Energy Ltd.	20-Jun-97	09-23-054-26W4	10-23-054-26W4	0.69	0.65	Abandoned	Oil-Well Effluent
Tidewater Midstream and Infrastructure Ltd.	2-Aug-96	10-20-054-25W4	12-21-054-25W4	1	4	Abandoned	Natural Gas
Tidewater Midstream and Infrastructure Ltd.	2-Aug-96	14-21-054-25W4	02-28-054-25W4	0.4	4	Abandoned	Natural Gas
Tidewater Midstream and Infrastructure Ltd.	2-Aug-96	10-36-053-26W4	02-01-054-26W4	1.28	0	Abandoned	Natural Gas
Tidewater Midstream and Infrastructure Ltd.	2-Aug-96	10-36-053-26W4	02-01-054-26W4	1.28	0	Abandoned	Natural Gas
Tidewater Midstream and Infrastructure Ltd.	2-Aug-96	06-01-054-26W4	01-11-054-26W4	1.34	0	Abandoned	Natural Gas
Tidewater Midstream and Infrastructure Ltd.	2-Aug-96	06-19-054-25W4	07-19-054-25W4	0.5	0	Abandoned	Natural Gas
Tidewater Midstream and Infrastructure Ltd.	13-Aug-96	13-22-054-25W4	05-27-054-25W4	0.58	0	Abandoned	Natural Gas
ATCO Gas And Pipelines Ltd.	30-Mar-10	13-32-053-25W4	12-32-053-25W4	0.24	0	Abandoned	Natural Gas
Sinopec Daylight Energy Ltd.	-	10-36-053-26W4	14-36-053-26W4	0.65	9.9	Discontinued	Oil-Well Effluent
Sinopec Daylight Energy Ltd.	8-Jul-86	05-01-054-26W4	14-36-053-26W4	0.58	8	Discontinued	Natural Gas
Sinopec Daylight Energy Ltd.	8-Jul-86	05-01-054-26W4	14-36-053-26W4	0.58	8	Discontinued	Natural Gas
Sinopec Daylight Energy Ltd.	11-Mar-94	05-01-054-26W4	05-01-054-26W4	0.15	8	Discontinued	Natural Gas
Sinopec Daylight Energy Ltd.	-	04-01-054-26W4	14-36-053-26W4	0.58	0	Discontinued	Natural Gas

