



APPENDIX A

Area Structure Plan Engagement



Round 1

Two Public Information Sessions were held on February 17, 2022, as a part of Round 1 engagement. The sessions were advertised using a variety of techniques including road signs, a postcard mailed out to residents in the region and the Hamlet, newspaper ads, and target invitations emailed from the project team.

A presentation was provided by the VAAMP and ASP project teams to share information regarding the project with a facilitated question and answer period to close the session. The sessions were attended by a total of 46 attendees that included members of the public, stakeholders and industry representatives.

In addition to the formal Public Information Sessions, County staff held two Call-a-Planner Sessions on February 22nd and March 1st, 2022. The purpose of the Call-a-Planner Sessions was to have the opportunity for the public to ask questions directly to the County project team.

Round 2

Two Public Information Sessions were held on May 2, 2022 for Round 2 engagement. The sessions were advertised using a variety of techniques including road signs, a monthly 'Takes Flight' email newsletter, newspaper ads, and target invitations emailed from the project team.

A presentation was provided by the ASP project team to share information regarding the project with a facilitated question and answer period to close the session. The presentation included considerations for planning near an airport, the ASP structure, and next steps in the ASP review process. The sessions were well attended by members of the public, stakeholders, and industry representatives.

To supplement the formal Public Information Sessions, County staff held one Call-a-Planner session on May 5, 2022. In addition to the public events hosted by the County, County staff held a series of one on one meetings with area landowners and industry representatives to listen to their thoughts on the ASP, address concerns, and answer questions.

Prior to the Public Hearing, the draft ASP was circulated to the public for comment. The Public Hearing was held in July 2022, where County staff was available to answer questions and respond to any concerns regarding the draft.



APPENDIX B

Agricultural Impact Assessment

Agricultural Impact Assessment

Villeneuve Airport Area Area Structure Plan

Prepared For

Sturgeon County
& Dillon Consulting Ltd.

Prepared By

Serecon Inc.

May 2022



serecon

May 25th, 2022

Dillon Consulting Ltd.
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RE: AGRICULTURAL IMPACT ASSESSMENT: VILLENEUVE AIRPORT AREA – AREA STRUCTURE PLAN

Please find attached our review of the agricultural impact of development of the Villeneuve Airport Area Development Plan. We have reviewed the potential for conflict of new development with agricultural uses and outlined the anticipated impact on the agricultural community.

We would be pleased to provide further data or clarification of details after your review of this draft agricultural impact assessment.

Yours truly,
SERECON INC.



Markus Weber
B.Sc.Ag, MBA, LL.B., P.Ag.

Enclosure

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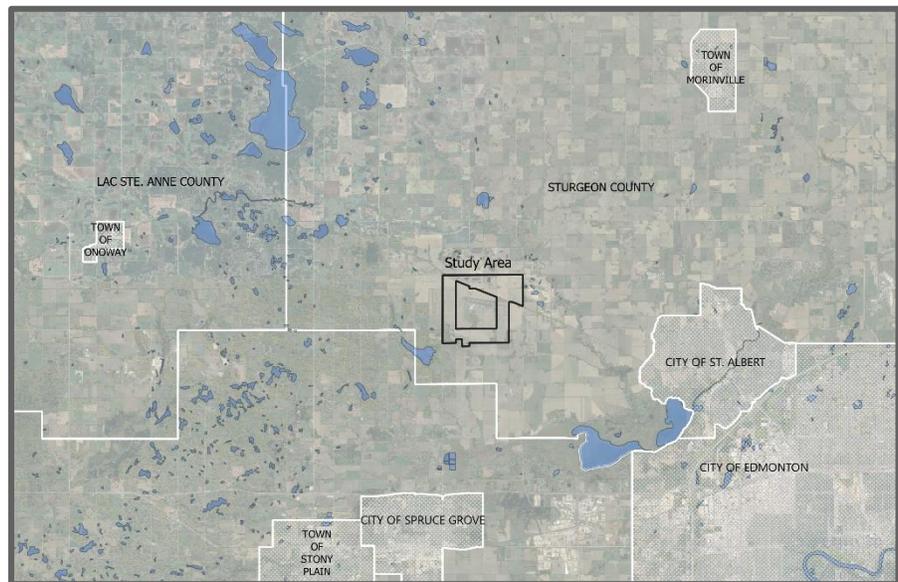
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1.0 Introduction

1.1 Location

This agricultural impact assessment has been prepared for the area currently being described as “Villeneuve Airport Area” and outlined below. The area is in the southwest part of Sturgeon County, immediately north of Spruce Grove and west of St. Albert. This area is referred to simply as the subject area, the ASP, or as VAA (Villeneuve Airport Area) throughout this report.

Figure 1: General Location of VAA - Area Structure Plan



The subject area is located west of Highway 44, south of Township Road 544, east of Range Road 272, and bisected within the southern portion by Secondary Highway 633.

The area includes lands primarily designated as Agriculture General and Resource Extraction, with minor Environmental Preservation and Primary Industry Support. The County Planning documents, and the designations applied within the subject area will be further discussed in Section 2.0 of this report.

1.2 Scope of the AIA

We were retained to produce this Agricultural Impact Assessment (AIA) to assess the impact of development in the study area on agricultural production in the region. Since Sturgeon County does not have specific requirements for an AIA, we have based our analysis on other agricultural impact assessments for area structure plans completed in other municipalities in the Edmonton region. We have therefore assumed that the minimum requirements for an AIA include the following:

1. Review of land use planning documents
2. Size, configuration, and accessibility of parcels

3. Soil analysis, drainage
4. Soil maps
5. Suitability of proposed concept
6. Inventory of current property
7. Impacts on current and neighbouring lands:
 - i. Fragmentation and conversion
 - ii. Impact on agricultural lands
 - iii. Loss of agricultural services
8. Final summary, including recommendations on mitigation or qualifications

An Agricultural Impact Assessment may on some occasions also require other professionally prepared reports upon request by certain parties, including biophysical, geotechnical, hydrogeological, environmental, floodplain, or servicing studies. However, under the circumstances of the current stage of development and consideration of the overall area structure plan, none of these additional reports should be required in the context of an AIA for the VAA. The assessment was conducted without accessing the said lands directly, but rather based on existing knowledge and information.

2.0 Existing Planning Documents

2.1 Sturgeon County

The following section will outline the implications of current planning documents and bylaws on the subject area. **Error! Reference source not found.** shows current designations from various Sturgeon County land use policies. Note that relevant inter-municipal policies are discussed in Section 2.2. These planning documents and policies are each a part of establishing and realizing the overall vision and strategy for the region.

Table 1: Sturgeon County Land Use Policy Documents

Policy	Subject Designation(s)
Land Use Bylaw	Agriculture General, Environmental Preservation, Rural Industry Support, Resource Extraction
Municipal Development Plan	Neighbourhood 'E'
Strategic Plan	County-wide strategy document, no designations

Land Use Bylaw

The Land Use Bylaw (LUB) is the most specific of the land use planning documents and is used to implement the vision of the broader planning documents through specific land districts or zones with certain regulations for appropriate land uses.

Most of the land within the subject area is zoned as AG (Agriculture General), with RE (Resource Extraction) being the second most common district.

The purpose of the Agriculture General district is to accommodate traditional agricultural operations and the supportive services that are essential to grow and sustain the agricultural industry. This includes limited residential and home-based businesses tied-into or compatible with the agricultural industry.

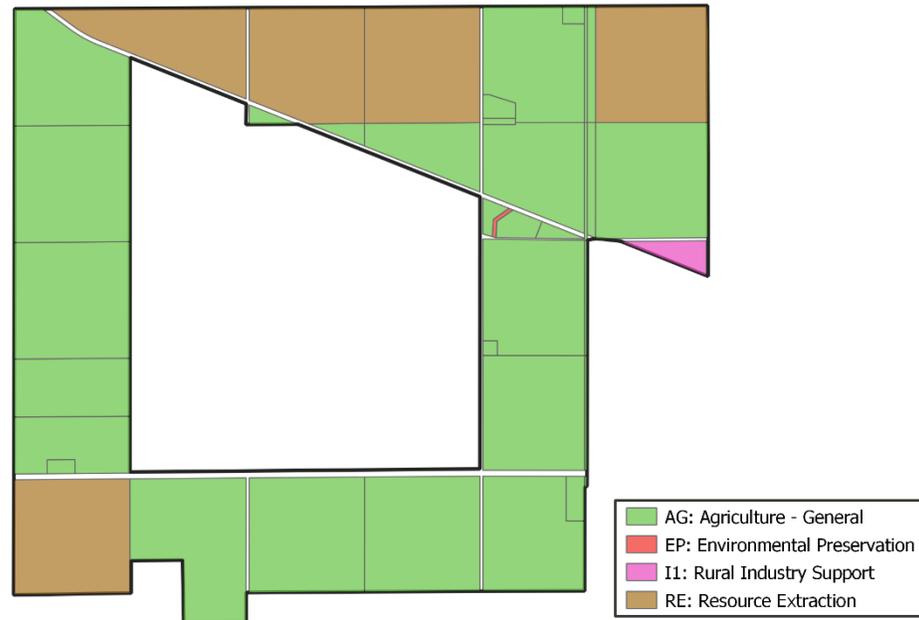
The purpose of the Resource Extraction district is to provide for the extraction, processing and stockpiling of on-site natural resources on lands. These areas are assumed to be redistricted to the appropriate use following complete reclamation.

Rural Industry Support districted lands are intended to provide for land uses of a rural context that support the County's primary industries (Agriculture and Resource Extraction) by providing value-added activities through the processing or distribution of materials derived from the agriculture or natural resource sectors.

Environmental Preservation districted lands are intended to protect and preserve environmentally sensitive lands.

There are notably, no parcels within the subject area zoned as Country Residential or Country Estate Residential.

Figure 2: Land Use Bylaw (2017) Land Use Districts for Villeneuve Airport ASP



Municipal
Development Plan

The Municipal Development Plan (MDP) is a county level plan used to strategize development and plan for the coordinated future needs and vision for the County. The underpinning objectives to the Sturgeon County's Integrated Regional Growth Strategy within its MDP are as follows:

- Sustainable Growth
- An Industrial and Agricultural Leader
- A Regional Partner: Influence on a Regional Scale
- Understanding the Public's Needs
- Consistency in Decision Making: Incorporating Strategic Thinking

The subject area is designated within the Neighbourhood E, with the affixed distinctive role *to shape and establish self-reliant, multi-faceted communities, by building on the inherent local conditions and recognizing the diverse range of opportunities*¹.

Strategic Plan

The County Council has adopted a new Strategic Plan for 2022 to 2025 at the end of 2021, which is supported with a set of guiding principles linked with desired community outcomes. Five community outcomes serve as goal statements for the organization, with corresponding strategic priorities. These outcomes are intended

¹ Sturgeon County Municipal Development Plan. 2014. pp 92.

to guide strategic decision making by the municipality to ensure that the County is continuously evolving in an intentional way. The five Community Outcomes are as follows:

- Planned Growth
- Thriving Communities
- Collaborative Governance
- Environmental stewardship
- Operational Excellence

2.2 Edmonton Metropolitan Region

Regional Growth Plan

Sturgeon County is a prominent member of the Edmonton Metropolitan Region Board (EMRB) and there are several EMRB strategy documents whose scope covers the subject area. These documents will be discussed and considered in connection with the County documents outlined previously.

The Edmonton Metropolitan Region Board Growth Plan (Growth Plan) is a multifaceted policy framework document with several guiding principals to be used to steer local governing bodies towards making development policies which are coherent within the region and enhance the effectiveness of individual municipalities' efforts.

The Growth Plan has been read as being an important strategy document, but it is recognized that it is broader in scope than local municipality documents and it may not fully reflect the nuance of a particular local area or specifically address individual areas the way a land use bylaw would. For this reason, we have listed all of the policy areas within the Growth Plan and the specific objectives on the policy areas deemed more relevant to the subject area for the purposes of this Agricultural Impact Assessment.

Key Growth Plan policies and principles are outlined to contextualize the intention of the growth plan with respect to the subject area.

Policy Area 1: Economic Competitiveness and Employment

Guiding Principle: Promote global economic competitiveness and regional prosperity.

Policy Area 2: Natural Living Systems

Guiding Principle: Protect natural living systems and environmental assets

Policy Area 3: Communities and Housing

Guiding Principle: Recognize and celebrate the diversity of communities and promote an excellent quality of life across the Region

Policy Area 4: Integration of Land Use and Infrastructure

Guiding Principle: Achieve compact growth that optimizes infrastructure investment

Objectives:

1. Establish a compact and contiguous development pattern to accommodate employment and population growth
2. Enable growth within built-up urban areas to optimize existing infrastructure and minimize the expansion of the development footprint
3. Plan and develop greenfield areas in an orderly and phased manner to contribute to complete communities
4. Plan for and accommodate rural growth in appropriate locations with sustainable levels of local servicing
5. Plan for and develop mixed use and higher density centres as areas to accommodate population and job growth
6. Prioritize investment and funding of regional infrastructure to support planned growth
7. Ensure compatible land use patterns to minimize risks to public safety and health

Policy Area 5: Transportation Systems

Guiding Principle: Ensure effective regional mobility

Policy Area 6: Agriculture

Guiding principle: Ensure the wise management of prime agricultural resources

Objectives:

1. Identify and conserve an adequate supply of prime agricultural lands to provide a secure local food source for future generations
2. Minimize the fragmentation and conversion of prime agricultural lands for non-agricultural uses
3. Promote diversification and value-added agriculture production and plan infrastructure to support the agricultural sector and regional food system

The policies, principles, and objectives of the Growth Plan generally indicate that agricultural lands and uses should be managed wisely to ensure an adequate supply of productive land remains into the future. Soil quality and productivity tend to be the emphases for priority of preservation with secondary considerations for socioeconomic and cultural values.

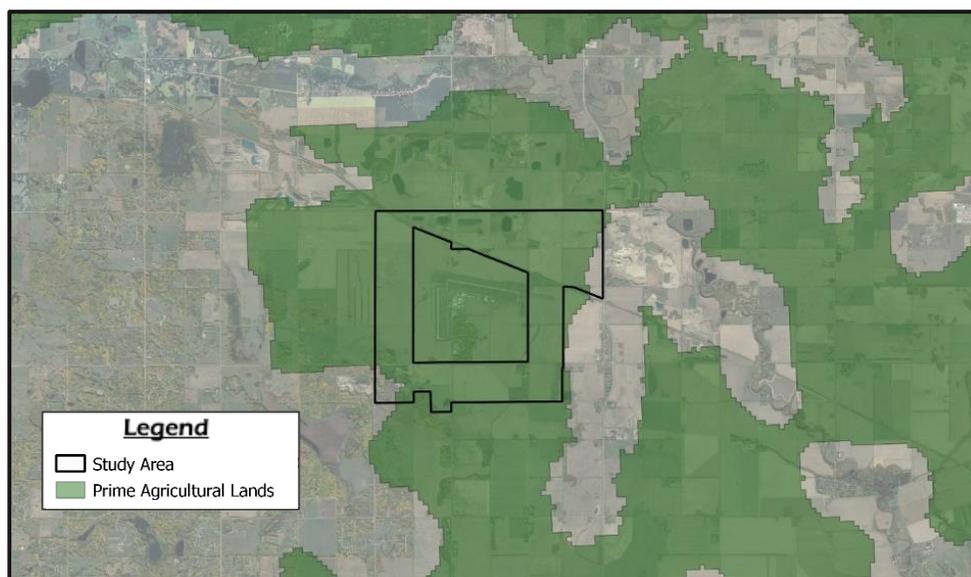
The subject area falls within RAMP's Policy Area 2 which has the explicit intention of *Agriculture Co-existing with other Land Uses*. This policy area has the goal of *cultivation of productive agricultural areas over the long-term that co-exist with lands with other designated uses*.

The following 5 policies are specified for lands within RAMP's Policy Area 2:

1. *Agricultural lands co-exist with existing designated land uses and shall remain in agricultural use until required for conversion.*
 2. *Reclaimed lands should be rehabilitated for agriculture uses. Where it may be more appropriate, reclaimed lands may be rehabilitated for environmental or ecological purposes, or for commercial, industrial, institutional or recreational uses that can leverage existing infrastructure.*
 3. *When applications are made to re-designate and/or re-district non-agricultural lands, consideration must be given to re-designating and/or re-districting the lands for agricultural uses.*
 4. *Agriculture related and value-added agriculture uses may be considered but must not hinder the operation of agricultural uses in the surrounding area, nor hinder the development of a designated non-agricultural use.*
 5. *Existing agricultural uses shall be given consideration to be kept as an existing land use within statutory plans.*
6. *Encourage public education about the daily and seasonal operational needs of agriculture and agricultural operators, fostering awareness, understanding, and reducing potential land use conflicts.*

RAMP also identified prime agricultural lands in all Policy Areas using a Land Evaluation Site Assessment (LESA) model which considered soil quality, agricultural land density, and proximity to existing urban development. Nearly all of the land within the subject area was identified as prime agricultural lands (Figure 3).

Figure 3: LESA-Identified Prime Agricultural Land and the Subject Area



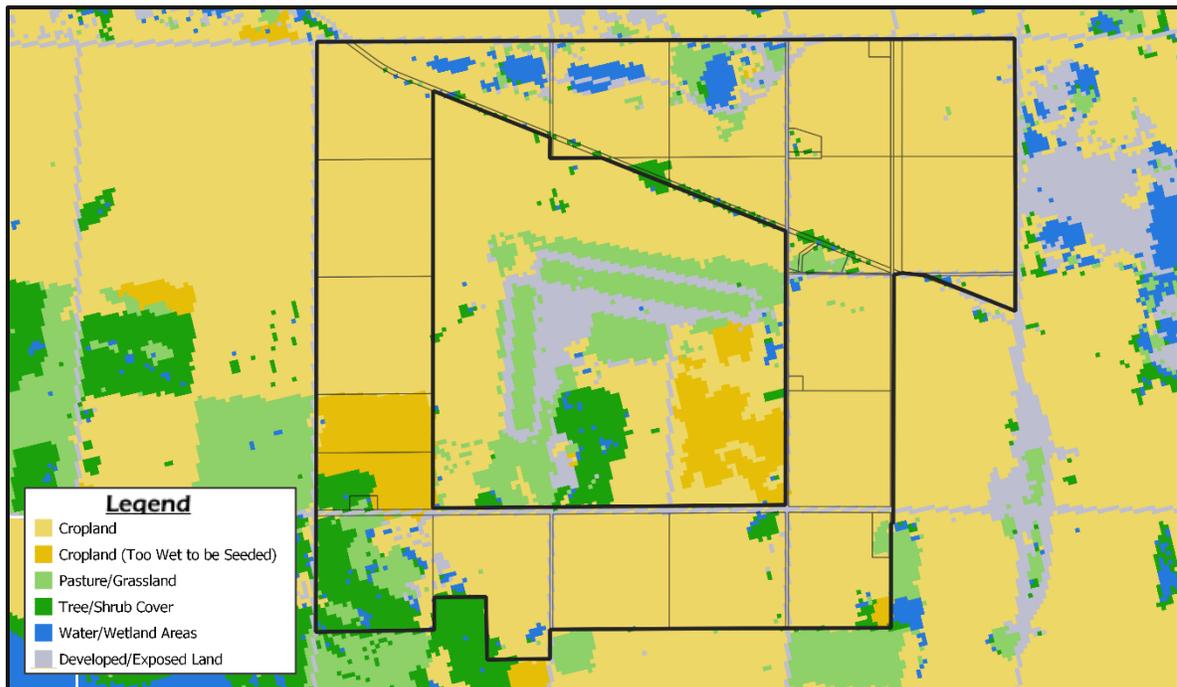
3.0 Area Description

3.1 Regional Influences

Current Land Use

Currently, there are two primary land uses within the subject area. Figure 4 shows remote sensing derived land uses from 2020. The remote sensing dataset is from Agriculture and Agri-Food Canada's Annual Crop Inventory. The thin black parcel boundaries indicate all parcels within the study area. This parcel dataset has been provided to us by the County.

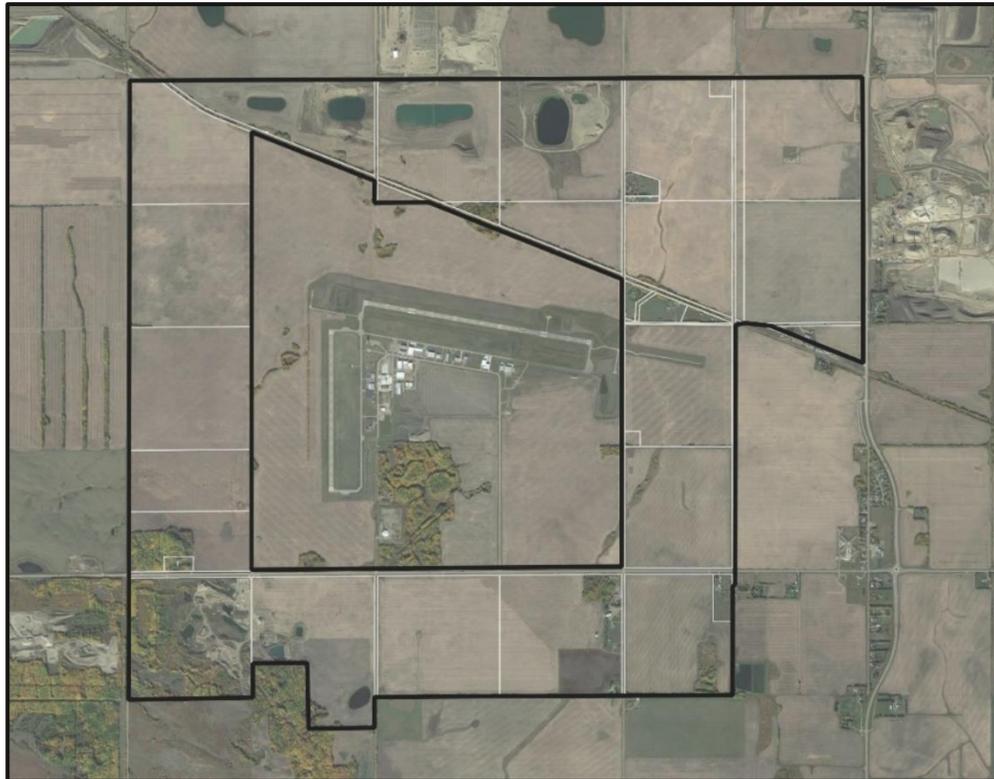
Figure 4: Remote Sensing-based Agricultural Crop Inventory and Parcels (2020)



As seen in Figure 4 above, annual crop production is the dominant land use within the subject area with exception only for aggregate mines in the north and southwest portions. These are indicated with a mixture of exposed and wetland areas which represent both active and inactive, un-reclaimed sites.

The aerial imagery seen in Figure 5 displays a visual of the land use pattern noted above. Visual imagery confirms that the northern aggregate mines are mostly inactive and agricultural operations are partially utilizing the lands surrounding the residual wetlands. The aggregate mine in the southwest is shown to be active.

Figure 5: Aerial Imagery and 2020 Parcel Boundaries



Landcover and Land Use Trends

The subject area is characterized and encircled by extensive agricultural land uses, however it is situated near the edge of the broader regional agricultural land base. It is punctuated by and adjacent to a concentrated centre of gravel mining sites and bordered to the west by a significant concentration of country residential properties. The density of gravel deposits and existing aggregate processing infrastructure has resulted in the strongest agricultural conversion pressure.

Figures 4 and 5 provide land use information for a single point in time, providing a view of the current agricultural land uses. Land use decisions are however inherently intertemporal and so it is important to also review the trends in land use for an accurate assessment of the state of agricultural use.

Land use trends are assessed by comparing remote sensing landcover data from 2000 (Figure 6) to the 2020 landcover data in Figure 4. The data for 2000 classified forage production within the annual crop land use category, and so it is best to compare the total agricultural landcovers from each year.

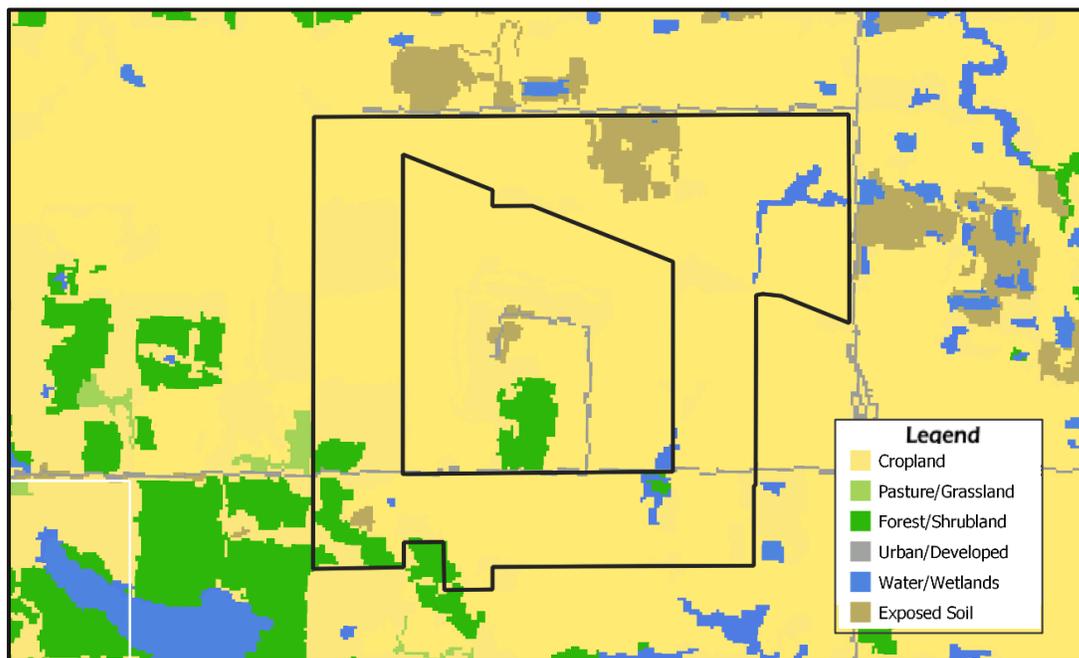
From 2000 to 2020, as shown in Table 2, the total agricultural land use decreased by 3% or 70 acres. This change appears to correspond to an increase in wetlands and tree/shrub cover. Upon reviewing areas of wetland addition, these are found to correspond with the filling of aggregate pits. There is also notably a loss of wetland area in the northeast of the subject area which is likely a result of enhanced drainage efforts.

Despite strong residential and commercial development pressure in the broader region, there was no increase in developed land during this time period. This indicates that there has to this point not been strong development pressure.

Table 2: Land Use Trends within Subject Area

Landcover	2000 Acres	2020 Acres	2000-20 Change
Developed/Exposed	133	133	- acres (no change)
Water/Wetlands	49	82	+33 acres (67% increase)
Tree/Shrub cover	101	138	+37 acres (37% increase)
Pasture/Grassland	1	108	+107 acres (10,700% increase)
Annual Crops	2622	2445	-177 acres (7% decrease)
Agricultural Use	2623	2553	-70 acres (3% decrease)

Figure 6: Remote Sensing Landcover Data (2000)²



Access and
Transportation

The primary accesses to the subject area are Highway 44, which partially borders the subject area to the east, and Secondary Highway 633, which bisects the subject area. Additionally, access to the northern and western component of the subject area are available from the intersecting Township Road 544 and Range Road 272. The

² Both Figure 3 and Figure 5 were obtained from Agriculture & Agri-food Canada's *Annual Crop Inventory* dataset.

highways and access road (Range Road 270A) to the Villeneuve Airport are paved, with the rest currently affording gravel access. The approximate driving distances and times to nearby communities are shown in the table below.

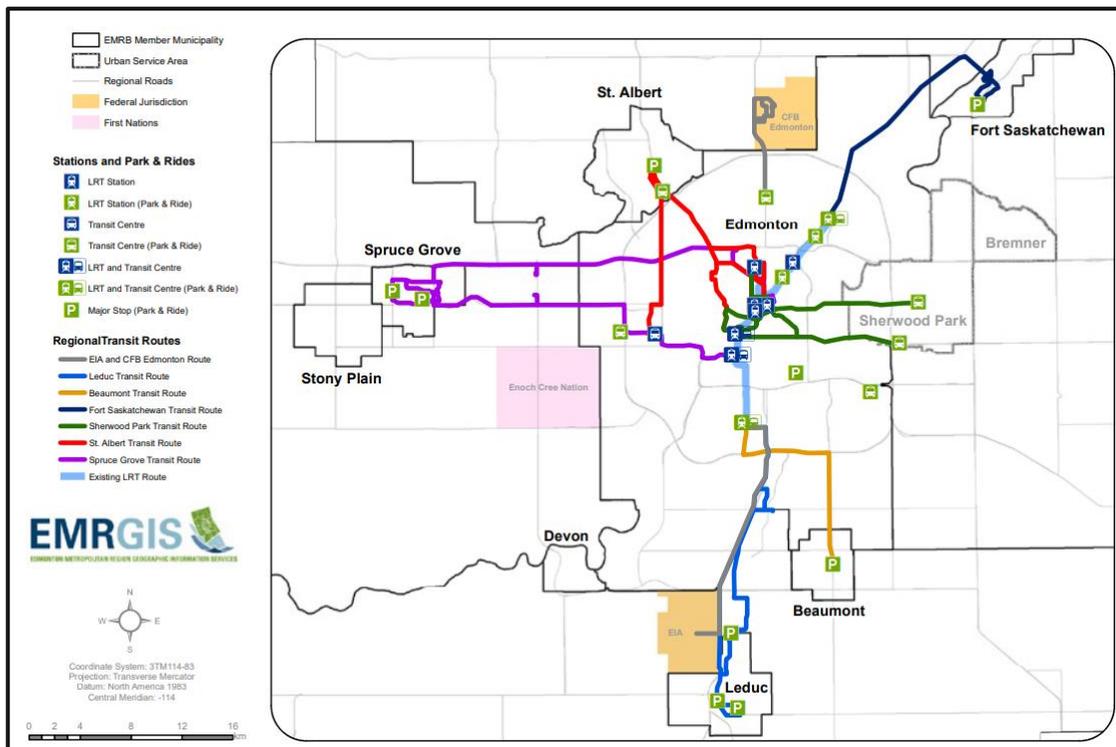
Table 3: Estimated Driving Distances within Region

Community	Approx. Distance	Approx. Time
St. Albert	15 km	15 min
Acheson	15 km	15 min
Spruce Grove	15 km	15 min
North Edmonton (Hwy216)	25 km	20 min
Morinville	35 km	25 min

While the above table is approximate in times and distances, it shows the accessibility of the subject area to nearby communities and indicates a high potential for businesses within the subject area to attract workers residing in regional communities and the cost-effective procurement of services from regional businesses.