ISL Engineering and Land Services

Company Name	Licence Application Date	From	To	Length (km)	H_2S Content (mol/kmol)	Status	Substance
Sinopec Daylight Energy Ltd.	-	04-01-054-26W4	14-36-053-26W4	0.58	0	Discontinued	Natural Gas
Sinopec Daylight Energy Ltd.	29-Jan-01	03-01-054-26W4	14-36-053-26W4	0.81	0	Discontinued	Natural Gas
Sinopec Daylight Energy Ltd.	29-Jan-01	03-01-054-26W4	14-36-053-26W4	0.81	0	Discontinued	Natural Gas
Sinopec Daylight Energy Ltd.	29-Jan-01	03-01-054-26W4	14-36-053-26W4	0.81	0	Discontinued	Natural Gas
Sinopec Daylight Energy Ltd.	29-Jan-01	03-01-054-26W4	14-36-053-26W4	0.81	0	Discontinued	Natural Gas
Sinopec Daylight Energy Ltd.	-	15-36-053-26W4	14-36-053-26W4	0.21	0	Discontinued	Natural Gas
Sinopec Daylight Energy Ltd.	-	03-01-054-26W4	14-36-053-26W4	0.81	0	Discontinued	Natural Gas
Sinopec Daylight Energy Ltd.	-	03-01-054-26W4	14-36-053-26W4	0.81	0	Discontinued	Natural Gas
Sinopec Daylight Energy Ltd.	-	10-02-054-26W4	05-01-054-26W4	1.52	0	Discontinued	Natural Gas
Sinopec Daylight Energy Ltd.	27-Jul-99	03-01-054-26W4	14-36-053-26W4	0.25	0	Discontinued	Natural Gas
Sinopec Daylight Energy Ltd.	27-Jul-99	03-01-054-26W4	14-36-053-26W4	0.25	0	Discontinued	Natural Gas
Sinopec Daylight Energy Ltd.	27-Jan-99	14-36-053-26W4	14-36-053-26W4	0.2	0	Discontinued	Natural Gas
Sinopec Daylight Energy Ltd.	27-Jul-99	14-36-053-26W4	14-36-053-26W4	0.5	0	Discontinued	Natural Gas
Richard J. Churchill Limited	-	06-22-054-25W4	11-22-054-25W4	0.4	0	Discontinued	Natural Gas
Richard J. Churchill Limited	-	11-22-054-25W4	15-22-054-25W4	0.4	0	Discontinued	Oil-Well Effluent
Pembina Pipeline Corporation	18-Jan-99	14-36-053-26W4	16-11-054-26W4	3.69	0	Discontinued	Crude Oil
Pembina Pipeline Corporation	18-Jan-99	14-36-053-26W4	16-11-054-26W4	3.69	0	Discontinued	Crude Oil
Cedar Creek Energy Ltd.	26-Apr-96	11-07-054-25W4	03-26-054-26W4	6.56	0	Discontinued	Natural Gas
Sinopec Daylight Energy Ltd.	14-Jul-97	11-13-054-26W4	01-14-054-26W4	1.35	5.5	Discontinued	Oil-Well Effluent
Sinopec Daylight Energy Ltd.	10-Jun-98	14-36-053-26W4	05-01-055-25W4	16.9	4	Discontinued	Natural Gas
Sinopec Daylight Energy Ltd.	10-Jun-98	14-36-053-26W4	05-01-055-25W4	16.9	4	Discontinued	Natural Gas
Sinopec Daylight Energy Ltd.	-	05-25-053-26W4	14-36-053-26W4	3.26	2.4	Discontinued	Natural Gas
Sinopec Daylight Energy Ltd.	14-Oct-98	10-36-053-26W4	14-36-053-26W4	0.49	2.4	Discontinued	Natural Gas
Cedar Creek Energy Ltd.	19-Jan-10	06-24-054-26W4	10-23-054-26W4	1.47	0.65	Discontinued	Oil-Well Effluent
Cedar Creek Energy Ltd.	22-May-01	15-21-054-25W4	05-27-054-25W4	1.34	1.3	Discontinued	Oil-Well Effluent
Cedar Creek Energy Ltd.	6-Mar-02	10-20-054-25W4	02-28-054-25W4	2.38	1.4	Discontinued	Oil-Well Effluent
Sinopec Daylight Energy Ltd.	-	03-01-054-26W4	14-36-053-26W4	0.23	9.9	Discontinued	Oil-Well Effluent
Sinopec Daylight Energy Ltd.	-	03-01-054-26W4	14-36-053-26W4	0.23	9.9	Discontinued	Oil-Well Effluent
Sinopec Daylight Energy Ltd.	-	06-06-054-25W4	14-36-053-26W4	2.05	9.9	Discontinued	Oil-Well Effluent
Sinopec Daylight Energy Ltd.	-	06-06-054-25W4	14-36-053-26W4	2.05	9.9	Discontinued	Oil-Well Effluent
Sinopec Daylight Energy Ltd.	-	14-36-053-26W4	14-36-053-26W4	0.18	9.9	Discontinued	Oil-Well Effluent
Sinopec Daylight Energy Ltd.	-	03-01-054-26W4	14-36-053-26W4	0.11	9.9	Discontinued	Oil-Well Effluent
Sinopec Daylight Energy Ltd.	-	03-01-054-26W4	14-36-053-26W4	0.11	9.9	Discontinued	Oil-Well Effluent
Sinopec Daylight Energy Ltd.	-	15-36-053-26W4	14-36-053-26W4	0.37	9.9	Discontinued	Oil-Well Effluent
Sinopec Daylight Energy Ltd.	-	14-36-053-26W4	14-36-053-26W4	0.03	9.9	Discontinued	Oil-Well Effluent
Sinopec Daylight Energy Ltd.	-	10-36-053-26W4	14-36-053-26W4	0.36	9.9	Discontinued	Oil-Well Effluent
Sinopec Daylight Energy Ltd.	-	14-36-053-26W4	14-36-053-26W4	0.23	9.9	Discontinued	Oil-Well Effluent

ISL Engineering and Land Services

Company Name	Licence Application Date	From	To	Length (km)	H_2S Content (mol/kmol)	Status	Substance
Sinopec Daylight Energy Ltd.	-	14-36-053-26W4	14-36-053-26W4	0.23	9.9	Discontinued	Oil-Well Effluent
Sinopec Daylight Energy Ltd.	-	08-02-054-26W4	14-36-053-26W4	0.55	9.9	Discontinued	Oil-Well Effluent
Sinopec Daylight Energy Ltd.	-	08-02-054-26W4	14-36-053-26W4	0.55	9.9	Discontinued	Oil-Well Effluent
Sinopec Daylight Energy Ltd.	-	05-01-054-26W4	05-01-054-26W4	0.2	8	Discontinued	Salt Water
Sinopec Daylight Energy Ltd.	-	14-36-053-26W4	05-01-054-26W4	0.58	8	Discontinued	Salt Water
Sinopec Daylight Energy Ltd.	-	14-36-053-26W4	05-01-054-26W4	0.58	8	Discontinued	Salt Water
Sinopec Daylight Energy Ltd.	-	11-25-053-26W4	14-36-053-26W4	2.22	25	Discontinued	Oil-Well Effluent
Sinopec Daylight Energy Ltd.	-	05-25-053-26W4	14-36-053-26W4	3.24	9.9	Discontinued	Natural Gas
Sinopec Daylight Energy Ltd.	-	15-36-053-26W4	14-36-053-26W4	0.23	9.9	Discontinued	Natural Gas
Sinopec Daylight Energy Ltd.	2-Aug-96	10-35-053-26W4	04-01-054-26W4	1.47	0	Discontinued	Natural Gas
Sinopec Daylight Energy Ltd.	-	05-01-054-26W4	14-36-053-26W4	0.93	5.5	Discontinued	Oil-Well Effluent
Sinopec Daylight Energy Ltd.	-	05-01-054-26W4	14-36-053-26W4	0.93	5.5	Discontinued	Oil-Well Effluent
Sinopec Daylight Energy Ltd.	-	01-14-054-26W4	05-01-054-26W4	3.24	5.5	Discontinued	Oil-Well Effluent
ATCO Gas And Pipelines Ltd.	30-Oct-02	07-02-054-26W4	14-31-053-25W4	2.72	0	Operating	Natural Gas
ATCO Gas And Pipelines Ltd.	30-Oct-02	07-02-054-26W4	14-31-053-25W4	2.72	0	Operating	Natural Gas
ATCO Gas And Pipelines Ltd.	30-Oct-02	07-02-054-26W4	14-31-053-25W4	2.72	0	Operating	Natural Gas
ATCO Gas And Pipelines Ltd.	30-Oct-02	14-31-053-25W4	10-32-053-25W4	1.98	0	Operating	Natural Gas
Redwater Energy Corp.	29-Jul-96	12-12-054-26W4	06-12-054-26W4	0.47	0	Operating	Natural Gas
Pembina Pipeline Corporation	13-Jan-89	02-29-053-26W4	02-34-054-24W4	29.42	0	Operating	Crude Oil
1256372 Alberta Ltd.	1-May-91	15-22-054-25W4	04-27-054-25W4	0.8	0.03	Operating	Fuel Gas
ATCO Gas And Pipelines Ltd.	-	07-11-054-24W5	10-11-054-25W4	0.03	0	Operating	Natural Gas
Pembina Pipeline Corporation	23-Feb-93	05-02-053-26W4	04-35-054-24W4	39.6	0	Operating	HVP Products
ATCO Gas And Pipelines Ltd.	-	11-03-054-26W4	11-12-054-26W4	4.51	0	Operating	Natural Gas
ATCO Gas And Pipelines Ltd.	-	11-12-054-26W4	09-28-053-25W4	10.7	0	Operating	Natural Gas
ATCO Gas And Pipelines Ltd.	-	11-12-054-26W4	09-28-053-25W4	10.7	0	Operating	Natural Gas
ATCO Gas And Pipelines Ltd.	-	11-12-054-26W4	09-28-053-25W4	10.7	0	Operating	Natural Gas
Sinopec Daylight Energy Ltd.	10-Jun-98	06-01-054-26W4	14-36-053-26W4	0.9	4	Operating	Natural Gas
Sinopec Daylight Energy Ltd.	10-Jun-98	06-01-054-26W4	14-36-053-26W4	0.9	4	Operating	Natural Gas
Cedar Creek Energy Ltd.	-	05-19-054-25W4	10-30-054-25W4	2.73	4	Operating	Natural Gas
Sinopec Daylight Energy Ltd.	-	06-01-054-26W4	04-01-054-26W4	0.55	9.9	Operating	Oil-Well Effluent
ATCO Gas And Pipelines Ltd.	21-Jul-94	11-32-053-25W4	14-32-053-25W4	0.21	0	Operating	Natural Gas
ATCO Gas And Pipelines Ltd.	7-Aug-96	07-02-054-26W4	14-31-053-25W4	2.75	0	Operating	Natural Gas
ATCO Gas And Pipelines Ltd.	7-Aug-96	07-02-054-26W4	14-31-053-25W4	2.75	0	Operating	Natural Gas
ATCO Gas And Pipelines Ltd.	7-Aug-96	07-02-054-26W4	14-31-053-25W4	2.75	0	Operating	Natural Gas
ATCO Gas And Pipelines Ltd.	12-Apr-77	14-31-053-25W4	11-32-053-25W4	1.96	0	Operating	Natural Gas
ATCO Gas And Pipelines Ltd.	13-Jan-03	11-32-053-25W4	10-32-053-25W4	0.08	0	Operating	Natural Gas
Sinopec Daylight Energy Ltd.	6-Dec-96	10-25-053-26W4	14-36-053-26W4	2	2.1	Operating	Natural Gas
Tidewater Midstream and Infrastructure Ltd.	2-Aug-96	03-10-054-26W4	07-19-054-25W4	7.28	0	Operating	Natural Gas
Tidewater Midstream and Infrastructure Ltd.	2-Aug-96	01-26-054-25W4	13-21-054-25W4	4.58	0	Operating	Natural Gas
Tidewater Midstream and Infrastructure Ltd.	2-Aug-96	07-19-054-25W4	13-21-054-25W4	2.9	0	Operating	Natural Gas
ATCO Gas And Pipelines Ltd.	17-Jul-02	14-31-053-25W4	14-31-053-25W4	0.01	0	Operating	Natural Gas