Public transportation within the region is shown in Figure 7 below, retrieved from the EMRB Servicing Plan Report. The ASP currently does not have any hamlets within it and under these circumstances, one would not expect any direct public transportation opportunities within the region. This means that the infrastructure which might otherwise impair agricultural traffic would not be expected to be an issue in this area either currently or with the envisioned future development.

Figure 7: Regional Transit Routes



Business and
Economic Influences

There is only one apparent agri-business within the subject area, but many small to medium-sized local businesses within the broad surrounding area. Businesses within the agricultural sector or who serve the agriculture sector include:

- Apiary
- Butcher and custom meat packing/wrapping
- Commercial/custom transport services
- Dairy production
- Electrical services
- Equine boarding and training facilities
- Equipment and automotive repair services
- Excavation services
- Farm Equipment Sales
- Fertilizer Distributors
- General contracting and construction
- Grain farming
- Grain Elevators
- Greenhouse Facility
- Horticultural Operations
- Intensive Livestock Operations

It should be noted that with the exception of a grain farm, none of these businesses listed above are based out of the subject area. Therefore, the following discussion on the potential impact will focus on indirect impacts as opposed to direct impacts of development.

Many of the businesses listed above would draw clientele from multiple sectors and not only from the agricultural industry. In addition, the specialized nature of these businesses would require them to draw from a relatively large geographic area (much larger than that of the subject area, including areas well beyond Sturgeon County's boundaries).

Considering these factors, it is unlikely that a conversion of subject lands from agriculture to commercial development would have a noticeable impact on these businesses.

If the entire subject area was eventually converted out of agricultural use, agri-businesses that supply inputs would likely face relatively small decreases in business volumes. Input providers typically supply large regions and so the loss of the subject area would not have a large negative impact on these regional agribusinesses.

Subject Area Agri-
businesses

A grain farm is the only agri-business that appears to base their operations within the subject area. It is assumed also that one or more other agricultural operations based outside of the subject area actively crop portions of the area.

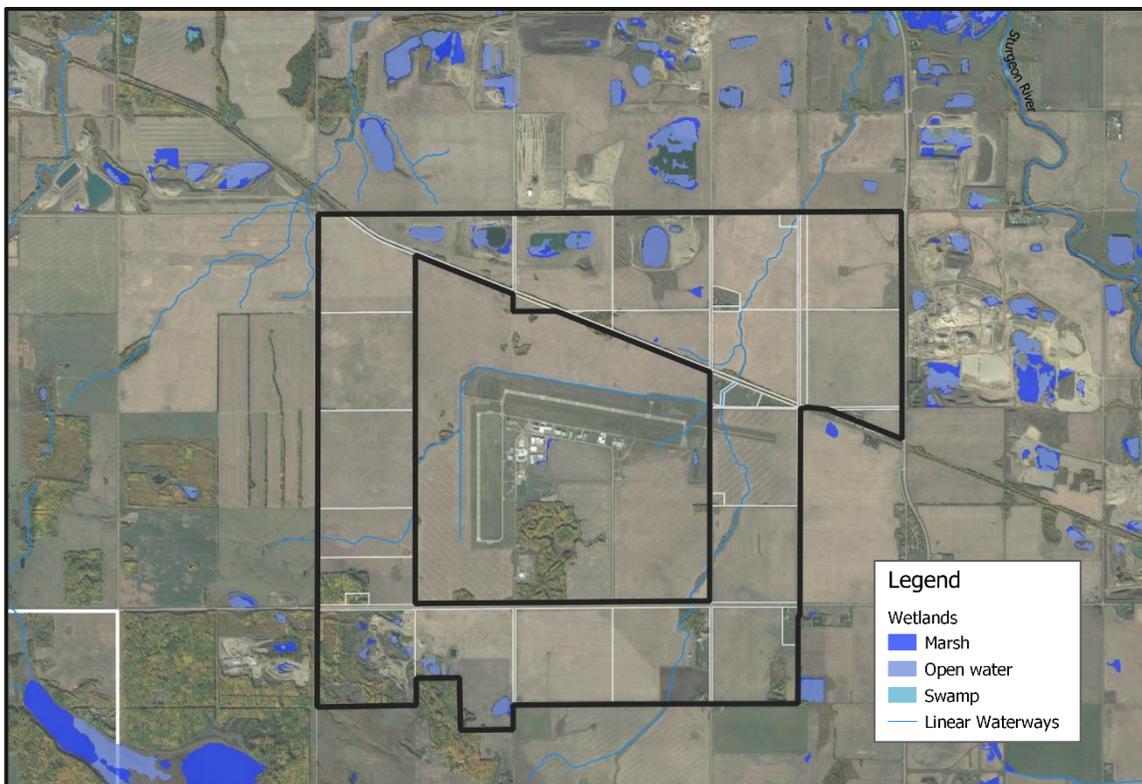
3.2 Physical Features

The aim of this section is to provide an overview of the predominant physical features of the subject area. As physical features inherently influence a region there is some overlap in concepts of this section and the previous section Regional Influences (3.1). These sections are meant to be taken into consideration together in providing an overall summary of the subject and surrounding area.

Topography and Drainage

Generally, land within the subject area is gently undulating with limited pockets of riparian and natural treed areas as well as shelterbelts. The exceptions within the subject area are the inactive aggregate mines in the northern portion and the hummocky non-agricultural land in the southwest corner. The Canadian System of Soil Classification (CSSC) describes the subject area's terrain as "gently undulating". Figure 8 outlines the waterways and wetland areas within the subject area. The drainage paths are ephemeral and integrated with formed drainage for the Villeneuve Airport. This drainage tracks to the northeast, where it enters the Sturgeon River.

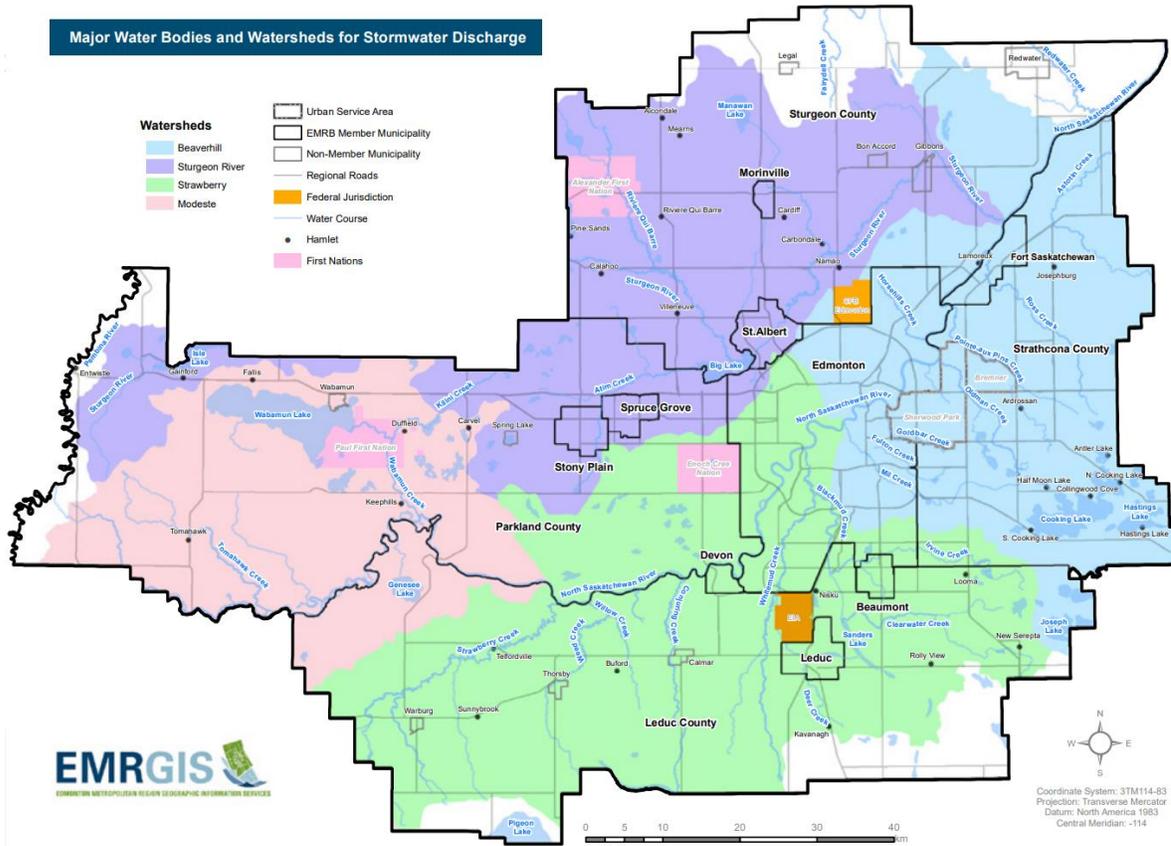
Figure 8: Waterways and Wetland Areas



CSSC classifies the area’s dominant drainage as ranging from well to moderately well. This classification applies to approximately 90% of the surface area within the particular classification region.

The subject area is within the Sturgeon River sub watershed of the North Saskatchewan River Watershed. A regional watershed map from EMRGIS is shown in the map below.

Figure 9: Regional Watersheds



Soil Productivity
Ratings

Soil can be classified and rated using multiple metrics. The Canadian System of Soil Classification (CSSC) and the Land Suitability Rating System (LSRS) classifications for the subject area will be discussed in this section.

Canadian System of
Soil Classifications

The following description of the Canadian System of Soil Classification was retrieved from the Canadian Society of Soil Science.

In a given area over the period of soil formation, environmental conditions cause a certain set of soil processes to occur, which leads to a distinctive set of soil horizons at the time we observe the soil. These soil horizons are the basis for classifying the soil in the Canadian System of Soil Classification. The Canadian System is a rigorous taxonomic system (taxonomy is the science of classification). The System is a comprehensive method for assigning pedons to the soil classes; if the system is correctly used, a pedon can only be assigned to one specific class. The System is also a hierarchical system: each group occupies a distinct position within the overall system. The major levels used in the classification include: Order, Great Group, and Subgroup.

The first level of categorization within the system is the Order. Which Order a given pedon is assigned to is based on properties of the pedon that reflect the nature of the overall soil environment and the effects of the dominant soil-forming process. There are ten Orders in the Canadian System of Soil Classification (shown in **Error! Reference source not found.**). The system has changed through time, and the last major addition to the system occurred in 1996, when the Vertisolic Order was added to the system.

Table 4: : Soil Orders of Canada Descriptions⁷

Order	Diagnostic Horizon	Comments
Chernozemic	Ah, Ap, Ahe	A grassland soil whose diagnostic horizon is formed by high levels of organic matter additions from the roots of grasses.
Solonetzic	Bn or Bnt	A grassland soil with high sodium levels in the B horizon; usually associated with a clay-rich B horizon and often with saline C horizon material.
Podzolic	Bf or Bh	A forest soil normally associated with coniferous vegetation on igneous-rock derived parent materials. High acidity in the A horizon results in formation of a bleached Ae horizon and deposition of iron and aluminum in the B horizon.
Luviosolic	Bt	A forest soil found in areas with parent materials derived from sedimentary rocks. Dominant process is eluviation of clay from the Ae horizon and its deposition in the Bt horizon.
Brunisolic	Bm	A forest soil whose properties are not strongly enough developed to meet the criteria for the Luviosolic or Podzolic Orders.

Gleysolic	Bg, Cg	Found throughout Canada wherever temporary or permanent water saturation cause formation of gleyed features in the profile.
Regosolic	No B horizon	Found throughout Canada wherever pedogenic conditions prevent the formation of B horizons (unstable slopes, sand dunes, floodplains etc.).
Vertisolic	Bss, or Css and Bv	Associated with high clay glacio-lacustrine landscapes; characterized by shrinking and swelling of clays.
Cryosolic	By, Cy, Cz	A soil of arctic and tundra regions; characterized by presence of permafrost.
Organic	O horizon	Organic soils are associated with the accumulation of organic materials (peat) in water-saturated conditions. They are most commonly associated with Boreal Forest soils.

Great Groups are sub-divisions of each Order. The Great Groups reflect differences in the strengths of the major processes or a major contribution of a process in addition to the major one. For example, if someone describes a Prairie soil as a Dark Brown Chernozem, the Order is Chernozemic (i.e., soils with rich topsoil that developed under grassland vegetation) and the Great Group is Dark Brown, which refers to the surface colour of the soil and reflects an intermediate level of soil organic matter (SOM) additions relative to the lower SOM levels to the south and the higher SOM levels to the north.

Subgroups are subdivisions of Great Groups. They are differentiated on: how closely they correspond to the central concept of the Great Group; intergrading towards soils of another Order; or additional special features within the profile. For example, an Orthic Dark Brown Chernozem reflects the central concept of the Dark Brown Great Group within the Chernozemic Order. In contrast, an Eluviated Dark Brown Chernozem has evidence of translocation of materials between horizons via eluviation and illuviation but does not meet the classification criteria of the Luvisolic Order.³

The subject lands are with the exception of the Luvisolic southwest corner, within the Chernozemic soil order, in the Black Chernozem Great Group. Soil polygon descriptions within the subject area include the following landform model classifications:

- **H1m – Hummocky stagnation moraine – Moderate relief;**
- **U1l -Undulating – Low relief; and**
- **U1h – Undulating – High relief .**

Land Suitability Rating System (LSRS) soil ratings in the subject area are listed as:

- 100% Class 2HT in the **H1m** area,
- 60% Class 2H, 20% Class 4, and 20% Class 5W in the **U1l** area, and
- 80% Class 2H and 20% Class 5W; and 100% Class 2H within the **U1h** areas.

³ Canadian Society of Soil Science, Soils of Canada. soilsofcanada.ca

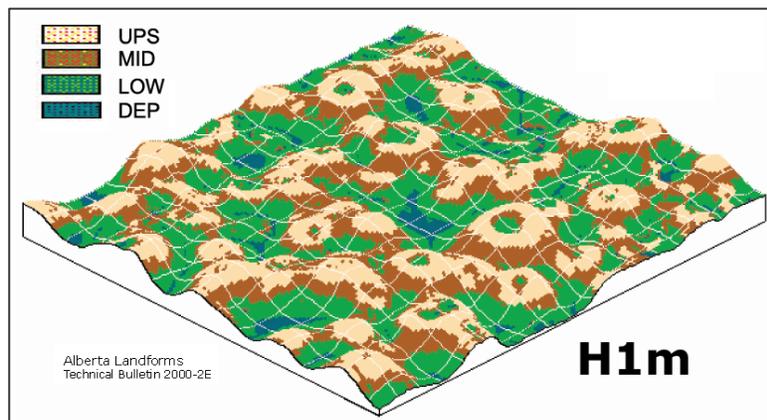
These classifications are described below. Descriptions and accompanying figures have been obtained through the Alberta Soils Information Viewer.⁴

H1m: Orthic and Dark Gray Luvisol that includes soils that are coarser textured than the dominant or co-dominant soils. A limiting slope of 9%.

Figure 10: Example Image of H1m Landforms



Figure 11: Landform Model of U1l Lands



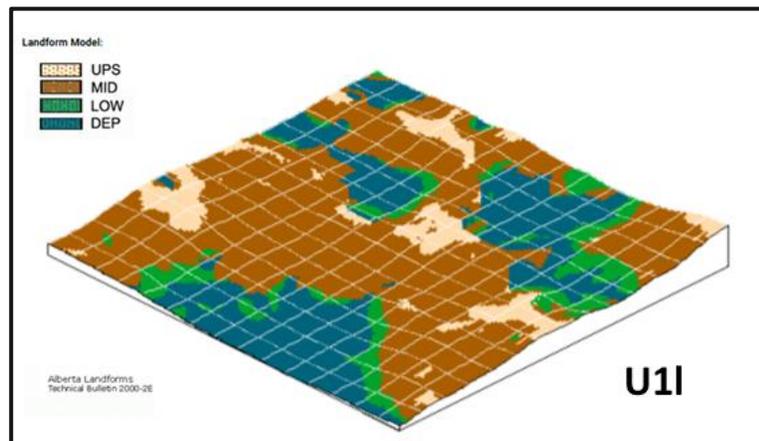
⁴ Alberta Agriculture and Forestry, Alberta Soils Information Viewer. soil.agric.gov.ab.ca/agrasidviewer/

U1i: Eluviated Black Chernozem on fine textured materials water-laid sediments. Undulating, low relief landform with a limiting slope of 2%.

Figure 12: Example Image of U1i Landforms



Figure 13: Landform Model of U1i Lands

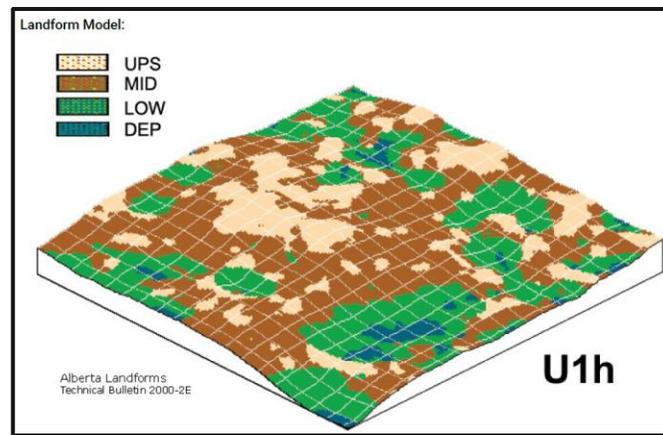


U1h: Eluviated Black Chernozem on fine textured materials water-laid sediments. Undulating, high relief landform with a limiting slope of 4%.

Figure 14: Example Image of U1h Landform



Figure 15: Landform Model U1h Lands



Land Suitability
Rating System –
Suitability for Small
Grains

Land Suitability Rating System maps detail the soil types in different regions and rate them based on their suitability for agricultural use, using the following classes and subclasses.⁵

Class 1 – there are no Class1 soils in Alberta due to climactic limitations (heat units)

Class 2 land has slight limitations that may restrict the growth of the specified crops or require modified management practices.

Class 3 land has moderate limitations that restrict growth of the specified crops or require special management practices.

Class 4 land has severe limitations that restrict the growth of the specified crops or require special management practices or both. This class is marginal for sustained production of the specified crops.

Class 5 land has very severe limitations for sustained production of the specified crops. Annual cultivation using common cropping practices is not recommended.

Class 6 land has extremely severe limitations for sustained production of the specified crops. Annual cultivation is not recommended even on an occasional basis.

Class 7 land is not suitable for the production of the specified crops.

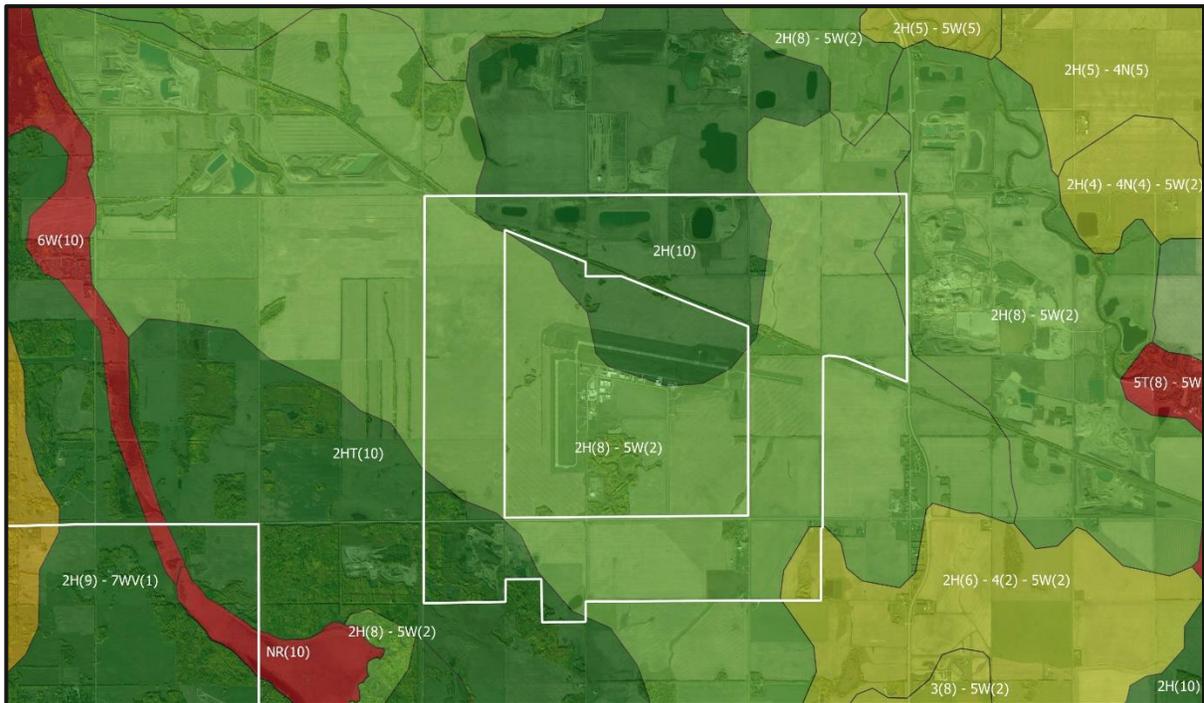
The subclasses are based on the kinds of limitations as outlined in Figure 16.

⁵ Government of Canada, Land Suitability Rating System for Agricultural Crops 1. Spring-seeded small grains. 1995. <https://sis.agr.gc.ca/cansis/publications/manuals/1995-lsrs/lrs.pdf>

Figure 16:LSRS Sub-Class Limitation Descriptions

Land Suitability Rating System Restrictions and Limitations			
General Restriction	Subclass	Code	Limitation
C – CLIMATE	Temperature	H	Inadequate heat units for the optimal growth.
	Moisture	A	Inadequate moisture for the optimal growth.
S – SOIL	Water holding capacity/texture	M	Crops are adversely affected by lack of water due to inherent soil characteristics.
	Soil structure	D	Crops are adversely affected either by soil structure that limits the depth of rooting, or by surface crusting that limits the emergence of shoots.
	Organic matter	F	Mineral soil with a low organic matter content in the Ap or Ah horizon.
	Depth of topsoil	E	Mineral soil with a thin Ap or Ah horizon.
	Soil reaction	V	Soils with a pH value either too high or too low for optimal growth.
	Salinity	N	Soils with amounts of soluble salts sufficient to have an adverse effect on growth.
	Sodicity	Y	Soils having amounts of exchangeable sodium sufficient to have an adverse effect on soil structure and/or growth.
	Organic surface	O	Mineral soils having a peaty surface layer up to 40 cm thick.
	Drainage	W	Soils in which excess water (not due to inundation) limits the production.
	Organic soil temperature	Z	Additional temperature limitation associated with organic soils.
	Rock	R	Soils having bedrock sufficiently close to the surface to have an adverse effect on production.
	Degree of decomposition or fibre content	B	Organic soils in which the degree of decomposition of the organic material is not optimum for production.
	Depth and substrate	G	Shallow organic soils with underlying material that is not optimum for production.
L – LANDSCAPE	Slope	T	Landscapes with slopes steep enough to incur a risk of water erosion or to limit production.
	Landscape pattern	K	Land areas with strongly contrasting soils and/or non-arable obstacles that limit production or substantially impact management practices.
	Stoniness and coarse fragments	P	Land that is sufficiently stony or gravelly so as to hinder tillage or limit production.
	Wood content	J	Organic soils with a content of wood or of <i>Eriophorum sp.</i> sufficient to limit production.
	Inundation	I	Land areas subject to inundation or flooding that limits production.

The location of the subject area is outlined on the Land Suitability Rating System map in Figure 17. The LSRS soil capability ratings within the subject area are generally equally or slightly more productive than those in other areas of the County. The ratings and proportions for the VAA subject lands are listed in Table 5: LSRS Ratings for VAA.

Figure 17: Land Suitability Rating System (LSRS) Ratings for VAA Area and Region

Table 5: LSRS Ratings for VAA Area

Percentage of Subject Area	LSRS Soil Class
69.3%	80% Class 2H, 20% Class 5W
19.8%	100% Class 2H
9.0%	100% Class 2HT
1.9%	60% Class 2H, 20% Class 4, 20% Class 5W

Current Land Uses

Annual cropland is currently the dominant agricultural land use with 90% coverage of the subject area. Developed/Exposed land covers 5% of the subject area and consist of aggregate mine sites, linear infrastructure (roads), and one instance of farm buildings or structures. In addition, there are some natural riparian, treed areas, and wetlands covering the remaining 5% of the subject area.

This section examines existing development and agricultural uses in more detail.

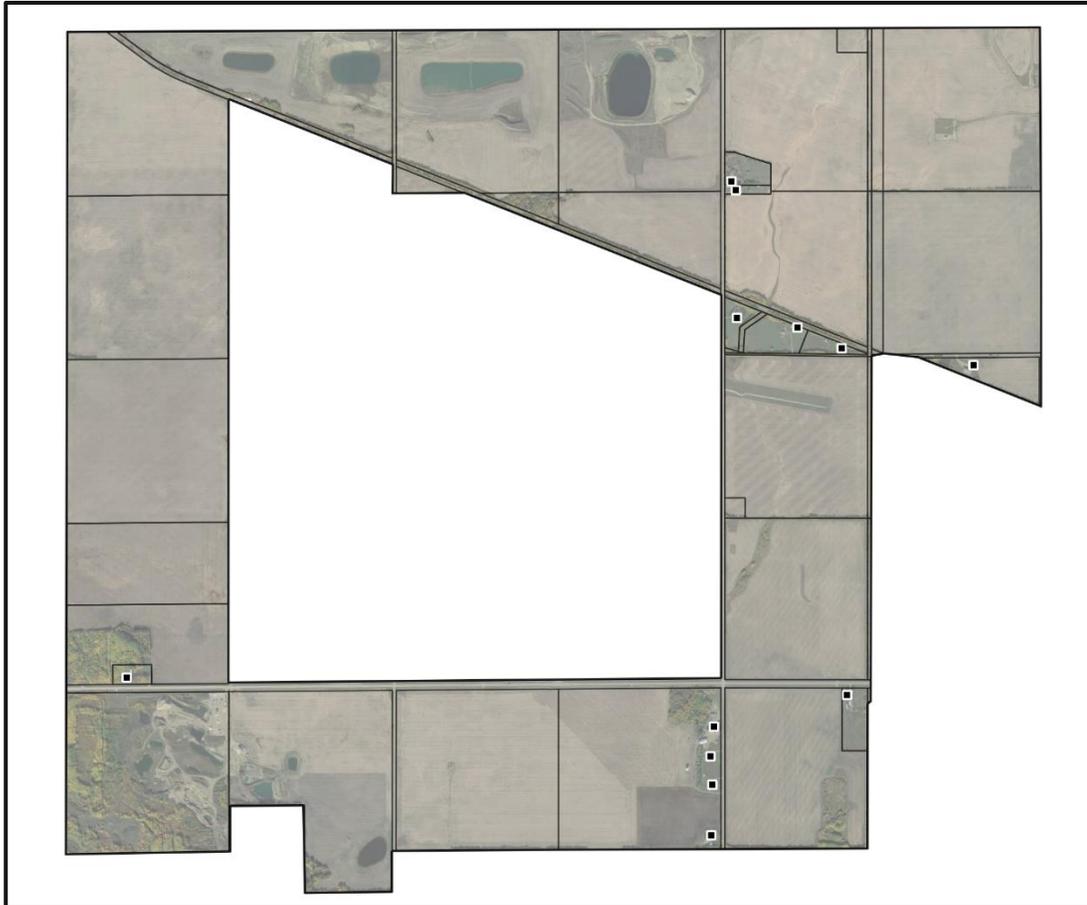
Existing Development and Permanent Structures

There is notably little residential development in the subject area. Only twelve residences were identified and are nearly all concentrated three small portions of the subject area. These areas can be seen clearly in parcel boundaries and in the locations of residences within the area. Figure 16 shows the locations of residences

(black squares), parcel boundaries. None of the residential parcels are within country residential districts.

There are two instances of residences on ageing farm sites that appear minimally active. A cluster of three residences in the subject area's southeast represent the only active farmyard, which includes numerous grain storage bins, two utility shops, and farm equipment storage areas.

Figure 18: Existing Residences within the VAA



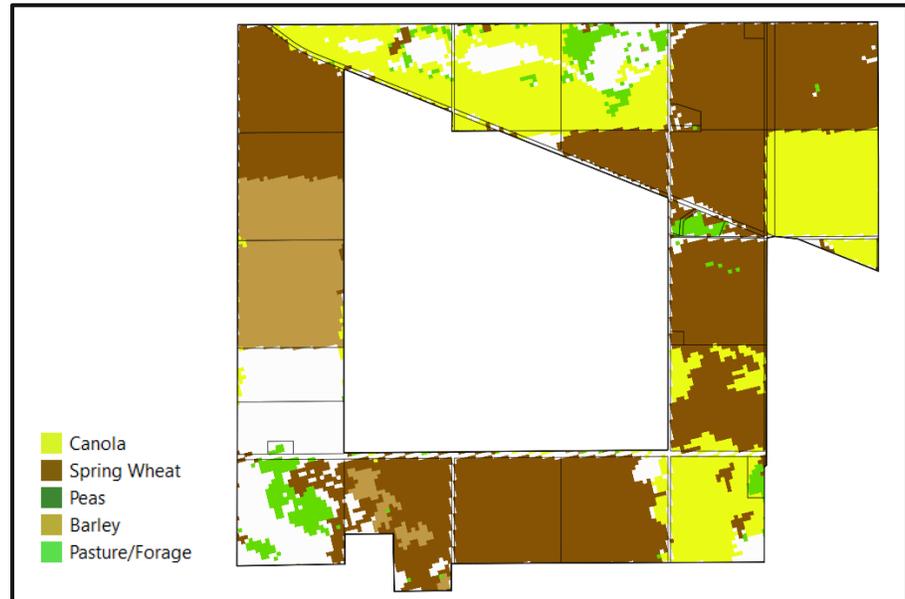
Current Agricultural
Uses

The current agricultural use of the VAA area is currently quite similar to the agricultural areas to the north, south, and east. It is dominantly annually cropped, with little or no pasture use. The map below shows the crops grown within the subject area in 2020. These maps are derived from data obtained from Agriculture and Agri-food Canada's Annual Crop Inventory, which relies on a combination of satellite imagery and calibrated algorithms to estimate the crop grown across the agricultural regions of the country.

The annual crop rotation in the subject area appears similar to areas right across central Alberta, dominated by the oilseed crop canola and the cereal crop wheat. It

also appears from remote sensing data that barley is part of rotations, but to a lesser degree than canola and wheat. It appears that yellow peas, a regionally common rotational crop was not grown in 2020.

Figure 19: Crop Inventory in the Subject Area, 2020



Of the crops grown in the area, canola has historically often been the most profitable agricultural crop to cultivate. For this and because of canola's agronomic strengths, its presence in a rotation can be used as an indicator of land's crop growth potential. In other words, the absence of canola from the rotation on a field is often used to indicate considerable limitations to production.

Canola is grown in the subject area, as shown in the two maps below. The first shows the estimated prevalence of canola in the study area during the 2020 crop year, with canola acres (in 30m pixels) being shown in yellow superimposed over satellite imagery. The second map shows fields which had canola grown on them at some point in the past five crop years.

Figure 20: VAA Fields Where Canola was Grown in 2020

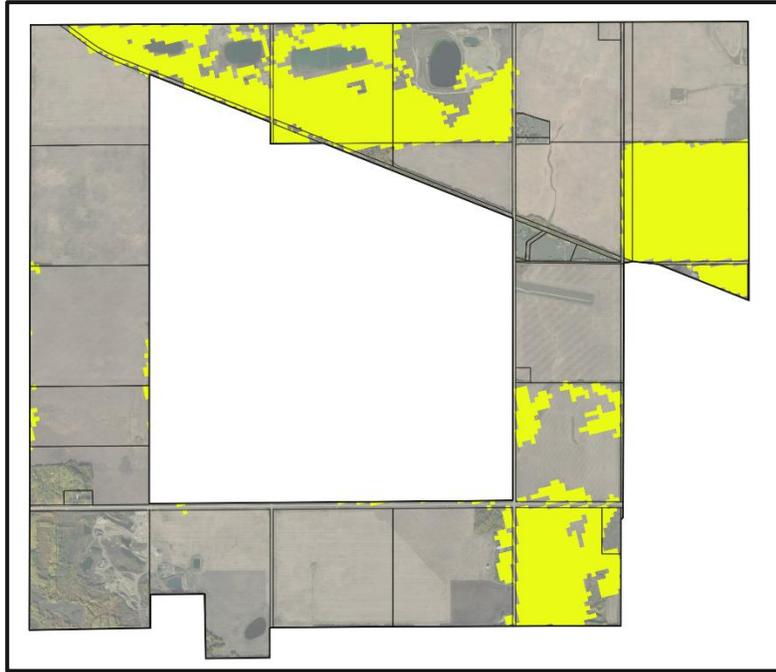
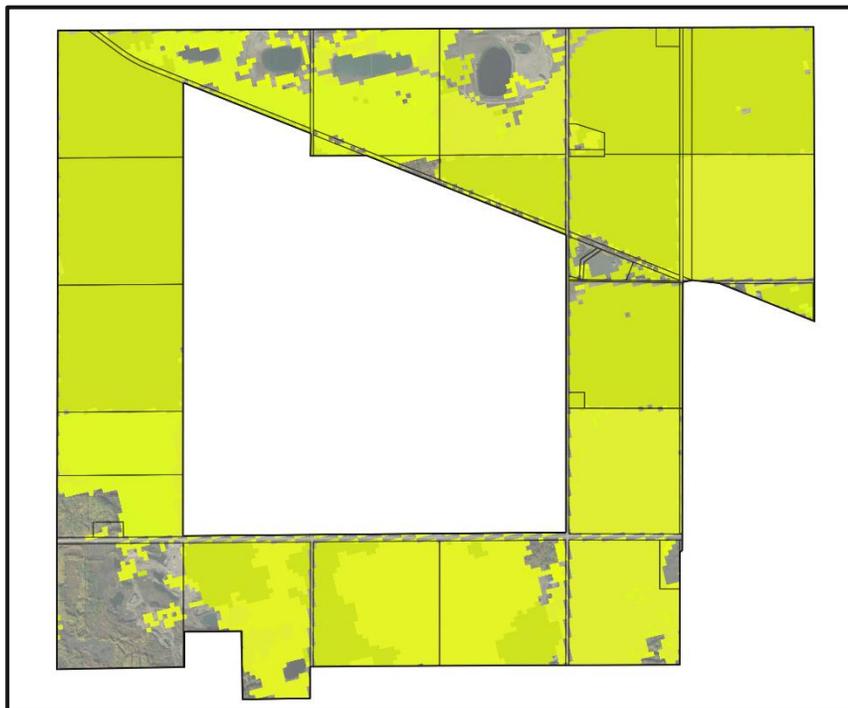
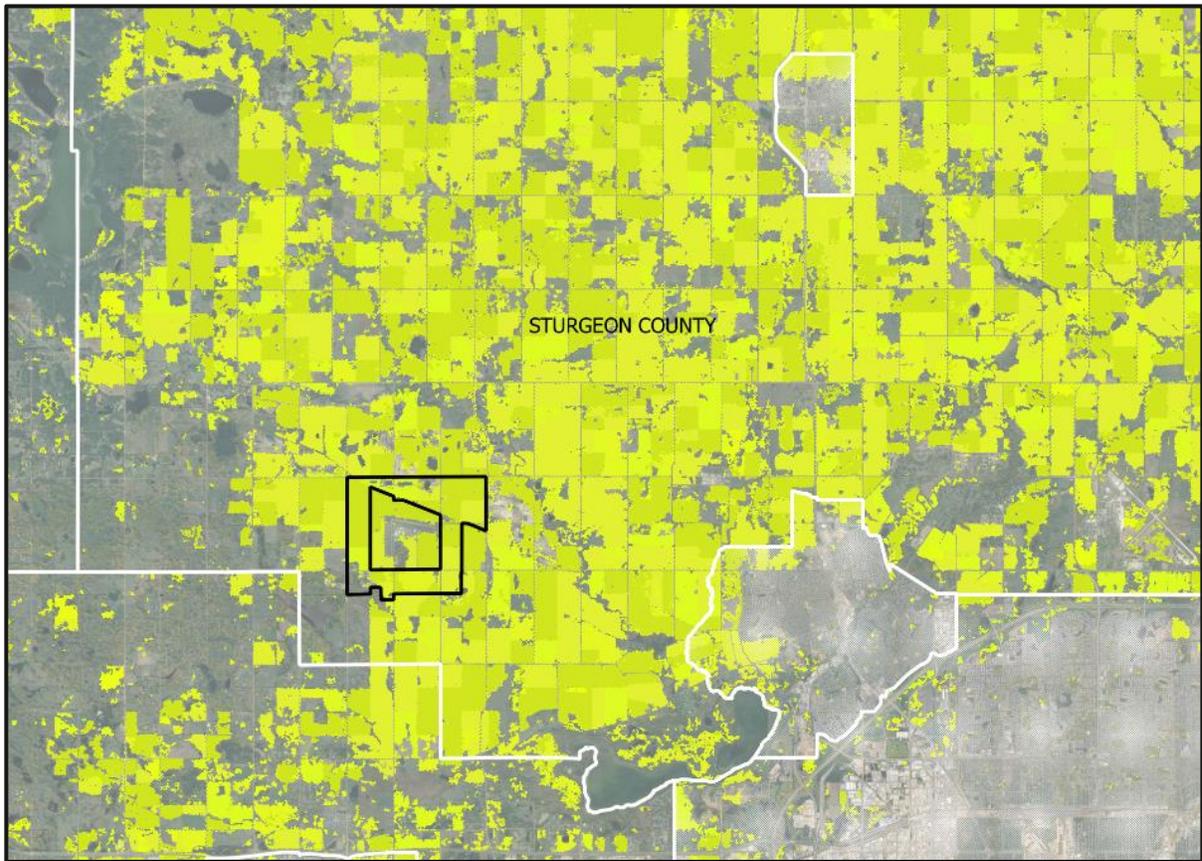


Figure 21: VAA Fields Where Canola was Grown at Least One Year 2016-2020



These maps show that all of the subject area's quarter-sections have sustained canola crops at some point in the last five years. For comparison, the map in Figure 20 of the southern portion of Sturgeon County shows that the subject area's canola prevalence is approximately equal, or slightly better than the regional average. This finding, along with the soil quality ratings indicates that the subject area's agricultural land is of the best quality within the region.

Figure 22: Canola Fields 2016-2020, within South Portion of Sturgeon County



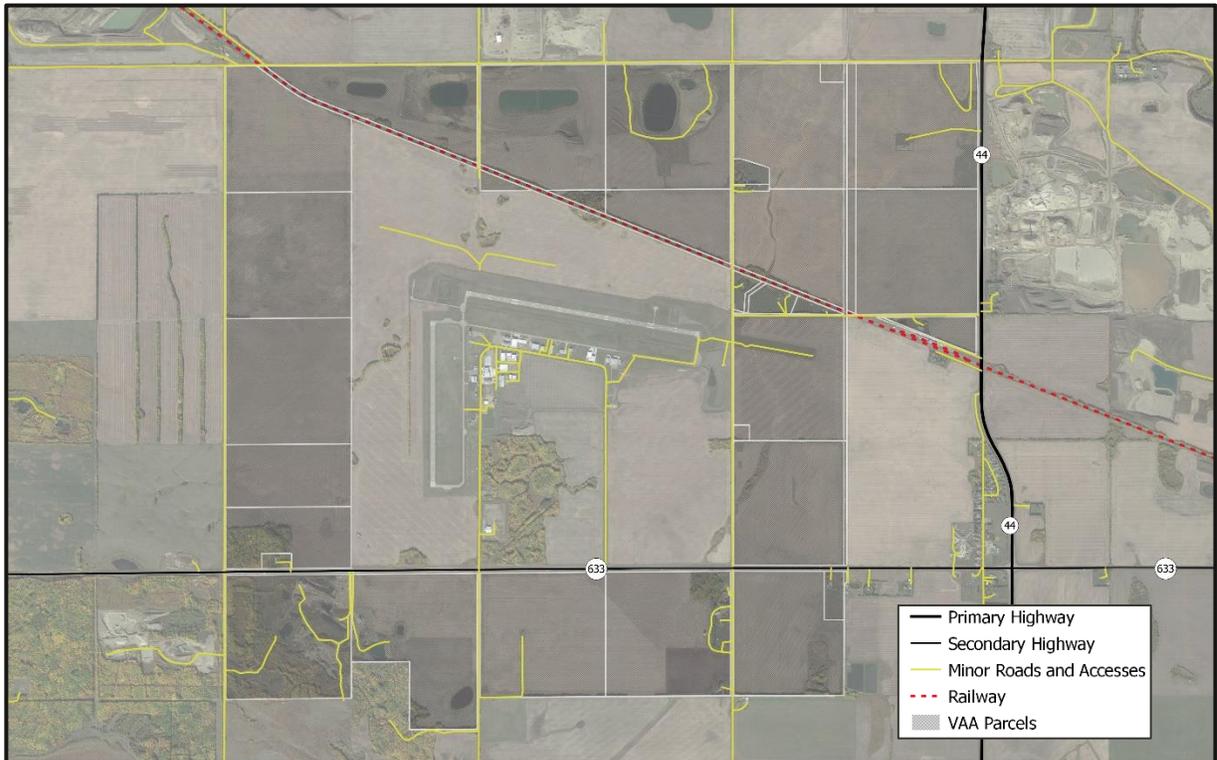
**Agricultural
Equipment Movement**

The study area has many mostly unrestricted access points to all parcels of agricultural land. Aggregate mine operations within and adjacent to the subject area may create some minor traffic issues, but the required large and well-maintained gravel roads are also well suited for agricultural equipment movement.

There are primary and secondary highways either bordering or bisecting the ASP: Highway 44 to the east, and Secondary Highway 633 within the southern portion. Travelling along or crossing either of these main arteries, especially during high traffic times of day is likely very difficult. While it is feasible to use or cross them, large farms would plan their travel routes carefully and plan travel times to minimize conflict with other traffic. Considering the available range and township roads, farmers would likely avoid traveling along either of these roads except in the lowest traffic periods of time.

There are numerous range road and township road access points bisecting and bordering the subject area lands. Planned development would be very unlikely to restrict access to any of the subject lands. The railway, which in some circumstances could provide a point of access restriction has three existing, staggered crossing points, and so no anticipated restriction to access would be expected.

Figure 23: Roadways and Railway within and surrounding the VAA



Despite the limited expected long-term impact to agricultural access that the planned development would have, considerations should be made during development. Agricultural producers in this region will need to access their fields with very large implements that require access particularly from the months of May to October. Development activity during this time will need to consider that access to some fields can only be had from a single side or even a single approach, either from gravel or paved roads. Farm implements can also be very tall in transport modes, so the location of temporary detours and temporary powerlines should consider this impact on agricultural producers within the ASP and for producers using the subject area roads to access the surrounding agricultural land base.

4.0 Impact and Suitability of Development

4.1 Impacts to Agriculture

This section outlines the potential impact to agriculture in view of the current strategy and land use planning documents, and the physical and socioeconomic characteristics of the study area and surrounding region.

The study area currently still has 2,550 acres of quality agricultural land being used largely for grain and oilseed production. The land is of high productive capacity as demonstrated by the Regional Agriculture Master Plan's identification of nearly the entire area as 'prime agricultural land'.

There is one notable operation in the southern portion of the ASP, but otherwise most fields must be cultivated by farms that have their home yard, storage facilities, buildings and equipment storage outside of the ASP.

While any loss of agricultural land should be considered carefully, we cannot see any particular feature of the subject area that makes these lands more favourable to any specialty agricultural production than the areas around it. There are minimal agricultural operations with infrastructure within the subject area, and no specialty operations that would be affected by the development of these lands.

Future development would likely bring more commercial and commuter traffic that will likely make some farm equipment movement more challenging, but there are range road and township roads that should provide alternatives to using the busier artery roads.

As discussed above, nearly all of the business activity in or supporting the agriculture industry is located outside the ASP boundaries in nearby communities. The overall impact to these businesses following the transition of subject land use away from agriculture is deemed to be negligible. In fact, some of the service businesses currently serving agricultural enterprises may be expected to become more economically sustainable due to commercial property development in the subject area.

4.2 Mitigation and Qualification

The development of these lands is not expected to impact the agricultural operations in the area beyond the direct loss of the developed lands. However, it is important to ensure that VAA lands are developed in a manner that minimizes impacts to agricultural operations.

Agricultural productivity of the soil is relatively uniform and high across the subject lands, and so there is no obvious direction that can be given to direct development first to lands with lower productivity. The northern lands, which include partially reclaimed aggregate mine sites are fragmented and are therefore likely to be less

productive as a result. This reality may indicate that developing them first would reduce overall agricultural impact. It is noted however that these lands are not directly serviced by a paved, arterial road and may have access issues due to the proximity to the bisecting railway.

Drainage issues will need to be considered as development proceeds. If either of the surface drainage ways that flow to the northeast are obstructed there is the potential for saturation and flooding within the southern and western agricultural lands. This would have potentially severe negative impacts to agricultural operations within the subject area and adjacent lands further up the drainage way.

In order to mitigate the impact to agriculture, it is recommended that development occur in clusters or pockets of commercial development, which aligns with goals for efficient servicing. This would mean subsequently developing consolidated groups of parcels instead of a patchwork of parcels. A patchwork approach would impact agricultural access and operations across a much greater portion of the subject area than necessary.

4.3 Suitability

Considering all the points within this report, the conclusion of this Agriculture Impact Assessment is that the ASP area is deemed to be suitable for development. While nearly all of the land within the ASP is also highly suitable for annual crop production, it is not so unique in quality or current agricultural use that its conversion to non-agricultural use would present a significant loss of agricultural potential to the surrounding Sturgeon County or the greater Edmonton area.

Development of the VAA lands will incrementally reduce the agricultural use, but is unlikely to restrict the use of the adjacent, undeveloped agricultural lands within the subject area nor the surrounding area agricultural lands. In summary, the planned development would not unduly impact the overall viability of either the local agricultural community or its surrounding areas.



APPENDIX C

ISL Memo - Servicing



7909 51 Avenue NW, Edmonton AB T6E 5L9, T: 780.438.9000 F: 780.438.3700

To: **Sturgeon County** Date: **June 1, 2022**
Attention: **Michael Klassen** Project No.: **16174**
Cc: **Jeffrey Yanew, Brendan Pollmann**
Reference: **Villeneuve Airport Area Structural Plan Servicing Memo – Final**
From: **Barry Raynard and Nancy Lai**

1.0 Introduction

Sturgeon County is looking to develop the area surrounding the Edmonton Regional Airport Authority's lands at the Villeneuve Airport and is currently in the process of preparing an Area Structure Plan (ASP). The planning area is bound by Township Road 544 on the north, Range Road 272 to the west, Highway 44 to the east and one quarter section south of Highway 633 on the south; it excludes the Villeneuve Airport as shown in **Figure 1.1**. This area is referred to as the study area throughout this memorandum. The Villeneuve Airport Area Master Plan (VAAMP) suggests potential industrial development due to presence of air, rail and highway access. The purpose of this study is to support Sturgeon County's Villeneuve Airport Area- Area Structure Plan (VAAASP) and expand on the 2021 Villeneuve Airport Area Master Plan. The study will develop the servicing plan to a level of details to satisfy Edmonton Metropolitan Region Board's (EMRB) Regional Evaluation Framework (REF) review.

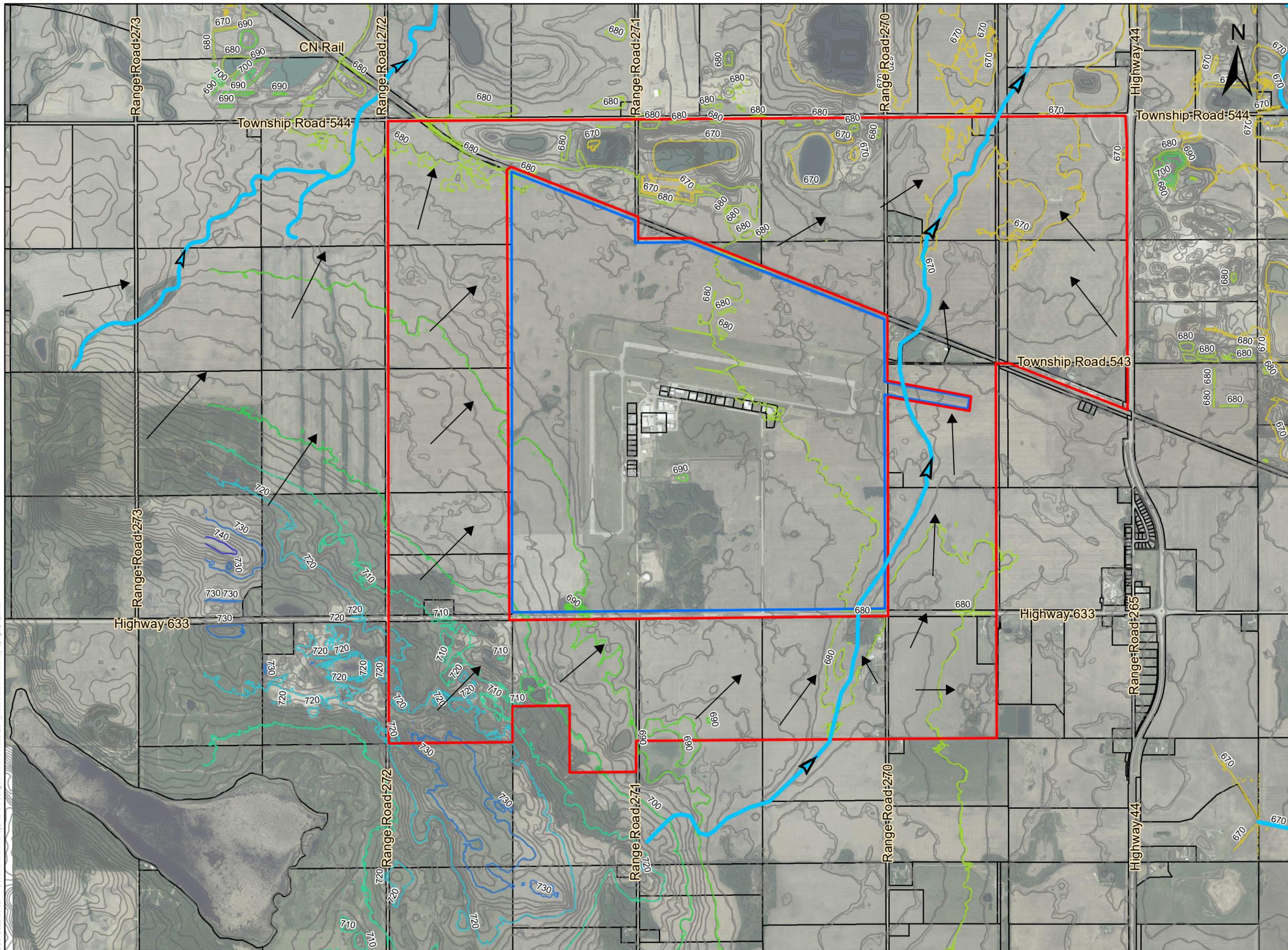
1.1 Existing Conditions and Topography

Figure 1.1 shows the study area and the topography. The land surrounding the Airport consists mostly of agriculture farmland, aggregate mining sites, old gravel excavation pits that have since filled with water, one active oil well and a couple of underground pipelines.

The topography shows that the land drains from a southwest high point of 732 m to the northeast toward the tributary water course that flows from south to north into the Sturgeon River. The land directly north of the Airport is flatter and most of the runoff is captured by the ponds located within the quarter sections. The land west of the Airport receives offsite runoff from a highpoint that is approximately 2 km to the west of the study area boundary, and cumulative runoff is intercepted by the railway ditch, which drains northwest to a culvert crossing the railway to a water course that crosses the railway at Range Road 272.

1.2 Proposed Development

Sturgeon County planned for primarily industrial and commercial development within the study area. **Figure 1.2** shows proposed development staging from the VAAASP. The south side and the east side are proposed to be developed in the short term while the north and west is considered long term development.



Legend

- STURGEON COUNTY STUDY AREA
- EDMONTON REGIONAL AIRPORT AUTHORITY PLANNING AREA
- CADASTRAL
- ▶ WATER COURSE

CONTOUR

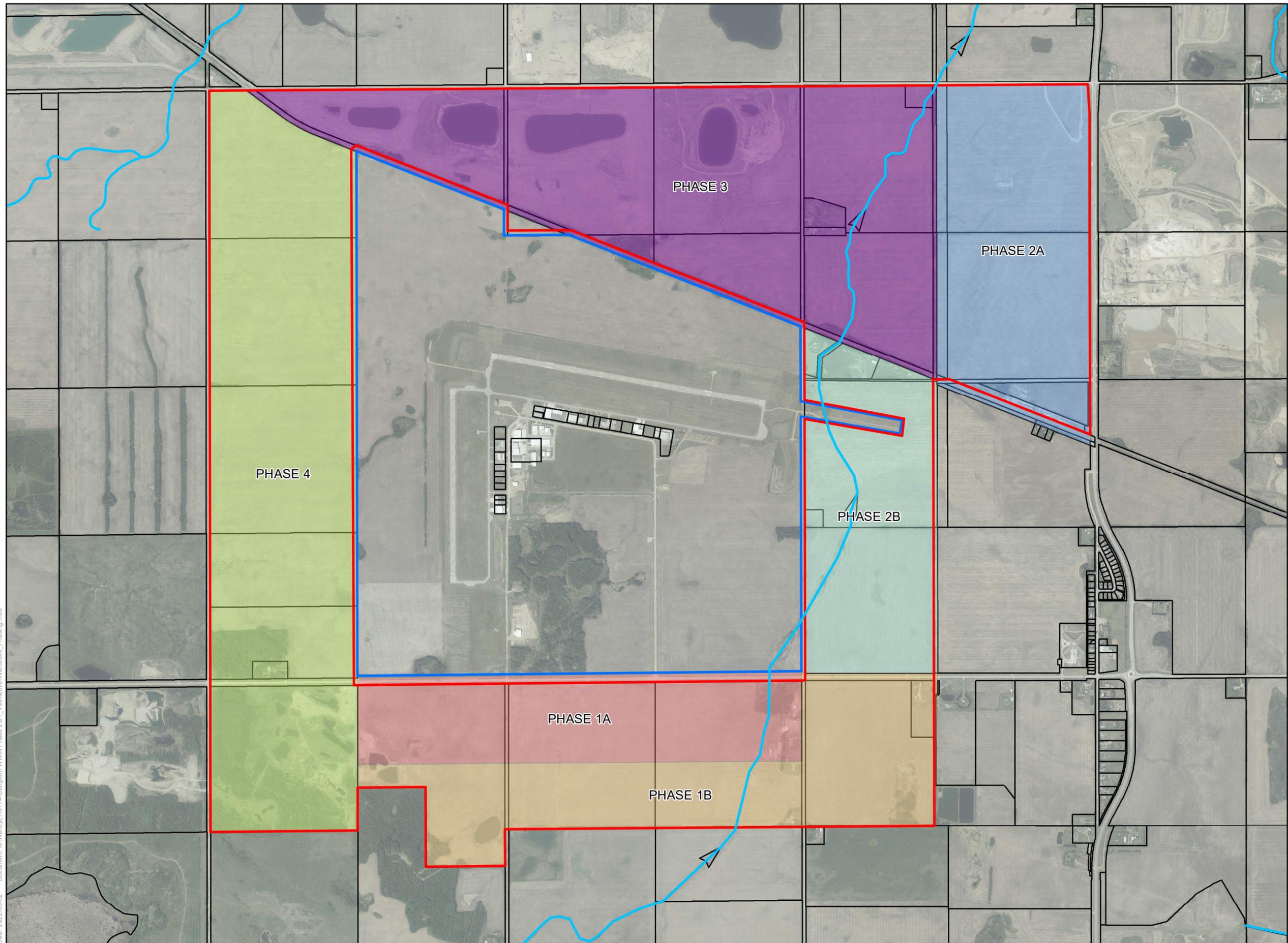
- 650 m
- 660 m
- 670 m
- 680 m
- 690 m
- 700 m
- 710 m
- 720 m
- 730 m
- 740 m
- ▶ SURFACE DRAINAGE ARROWS

Coordinate System:
 NAD 1983 CSRS 3TM 114
 1:24,000

FIGURE 1.1
 TOPOGRAPHY
 VILLENEUVE AIRPORT AREA ASP



Date: 2022-05-02 Document: M:\Nancy\16174-Sturgeon WWIA Phase 201_Villeneuve\16174-Sturgeon WWIA Phase 201_Villeneuve\16174-Sturgeon WWIA Phase 201_Villeneuve_Topography.mxd



- Legend**
- STURGEON COUNTY STUDY AREA
 - EDMONTON REGIONAL AIRPORT AUTHORITY PLANNING AREA
 - CADASTRAL
 - ▶ WATER COURSE
- VAA-ASP Phasing**
- PHASE 1A
 - PHASE 1B
 - PHASE 2A
 - PHASE 2B
 - PHASE 3
 - PHASE 4

Coordinate System:
NAD 1983 CSRS 3TM 114

1:20,000



FIGURE 1.2
PROPOSED PHASING
VILLENEUVE AIRPORT AREA ASP



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2.0 Water Servicing Plan

2.1 Existing System / Future Plans

The Hamlet of Villeneuve’s local water system is currently serviced by a reservoir, two distribution pumps (12.6 L/s each) and one fire pump (60.6 L/s) with a total pumping capacity of 73.2 L/s, assuming only one distribution pump will be active while the other remains on standby. **Table 2.1** summarizes the existing pumping and storage capacity of the Hamlet Reservoir. The Villeneuve Airport is serviced by an Edmonton Regional Airport Authority (ERAA) reservoir that is filled by the 200 mm transmission main from the Villeneuve Hamlet Reservoir.