Appendix E.4
Ecological Constraints Oil and Gas Facilities Inventory

ISL Engineering and Land Services

Operator	Facility Name	Type	Status
Archean Energy Ltd.	AEL ET AL MORINVILLE 6-24	Crude Oil Single-Well Battery	Suspended
Canadian Cometra, Inc.	CANADIAN MORINVILLE 11-13	Crude Oil Single-Well Battery	Suspended
Cedar Creek Energy Ltd.	PETROBANK MORINV 11-7 BTY	Gas Single-Well Battery	Suspended
Cedar Creek Energy Ltd.	KETCH ET AL MORINVILLE 05-19	Gas Single-Well Battery	Suspended
Imperial Oil Resources Limited	IMPERIAL ST. ALBERT #3 6-1	Gas Single-Well Battery	Suspended
NS Industries Canada Limited	FCE ST. ALBERT BELLY RIVER GAS 14-36	Gas Multiwell Group Battery	Suspended
Obsidian Energy Ltd.	102/15-21-054-25W4/00 - SWB	Gas Single-Well Battery	Suspended
Paramount Resources Ltd.	FLETCHER ST ALBERT 6-1-54-26	Gas Single-Well Battery	Suspended
Paramount Resources Ltd.	FCE ST. ALBERTA SWEET GROUP 15-36	Gas Multiwell Group Battery	Suspended
Redwater Energy Corp.	MONTNEY MORINVILLE 12-12	Gas Multiwell Group Battery	Suspended
Richard J. Churchill Limited	RICHFIELD CAMPBELL 6-22	Gas Single-Well Battery	Suspended
Sinopec Daylight Energy Ltd.	FCE ST ALBERT 6-25 GROUP	Gas Multiwell Effluent Measurement Battery	Suspended
Sinopec Daylight Energy Ltd.	00/14-36-053-26W4 St Albert #1 GMWB	Gas Multiwell Group Battery	Suspended
Sinopec Daylight Energy Ltd.	00/14-36-053-26W4 St Albert #2 GMWB	Gas Multiwell Group Battery	Suspended
Sinopec Daylight Energy Ltd.	00/14-36-053-26W4 St Albert GP	Gas Plant Acid Gas Flaring < 1 T/D Sulphur	Suspended
Sinopec Daylight Energy Ltd.	ST. ALBERT OSTRACOD GAS 14-36	Gas Multiwell Group Battery	Suspended
Sinopec Daylight Energy Ltd.	FLETCHER ST ALBERT SOUR 14-36	Gas Multiwell Group Battery	Suspended
Sinopec Daylight Energy Ltd.	FCF ST.ALBERT SWEET GROUP 14-36	Gas Multiwell Group Battery	Suspended
Sinopec Daylight Energy Ltd.	FCE ST. ALBERT 8-26 GROUP	Gas Multiwell Group Battery	Suspended
Sinopec Daylight Energy Ltd.	AMOCO ST ALBERT-BIG LAKE UNIT 1	Crude Oil Multiwell Proration Battery	Suspended
Sinopec Daylight Energy Ltd.	DYNAMIC ST. ALBERT	Gas Gathering System	Suspended
Sinopec Daylight Energy Ltd.	DYNAMIC ST. ALBERT	Gas Gathering System	Suspended
Sinopec Daylight Energy Ltd.	DYNAMIC ST. ALBERT	Gas Gathering System	Suspended
Sinopec Daylight Energy Ltd.	AMOCO ST ALBERT UNIT 5	Disposal	Suspended
Tervita Corporation	MONTNEY MORINVILLE	Disposal	Suspended
TransGlobe Energy Corporation	ARCH SWB 05-19	Crude Oil Single-Well Battery	Suspended
Trax Petroleums Limited	TRAX MORINVILLE	Crude Oil Single-Well Battery	Suspended
Westhill Resources Limited	WESTHILL CAMAO 15-22	Crude Oil Multiwell Proration Battery	Suspended
Westhill Resources Limited	WESTHILL CAMPBELL NAMAO 6-22	Gas Single-Well Battery	Suspended
Westhill Resources Limited	WESTHILL CAMAO 10-15-54-25	Crude Oil Single-Well Battery	Suspended

THIS PAGE LEFT INTENTIONALLY BLANK