Table 2.1 Hamlet of Villeneuve Reservoir Capacity

Reservoir	Existing Pumping Capacity (L/s)	Existing Storage Capacity (m³)
Hamlet of Villeneuve	73.2	1,036

The Hamlet of Villeneuve Reservoir receives flow from a 550 mm transmission main that runs from the Oakmont Reservoir to the Sturgeon Valley where it tees off and reduce to 300 mm to the Northern Lights Reservoir via the ProNorth Transmission Main. The Northern Lights Reservoir then pumps through the 200 mm Villeneuve Transmission Main to Villeneuve Reservoir. The Morinville Transmission Main is connected to the Morinville Booster Station, located within the Oakmont Reservoir Pumphouse in St. Albert; however, the Booster Pump is currently not installed, and the Morinville Transmission Main is operating at EPCOR pressure. There is a Tri-Party Agreement (2013) that governs the capacity usage of the Morinville waterline: Morinville, Legal and Sturgeon County have been allocated 64.7 L/s, 12 L/s and 23.3 L/s of the available 100 L/s capacity, respectively. Once the total peak demand between Sturgeon County, Town of Morinville and Village of Legal exceeds the current capacity, the Morinville Booster Pump will need to be installed and activated.

Table 2.2 summarizes the capacity and existing utilization of the transmission main with the following notes:

- The pipe capacity assumes that the transmission main is operating at a maximum of 1.5 m/s, which is considered high for a transmission main.
- The pumping rate at the design point refers to the set point at which a pump station is intended to operate at upstream of the listed transmission main. It does not represent a maximum pumping capacity upstream of the listed transmission main.
- The maximum flow possible column refers to the maximum potential flow within the given transmission main during MDD conditions elsewhere and is based on the following criteria:
 - 140 kPa must be maintained at the reservoir inlet downstream of the given transmission main; and
 - Velocity in the transmission main must not exceed 1.5 m/s.
- The peak utilization represents the ratio of MDD demands over the maximum flow possible as a rough measure of the capacity of the transmission main.

Table 2.2 Transmission Main Capacity to Hamlet of Villeneuve

Transmission System	Diameter (mm)	Pipe Capacity @ 1.5m/s (L/s)	Pumping Rate @ Design Point (L/s)	Maximum Flow at 140 kPa (L/s)	MDD (L/s)	Peak Utilization (%)
Morinville Transmission Main	550	356.4	74.0	233.2	51.0	69%
ProNorth Transmission Main	300 (283 ID)	94.4	16.8	48.3	3.9	23%
Villeneuve Transmission Main	200 (192 ID)	43.4	10.2	24.8	3.5	34%

Notes:

1. 51.0 L/s MDD is based on recent meter read data from Morinville.
2. MDD values for ProNorth and Villeneuve transmission mains are based on a maximum day peaking factor of 1.8, whereas reservoir storage and distributions systems will be evaluated using a maximum day peaking factor of 2.0.



3. ProNorth Transmission Main pumping rate at design point is based on an estimated split in flow between ProNorth, Morinville and Summerbrook using a supply rate of 74.0 L/s.
4. Peak utilization calculations use the pumping rate at the design point as the supply rate for each of the transmission mains since any future capacity limitations will be due to the 74.0 L/s supply rate and not the transmission main capacity itself.

The existing Morinville Transmission Main is at 69% utilization of EPCOR's 74 L/s allowance during historic peak demand in the transmission main. Therefore, meeting with EPCOR to increase the supply from 74.0 to 100.0 L/s will be required in the short to medium term and installing the Morinville Booster Pump (along with additional discussions with EPCOR) will be required in the medium to long term.

Upgrading the Northern Light Reservoir storage and pumping capacity is required for fire protection in ProNorth, as well as maintaining adequate pressure for the Villeneuve Transmission Main. With the Northern Lights pump upgrade, pressure reducing valve (PRV) modification is required along the Villeneuve Transmission Main to prevent excessive high pressure at low elevation areas. Upgrading the storage and pumping capacity at Villeneuve Hamlet Reservoir was recommended as part of the Water and Wastewater Infrastructure Assessment (WWIA) Phase I to ensure that the Hamlet could achieve higher fire flows.

Growth at the Villeneuve Airport will have a minor impact on the available pumping capacity at the Villeneuve Hamlet Reservoir since the Airport Reservoir is supplied through the Villeneuve Hamlet Reservoir. Ultimate average demand at the Airport is currently estimated at 33,000 m³/year, which is approximately 1.0 L/s. Future study will be required to determine the impact of future growth that the Villeneuve Airport will have on the Hamlet Reservoir.

2.2 Design Criteria

Sturgeon County is in the process of updating the General Municipal Servicing Standards (GMSS), and the list below summarizes the design standard relevant to the current study:

- Industrial Average Day Demand = 20,000 L/ha/day;
- Max Day Demand = 2.0 x Average Day Demand for reservoir storage and distribution mains;
- Max Day Demand = 1.8 x Average Day Demand for transmission mains (based on EPCOR supply and not the GMSS);
- Peak Hour Demand = 3.0 x Average Day Demand;
- Fire Flow Requirement for Light Industrial Area = 200 L/s;
- Maximum Allowable Pressure = 700 kPa;
- Minimum Peak Hour Pressure = 280 kPa;
- Minimum Maximum Day + Fire Flow Pressure = 140 kPa;
- Maximum Allowable Pressure for Water Services = 550 kPa;
- Maximum Velocity During Normal System Operation = 1.5 m/s;
- Maximum Velocity During Fire Flow Condition = 3.0 m/s; and
- Minimum Water Pipe Diameter Servicing Industrial Area = 300 mm.

The following design standard is from the 2009 GMSS Section D-Water Distribution System:

- Municipal potable water reservoirs shall be designed and constructed as an underground concrete reservoir and sized to accommodate:
 - $S = 5 * [2 * ADD - 1.5 * ADD] + \text{Fire Flow} + \text{Emergency} = 2.5 * ADD + \text{FF} + \text{Emergency}$, where:
 - $2 * ADD$ = MDD and is the demand from the reservoir;
 - $1.5 * ADD$ is the available inflow from the supply line to the reservoir; and
 - Emergency = 10% of the total storage.



2.3 Water Demand

Table 2.3 summarizes the existing water demand for the Hamlet and Airport. Hamlet demand is calculated from the average reservoir usage and truck fill from 2017. Airport demand is estimated as 5,800 m³/yr (0.18 L/s) based on Villeneuve Reservoir Assessment (ERAA, 2021). The maximum day demand uses a peak factor of 2.0.

Table 2.3 Villeneuve Existing Water Demand

Demand Rate (L/ha/d)	Average Daily Demand (L/s)	Max Daily Demand (L/s)
Existing Hamlet	1.9	3.9
Existing Villeneuve Airport	0.18	0.36

Table 2.4 summarizes the future water demand and proposed reservoir storage requirement for the study area. Water demand flow was calculated using the light industrial demand rate in the draft updated servicing standards, as well as the rate calculated from historical Villeneuve Airport Reservoir usage. The historical Villeneuve Airport Reservoir usage was calculated by the averaging the water trucked to the Airport on a yearly basis. The annual water usage between 2003 and 2012 is approximately 2418 m³/year, which averages out to be 770 L/ha/d. The rate from the standard is more conservative in nature and the actual demand might be closer to the historical rate. Storage requirement is the proposed storage required to satisfy the future max daily demand ($P_f = 2.0$), fire flow and emergency flow according to the GMSS (May 2009) Section D.3 Storage Requirements; the equation used to calculate the storage requirement is shown in **Section 2.2**.

Table 2.4 Proposed Water Demand and Storage for Study Area

Demand Rate (L/ha/d)	Average Daily Demand (L/s)	Max Daily Demand (L/s)	Peak Hour Demand (L/s)	Storage Requirement (m ³)
Future 770 L/ha/d (Historical)	7.5	15.0	22.5	3,802
Future 20,000 L/ha/d (Conservative)	195.0	390.0	585.0	48,800

Table 2.5 summarizes the existing storage capacity, proposed storage increase from the WWIA Phase I for the existing reservoir and the proposed future storage for the ASP area. The proposed storage increase from WWIA Phase I is a recommended upgrade for the existing Hamlet Reservoir due to insufficient storage to support 230 L/s fire flow.

Table 2.5 Storage Requirement Summary

Scenario	Existing Storage (m ³)	Additional Storage Requirement (m ³)
Existing Hamlet Reservoir	1,036	N/A
Proposed from WWIA Phase I	1,036	4,000
Future 770 L/ha/d (Historical)	0	3,802
Future 20,000 L/ha/d (Conservative)	0	48,800

The above table assumes that the ASP Reservoir provides its own fire storage, which is conservative. It is expected that fire storage volumes can be shared between the proposed ASP Reservoir, the Hamlet Reservoir and potentially the Airport Reservoir. Please note that the storage requirement determined using the future demand rate of 20,000 L/ha/d is very conservative.



2.4 Proposed Water Servicing Concept for ASP Area

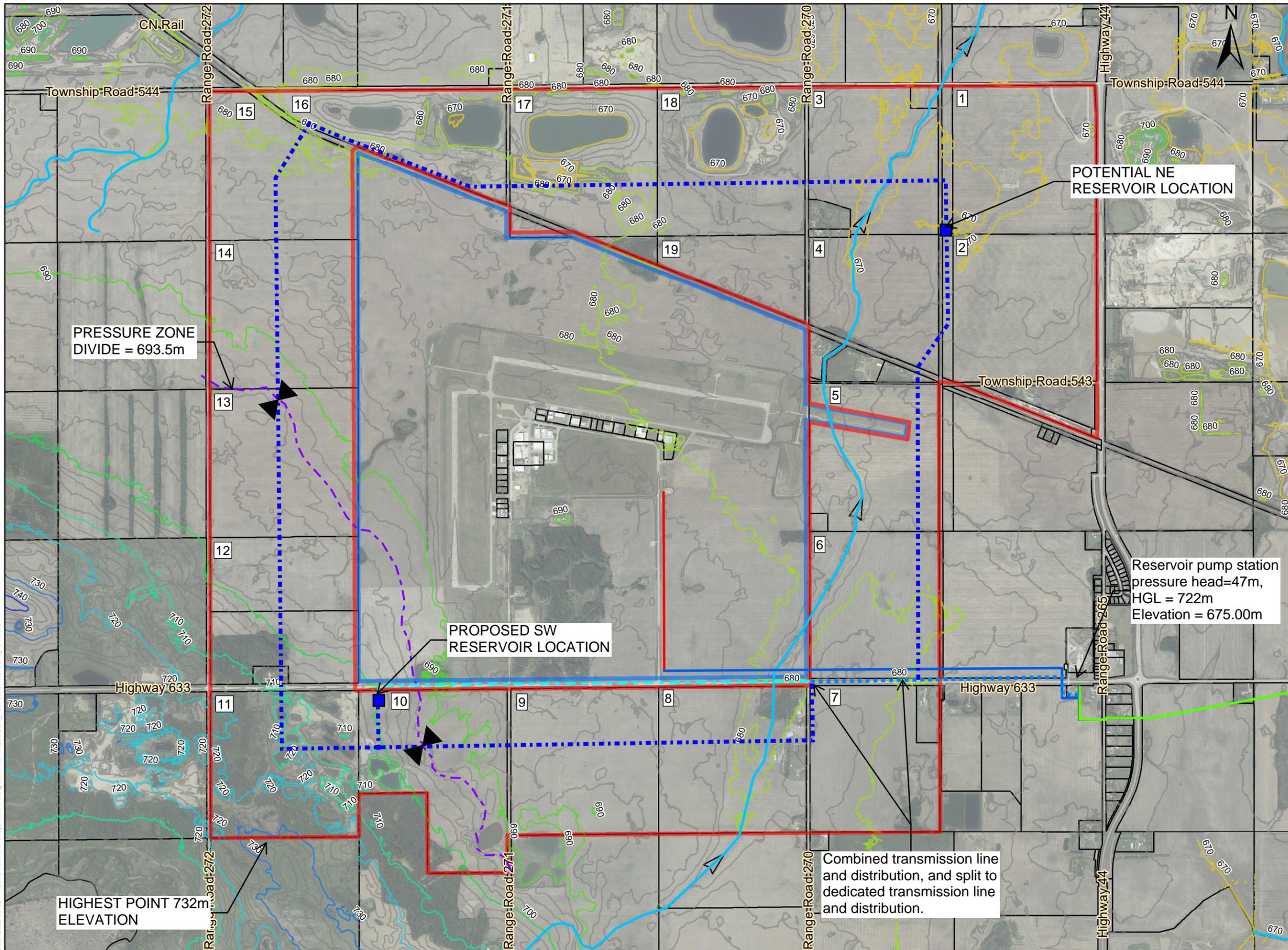
The proposed system for the study area assumes that the reservoir and pump upgrades proposed for the existing system (230 L/s fire pump and additional 4,000 m³ of reservoir storage) from the Water and Wastewater Infrastructure Analysis (2021) have been implemented.

Two reservoirs and a connected 300 mm loop are proposed for the study area as shown on **Figure 2.1**. The NE Reservoir is proposed at the northwest corner of Parcel 2. The NE Reservoir will be fed through the distribution line in the nighttime and support water distribution need in the daytime. The SW Reservoir is proposed at the northwest corner of Parcel 10 at an elevation of 700 m. The SW Reservoir will be fed through a combined transmission and distribution line up to the west most edge of Parcel 7 before splitting to a dedicated transmission feed line to the SW Reservoir and a distribution line for the parcel to the west. The configuration is proposed to support servicing Parcels 7 to 11 through both the Hamlet Reservoir and the proposed SW Reservoir in the interim state as described in **Section 2.5**.

Due to the high elevation located at the southwest of the servicing area there is a pressure zone boundary proposed along elevation 693.5 m, pressure reducing valves will be needed to manage pressure from the SW Reservoir. The pressure zone is calculated based on highest elevation with minimum 280 kPa pressure that can be serviced from the Hamlet Reservoir at a HGL of 722 m. Please note that SW and NE Reservoir location are conceptual, and the actual locations should be refined with further study.

Due to the uncertainty of the actual demand that will be generated in this planning area, all proposed systems should be designed with upgrading flexibility in mind.

Fire flow requirements for the study area are high (200 L/s), but the average demand rate may be considerably lower; therefore, it poses a water quality issue for both the Villeneuve Hamlet Reservoir and the proposed reservoirs. The Airport reservoir currently faces water quality issues due to the large storage capacity for fire flow demands but low water demand rates. There is an opportunity for a policy investigation to collaborate with the Airport Authority for demand support in the event of Emergency Fire Flow. This could potentially reduce the reservoir size and, at least partially address the reservoir water quality issues.



- Legend**
- STURGEON COUNTY STUDY AREA
 - EDMONTON REGIONAL AIRPORT AUTHORITY PLANNING AREA
 - CADASTRAL
 - WATER COURSE
 - 100 mm EXISTING WATERMAIN
 - 200 mm EXISTING WATERMAIN
 - 300 mm EXISTING WATERMAIN
 - 300 mm PROPOSED WATERMAIN
 - 300 mm PROPOSED DISTRIBUTION AND TRANSMISSION WATERMAIN
 - PROPOSED TRANSMISSION MAIN
 - PROPOSED RESERVOIR AND PUMP STATION
 - ▲ PROPOSED PRESSURE REDUCING VALVES

POTENTIAL NE RESERVOIR LOCATION

PRESSURE ZONE DIVIDE = 693.5m

PROPOSED SW RESERVOIR LOCATION

Reservoir pump station pressure head=47m, HGL = 722m Elevation = 675.00m

HIGHEST POINT 732m ELEVATION

Combined transmission line and distribution, and split to dedicated transmission line and distribution.

Coordinate System:
NAD 1983 CSRS 3TM 114

1:20,000



FIGURE 2.1
WATER CONCEPT SERVICING PLAN
VILLENEUVE AIRPORT AREA ASP



Date: 2022-05-02 Document: M:\Nancy\116174-Sturgeon WWIA Phase 201_Villeneuve\villeneuve_WAT.mxd



2.5 Interim Servicing Options

According to the proposed phasing shown on **Figure 1.2**, interim servicing was investigated to determine the number of parcels that could be serviced without triggering the need to construct either of the proposed reservoirs and the 300 mm looping around the northwest corner of the study area. Along the south, the Hamlet Reservoir and pumps can service up to Parcel 9 before requiring the SW Reservoir. The Hamlet Reservoir can service Parcel 10 right up to the pressure zone boundary of 693.5 m. For servicing beyond the pressure zone boundary and Parcel 11, the SW Reservoir will be needed.

A combined transmission and distribution line are proposed to service Parcel 7 and split after Parcel 7 to a transmission line to the SW Reservoir and distribution line to service Parcels 8 and 9. The transmission line will supply flow to the SW Reservoir without impacting the servicing pressure for parcels 8 and 9. The proposed system allows for the SW Reservoir to support the Hamlet Reservoir in servicing Parcels 7 to 9; however, a pressure reducing valve is required at the pressure boundary to mitigate the system pressure between SW Reservoir and Hamlet Reservoir. Further study is beneficial to explore the storage requirement that can be shared between SW Reservoir and Hamlet Reservoir.

Along the east, the Hamlet Reservoir and pumps can service up to Parcel 4 before requiring the NE Reservoir. The NE Reservoir is needed for fire flow but is not required if the SW Reservoir and the complete 300 mm looping through all the service area is built. However, the NE Reservoir may be required in the long term to support increasing water demand. As developments construct and expand, the actual water demand can be determined, and reservoir storage requirement and pumping capacity can be further refined.

2.6 Transmission System Assessment

Under existing demands from **Table 2.2**, the Morinville Transmission Main is at 69% peak utilization and future growth will trigger discussions with EPCOR to increase the water supply from 74 to 100 L/s, installing the Morinville booster pump (with further discussions with EPCOR) and potentially twinning the transmission mains. **Table 2.6** summarizes the utilization of the Morinville, ProNorth and Villeneuve Transmission Mains using the historical and standard water demand rates for future growth. Transmission main capacity from Morinville to Villeneuve is not exceeded in the 770 L/ha/d demand scenario.

However, with the standard demand rate of 20,000 L/ha/d, transmission main twinning for the Morinville, ProNorth and Villeneuve Transmission Mains is required. Additionally, installing and commissioning the Morinville Booster Pump and pump upgrades at Northern Lights Reservoir are required. It is noted that the 20,000 L/ha/d standard is intended to be used for sizing of local distribution mains is very conservative when applied over a large area. It is also noted that the County has committed to investigating other potential sources of water supply within the region for the VAASP.



Table 2.6 Proposed Transmission Main Utilization

Transmission System	Diameter (mm)	Pipe Capacity @ 1.5m/s (L/s)	Pumping Rate @ Design Point (L/s)	Maximum Flow at 140 kPa (L/s)	Existing MDD (L/s)	MDD at Proposed 770 L/ha/d (L/s)	MDD at Proposed 20,000 L/ha/d (L/s)
Morinville Transmission Main	550	356.4	74.0	233.2	51.0	103.9	478.9
ProNorth Transmission Main	300 (283 ID)	94.4	16.8	48.3	3.9	15.4	390.4
Villeneuve Transmission Main	200 (192 ID)	43.4	10.2	24.8	3.5	15.0	390.0

Notes:

1. At 770 L/ha/d, the proposed MDD exceeds the current 74.0 L/s supply from EPCOR. EPCOR mentioned that the supply rate for this demand rate could be supplied without issue.
2. At 20,000 L/ha/d, the demand within Villeneuve would exceed the capacity of the Morinville booster station once installed (300 L/s) and the transmission system capacity of all three transmission systems

Further study should be done to review the potential of by-passing the ProNorth Reservoir and Pumphouse and to install a booster station to service the Hamlet of Villeneuve.



3.0 Wastewater Servicing Plan

3.1 Existing System / Future Plans

The Hamlet of Villeneuve is currently serviced through a low-pressure system that discharges to a lagoon located southwest of the Highway 633 and Highway 44 intersection. The lagoon also services the Villeneuve Airport through a lift station and an existing 100 mm PVC forcemain that transitions to a 150 mm forcemain. The current upgraded lagoon capacity can service the Hamlet and the Airport up to a population of 349, which is expected to be reached by year 2040.

There are plans to upgrade the existing 100 mm and 150 mm forcemain from the Hamlet of Villeneuve lift station to the lagoon to 150 mm and 200 mm respectively. The long-term plan for wastewater collection is to decommission the lagoons and diverting the flow to the Alberta Capital Region Wastewater Commission (ACRWC) Parkland Sanitary Trunk approximately 8 km to the South through a proposed central lift station located south of the Hamlet and a 300 mm HDPE forcemain.

3.2 Design Criteria

Sturgeon County is in the process of updating the General Municipal Servicing Standards, and the list below summarizes the design standard relevant to the current study.

- Average Sewage Generation Rate for Industrial and Commercial = 20,000 L/ha/d.
- Peak Dry Weather Flow = $Q_{peak\ dry\ weather} = (Q_{Average\ flow} \times P_f)$
 - $P_f = 10(Q_{Average\ flow})^{-0.45}$
 - The peaking factor shall not be less than 3.0 or greater than 25.0. If a peaking factor of less than 3.0 is calculated, use 3.0. If a peaking factor of greater than 25.0 is calculated, use 25.0.
- Inflow and Infiltration Allowance Rate = 0.28 L/s/ha.

3.3 Wastewater Flow

Table 3.1 summarizes the existing wastewater flows for the Villeneuve Hamlet and the Airport. The existing Hamlet wastewater flow was calculated from the annual lift station usage in 2017. The Airport average wastewater flow was documented in Sturgeon County Infrastructure Master Plan (2017) and estimated to contribute about 5.7 m³/d (0.07 L/s). There is no available information on peak wet weather flows at the lift station and thus, inflow / infiltration was not determined for the existing system as well.

Table 3.1 Existing Villeneuve Hamlet and Airport Wastewater Flow

Scenario	Approximate Existing Area (ha)	Dry Weather Flow (L/s)	Peak Dry Weather Flow (L/s)	Inflow / Infiltration (L/s)	Peak Wet Weather Flow (L/s)
Existing Hamlet	40	1.1	2.5	N/A	N/A
Existing Villeneuve Airport	27	0.07	N/A	N/A	N/A

Table 3.2 summarizes the proposed wastewater flow for the study area. Proposed study area wastewater flow was calculated with the light industrial generation rate in the updated servicing standard, as well as the rate calculated from historical Villeneuve Airport Reservoir usage. The historical Villeneuve Airport Reservoir usage rate was considered because wastewater flow is generally proportional to water usage and sometimes used to determine wastewater flow where wastewater flow data is not available. The rate from the standard is more conservative in nature and the actual flow may be closer to the historical rate calculated from the Airport Reservoir usage.



Table 3.2 Proposed Sturgeon County Study Area Wastewater Flow

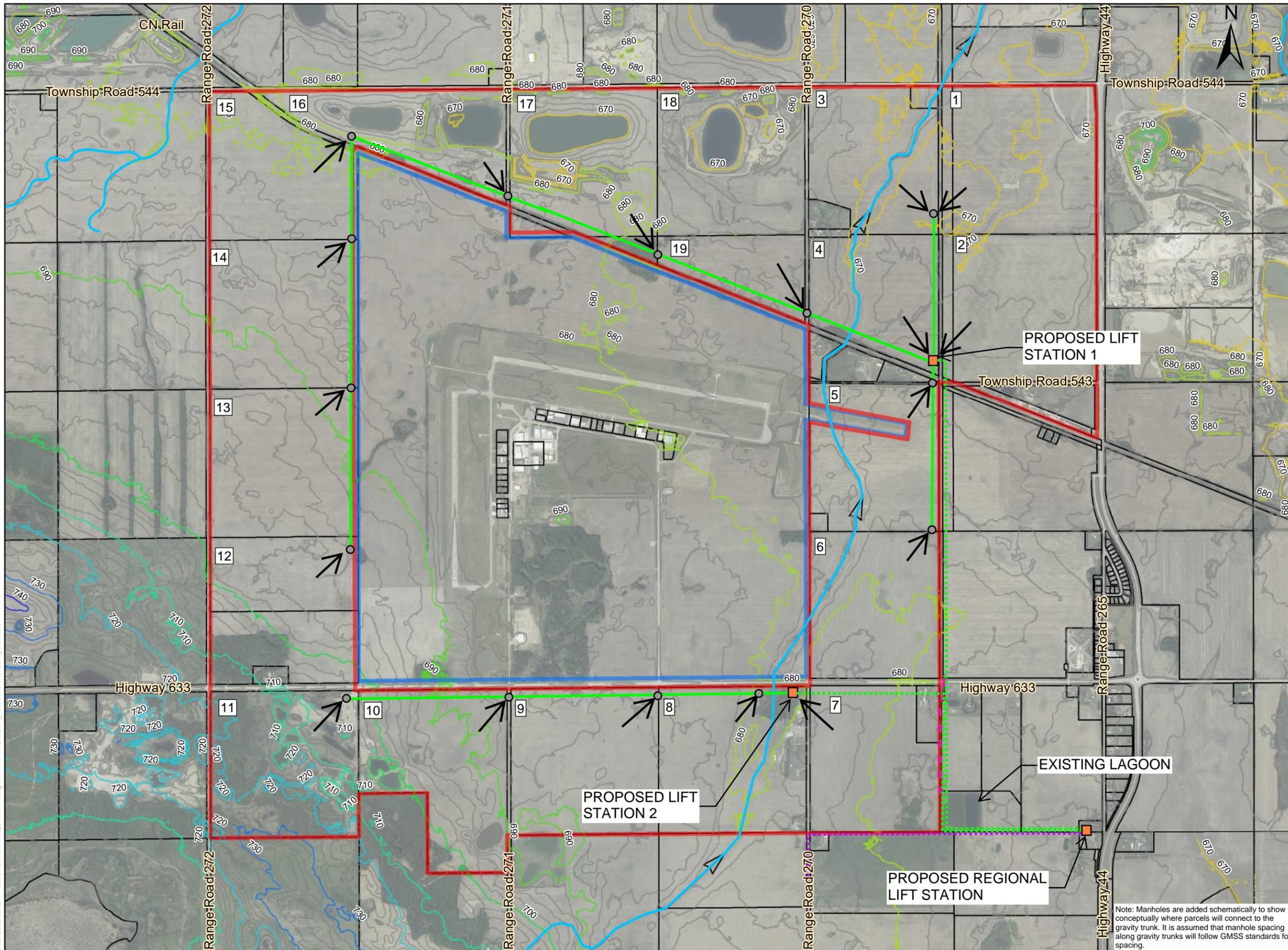
Scenario	Gross Developable Area (ha)	Dry Weather Flow (L/s)	Peak Dry Weather Flow (L/s)	Inflow / Infiltration (L/s)	Peak Wet Weather Flow (L/s)
Study Area at 770 L/ha/d (Historical)	842.4	7.5	15.0	236.0	243.5
Study Area at 20,000 L/ha/d (Conservative)	842.4	195.0	585.0	236.0	821.0

3.4 Proposed Wastewater Servicing Concept for ASP Area

Figure 3.1 shows the wastewater servicing concept for the planning area. Parcels 1 to 6 and 12 to 19 will be serviced through the gravity system to proposed Lift Station 1 at southeast corner of Parcel 4 with a dedicated forcemain to the proposed regional lift station. Parcels 8 to 11 will be serviced through the gravity system service to the proposed Lift Station 2 located at northeast corner of Parcel 8 with a dedicated forcemain to the proposed regional lift station. Parcel 7 will be serviced through a local wastewater system to proposed Lift Station 2. The proposed regional lift station will be located at Range Road 265, approximately 1 km east of existing lagoon. Both lift stations will be serviced with a dedicated forcemain but, if a combined forcemain is desired, further engineering study will be required to check for feasibility, operational and maintenance constraints. The proposed regional lift station will be serviced through a regional forcemain to the ACRWC Parkland trunk sewer.

Due to the uncertainty of the actual demand that will be generated in this planning area, all proposed system should be designed with upgrading flexibility in mind.

There is potential for low-pressure sewers, but this can introduce operational and maintenance concerns that could limit developer interest in the area (e.g., private septic tank maintenance). Therefore, a low-pressure wastewater system is not proposed for the study area.



- Legend**
- STURGEON COUNTY STUDY AREA
 - EDMONTON REGIONAL AIRPORT AUTHORITY PLANNING AREA
 - CADASTRAL
 - ▶ WATER COURSE
 - - - 150 mm EXISTING FORCEMAIN
 - . . . 300 mm PROPOSED REGIONAL FORCEMAIN
 - PROPOSED GRAVITY SEWER
 - . . . PROPOSED FORCEMAIN
 - CONCEPTUAL MANHOLES LOCATION
 - PROPOSED LIFT STATION

Coordinate System:
NAD 1983 CSRS 3TM 114

1:20,000



FIGURE 3.1
SANITARY CONCEPT SERVICING PLAN
VILLENEUVE AIRPORT AREA ASP



Note: Manholes are added schematically to show conceptually where parcels will connect to the gravity trunk. It is assumed that manhole spacing along gravity trunks will follow GMSS standards for spacing.

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3.5 Interim Servicing Options

According to the proposed development phasing shown in **Figure 1.2**, interim servicing was investigated on the number of parcels that can be serviced without triggering the need for the regional lift station and forcemain. The interim servicing option relies heavily on the availability of the existing Villeneuve Lagoon on receiving additional flow; therefore, discussions between Sturgeon County and Alberta Environment and Parks will be required to determine if the Villeneuve Lagoon can receive domestic wastewater from industrial sites (e.g. industrial buildings with sinks and bathrooms but no industrial processes). Any process / industrial wastewater will not be accepted in the existing lagoon.

Short term non-residential development with strictly domestic flows, such as bathrooms, can be serviced by the Villeneuve Lagoon pending approval from the Province. Wastewater flow from the study area should be monitored to not exceed the existing lagoon capacity, as well as ensuring that no process / industrial wastewater is entering the existing lagoon. To service process / industrial flow, a new lagoon will need to be built and the County will need to apply for a new permit to discharge. Visual assessment shows that there is available land east of the existing lagoon to construct an interim lagoon, though further investigation will be required for cost and feasibility.

Development in Parcels 1 to 6 will trigger the gravity trunk to proposed Lift Station 1 and the forcemain to the lagoon. Development in Parcel 7 will trigger the proposed Lift Station 2 and the forcemain to the lagoon. Development in Parcels 8 to 11 will trigger the need for the gravity trunk, the forcemain and proposed Lift Station 2. Parcels 12 to 19 should be delayed until Parcels 1 to 6 are developed to reduce offsite infrastructure cost.

4.0 Stormwater Servicing Plan

4.1 Existing Drainage

The existing stormwater system consists mostly of ditches and culverts. There are three quarter sections north of Villeneuve Airport with large clay lined gravel pits that have since filled with water that were left behind from previous aggregate mining. There are two watercourses by the study area. One flows through the southeast side of the study area and flows northeast toward the Sturgeon River. The other is located northwest of the study area and crosses the railway at Range Road 272, as shown in **Figure 1.1**.

4.2 Design Criteria

Sturgeon County is in the process of updating the General Municipal Servicing Standards, and the list below summarizes the design standard relevant to the current study with some from a different but approved source:

- The pond sizes should be designed to contain the total rainfall depth for 1 in 100-Year, 24 Hour Huff simulated storm;
- Minimum runoff coefficients for Agriculture, Undeveloped Land is 0.10;
- Minimum runoff coefficients for Industrial is 0.8; and
- Outflow rate will be controlled at 2.5 L/s/ha according to the Big Lake Stormwater Management Plan (2004).



4.3 Proposed Stormwater Servicing Concept for ASP Area

Figure 4.1 shows the stormwater servicing concept for the planning area. Most quarter sections will have a dedicated Stormwater Management Facility (SWMF) located at the lowest point of the quarter section. For Parcels 16 to 18, it is proposed to use the existing clay lined ponds for stormwater servicing. These ponds do not have an outlet and are proposed to remain as evaporation ponds. Parcel 19 will not have a dedicated pond due to the parcel size and is proposed to be graded toward the Parcel 18 evaporation pond.

The ponds in Parcels 9 to 11 and 12 to 14 are connected through a series of pipes that will ultimately release at a downstream water course at a controlled rate of 2.5 L/s/ha. Parcel 7 requires overall grading toward the storm ponds especially for west side of the parcel. Parcels 1 to 11 will drain to the water course flowing through the study area on the east side, Parcels 12 to 15 will drain northwest along the railway ditch crossing through the culvert under the railway east of Range Road 272 and towards the water course northwest to the planning area. Stormwater pond sizes were estimated based on the gross catchment area that is flowing toward the lowest point in the parcel, using an 80% imperviousness for the developable area, 10% imperviousness for offsite undeveloped land and a total rainfall depth for the 1 in 100-Year, 24-Hour Huff simulated storm. Areas to the west will require further study to determine if offsite drainage will be intercepted by Range Road 272 since it will impact the actual pond size. The pond surface area depends on the pond depth which depends on the relative elevation of the downstream watercourse. Due to the relative shallow depth of the existing watercourses, several SWMF will need to be pumped. Some ponds will require pumping even if it is near the receiving water course due to the depth required to retain flow may set the pond normal water level (NWL), and the outlet pipe lower than the connecting water course. For the servicing study, ponds that are pumped assume a 2 m pond depth and ponds that are drained by gravity assume a 1 m pond depth. The stormwater ponds in this servicing study are conceptual in nature and further study will be required to refine the location of the pond and confirm whether pumping is required. **Table 4.1** summarizes the stormwater pond details for each quarter section.



Table 4.1 Proposed Stormwater Pond Details

Quarter Section	Approximate Gross Catchment Area (ha)	Assumed Pond Depth (m)	Approximate Pond Area (ha)	Proposed Outlet	Proposed Draining Method
1	88.8	2.0	5	Tributary of Sturgeon River	Pumping
2	80.8	2.0	4	Wet Pond at Parcel 1	Pumping
3	39.7	2.0	2	Tributary of Sturgeon River	Pumping
4	38.7	2.0	2	Tributary of Sturgeon River	Pumping
5	37.8	2.0	2	Tributary of Sturgeon River	Pumping
5A	17.0	2.0	1	Tributary of Sturgeon River	Pumping
6	50.7	2.0	3	Tributary of Sturgeon River	Pumping
7	55.8	2.0	3	Tributary of Sturgeon River by the lagoon	Pumping
8	41.5	2.0	2	Tributary of Sturgeon River	Pumping
8A	9.0	2.0	0.5	Tributary of Sturgeon River	Pumping
9	115.2	2.0	4	Tributary of Sturgeon River	Pumping
10	118.3	1.0	8	Wet Pond at Parcel 9	Gravity
11	76.7	1.0	7	Wet Pond at Parcel 10	Gravity
12	97.1	1.0	8	Wet Pond at Parcel 13	Gravity
13	131.3	1.0	8	Wet Pond at Parcel 14	Gravity
14	179.0	1.0	9	Tributary of Sturgeon River by the Railway	Gravity
15	184.3	2.0	4	Tributary of Sturgeon River by the Railway	Pumping
16	N/A	N/A	N/A	N/A	N/A
17	N/A	N/A	N/A	N/A	N/A
18	N/A	N/A	N/A	N/A	N/A
19	N/A	N/A	N/A	Grade to flow toward Parcel 18 Pond	N/A

4.4 Interim Servicing Options

Based on the proposed phasing, the parcels that are developing in short term are close to the water course where the storm ponds can connect directly. For parcels that are not close to the receiving water course and are proposed to drain through another pond before reaching the water course, alternative stormwater servicing will be required. Alternative servicing options could include pumping to or using a graded drainage ditch that drains to the nearest receiving water course.



5.0 Conclusion

The overall planning area can be serviced with water, wastewater, and stormwater infrastructure. Development phasing is important as it impacts the amount of offsite infrastructure needed to service the area. The south and east portions of the planning area is easier to service than the northwest area. There is some uncertainty regarding the proposed water demand rate and wastewater generation rate, and the difference between the historical rate and the standard rate is high and can trigger different upgrading requirements. Therefore, all proposed system should be designed to consider upgrading flexibility such as space for additional pumps in lift station and forcemain locations with potential for twinning.

6.0 Recommendation

The following list summarizes the recommendations for each servicing unit.

Water

- Consider upgrading the Hamlet Reservoir storage and pumping capacity as per WWIA Phase I. Investigate the potential for the Hamlet Reservoir to service future growth on an interim basis until a time that future reservoirs are constructed.
- Investigate reservoir storage sharing between the Hamlet Reservoir, proposed reservoir to the west and potentially the airport reservoir to improve storage turnover.
- Investigate the opportunity for by-passing the Northern Lights Reservoir by installing a separate booster station to service the Villeneuve Transmission Main and Reservoir.
- Upgrade the Northern Lights Reservoir and pumping capacity if the by-pass option is not pursued.
- It is noted that the historical maximum day demand along the Morinville water line is 51 L/s. Currently, EPCOR can provide a maximum day demand of 74 L/s which is based on the 5-year growth projections provided by the municipalities. The following are recommended as the Villeneuve area develops:
 - Although very unlikely, the VAASP water demands could exceed the available Morinville line capacity. The County is committed to investigating alternative water supply options should they ever become necessary.
 - Projecting future water demands considered two water demand rates:
 - 770 L/ha/d – historical water usage from the Villeneuve airport.
 - 20,000 L/ha/d – this is a standard value for urban developments that is considered to be very conservative. Especially in the VAASP area where non-residential development is not anticipating any heavy water users, this demand rate should be considered with caution as it will overestimate the actual water demands in the growth area. Typically, demand rates this high are intended for design of local water mains and not for transmission systems.
 - Representatives from EPCOR mentioned that development in the Villeneuve airport area at historical demand rates could be supplied by EPCOR; however, the conservative demand rates would require further discussion.
 - As Villeneuve develops:
 - If the County exceeds the 23.3% allocation of the Morinville line, the County can lease additional capacity from the Morinville Line until a time where development would exceed 74 L/s.
 - Once the capacity of 74 L/s is reached, this will trigger discussions with EPCOR to increase the flow to the Morinville line to 100 L/s. As Villeneuve development continues, the County can lease capacity from the line should their usage exceed 23.3%.
 - Once the 100 L/s capacity is reached, if Villeneuve development is driving the increase in water demands, then the County will need to purchase the pump and install it within the Morinville Booster Station to increase the capacity of the Morinville line to approximately 300 L/s (will require further discussions with EPCOR regarding supply).
 - The County is willing to cover all applicable costs for the above items in order to develop the VAASP area.



Wastewater

- Determine if lagoon policy allows for light industrial wastewater flows that are domestic in nature to be serviced by the existing lagoon in the interim.
- Conduct further study on available lagoon capacity for domestic flow from study area if lagoon is approved to receive flow from study area.
- A new lagoon will be needed if treating light industrial flows for interim servicing is desired, however, further study will be required.
- Encourage development to begin in the southeast of the study area and develop either to the west and/or to the north to optimize offsite infrastructure cost

Stormwater

- Conduct additional study to refine pond catchment boundary to optimize pond design.



Corporate Authorization

This document entitled "Villeneuve Airport Area Structural Plan Servicing Memo – Final" has been prepared by ISL Engineering and Land Services Ltd. (ISL) for the use of Sturgeon County. The information and data provided herein represent ISL's professional judgment at the time of preparation. ISL denies any liability whatsoever to any other parties who may obtain this report and use it, or any of its contents, without prior written consent from ISL.

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Lead, Water Planning



APPENDIX D

Transportation Analysis



**Villeneuve Airport Area Master Plan –
Transportation Analysis Memo for
Area Structure Plan (ASP)**

Prepared for:

Sturgeon County
Alberta, Canada

Document	H-365554-AC-230-S1-0002 - Rev.0
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Revision History Record					
Rev.	Description	Date	Originator	Checker	Approver
0	Memo	May 26, 2022	Rayan Farage	Benson Nguyen	Lincoln Chan

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1 TRANSPORT NETWORK

ZVL is located 10 km due West of St. Albert on Highway 633, close to the Highway 44 intersection and 39 km Northwest of Edmonton.

The Master Plan explored the existing local transport infrastructure to understand opportunities and constraints placed on future development, road condition, and when road upgrades will be required.

Preliminary site feasibility studies focused on the following areas:

- Existing road conditions and technical analysis
- Existing traffic movement survey information
- Initial demand capacity and capacity analysis
- Highways Authority plans and policies
- Airport operations and businesses interfaces
- CN rail right-of-way alignment requirements

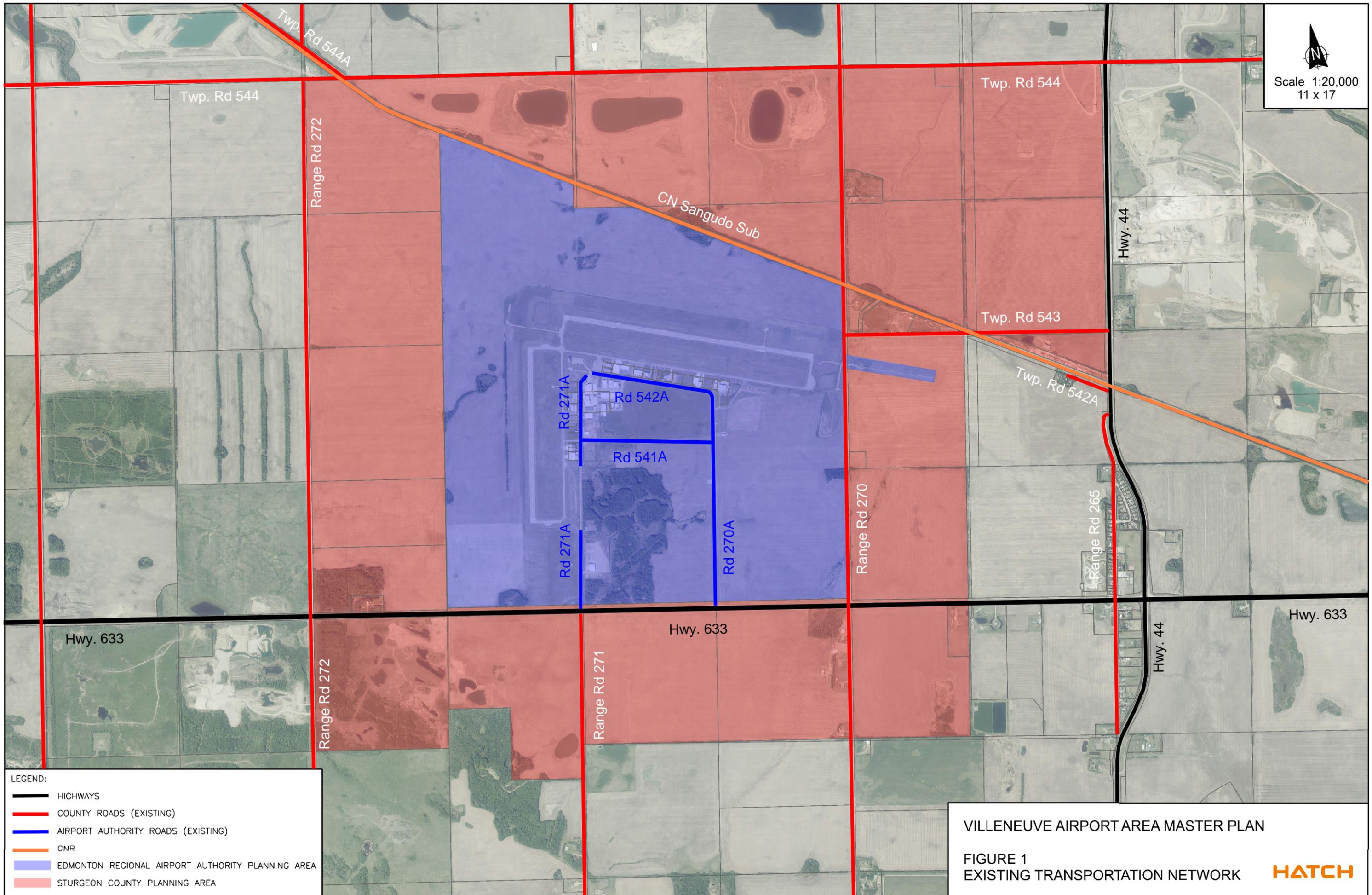
1.1 AREA TRANSPORTATION NETWORK

The airport lands are well served by a grid transportation network that includes provincial highways and municipal roads that link the lands to the Cities of Edmonton and St. Albert, as well as the surrounding region and private roads that are under the jurisdiction of EIA.

The existing road network within the Study Area includes two provincial highways, Highway 44 and Highway 633, and municipal County roadways. The existing road network is shown on Figure 1.

OCTOBER 1, 2021 - H365554-AC-120-S1-0008 - EXISTING TRANSPORTATION NETWORK

Scale 1:20,000
11 x 17



LEGEND:

- HIGHWAYS
- COUNTY ROADS (EXISTING)
- AIRPORT AUTHORITY ROADS (EXISTING)
- CNR
- EDMONTON REGIONAL AIRPORT AUTHORITY PLANNING AREA
- STURGEON COUNTY PLANNING AREA

VILLENEUVE AIRPORT AREA MASTER PLAN

FIGURE 1
EXISTING TRANSPORTATION NETWORK

1.2 REGIONAL TRANSPORTATION FACILITIES

1.2.1 PROVINCIAL HIGHWAYS

Highway 44 is a north-south two-lane provincial highway located adjacent to the East boundary of the existing development within the Hamlet of Villeneuve (Villeneuve). Highway 44 connects Highway 16 (Yellowhead Highway) 10 km south of the airport with Northern Alberta communities including Westlock, Slave Lave, and Peace River. The paved surface is approximately 11.8 metres wide with shoulders and a posted speed limit of 80 km/h - 100 km/h. Full illumination is not provided along Highway 44 but partial illumination is provided at key intersections. Highway 44 is designated as a High Load goods movement corridor and a future expressway or freeway in Schedule 1 of the Edmonton Municipal Region Board Integrated Transportation Master Plan (EMRBITMP).

Highway 633 is an east-west provincial highway that connects Highway 2 (St. Albert Trail) in the East with Highway 779 approximately 25 km to the west of Highway 2. Highway 633 passes through Villeneuve located approximately 12 km west of Highway 2 and is adjacent to the Southern part of the existing ZVL lands.

Highway 633 has a 9.2-metre-wide road width west of Highway 44 and an 8.4-metre-wide road width East of Highway 44. The posted speed limit along the highway within Villeneuve is 50 km/h, increasing to 100 km/h westerly from RR270. The speed limit along Highway 633 east of Highway 44 is 100 km/h. Street lighting is not provided along the highway, but partial illumination is provided at key intersections. The highway is designated as an existing/future expressway or freeway in Schedule 1 of the EMRBITMP.

The intersection of Highway 44 and Highway 633 includes a single-lane roundabout with an inscribed circle diameter of approximately 49 metres, an apron having a circulation diameter of approximately 35 metres, and an inner circulation diameter of approximately 22 metres. There are single lane entries on all legs, and with a channelized right turn from Highway 633 eastbound to Highway 44 southbound. Truck aprons are provided on all corners and around the central island to accommodate the over tracking of larger commercial vehicles. A horizontal deflection is provided on the westbound entry for speed control on this approach. The eastbound entry alignment is constrained by the intersection of Highway 633 with TWP Road 265 located approximately 160 metres west of the roundabout. The north and south entries are offset from each other, with the approaches realigned to give an intersecting angle closer to 90 degrees.

1.2.2 MUNICIPAL ROADS

Range Road 270 is a rural north-south roadway located approximately 1.6 km west of Highway 44. This road has a gravel surface adequate for two travel lanes without shoulders and is generally on a tangential horizontal alignment. The Villeneuve Airport lands are located immediately west of this road. The intersection of Range Road 270 and Highway 633 is a four-legged unsignalized intersection with stop control on the north and south approaches. The intersection is currently designed as a Type 1b intersection which is typical for intersecting roads having an AADT volume of less than 200 veh/d. The assumed speed

limit is 80 km/h. RR270 extends across the east end of the runway approach to the airport before crossing the CN Rail tracks to the north.

Range Road 271 is a two-lane paved private road within the area of the VAA. It is discontinuous north of Highway 633, with the southern section having a gravelled surface serving as access to the existing construction tenant. The intersection of RR271 and Highway 633 is a four-legged unsignalized intersection that is designed as a Type 1b intersection in accordance with provincial standards. This type of design is appropriate for connecting roads that have AADT volumes of less than 200 veh/d. All approaches to the intersection with Highway 633 are single lane gravelled surfaced approaches, without provision for added turning lanes or tapers. The assumed speed limit is 80 km/h south of Highway 633. The roadway north of Highway 633 is a private road within airport lands without a posted speed limit.

Township Road 542A is a rural east-west paved roadway accommodating two travel lanes with shoulders that serves as the access to an existing residential property from Highway 44. The road is located approximately 25 metres south of the CN Rail tracks and terminates approximately 300 metres west of Highway 44. The intersection of TWP Road 542A and Highway 44 is an unsignalized 'T' intersection with stop control on the West approach. Single lane approaches are constructed on all legs to the intersection without the provision of separate left or right turn lanes.

A private road providing access to Ward Chemical is located approximately 50 metres north of the CN Rail tracks. This private roadway connects between Highway 44 at the east end and Township Road 543 at the west end. The intersection with Highway 44 is an unsignalized 'T' intersection with stop control on the west approach. Single lane approaches are constructed on all legs to the intersection without the provision of separate left or right turn lanes. This intersection is currently designed as a Type 1a intersection. This type of intersection design is normally adequate for AADT volumes of less than 200 veh/d.

The rail crossing of Highway 44 located between the private road to Ward Chemical and TWP Road 542A includes automatic protection including flashing signals and crossing signs. The crossing is paved between the tracks.

Township Road 543 is an east-west municipal road that connects RR270 and Highway 44. TWP Road 543 has a gravel surface adequate for 2 travel lanes without shoulders. The roadway currently serves as access to an existing farm and has field entrances situated along its length as well as a connection to the private road serving Ward Chemical located approximately 700 metres west of Highway 44. The intersection with RR270 is designed as Type 1a as a three-legged unsignalized intersection. The intersection with Highway 44 is also designed as a Type 1a three-legged intersection, without provision for added turn lanes in Highway 44. The right-of-way for TWP Road 543 is approximately 15 metres.

TWP Road 543 also has an at-grade intersection with the CN Sangudo Subdivision. This crossing of the single CN track is located approximately 800 metres east of RR270. The crossing has an acute angle with the tracks and railway crossing signs with stop signs below on both east and west approaches. The surface of the crossing consists of wood planks extending for the width of the crossing. The assumed speed limit is 60 km/h.

Township Road 544 is a municipal east-west road extending from east of Highway 44 to west of RR272. The roadway has a gravel surface adequate for two travel lanes without shoulders. The posted maximum speed for trucks is 80 km/h. The intersection of TWP Road 544 and Highway 44 consists of a four-legged intersection. The highway approaches include widening for a northbound and southbound shared through and left turn lane and southbound bypass lane and a separate southbound right turn lane. The northbound bypass lane is marked as a separate northbound to eastbound right turn lane. The east-west approaches have gravel surface and include throat widening to accommodate the movements of larger vehicles to/from Highway 44. TWP Road 544 also has an intersection with RR272 located approximately 4.8 km west of Highway 44 as well as a private access to the Inland Aggregate site located to the northwest. RR272 has been realigned to be discontinuous at this intersection such that westerly movement on TWP Road 544 is now redirected to the Inland development and movement to the existing TWP Road 544 west is made via a left turn to a realigned link that connects to the existing TWP Road 544 and to RR272 at an intersection located 50 metres to the west. The realignment of the roads at the intersection is reinforced through the use of a temporary concrete barrier placed along the south side.

TWP Road 544 intersects the CN Sangudo Subdivision at a crossing located between the intersections of RR272 (west of the crossing) and TWP Road 544A (east of the crossing). The crossing is at-grade and has rail crossing signage with flashing lights. The TWP Road 544A intersection has a gravel surface, and all approaches consist of single-lane approaches. Stop control is provided on TWP Road 544A (north approach).

1.2.3 AIRPORT NETWORK

Road 270A (Airport Access Road) is a private access under the jurisdiction of the Airport Authority. The roadway has two travel lanes and 2-metre partially paved shoulders (1 metre paved). The roadway connects with Highway 633 and runs northward and intersects with Road 542A and Road 541A (recently improved east-west access road connecting to Road 271A within the airport) that serve the current airport development. The intersection of Road 270A and Highway 633 is a three-legged intersection with stop control on the north approach. The intersection is designed as a Type IIIa intersection. This design provides a left turn bypass lane for eastbound traffic and westbound right turn deceleration taper and escape/acceleration taper on the west side of the intersection for westbound traffic. The north approach to the intersection includes a minor throat widening with one southbound lane and one northbound lane (no added widening for the southbound left-turn lane). The posted speed limit is 70 km/h.

Road 542A is a private road within the airport lands that connects to Road 270A at the east end and terminates east of Road 271A. The road is under the jurisdiction of the Airport Authority and provides local access to adjacent airport development. Road 542A has two paved traffic lanes and two partially paved (1-metre paved) shoulders. The posted speed limit is 50 km/h. The road is currently fenced off on the west end.

Road 271A is the separate north section of Road 271 within the airport. This private road has a paved surface and serves as a north-south connection within the airport lands providing access to the existing development and is accessible from Road 541A and Road 270A.

Road 541A (a recently improved east-west road connecting to Road 270A and Road 271A, within the airport) is a private road having two paved travel lanes and two partially paved (1 metre) wide shoulders.

1.3 FUNCTIONAL CLASS, VOLUMES AND SPEED

Existing (2018) daily and peak hour traffic volumes and road network roads in the study area are identified in the Sturgeon County Infrastructure Master Plan. Table 1 summarizes key routes in the study area. Volumes are based on existing (2018) traffic volumes provided in the County IMP and the application of a linear background traffic growth rate of 2.5 percent per annum for non-study area traffic growth. Traffic analysis of the existing and future background traffic volumes for key roadways within the study area, specifically the intersection of Highway 633 and Road 270A (Airport Access), was undertaken in the County IMP. It was found that this intersection is and will continue to operate at Level of Service (LOS) D with no improvements needed to accommodate the existing or future background (without further airport area development).

TABLE 1: EXISTING AND FUTURE BACKGROUND TRANSPORTATION NETWORK CHARACTERISTICS

Road/Hwy	From	To	Jurisdiction	Functional Classification	Posted Speed (km/h)	2018 Daily Volume (veh/d)	2044 Daily Volume (veh/d)
Hwy 633	W. County Bdy	Hwy 44	Province	Highway	100 (50 in Hamlet)	3200 - 3400	5300 - 5600
Hwy 633	Hwy 44	E. County Bdy	Province	Highway	100	2000 - 4000	>8000
Hwy 44	S. County Bdy	Hwy 37	Province	Highway	100 – with drop to 80 and 50 km/h at roundabout	4000 - 8000	>10000
Road 271A	Airport	Southerly	Airport Authority	Rural Local	50	<200	200 - 500
Range Road 272	S. County Bdy	Hwy 633	Township	Rural Local	80	200 - 500	500 – 1000
Range Road 272	Hwy 633	TWP Road 544	Township	Rural Local	80	<200	200 – 500
Road 270A (Airport Road)	Hwy 633 Northerly	Road 542A	Airport Authority	Rural Collector	70	3800	4000 – 8000
Range Road 270	Hwy 633	TWP Road 544	Township	Rural Local	80	<200	200 – 500
TWP Road 265	Hwy 633	Hwy 44	Township	Rural Collector	50	3300	5400
Road 541A	Road 271A	Road 270A	Airport Authority	Rural Local	50	<200	<200
Road 542A	Road 270A	--	Airport Authority	Rural Local	50	3500	4000
TWP Road 543	Hwy 44	TWP Rd 270	Township	Rural Local	50	<200	200 – 500
TWP Road 544	Hwy 44	TWP Road 272	Township	Rural Local	80	<200	200 – 500

Notes:

1. Traffic volumes based on 2018 traffic data sourced from the Sturgeon County Infrastructure Master Plan.
2. Future daily traffic volumes based on a linear background growth rate of 2.5 percent per annum.

1.4 ROAD HIERARCHY

A hierarchy of functional classification of study area rural roads has been based on the classification scheme presented in the County IMP. Tables 5.10 and 5.11 of the IMP are reproduced in Table 2. This classification scheme has been incorporated into the road summary presented in Table 1. Road improvement needs that are keyed to changes in use and traffic volume are noted in Table 2. Relevant characteristics of rural and urban roads published by the Transportation Association of Canada in Table 2.6.4 and Table 2.6.5 extracted from the Geometric Design Standards for Canadian Roads and Streets are reproduced in Table 2 and Table 3.

The multi-jurisdictional nature of the existing transportation network is a significant characteristic that adds complexity in terms of the coordination and implementation of improvements.

TABLE 2: RURAL ROADWAY CLASSIFICATIONS

	Rural Local	Rural Collector
Traffic Volumes	0 – 1000 vehicles per day	>1000 vehicles per day
Connectivity	Limited connectivity to any substantial development areas. Providing access to local acreages, farmsteads and small subdivisions.	Providing dedicated access between several local roadways connecting to a substantial built-up area.
Description	Narrow, unimproved gravel surface with one lane per direction. Shoulder widening is required @ 200 vehicles per day with dust abatement. Hard surfacing is required at 500 vehicles per day.	Hard surfaced, with additional widening. roadway structure and width depend on the volume and type of traffic.

TABLE 3: SUBURBAN/HIGHWAY ROADWAY CLASSIFICATIONS

	Local	Collector	Arterial
Traffic Volumes	0 – 2000 vehicles per day	2000 – 10,000 vehicles per day	2 lanes <15,000 vehicles per day* 4 lanes <25,000 vehicles per day*
Connectivity	Main access road to a built-up area with a high number of residential or business accesses.	Connectivity between local roadways and arterials.	Regional connectivity. Provincial Highway network but may have some links with lower volumes.
Description	Hard surfaced, once developed. May include sidewalks, streetlights, landscaping, and other urban elements.	Hard surfaced. May include sidewalks, streetlights, landscaping, and other urban elements.	Improved/Paved, urban standard (streetlights, underground stormwater), two lanes per direction.

*Number of lanes depend on Alberta Transportation Design Guidelines

Table 2.6.4: Characteristics of Rural Roads

	Rural Locals	Rural Collectors	Rural Arterials	Rural Freeways
service function	traffic movement secondary consideration	traffic movement and land access of equal importance	traffic movement primary consideration	optimum mobility
land service	land access consideration	traffic movement and land access of equal importance	land access secondary consideration	no access primary
traffic volume vehicles per day (typically)	<1000 AADT	<5000 AADT	<12 000 AADT	>8000 AADT
flow characteristics	interrupted flow	interrupted flow	uninterrupted flow except at signals	free flow (grade separated) major intersections
design speed (km/h)	50 - 110	60 - 110	80 - 130	100 - 130
average running speed (km/h) (free flow conditions)	50 - 90	50 - 90	60 - 100	70 - 110
vehicle type	predominantly passenger cars, light to medium trucks and occasional heavy trucks	all types, up to 30% trucks in the 3 t to 5 t range	all types, up to 20% trucks	all types, up to 20% heavy trucks
normal connections	locals collectors	locals collectors arterials	collectors arterials freeways	arterials freeways

Source: Transportation Association of Canada, “Geometric Design Guide for Canadian Roads”, June 2017.

Table 2.6.5: Characteristics of Urban Roads

	Public Lanes		Locals		Collectors		Arterials		Expressways	Freeways
	Residential	Commercial	Residential	Industrial / Commercial	Residential	Industrial / Commercial	Minor	Major		
traffic service function	traffic movement not a consideration		traffic movement secondary consideration		traffic movement and land access of equal importance		traffic movement major	traffic movement primary consideration	traffic movement primary consideration	optimum mobility
land service / access	land access only function		land access primary function		traffic movement and land access of equal importance		some access control	rigid access control	no access	no access
traffic volume (veh/day) (typical)	<500	<1,000	<1,000	<3,000	<8,000	1,000 – 12,000	5,000 – 20,000	10,000 – 30,000	>10,000	>20,000
flow characteristics	interrupted flow		interrupted flow		interrupted flow		uninterrupted flow except at signals and crosswalks		uninterrupted flow except at signals	free-flow (grade separated)
design speed (km/h)	30 – 40		30 – 50		50 - 80		50 - 70	60 - 100	80 - 110	80 - 120
average running speeds (km/h) (off-peak)	20- 30		20 – 40		30 - 70		40 - 60	50 - 90	60 - 90	70 - 110
vehicle type	passenger and service vehicles	all types	passenger and service vehicles	all types	passenger and service vehicles	all types	all types	all types up to 20% trucks	all types up to 20% trucks	all types up to 20% trucks
desirable connections	public lanes, locals		public lanes, locals, collectors		locals, collectors, arterials		collectors, arterials, expressways, freeways		arterials, expressways, freeways	arterials, expressways, freeways
transit service	not permitted		generally avoided		permitted		express and local buses permitted		express buses only	express buses only
accommodation of cyclists	no restrictions or special facilities		no restrictions or special facilities		special facilities considered		No restrictions; special facilities considered		prohibited	prohibited
accommodation of pedestrians	pedestrians permitted, no special facilities		sidewalks normally on one or both sides	sidewalks provided where required	sidewalks provided both sides	sidewalks provided where required	sidewalks may be provided, separation for traffic lanes preferred		pedestrians prohibited	pedestrians prohibited
parking (typically)	some restrictions		no restrictions or restrictions one side only		few restrictions other than peak hour		peak hour restrictions	prohibited or peak hour restrictions	prohibited	prohibited
min. intersection spacing (m) ¹	as needed		60		60		200	400	800	1,600 (between interchanges)
right-of-way width (m) (typically)	6 - 10		15 – 22		20 - 24		20 ² - 45 ³		>45 ³	>60 ³

- Notes:** 1 More information about intersection spacing is provided in Chapter 9 – Intersections.
 2 Rights-of-way 20 m in width applicable to retrofit conditions only.
 3 Wider rights-of-way are often required to accommodate other facilities such as utilities, noise mitigation implications, bikeways and landscaping. For new streets, the immediate provision of wider rights-of-way may be considered to accommodate such facilities.

Source: Transportation Association of Canada, “Geometric Design Guide for Canadian Roads”, June 2017

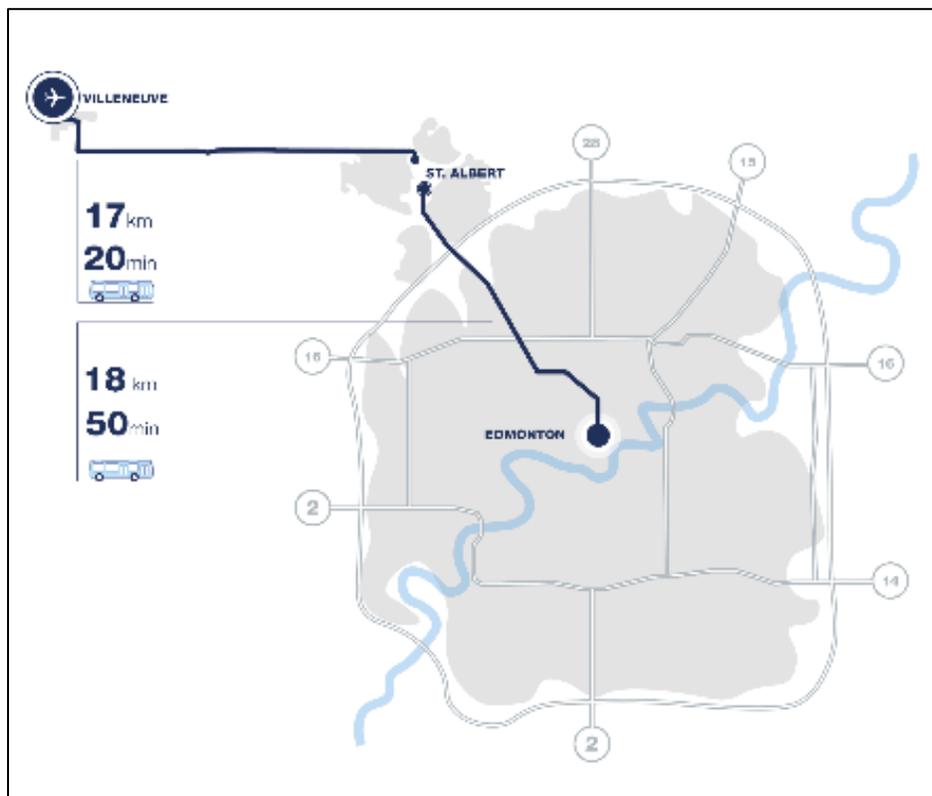
1.5 TRANSIT

The Master Plan is aligned to Federal Government commitments to achieve net-zero emissions by 2050. Another major consideration is to ensure that the development is fully accessible and safeguards for all modes of transport including cycles, and pedestrians.

As the Master Plan builds out the number of jobs and car trips will increase creating potential for congestion on local roads at peak periods and associated environmental impacts CO₂ emissions and air quality. Currently there is no bus service and no plans to invest in public transit connectivity. The principal mode of transport to and from the VAA is private car and taxi.

The Master Plan will safeguard for a frequent service transit bus connectivity from St. Albert to the VAA, improving access to jobs for local communities. It is proposed that the development area businesses would pay for this service.

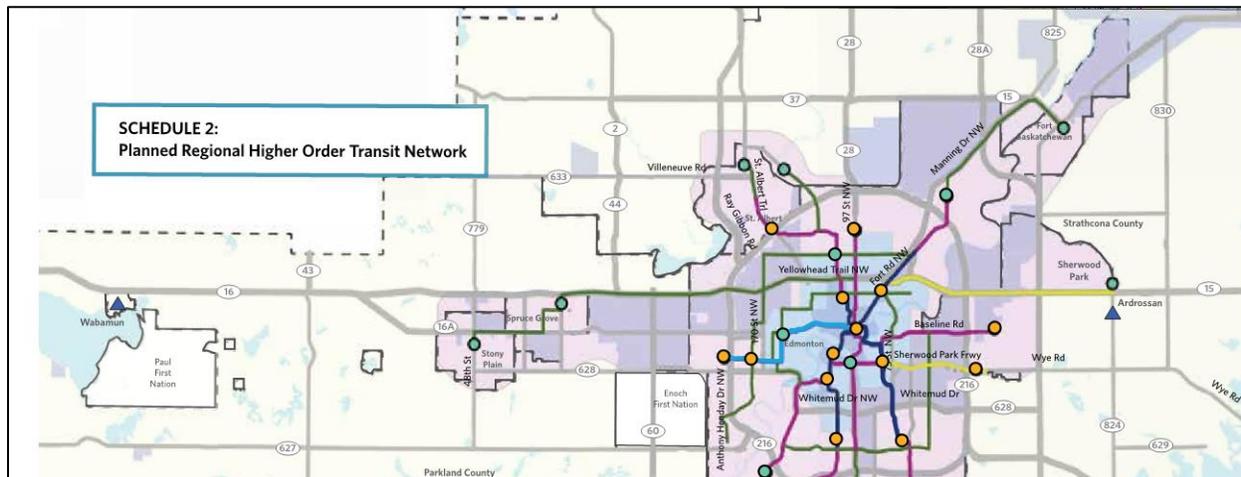
Figure 2: Map of Transit Commute Time from Central Edmonton to Villeneuve



There are plans for public transit connectivity in the area and any such investment would need to be driven by wider economic benefits for the region and future passenger demand. It is assumed that infrastructure on this scale will require the County to collaborate with neighboring municipalities and the Regional Transit Commission.

The Edmonton Metropolitan Region Board Integrated Transportation Master Plan identifies a planned regional Higher-Order Transit Network that includes two future mobility hubs within the City of St. Albert that connect to Transit Priority Corridors of Dedicated Rapid Transit lines within the Cities of St. Albert and Edmonton. This future network is illustrated in Schedule 2 of the EMRBITMP and is partially reproduced in Figure 3.

Figure 3: Planned Regional Higher Order Transit Network



Existing development within the VAA could reasonably be serviced by connection to the planned mobility hubs for access to the regional transit network. The provision of a frequent transit bus service from St. Albert to the VAA could potentially ensure that the development is fully accessible for all modes of transport including cyclists and pedestrians. It is proposed that the airport development area businesses would pay for this service. Shuttles or shared services operating on connecting east-west routes including Highway 633 and north-south routes within the Master Plan study area were considered in the planning for the future road network. Keeping road network and block spacing relatively small to maximize pedestrian access within a 5 – 10-minute walking distance and providing street-facing development and providing pedestrian and cyclist facilities that connect to potential transit routes will support possible future transit service options.

1.5.1 ACTIVE TRANSPORTATION

Active transportation facilities within the study are not currently provided except for partially paved shoulders on some roads and highways that can accommodate pedestrians and cyclists. Provision for active road users should be made through the development of a region-wide active Master Plan with connection of on- and off-road facilities to existing and proposed off-road trails and paths. Application of current active design standards for urban and rural roads, to include buffered on- and off-road facilities, has been included in development of the study area transportation network.

1.6 GOODS MOVEMENT

There are two main goods movement corridors in the vicinity of the Villeneuve Airport lands: the Highway 44 corridor and the CN Sangudo Subdivision.

1.6.1 ROAD

Highway 44 is designated as a High Load goods movement corridor in Schedule 1 of the Edmonton Municipal Region Board Integrated Transportation Master Plan. The highway has important connections with other regional and provincial routes including Highway 16 to the south, and through that connection, access to Highway 216 (Anthony Henday Drive) ring road of the City of Edmonton. Highway 44 also connects with Highway 633 which extends easterly to connect to Highway 2 (St. Albert Trail) that serves communities in northeastern Alberta.

1.6.2 RAIL

Rail transportation in the area is provided by the CN Sangudo Subdivision. The rail line crosses the plan area from the southeast to the northwest. The CN line to the southeast connects to Class 1 rail providers and ports in British Columbia on the west coast of Canada and world markets beyond.

The single track has at-grade crossings at TWP Road 544, RR270, TWP Road 543, and Highway 44. The TWP Road 544 and Highway 44 crossings include automatic protection with crossing signs and flashing lights. The remaining crossings have crossing signs and stop signs below them on the road approaches. A 2011 rail safety assessment completed for Inland Aggregates Limited determined that the average annual train volume was 4 freight train movements per day. The Inland Aggregates development contributes an additional 1 – 2-unit train movements per day between the months of April and November.

1.7 COMMERCIAL VEHICLE GENERATORS

In addition to the freight traffic carried by the highway and rail system, additional freight traffic is generated by airport operations, agricultural operations, aggregate mining, and the less regular movement of oversized vehicles related to the energy, resource, and industrial sectors.

1.7.1 AIRPORT OPERATIONS

Deliveries of fuel, supplies, and air shipments make up most of the commercial traffic to the airport. The future development of the VAAMP may contribute to additional freight movements.

1.7.2 AGRICULTURAL OPERATIONS

Agricultural uses surround the airport and many of the area roads provide farm and field access and accommodate regular farm equipment movement. The vision for the VAAMP transportation network

recognizes the importance of maintaining the vitality and growth of the agricultural sector and incorporates measures to accommodate farm equipment movement and safe access to area roads.

1.7.3 AGGREGATE EXTRACTION

Sturgeon County has an abundance of aggregate resources that are and will continue to contribute to the local economy. The areas to the north and east of the existing airport are currently being mined and these operations are anticipated to continue for at least 10 to 15 years. The Master Plan for the airport area recognizes the importance of maintaining a high degree of access to the County and provincial roads and highways for aggregate trucks and mobility for these vehicles to circulate within and around the airport lands. Most heavy vehicles engaged in the hauling of aggregate are destined for Highway 44 and areas north and south.

1.7.4 OVERSIZED VEHICLES

With the existing industrial and aggregate development surrounding the airport, it is not uncommon for large pieces of equipment or building components to be moved using the higher-order road and highways that have the strength and width to accommodate these movements. Continued development of the lands around the airport and in the region will contribute to on-going needs to accommodate oversized vehicle movements. Fortunately, these movements are not an everyday occurrence and are accommodated through a permit process to ensure that the timing, route, and pilot vehicles are provided to control traffic during transit. Occasionally these movements require temporary closure of sections of the highways and County roads. To ensure that oversized vehicle movements can be accommodated, the planning for the future development of the airport area has incorporated engineering standards and guidelines for road cross-sections and intersections, based on design guidelines published by the County and by other recognized sources including the Transportation Association of Canada and Alberta Transportation to maximize the width of the road platform and structural adequacy of the roads.

1.8 NETWORK CONSTRAINTS

There are several constraints that have been considered in identifying the transportation network to support the Master Plan development. These include the number and quality of existing rail crossing and rail operations through the area; highway intersection spacing; airport operations and possible height limitations; adequacy of the existing network to accommodate added traffic; and the access capacity currently provided by the existing roads in the vicinity of the airport.

1.8.1 RAILWAY ALIGNMENT CROSSINGS

The road–rail crossings in the area are all at-grade (level) crossings, but with skewed intersections due to the rail alignment. The Highway 44 and TWP Road 544 crossings consist of steel or pavement crossings with automatic protection (flashing lights and signs). All other crossings consist of wood planks and

crossing signs only. Increased traffic, particularly heavy vehicle traffic, will require these crossings to be upgraded and automatic protection provided as required by traffic volumes.

1.8.2 HIGHWAY INTERSECTION SPACING

The airport area includes two highway corridors that are designated as future expressways or freeways, and in the case of Highway 44, as a High Load corridor. While conversion of these highways to higher-order access-controlled facilities such as expressways and freeways may be a long-term protection, it will be important in the interim period to maintain an intersection spacing and grid that facilitates possible later conversion to interchanges. The current road grid incorporates a basic spacing between range roads of 1.6 km (1 mile). The planning for the roads in the VAAMP attempts to maintain this spacing between main collector road intersections.

1.8.3 AIRPORT APPROACH CONSTRAINTS

Runway 26 (east end of existing east-west runway) is located close to RR270. The approach to this runway is subject to height limitations that affect the potential to have traffic using this section of road. It's estimated that the maximum vehicle height possible on RR270 at the runway approach is 2.5 metres. Roadway vertical clearances of 5.0 – 5.5 metres are typically provided. This limits the ability of RR270 in this area to accommodate trucks and other traffic.

1.8.4 AREA NETWORK CAPACITY

The main highway links near the airport consist of 2 basic travel lanes (one lane in each direction), with additional turning lanes provided at some locations. As noted above, when the traffic volumes exceed 12,000 – 15,000 vehicles per day (600 – 750 vehicles per hour in the peak direction), a widening to 4 basic lanes (two lanes per direction) is needed. Final timing for widening provincial highways is subject to the approval of Alberta Transportation.

Only some of the intersections surrounding the airport area have additional turning lanes provided. These include:

- Eastbound to southbound bypass lane at the Highway 44 – 633 roundabout.
- Northbound right turn lane at Highway 44 access to the cemetery.
- Separate northbound left turn lane and southbound right turn taper and acceleration taper at Highway 44 – Road 264 intersection.
- Separate northbound right turn deceleration lane and southbound shared through and left turn lane at the access to the aggregate mining operation on the East side of Highway 44, north of TWP Road 543 (the added southbound lane extends northerly to TWP Road 544).
- Separate northbound and southbound right turn lanes and left turn lanes at TWP Road 544.
- Separate westbound right turn lane and eastbound bypass lane at Highway 633 – Road 270A intersection.

Additional turning lanes at new intersections or extended lanes at existing intersections will be needed to accommodate increased traffic generated by the VAAMP development.

1.8.5 LIMITED ACCESS CAPACITY

At present, airport access is limited to just the Road 270A access to Highway 633. Typically, an unsignalized 2-lane access can accommodate up to 500 vehicles per hour (veh/h) in the peak direction depending on the highway conditions, geometry visibility, and other factors. Beyond this level, a roundabout form of intersection control is typically used by Alberta Transportation. Under some circumstances, signalization of the intersection and possibly the addition of turning lanes may be required if traffic studies indicate that traffic signal control is preferred over a roundabout configuration.

As discussed in Section 1.10, additional traffic generated by the VAAMP development will require additional new access in addition to the existing Road 270A. The location and spacing of these accesses will need to be in accordance with provincial and County Road design standards. Access to provincial highways is typically considered temporary and may be removed and provided by a service road in cases where the highway is widened or otherwise upgraded.

1.9 OPPORTUNITIES

1.9.1 GRID TRANSPORTATION SYSTEM

The lands surrounding the airport are for the most part agricultural lands with some industrial uses to the north and west. There is an existing basic grid road system that currently serves the area that is based on a basic 3.2-km (2-mile) grid that supports north–south range roads and a basic 1.6-km (1 mile) grid that supports east–west township roads. A grid pattern of roads allows for optimization in the number and location of accesses to reduce travel time and provide cost-effective access. A minimum interchange spacing for expressways/freeways of approximately 3 – 4 km is required to meet Alberta Transportation design guidelines. A minimum spacing of at least 1.6 km would be suitable for at-grade highway access and is generally the basis for the connection of north-south roads to Highway 633 and east–west roads to Highway 44.

1.9.2 ALTERNATE HIGHWAY ACCESS

The airport and area are served by two provincial highways allowing greater opportunity for access to the highway system for commercial and employee traffic, offering a competitive advantage to the businesses located here. As noted above, the Master Plan attempts to achieve a collector road spacing of 1.6 km. In addition, development setbacks for properties adjacent to highway corridors are typically required by Alberta Transportation to allow for highway widening and construction of a service road parallel and adjacent to the highway.

1.9.3 RAIL ACCESS

The location of the CN Sangudo Subdivision to the North provides an opportunity for improved access to the planned developments in this area. A rail spur is already provided to the existing Ward Chemical on the north side of the tracks, west of Highway 44. A similar opportunity exists for planned developments north of the tracks.

Sturgeon County has requested that the VAAMP should explore the potential for a rail spur for the ZVL Area.

The initial analysis would suggest that the best location for a rail spur is north of the rail corridor which will reduce noise impacts on the Hamlet of Villeneuve.

The existing single track has limited capacity for regular trains and initial research has confirmed that CN will only run Unit Trains on this Subdivision. These trains have 100+ cars and are used to haul single commodity goods. Attracting developers with Unit Train production and movement volumes to the area will be challenging. The business case for shorter trains will require further investigation.

The volume of goods created by existing and proposed businesses in the early stages of the VAA development may not be enough to justify a rail spur. However, the cost efficiencies that rail transportation offers will attract business investors and transporting a higher proportion of goods by rail will reduce the number of heavy trucks on local roads and CO₂ emissions.

Funding for a rail spur would need to come from the private sector. This will require a robust business case supported by catchment area analysis for each bulk commodity.

Sturgeon County's primary industries rely on rail to transport bulk goods to market. A more detailed study will be required to understand the rail alignment issues and space required for this facility.

An inventory and assessment of the railway crossings at roadways using Transport Canada Guidelines will be required for planning future rail projects or expansions to support growth.

1.9.4 PUBLIC – PRIVATE COLLABORATION

The current multi-jurisdictional ownership and operation of the airport roads offer a unique opportunity for a public-private partnership that allows airport development servicing to be achieved using mainly private-sector funds. This would apply for the provision of new or upgraded roads, and as noted above, possible transit shuttles serving the airport and area that could be provided based on business contribution.

1.9.5 COMPLETE STREETS

The development of the VAAMP lands will attract approximately 2,000 new employees and attract additional commercial and visitor traffic. The lands are proximate to the Hamlet of Villeneuve, the cities

of St. Albert, Edmonton, and other communities to the north and west. It is anticipated that cycling and shared transportation either by shuttle or multi-occupant vehicles will be produced because of continuing area development. Accordingly, the design for the transportation system serving the Master Plan lands should incorporate a complete street philosophy that has an objective to accommodate all road users and encourage greater choice in mode of travel. Provision of on-road cycling facilities through the use of wider paved shoulders or on-and off-road cycling lanes along urban roads, and linkages to other on-and off-road commuter and recreational cycling infrastructure is a key objective of the transportation network development.

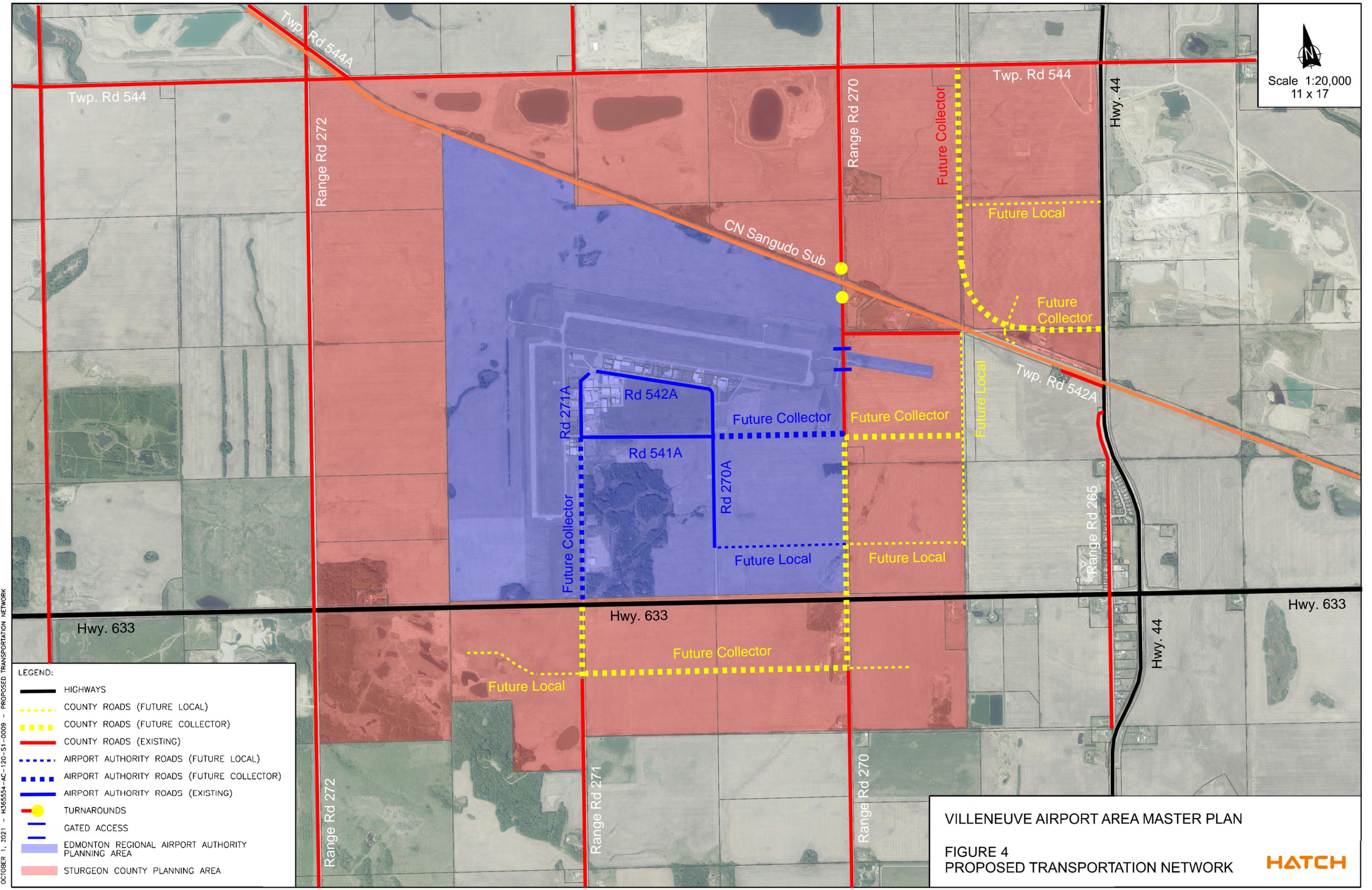
1.10 BUSINESS PARK TRANSPORTATION NETWORK

A holistic mobility vision is proposed for people, goods, and services moving through and around the proposed development. All roads within industrial and commercial areas should be designed to an urban road standard and should provide safe and efficient pedestrian and cycle routes between buildings and sites. These roads will contribute to a high-quality built environment that is efficient, safe, and environmentally sustainable.

The design will future-proof for the following:

- Transition from internal combustion engines to electric and hydrogen
- Disruptive technologies, innovative mobility solutions
- Diverse selection of transport modes
- Walkable public realm and cycle routes
- Reduce impacts on natural environment

The proposed development plan and road network are shown on Figure 4.



OCTOBER 1, 2021 - H36554-AC-120-S1-0009 - PROPOSED TRANSPORTATION NETWORK

LEGEND:

- HIGHWAYS
- COUNTY ROADS (FUTURE LOCAL)
- COUNTY ROADS (FUTURE COLLECTOR)
- COUNTY ROADS (EXISTING)
- AIRPORT AUTHORITY ROADS (FUTURE LOCAL)
- AIRPORT AUTHORITY ROADS (FUTURE COLLECTOR)
- AIRPORT AUTHORITY ROADS (EXISTING)
- TURNAROUNDS
- GATED ACCESS
- EDMONTON REGIONAL AIRPORT AUTHORITY PLANNING AREA
- STURGEON COUNTY PLANNING AREA

VILLENEUVE AIRPORT AREA MASTER PLAN
 FIGURE 4
 PROPOSED TRANSPORTATION NETWORK



A major constraint for development of the internal road system serving the airport area is the location of the CN line and limiting or improving the number of crossings of the track. A further constraint has been the assumption that RR270 will not be improved through the area of the existing runway due to clearance limitations in the Runway 26 approach area. It is assumed that the existing roadway will be gated to prevent vehicles crossing this area. Additionally, an aviation reserve exists on the north side of the existing runway that will not be developed within the planning horizon of this assessment. Also, the proposed development plan does not include development concepts on the west side of RR271. It is recognized however that this future development may occur at some point and the transportation network has been developed to enable this to occur.

Alberta Transportation has noted that the spacing between Road 270A and RR271 (800 metres) is too close to meet a highway access standard that allows provision of added turning lanes at at-grade intersections and provides for future interchange spacing of 3 – 4 km under controlled access expressway/freeway operation. The spacing between RR 270 and Road 270A is also approximately 800 metres, and based on the above Alberta Transportation comment, it is also too close to meet highway access standards. Analysis of future traffic conditions discussed in the following sections of this report indicate that full buildout of airport development will require more than one access to Highway 633. The existing Road 270A intersection is too close to other existing range roads to permit them to be used in conjunction with Road 270A. Accordingly, to maintain a basic 1.6 km spacing between collector roads with connection to the existing highways, RR271, as a range road has been designated as a future collector road to service the west side of the airport and surrounding lands south of Highway 633. RR270 located 1.6 km to the east is also designated as a future collector and primary access from Highway 633 to the airport and surrounding development. Within the airport, RR271 would be extended to connect Road 541A and Road 270A for enhanced internal circulation. The existing Road 270A connection to Highway 633 is to be closed in the future as development of the lands and the supporting road network proceeds.

To serve the proposed development on the southern, eastern, and northern areas of the plan, a collector road network that connects to Highway 633 at RR271 and RR270 is proposed. This road will loop and connect development south of the highway and will extend northerly from the highway with an alignment running along Road 270. This future roadway will connect to a future east–west collector, aligned roughly with the existing Road 541A and connect to the existing Road 270A (Airport Access Road). East of here, the future road curves to the north to align parallel to an existing utility corridor located between RR270 and RR265 approximately 800 metres north of the highway. North of the east–west collector, the existing RR270 alignment is maintained but made discontinuous across the CN tracks with termination in a turnaround on either side of the tracks. The existing RR270 north of the tracks is maintained. A corridor for the existing RR270 rail crossing will be maintained in the plan.

The collector road system south of the tracks is augmented by a local road system that includes an east–west local roadway paralleling Highway 633 and connecting with Road 270A and the new RR270 collector. An additional north–south local road extends from this point northerly roughly midway between RR270 and RR265 to connect to the existing Township Road 543 south of CN tracks. Township Road 543 and its crossing of the tracks is maintained for local vehicle access only (trucks to be restricted to local deliveries

only). The existing Township Road 543 will be realigned to intersect an upgraded collector road that extends from Highway 44 in the east and turning northerly east of the tracks to provide access to planning area lands. This collector will extend to Township Road 544, a primary east–west access road. The proposed road plan maintains connections with Township Road 543 and the private road serving Ward Chemical and includes an upgraded connection to Highway 44. With this alternate highway access available for the Ward Chemical site, closure of the existing private road access to Highway 44 may be considered in the future subject to further consultation with the property owner and Alberta Transportation. An additional local road connection to a relocated Highway 44 access is also proposed roughly mid-way between Township Roads 543 and 544 that will connect to the future North–South collector road.

The collector road network includes a loop collector south of Highway 633 that connects the new collector extension south from RR270 on the east side of the airport lands and the existing RR271 to the west. The western section of the planning area lands will be serviced by RR271 south of the highway. The section of RR271 north of the highway will be upgraded to collector standards and extend to Road 541A within the airport. Access to the existing pump station will be maintained. In the future, should further development be contemplated on the west side of the airport lands, consideration may be given to incorporating a new north–south collector located approximately on an alignment extending from the intersection of RR272 and Highway 633.

A recommended local road system that provides access to the proposed lands north and south of the CN track, and south of Highway 633 that ties into the existing and future collector roads, is shown in Figure 4. As noted above, a local road connection to the existing Road 270A and future collector RR270 is provided immediately north of the proposed highway commercial fronting Highway 633 to provide service vehicle and customer/employee access. This development and future local road are to be set back from the highway sufficiently to allow for a possible future service parallel to the highway corridor.

The posted speed limit on Highway 633 within the Hamlet of Villeneuve is 50 km/h and increases to 100 km/h near RR270 west of the Hamlet. As the development of the airport lands takes place, additional collector and local road intersections with Highway 633 are planned such that intersections are spaced at 1,600 metres between Highway 44, RR270, and RR271, and possibly a longer-term collector road intersection located at RR272 approximately 1,600 metres west of RR271.

As development takes place and with more intersections along Highway 633, consideration should be given to reducing the speed limit from 100 km/h to 70 km/h and then to 50 km/h within the Hamlet. This will be consistent with possible land uses including commercial development on the North side, East of the Airport Road.

1.10.1 NETWORK HIERARCHY

Arterial

The proposed roadway network includes arterial roads (Highways 44 and 633) that are designated as existing or future expressways or freeways, and in the case of Highway 44, as a High Load corridor. These roadways incorporate provincial design standards for cross section elements and property requirements. While these facilities are designated as future expressways or freeways, within the planning horizon of the airport plan, additional road connections to Highways 633 and 44 are proposed. If these highways are upgraded to expressway or freeway class in the longer term, direct connections to the highways will be reduced to provide a spacing of approximately 3.4 km (2-miles), which is adequate for the operation of future interchanges. In this scenario, a system of frontage roads will be necessary to accommodate access from the adjacent development and divert traffic to the interchanges. Appropriate setbacks will be required within the VAAMP to accommodate potential future frontage roads adjacent to Highway 44 and Highway 633. A minimum 32-metre reserve strip parallel to the highway ROW would accommodate a two-lane rural frontage road with open ditch on one side. This would be in addition to the normal 50 to 60-metre highway width that is adequate for a four-basic-lane rural highway cross section and roadway clearance from the service road. Additional property may be required at intersections to accommodate turning lanes.

Highway 44 currently has a roundabout at the intersection with Highway 633. This configuration is inadequate for a future expressway or freeway should either Highway 44 or Highway 633 be upgraded to this type of facility in the future. In this case, the highways may be realigned in the future as part of a bypass of the Hamlet of Villeneuve or as part of a grade-separated interchange of the highways. In this case, the existing highway sections not included in the future design would revert to the Township as arterial roads. Undivided 4-lane rural arterial roads generally have ultimate ROW widths of approximately 40 metres.

The preliminary traffic assessment has found that protection for four basic traffic lanes on Highway 44, with added auxiliary lanes at key intersections will be required. Under these conditions, protection for either a multi-lane roundabout in the future with two entering lanes on each approach or a grade separated interchange and ramps should be provided. Similarly, Highway 633 will require four basic travel lanes to accommodate traffic from the full development of the airport area lands and growth in background traffic. An initial ROW of 50 – 60 metres should be protected for Highway 633 with rural cross section prior to possible upgrading to expressway/freeway status.

Collector

Existing and future collector roads in the VAA will be urban collectors for the industrial and commercial areas and possibly rural collectors elsewhere. The roads should be designed in accordance with County design standards and those of the Transportation Association of Canada. Ultimate cross section widths will depend on the need for auxiliary lanes at intersections and provision for off-road active facilities within the ROW. Generally, in midblock sections, urban collectors will have a 20 – 24 metre ROW whilst rural collectors can have a 26 – 34 metre ROW width requirements. In rural sections, travelled lanes and shoulders are generally paved. Shoulders can be partially or fully paved. Fully paved shoulders are

recommended if the collector is to be part of the pedestrian and cycling networks and suitable buffering from heavy vehicles and high-speed traffic is to be provided.

Local

Existing or future local rural roads generally consist of one travelled lane in each direction plus shoulders that are approximately 1 metre in width. The lanes and shoulders can be paved depending on the traffic volumes as noted in the tables above. Shoulders should be paved if the route is part of the pedestrian or cycling network. At a minimum, travel lanes and shoulders are usually paved if traffic volumes exceed 500 vehicles per day (veh/d). The ROW for rural local roads is generally in the range of 20 – 30 metres depending on side slope and ditching requirements. The ROW for urban local roads will depend on provisions for pedestrians and cyclists but are generally in the range of 20 – 22 metres.

1.10.2 PEDESTRIAN / CYCLIST CONNECTIVITY

The proposed airport development will include provision for an additional 2,000 employees in the area. All roadways serving the industrial and commercial areas are to be urban and should incorporate provision for one traffic lane in each direction and either one buffered on-road or off-road bike lane and sidewalks on both sides. Rural local roads would have paved shoulders that have sufficient width to accommodate pedestrians and cyclists. The airport lands are approximately 10 km from the St. Albert municipal boundary. Some level of commuting by active modes is to be encouraged. Provincial roads have incorporated paved shoulder treatments that can accommodate cyclists and pedestrians and further enhancement of these facilities should be made as part of normal road rehabilitation and/or reconstruction. This will ensure that active transportation linkages are provided to/from the airport area from other built-up areas.

1.10.3 RAIL CROSSINGS

Except for the Highway 44 at-grade railway crossing north of the Hamlet and TWP Road 544 crossing west of Highway 44, existing railway crossings are wood planked and include crossing signs and stop signs on the road approaches. The TWP Road 544 crossing has been upgraded to include flashing lights. The Highway 44 crossing also has active protection with flashing lights. Automatic gates are not provided.

The development of the airport lands will add a considerable amount of new traffic to the roads in the vicinity of the tracks. The proposed road network has been developed to reduce where possible the number of rail crossings and where crossing of the tracks is unavoidable, to improve the crossing angle and alignment as much as is feasible.

With the added traffic from the development, the existing crossings should be monitored closely to determine the need for improvements at each crossing. For example, with the increased truck and other vehicular volumes, replacing the existing wooden crossing surfaces with either steel or concrete planking is recommended to improve durability and wearability. The approach signage including rail crossing signs, crossing ahead signs, stop ahead signs, whistle signs, Do Not Stop on Tracks signs, and pavement markings

should be reviewed and updated in accordance with RTD-10 requirements. Regular monitoring of rail and road traffic volumes should be undertaken to confirm whether any of the crossings meet warrants for:

- Grade crossing warning system: a road – rail cross product of at least 1,000 (road volume of at least 170 vehicles per day based on a train volume of 6 trains per day). This system includes flashing lights and bells.
- Automatic Gates: a road – rail cross product of at least 100,000 (road volumes of at least 16,600 vehicles per year)
- Grade separation: a road – rail cross product of at least 200,000 (road volumes of at least 33,000 vehicles per year)

1.10.4 ACCESS AND CIRCULATION

The proposed road network has been developed in accordance with the existing road network and intersection spacing, geographic and drainage features, existing and proposed land use, and the intended function of the roads. Based on the traffic analysis, key access points to the airport lands from Highway 633 should consider configuration as a roundabout, or if physical conditions prevent this installation as a signalized/unsignalized intersection, including the provision of separate left and right turn lanes if/when the provincial warrants for these lanes are met. The intersection spacing on the highway will permit the use of either a roundabout or conventional signalized intersection. Ultimate development is anticipated to generate the need for improvements to the collector road intersections with the highways that at a minimum will include a need for separate left and right turn lanes at the two proposed collector road intersections to Highway 633.

The upgrading of TWP Road 543 and connection to Highway 44 may require the provision of a separate northbound left turn lane and a southbound right turn lane. There is sufficient spacing between the Highway 44 crossing of the CN tracks to incorporate these changes if they are found warranted by traffic conditions.

Traffic Control

Alberta Transportation has a requirement that a roundabout be installed instead of signals in all locations unless physical restraints prevent this from occurring. Based on recommendations from Traffic Impact Assessment studies completed in advance of development, roundabouts or traffic signals are to be provided at key highway/collector road intersections if justified by warrants for the installation of these controls. The final selection of either treatment would include a detailed assessment of the capacity, operations, safety, property requirements, and life cycle costs of each alternative.

Future intersections with other municipal roads will operate adequately under just stop control or a possible roundabout configuration. The timing for any changes to the intersection control will depend on the pace of development. Volumes and collision experience should be reviewed periodically to assess the need for upgrading traffic control at any of the collector and local road intersections serving the development lands.

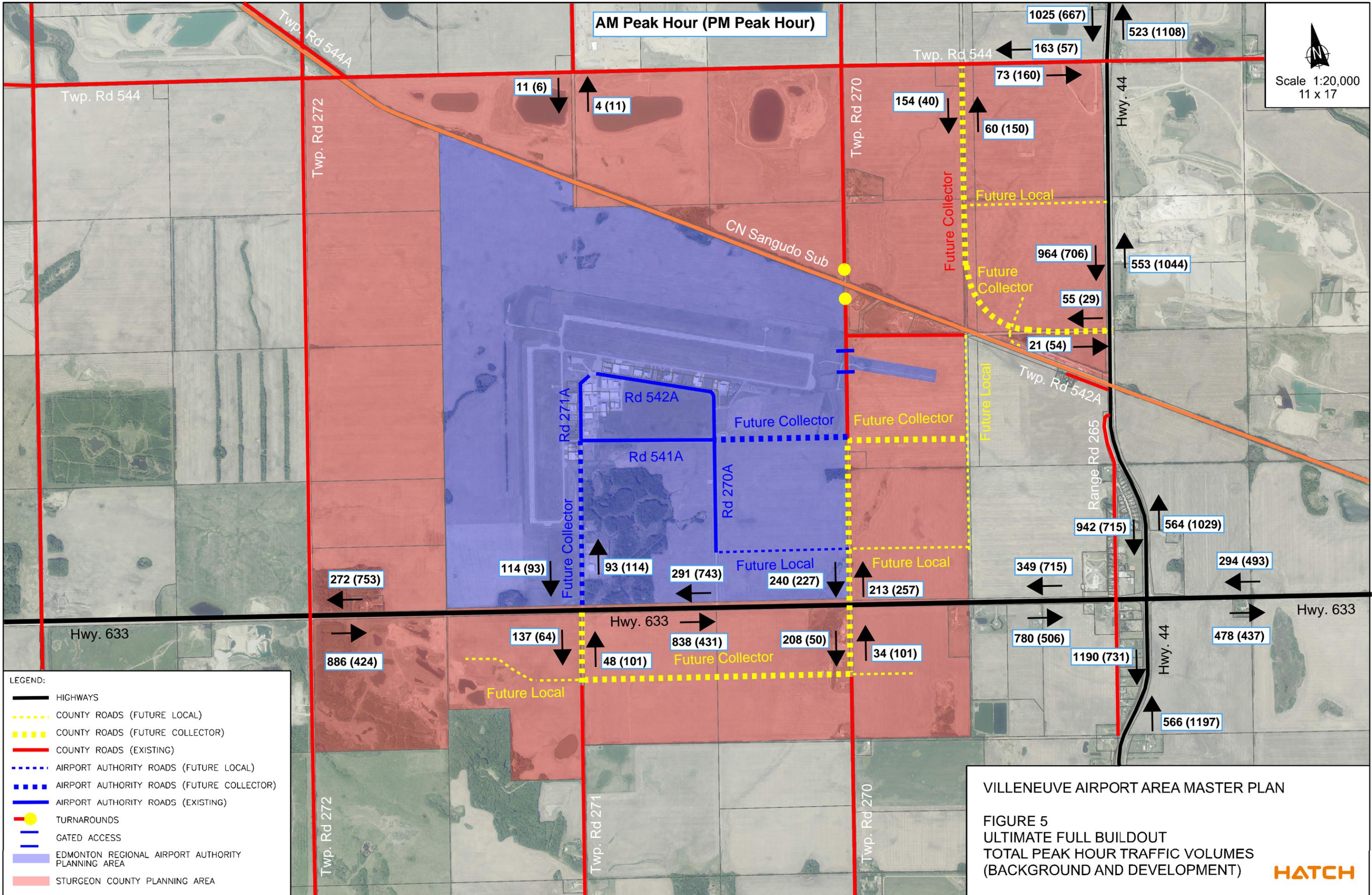
Travel Demand Management (TDM)

The traffic forecasts prepared as part of the VAAMP have been based on the application of a historical background traffic growth rate of 2.5 percent (linear) determined in the County Infrastructure Master Plan. It is recognized that this approach is conservative and may not fully consider effects from long-term changes in vehicle technology and delivery systems, encouragement of transit/shuttle services, active transportation by employees, and micro logistics applications at the airport development. Implementation of other forms of travel demand management should also be considered to reduce the amount of vehicular traffic on area roads. As noted in the background documents, these effects may reduce demand by up to 10 – 20 percent. Stakeholders are encouraged to implement these alternatives during the development and phasing of the airport lands and to refine the staged implementation of road and transportation network improvements to maximize opportunities to encourage greater non-auto modes of travel and less single-occupant travel.

1.10.5 ROAD CAPACITY FOR PROJECTED BUSINESS AND ECONOMIC ACTIVITY

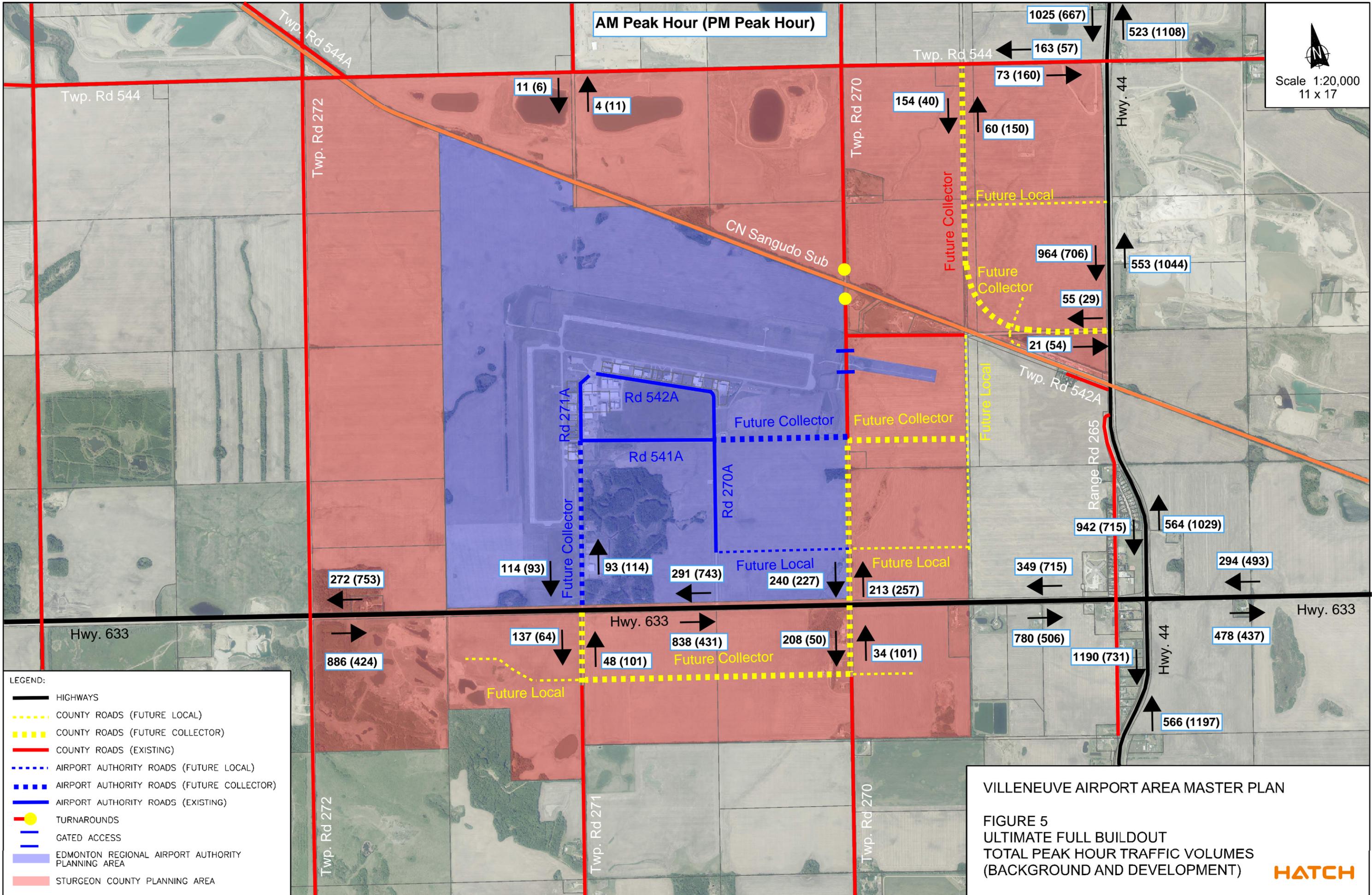
A preliminary traffic assessment has been undertaken based on trip counts for the estimated 2,000 full-time employment jobs that will be generated in the first 10 years as well as the planned road network serving the development concept. This analysis was undertaken to confirm the adequacy of the planned internal circulation system and access to the external boundary road system.

Figure 5 summarizes the forecast peak hourly traffic volumes on internal and external roads in the airport area.



Scale 1:20,000
11 x 17

AM Peak Hour (PM Peak Hour)



The following are the key transportation findings of this study.

Highway Access:

1. Two upgraded highway accesses are required to accommodate full development traffic volumes: a future collector road connecting to Highway 633 at RR270 and existing RR271 in conjunction with removal of the Road 270A connection to the highway; and an upgraded TWP Road 543 connection to Highway 44. As discussed above, access via RR270 and RR271 provides a minimum 1.6 km intersection access spacing in accordance with Alberta Transportation design guidelines and comments regarding spacing between Road 270A and RR 271.
2. Highway 44, from Highway 16 to north of TWP Road 544, will need to be widened to 4 basic traffic lanes by the full build-out horizon. The limits of this expansion beyond the airport area will need to be determined from further detailed traffic analysis of the wider area.
3. Highway 633 will require widening to 4 basic traffic lanes between Highway 44 and west of Road 270A to accommodate growth in background traffic and airport development traffic at full buildout.

Intersection improvements needed along the adjacent highways are shown in Table 4.

4. The proposed internal road network is adequate to accommodate the full build-out traffic volumes. The existing TWP Road 543 rail crossing is to be maintained but restricted to local use only. The existing RR270 crossing is to be removed and road terminated in turnarounds on both sides of the tracks in conjunction with provision of a north-south collector/local road in the RR270 corridor.
5. Provide active transportation facilities including sidewalks and cycling facilities (either buffered bike lanes on or off road) adjacent to collector and local roads.
6. Right of way widths for internal roads and boundary roads are shown in Table 5.
7. The initial traffic analysis has identified capacity upgrade requirements to maintain road efficiency and safety. A more detailed traffic impact assessment will be required as part of the local plan preparation process for the County Servicing standards. The designation and design of internal roads including classification, street sizing, intersections, and access planning will be refined as part of the ASP.

TABLE 4: BOUNDARY INTERSECTION IMPROVEMENT REQUIREMENTS

Intersection	Improvement	Timeframe
Hwy 44 and Hwy 633	Convert single-lane roundabout to multi-lane roundabout or Traffic Signal	Full Development
Hwy 44 and CN Rail Crossing	Automatic gates added to the at-grade crossing	When highway volumes reach ~16,600 veh/d
Hwy 44 and TWP Road 543	Added northbound left turn lane and southbound right turn lane, as warranted by traffic volumes.	When warrants are met for auxiliary turning lanes or as justified by capacity analysis
Hwy 44 and TWP Road 544	New multi-lane roundabout or traffic signal. (Separate northbound and southbound left turn lanes and right turn lanes already exist)	Single-lane roundabout or traffic signal for the initial phase of the logistics park. Convert to multi-lane roundabout or revise traffic signals when Hwy 44 widened to 4 lanes
Hwy 633 and Range Road 270	Initially new single-lane roundabout with protection for conversion to a multi-lane roundabout, or traffic signals, if determined in Future TIA	In conjunction with the first phases of development north of Hwy 633. Convert to multi-lane roundabout when highway widened or install upgraded traffic signals, if determined in future TIA.
Hwy 633 and Road 270A	Existing intersection to be decommissioned	In conjunction with later phases of airport area development.
Highway 633 and Range Road 271	Initially new single-lane roundabout with protection for conversion to a multi-lane roundabout or signalized intersection with separate left and right turn lanes as determined from future TIA.	At the time of full buildout of airport area lands.

TABLE 5: RIGHT-OF-WAY REQUIREMENTS

Road/Highway	From	To	Existing ROW (m)	Proposed ROW (m)
Highway 44	Highway 633	TWP Road 544	48 – 56 ^[1]	56 ^[2]
Highway 633	Highway 44	West of Range Road 271	40	56 ^[3]
TWP Road 544	Highway 44	Range Road 272	26 - 30	26 – 36
Range Road 270 / Range Road 271	Highway 633	TWP Road 544 and N/S of Highway 633	20	26 – 36
Road 270A	North of Highway 633	TWP Road 542A	--	26 – 36
TWP Road 543	Highway 44 Westerly	--	--	26 – 36 ^[4]
Internal Local Roads	--	--	--	23 – 26 ^[5]

Notes:

- Existing ROW estimated from Ortho Imagery.
- 56m ROW adequate for 4-lane rural highway midblock cross-section. Reserve for possible future conversion to 4-lane expressway/freeway with frontage roads on both sides of 62 m each side of Centreline (60 m freeway corridor and 64 m frontage road of each side) is the ultimate requirement (reserve of 34 m on each side of the interim ROW).
- Additional property for frontage road and possible long-term interchange on Highways 44 and 633 to be protected for in the plan.
- Range reflects provision of either on-street buffer bike lane or on-street parking
- Range reflects provision of either on-street parking lane or combined on-street parking and buffered bike lane

Rail Access

Rail transportation in the area is provided by the CN Sangudo Subdivision. The rail line crosses the plan area from the southeast to the northwest. CN connects to Class 1 rail providers and ports in British Columbia on the West coast of Canada and world markets beyond.

An average annual train volumes of 4 trains per day, with increase to 6 transit per day between the months of April and November has been determined from previous studies. Train traffic on the line is to be monitored as development proceeds to assess need for improvements to at-grade crossings and crossing protection within the County planning area.

Initial analysis suggests that the best location for a rail spur is north of the rail corridor which will reduce noise impacts on the Hamlet of Villeneuve.

The existing single track has limited capacity for regular trains and initial research has confirmed that CN would prefer to only run Unit Trains on this Subdivision. Unit Trains have 100+ cars and are used to haul single commodity goods. Attracting Unit Trains to the area will be challenging. The business case for shorter trains will require further investigation.

The volume of goods created by existing and proposed businesses in the early stages of VAA development may not be enough to justify a rail spur. However, cost efficiencies that rail transportation offers will attract business investors and transporting a higher proportion of goods by rail will reduce the number of heavy haul trucks on local roads and CO₂ emissions.

It is understood that funding for a rail spur would need to come from the private sector. This will require a robust business case supported by catchment area analysis for each bulk commodity.

Sturgeon County's primary industries rely on rail to transport bulk goods to market. A more detailed study will be required to understand the rail alignment issues and space required for this facility.

An inventory of the rail lines rail crossings and an assessment of railway crossings at roadways using Transport Canada's Guidelines will be required for planning future rail projects or expansions to support growth.



APPENDIX E

Environmental Desktop Analysis



**Villeneuve Airport Area Master Plan –
Environmental Desktop Analysis Memo for
Area Structure Plan (ASP)**

Prepared for:

Sturgeon County
Alberta, Canada

Document	H-365554-AC-230-S1-0001 – Rev.0
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Revision History Record					
Rev.	Description	Date	Originator	Checker	Approver
0	Memo	May 26, 2022	Rayan Farage	Benson Nguyen	Lincoln Chan

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2	ENVIRONMENTAL ASSESSMENT	10

1 EXISTING SITE CHARACTERISTICS OF THE AREA AND LAND USES

1.1 INTRODUCTION

Villeneuve Airport is located Northwest of Edmonton, Alberta, surrounded by agricultural land and gravel extraction operations. The Local Study Area (LSA) is generally defined as the area bordered by Highway 633 to the South, agricultural land to the West, the CN rail line to the North, and Range Road 270 to the East (Figure 1). Within the LSA, there are multiple tree stands that could be considered habitat for various species, but broadly the LSA consists of grass fields, and the infrastructure of the airport itself. The Regional Study Area (RSA) extends South past Highway 633 by approx. 800 m, West to RR272, North to TWP Road 544, and East approximately 750 m past RR270 (Figure 1).

The primary data sources used are listed below in relation to their associated organizations:

- Alberta Biodiversity Monitoring Institute:
 - Wetlands - [ABMI - ABMI Wetland Inventory](#)
- Alberta Agriculture and Forestry, Government of Alberta:
 - Soils and Landforms - [Agricultural Regions of Alberta Soil Information Database Version 4.1](#)
- Alberta Environment and Parks:
 - Fish - [FWIMT Pub \(alberta.ca\)](#)
 - Alberta Water Well Information Database - [Alberta Water Well Information Database - Open Government](#)
- Alberta Parks:
 - Protected Areas, Element Occurrence Part 1 & Part 2 - [Download Data | Alberta Parks](#)
- Government of Alberta:
 - Alberta Water Wells - [Alberta Water Wells](#)
 - Wildlife Sensitivity Maps - [Wildlife sensitivity maps | Alberta.ca](#)
 - Alberta Land Titles and Surveys Spatial Information System - [SpinIIHost \(gov.ab.ca\)](#)
 - Long Term Weather Data - [Interpolated Weather Data Since 1961 for Alberta Townships \(gov.ab.ca\)](#)
- Alberta Culture, Multiculturalism, and Status of Women, Government of Alberta:
 - Listing of Historic Resources - [Listing of Historic Resources \(alberta.ca\)](#)
- Alberta Community Bat Program:
 - Alberta Bat Profiles and Ranges - [batprofiles - Alberta Community Bat Program \(albertabats.ca\)](#)
- AltaLis:
 - 1:20,000 DEM - [Altalis - Map](#)

The LSA and RSA do not coincide with any provincially protected or environmentally significant areas; however, there is one area that is under “Environmental Protection” via the County (Figure 1). This occurs in the East side of the RSA, just South of the rail line, and follows a small stream (Figure 2). When this

parcel of land was subdivided, the County placed this polygon under environmental reserve through the *Municipal Government Act*. It means that the specific polygon highlighted in red in Figure 1 cannot be sold nor developed, yet the remainder of the land parcel can be sold.

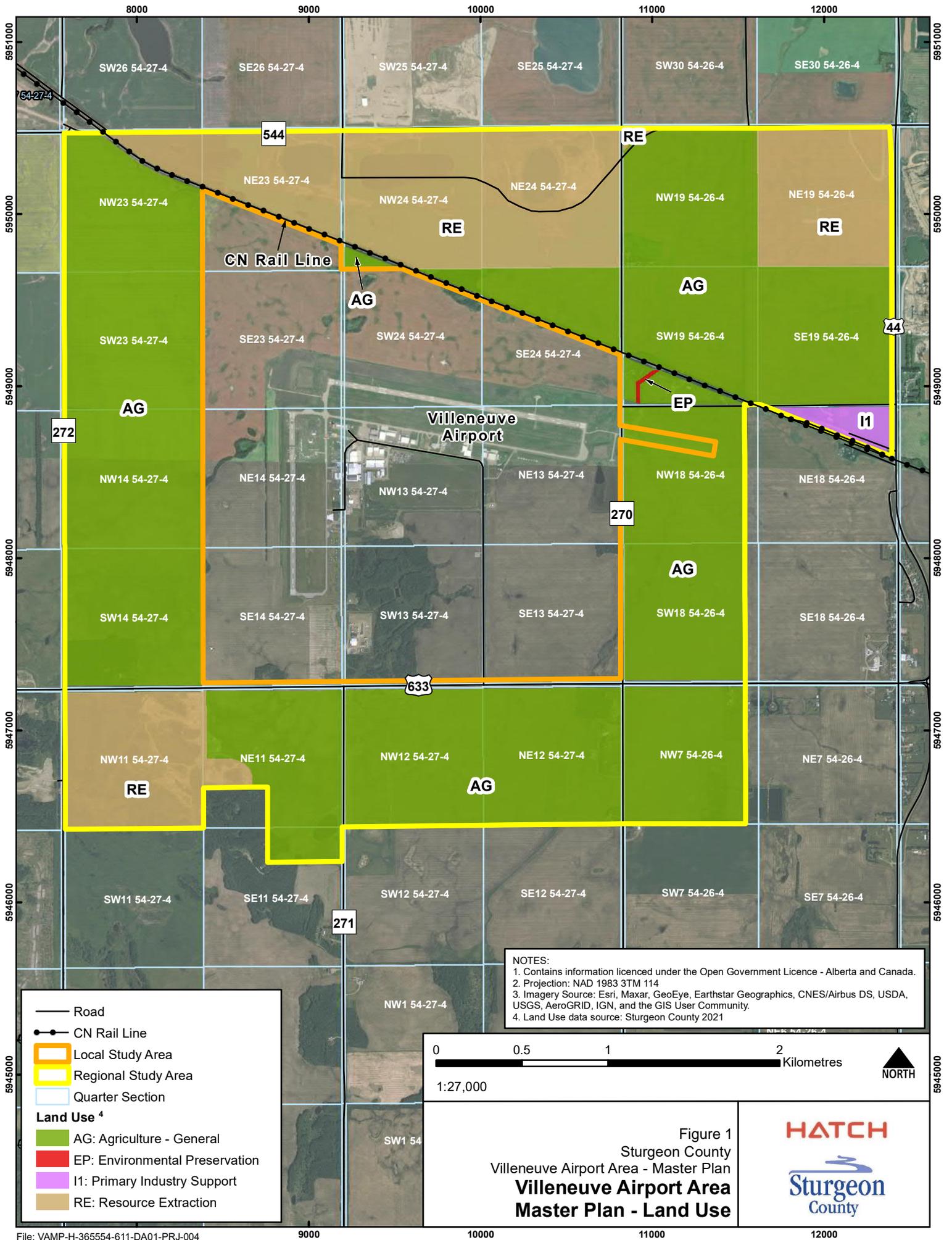
There are sites with the potential for paleontological evidence in both the LSA and RSA; these sites are discussed below. No species at risk have been identified or observed within the LSA or RSA. However, due to a lack of data, wildlife, vegetation, bird, bat, and amphibian surveys will be required to identify at-risk species within the LSA if the development of the Villeneuve Airport expands beyond the current area (Table 2).

1.2 LAND USE

A desktop survey was performed to identify land use classification, surface, and mineral rights for both the LSA and RSA. Land use classification within the RSA was predominantly agricultural, industrial, and gravel extraction. There are three gravel extraction sites located north, east, and south of the Villeneuve Airport (Figure 1). None of the land in both the LSA or RSA is protected under the Wildlife Protection Act, or under a nature reserve. There were several sites that are classified as having the potential for paleontological evidence and fall under the Historical Resources Act. In the event these sites are disturbed, regulatory review and approval under the Historical Resources Act will be required. The land title numbers for the surface and mineral rights, and the sites that fall under the Historical Resources Act are shown in Table 1 and Figure 2.

TABLE 1: SUMMARY OF LAND USE ASSESSMENT

Study Area/Land Use	Land under Wildlife Protection Act	Land Within/Nearby Nature Reserve/Park	Land Title		
			Surface Rights	Mineral Rights	Historical Resources Act Sites
LSA	No	No	Yes (Title Numbers: 202219944, 49L256)	Yes (Title Numbers: 139I240A6)	Yes (24-54-27-W4). Potential Paleontological sites
RSA	No	No	Yes (Title Numbers: 942011350020, 872080795, 942011350030, 51L256, 982280863, 992151866001, 202219944, 202219944001, 872109224, 0421470466001, 752049235, 49L256, 022042563015, 1632225348, 072591675001, 092373861009, 022042463021, 082064500001, 212034286001, & 212034286)	Yes (Title Numbers: 139240A4, 139240A5, 139I240A7, 072095623, 072095604, 082024362011, 132F223A, 142034627002, 162307398, 082024362011, 132F223A, 162307398, 072591675002, 082024362011, 142034627, 234I190, 982254092, 052350326, 142004097, 142004100, 192273297, 852219943B, 982028867001, 992235948, 002016137, 082024362008, 922013044, 922013147, 922277130001, 932064352)	Yes (24-54-27-W4) Potential Paleontological sites



NOTES:
 1. Contains information licenced under the Open Government Licence - Alberta and Canada.
 2. Projection: NAD 1983 3TM 114
 3. Imagery Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.
 4. Land Use data source: Sturgeon County 2021

— Road
 ●— CN Rail Line
 Local Study Area
 Regional Study Area
 Quarter Section

Land Use ⁴

- AG: Agriculture - General
- EP: Environmental Preservation
- I1: Primary Industry Support
- RE: Resource Extraction

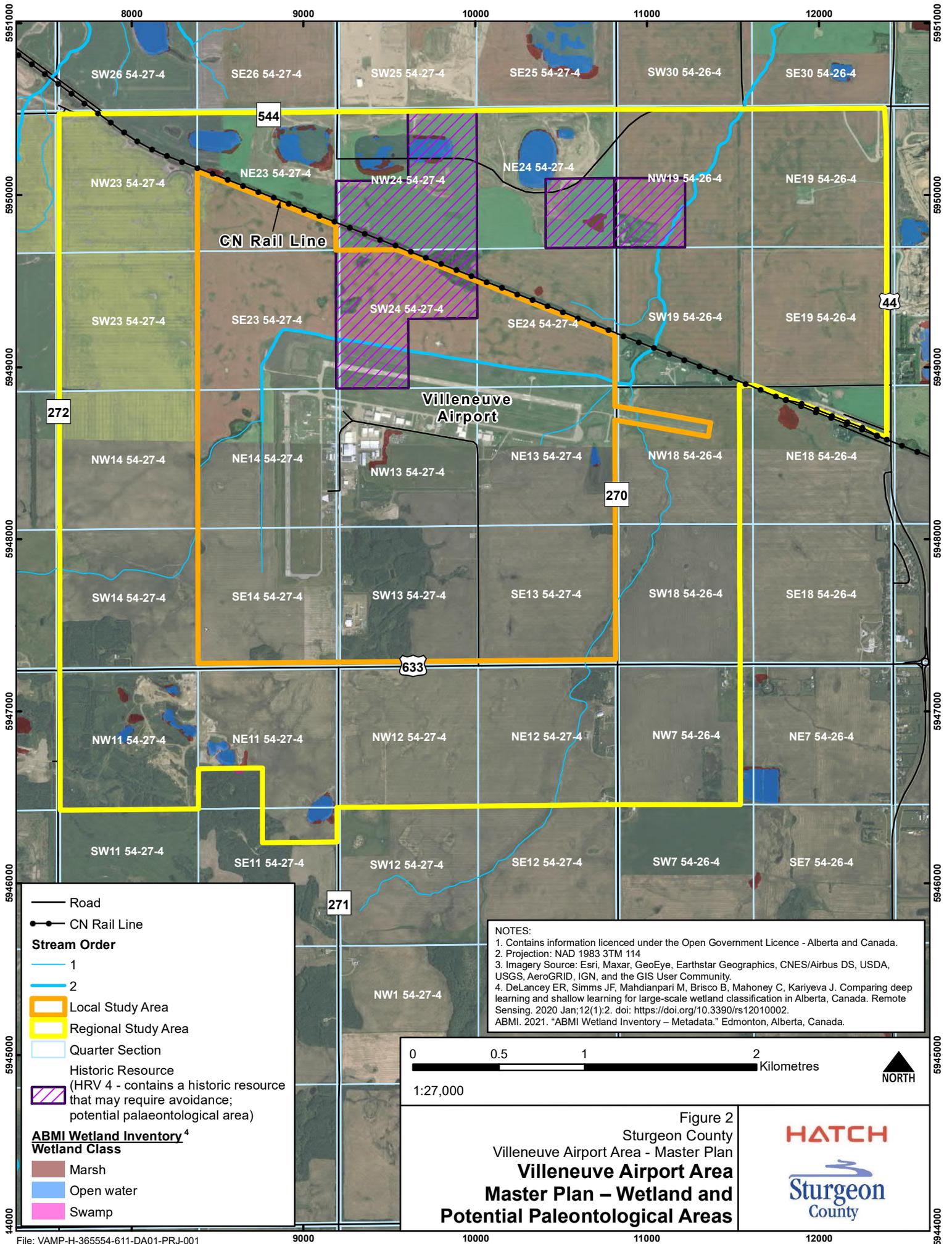
0 0.5 1 2 Kilometres

1:27,000

NORTH

Figure 1
 Sturgeon County
 Villeneuve Airport Area - Master Plan
**Villeneuve Airport Area
 Master Plan - Land Use**





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1. Contains information licenced under the Open Government Licence - Alberta and Canada.
2. Projection: NAD 1983 3TM 114
3. Imagery Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.
4. DeLancey ER, Simms JF, Mahdianpari M, Brisco B, Mahoney C, Kariyeva J. Comparing deep learning and shallow learning for large-scale wetland classification in Alberta, Canada. Remote Sensing. 2020 Jan;12(1):2. doi: <https://doi.org/10.3390/rs12010002>. ABMI. 2021. "ABMI Wetland Inventory – Metadata." Edmonton, Alberta, Canada.



Figure 2
 Sturgeon County
 Villeneuve Airport Area - Master Plan
Villeneuve Airport Area
Master Plan – Wetland and
Potential Paleontological Areas



— Road
 ●— CN Rail Line

Stream Order

— 1
 — 2

Local Study Area
 Regional Study Area

Quarter Section
 Historic Resource
 (HRV 4 - contains a historic resource
 that may require avoidance;
 potential palaeontological area)

ABMI Wetland Inventory⁴
Wetland Class

Marsh
 Open water
 Swamp

1.3 BIOPHYSICAL

A summary of the biophysical characteristics of the LSA and RSA is provided in Table 2. The LSA and RSA occur in Alberta’s Central Parkland region. The region is a prosperous agricultural area due to its moist climate, relative to the Grasslands to the South, as well as the abundance of wetlands (Figure 2) and rich dark soils (Figure 3). The Central Parkland region of Alberta has a varied morphology due to past glaciation resulting in ripples across the landscape and till inclusions throughout the soil (Figure 3 and Figure 4). The region experiences hot summers with most of the precipitation occurring in this season, and cold winters, with a temperature range of about 60°C each year.

A desktop survey was performed to determine whether ecologically significant areas, such as wetlands (Figure 2), and species at risk are present in the LSA and RSA. Although the records do not identify any sensitive species or species at risk, there is a potential for them to be found in both the LSA and RSA, and because of this, surveys will be required. Due to lack of data within the LSA and RSA, field studies will need to be conducted for vegetation, wildlife, birds, bats, and amphibian species in the LSA and RSA as part of the permitting and approval process.

TABLE 2: SUMMARY OF BIOPHYSICAL ASSESSMENT AND RECOMMENDED SURVEY

Study Area/Land Use	Vegetation Species of Management Concern	Wildlife Species of Management Concern	Bird Species of Management Concern	Bat Species of Management Concern	Habitat for Amphibians of Management Concern	Potential Fish Habitat	Ecologically Sensitive Forest System	Wetlands/ Waterbodies
LSA	Vegetation survey required	Wildlife survey required	Bird survey required	Yes (In range, survey required)	Habitat survey required	Yes	No	Yes
RSA	Vegetation survey required	Wildlife survey required	Bird survey required	Yes (In range, survey required)	Habitat survey required	Yes	No	Yes

Wetlands are present in both the LSA and RSA, and waterbodies are present in the RSA (Figure 2); both could potentially be fish habitat; however, no fish surveys in the area have identified fish species of concern.

The lithology/geology in the LSA and RSA was determined based on the groundwater well information available. An overall summary of the lithology is shown in

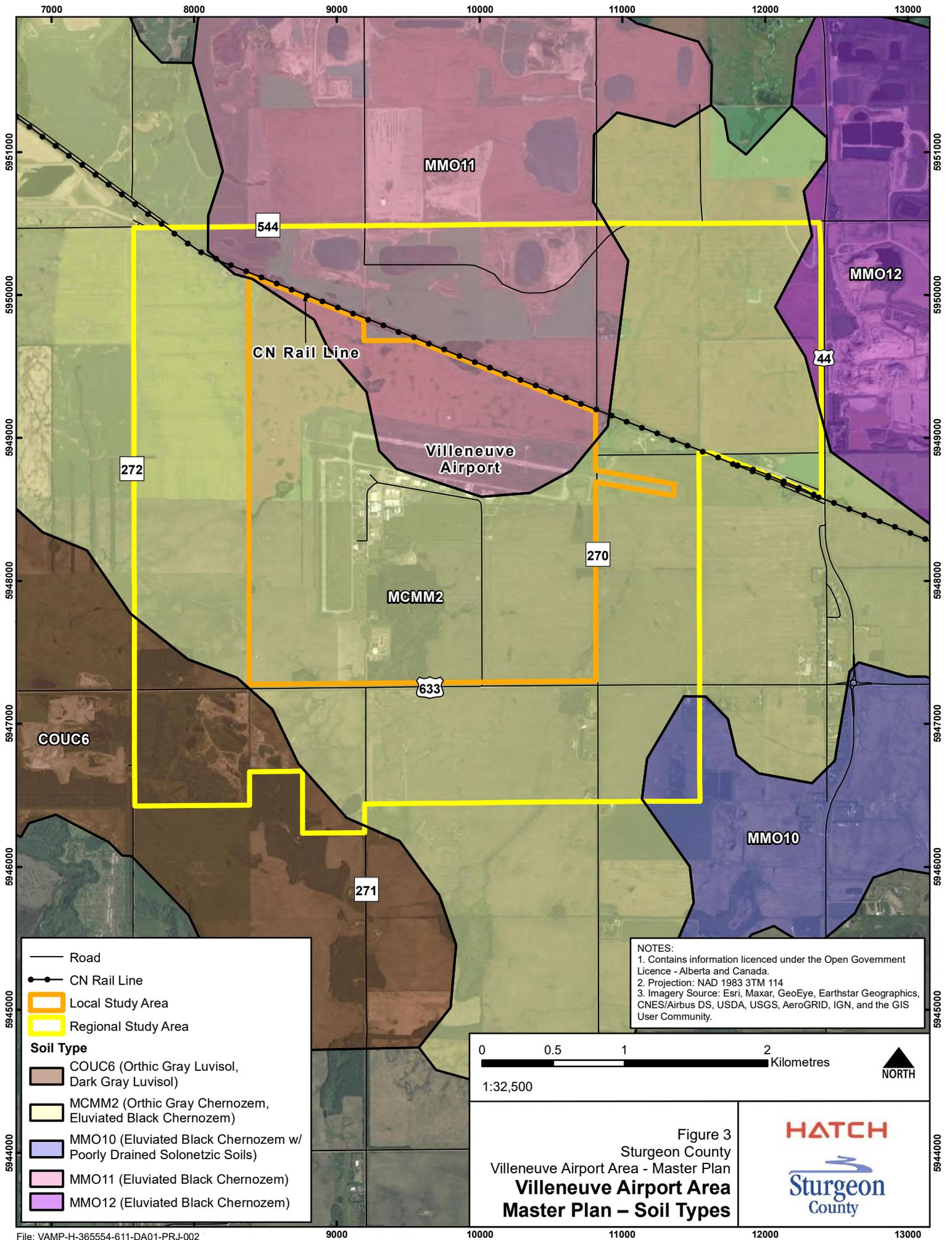
Table 3 and should not be substituted for a formal lithological survey should that be deemed necessary.

TABLE 3: OVERALL SUMMARY OF THE LITHOLOGY

Depth (ft)	Lithology/Geology
1-5	Topsoil (black chernozem)
5-60	Clay with mixed gravel, sand and till
60-160	Shale and some sandstone
160-360	Shale, sandstone, and coal

Within the LSA, there are two different classifications of chernozemic soils; the RSA includes these soil types as well as another chernozemic soil type and a luvisolic soil (Figure 3).

The topography of the area is relatively flat, but from the desktop survey, it was evident there is an elevation change from the SW corner of the RSA grading down towards the NE corner of the RSA. There are some landforms within the LSA and RSA; the landform types and general morphology can be seen in Figure 4.



— Road
 ●— CN Rail Line
 Local Study Area
 Regional Study Area

Soil Type

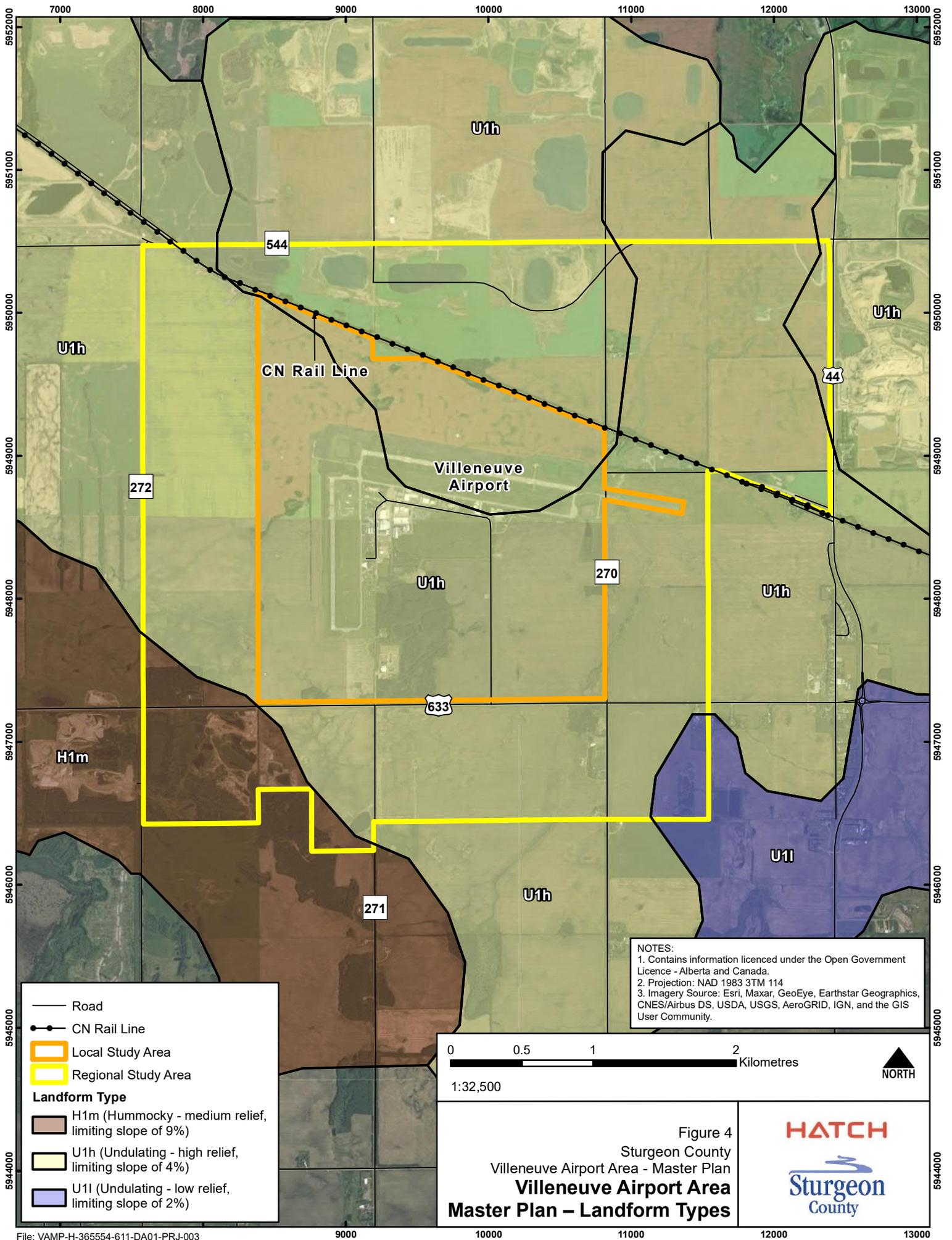
- COUC6 (Orthic Gray Luvisol, Dark Gray Luvisol)
- MCMM2 (Orthic Gray Chernozem, Eluviated Black Chernozem)
- MMO10 (Eluviated Black Chernozem w/ Poorly Drained Solonchic Soils)
- MMO11 (Eluviated Black Chernozem)
- MMO12 (Eluviated Black Chernozem)

NOTES:
 1. Contains information licenced under the Open Government Licence - Alberta and Canada.
 2. Projection: NAD 1983 3TM 114
 3. Imagery Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.



Figure 3
 Sturgeon County
 Villeneuve Airport Area - Master Plan
**Villeneuve Airport Area
 Master Plan – Soil Types**





NOTES:
 1. Contains information licenced under the Open Government Licence - Alberta and Canada.
 2. Projection: NAD 1983 3TM 114
 3. Imagery Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.



Figure 4
 Sturgeon County
 Villeneuve Airport Area - Master Plan
Villeneuve Airport Area
Master Plan – Landform Types



2 ENVIRONMENTAL ASSESSMENT

The proposed VAAMP has been assessed against the land use and biophysical information presented in Section 1.

There are several potential paleontological areas within the boundaries of the RSA. The NE development area overlaps quarter sections NE24 54-27-4 and NW19 54-26-4 which are both identified as potential paleontological areas under the Historical Resources Act. In the NW development area, and extending over the north airport runway, quarter section SW24 54-27-4 is also identified as a potential paleontological area. These areas will require clearance under the Historical Resources Act prior to the start of construction. Sturgeon County should engage with a qualified Archaeologist and Permit Holder to undertake the necessary studies and submissions to obtain the clearances.

There are multiple owners of surface and mineral rights throughout the RSA. Table 4 provides the surface and mineral rights that may be affected by the Master Plan. Prior to development, Sturgeon County will need to undertake the proper notification and consultation activities necessary to acquire the rights to these areas.

TABLE 4: MINERAL AND SURFACE RIGHTS TITLES FOR EACH PROPOSED AREA IN THE VILLENEUVE AIRPORT MASTER PLAN

Building Site	Land Title	
	Surface Rights	Mineral Rights
SW Development	942011350020, 942011350030, and 872080795	139I240A4, and 139I240A5
SE Development	942011350030, and 212034286	139I240A5, 082024362008, 922013044, 922013147, 922277130001, and 932064352
Central Development	072591675001, 092373861009, 022042563021, 082064500001, 212034286001	139I240A6, 072591675002, 082024362011, 142034627, 234I190, 982254092, 052350326, 142004097, 142004100, 192273297, 852219943B, 982028867001, 992235948, and 002016137
NE Development	202219944001, 872109224, 0421470466001, 752049235, 022042563015, 162225348, 072591675001, 092373861009	072095623, 072095604, 082024362011, 132F223A, 142034627002, 162307398, 072591675002, 082024362011, 142034627, 234I190, and 982254092
NW Development	202219944001, and 49L256	072095623

In the SC Planning Area, there are several wetlands that may be affected by the implementation of the Master Plan. These areas are shown in Figure 2. Potential indirect affects to the wetlands in the SC Planning Area include increased sediments and dust, fragmentation of habitat, and disruption of hydrological process which can reduce habitat effectiveness for plants and wildlife. Developments in a location that does not have the potential to affect the wetlands would eliminate these potential effects to the wetlands. If a development cannot be moved, mitigation measures will be required to address the effects.

The SE development is planned for an area with an Order 1 stream (Figure 2). This stream will need to be re-routed if the SE development cannot be redesigned or moved to a different location. This would require approval and permitting through the Department of Fisheries and Oceans Canada (DFO). Re-routing a stream involves building and designing a stream bed with natural features to create habitat for fish and amphibian species and working with the natural geography and morphology to ensure the stream flows effectively.

The Master Plan will result in changes to the land surface that will alter the movement of water throughout the area. Surface runoff during precipitation events and spring melt will be increased due to the impermeability of roads, parking lots, and buildings. There will need to be plans to accommodate the movement of water as its natural flow paths will be disrupted by the new infrastructure. Additionally, if the storm water is intended to be recycled and treated for various uses, how the water is diverted should be designed to prevent the possibility of further contamination by wastewater or other possible contaminants. Water management will need to be designed to keep separation of water that comes into contact with the disturbed areas and that which is in the undisturbed areas. A water management plan will need to be developed as part of the ASP.

With increased usage of water comes an increased need for treating water. Though the stormwater treatment facility has an expansion planned, there is not a direct mention of how or where wastewater will be treated. Wastewater could be treated at site to be reused for agriculture or general irrigation. There are different strategies for this depending on what the wastewater has come into contact with, and what is its end use. Typically, a filtration system would be necessary depending on the water quality of the wastewater, as even if it is surface runoff, there could be higher than recommended concentrations of various ions, metals, and dissolved solids, or high salinity, acidity, or alkalinity. To determine how to treat the water, it needs to be tested to ensure the treatment will raise the water quality to the standards for its intended uses. Once a determination of the end use of the water is made, a design for the water collection, testing, processing, and distribution can be completed.

Furthermore, abandoned oil and gas wells are present in the region. Best practice when building in areas with such features is to avoid building on, or immediately adjacent to them if possible. Abandoned oil and gas wells can be dangerous if not abandoned properly, and depending on the age of the wells and materials used, they can degrade and leak. When wells are abandoned, cement is poured into the pipe opening; the pipe is then cut at least one metre below surface, and then a cap is welded on.

Within the SE, SW, NE, and Central development areas, there are several abandoned wells present within. If they cannot be avoided, the wells should be located and flagged for testing, and the well abandonment reports should be requested and reviewed to ensure the well was abandoned to current standards and guidelines. There are several tests that should be done to ensure the safety and seal of the well, including methane, carbon dioxide, benzene, and nitrous oxide; and soil testing can indicate the efficacy of the well seal. Uncovering the well to examine the state of the pipe and cap is also recommended. If a building is placed on an abandoned well, gas monitoring should be implemented as a safety precaution.

Prior to development of aspects of the Master Plan, the relevant municipal, provincial, and federal permits and approvals will be required. Sturgeon County should engage with qualified professionals to complete the necessary field studies, consultation activities, land acquisition, and regulatory submissions for the implementation of the Master Plan.



APPENDIX F

Economic Analysis



Villeneuve Airport Area Area Structure Plan Economic Analysis

May, 2022



WestonWilliamson+Partners

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1. Situational Analysis

1.1 Socio-economic Profile

This section of the report provides a socio-economic profile of the Edmonton Metropolitan Region. It addresses demographic considerations, economic assets, key industry sectors and also provides a strengths, weaknesses, opportunities and threats (SWOT) analysis of the region. The objective of the socio-economic profile is to assess the current state of the economic environment, the role ZVL plays in Sturgeon County, and other economic drivers. The findings of this exercise will help to identify potential market differentiators that could eventually support or facilitate the development of innovative growth ideas and/or concepts in the airport area.

Regional Demographic Profile and Statistical Overview

The Regional Demographic Profile and Statistical Overview will measure regional differences between Sturgeon County and its surrounding area. This section uses data from the Statistics Canada 2016 Census Profile¹ and the 2019 Sturgeon County Municipal Census Report².

1.1.1.1 Population by Jurisdiction

Chart 1-A compares the 2011 and 2016 population counts between the four (4) counties (Sturgeon, Parkland, Leduc, Strathcona). The chart (to the right) presents the percentage change in population by jurisdiction (between 2011 and 2016) and also includes statistics pertaining to the City of Edmonton and the Province of Alberta, which were not presented in the chart (on the left) due to their exceedingly high population counts relative to the four (4) counties.

The important information to note from these two (2) charts is the change in population counts rather than the individual populations. Of particular note is that three (3) of the four (4) counties were relatively close in changes to their population figures during the study period, just as the changes in population counts for Edmonton and the Province of Alberta were similar to one another. Overall, Leduc County experienced the smallest population increase (representing 2.1%). Sturgeon County experienced an increase of 4.7%; by comparison, the City of Edmonton and the Province of Alberta both underwent the most significant population increase, by 14.8% and 13.5%, respectively. Data from the Sturgeon County 2019 Census Report indicates a 2019 population of 20,506, which represents a 4.74% increase since 2011³.

¹ <https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/index.cfm?Lang=E>

² <http://www.sturgeoncounty.ca/Portals/0/2019%20Municipal%20Census%20Report.pdf>

³ <http://www.sturgeoncounty.ca/Portals/0/2019%20Municipal%20Census%20Report.pdf>

Chart 1-A Population and Population Change by Jurisdiction

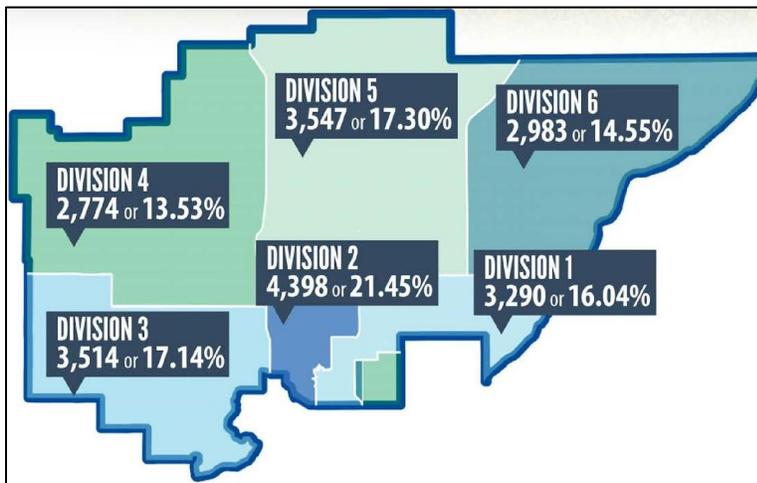
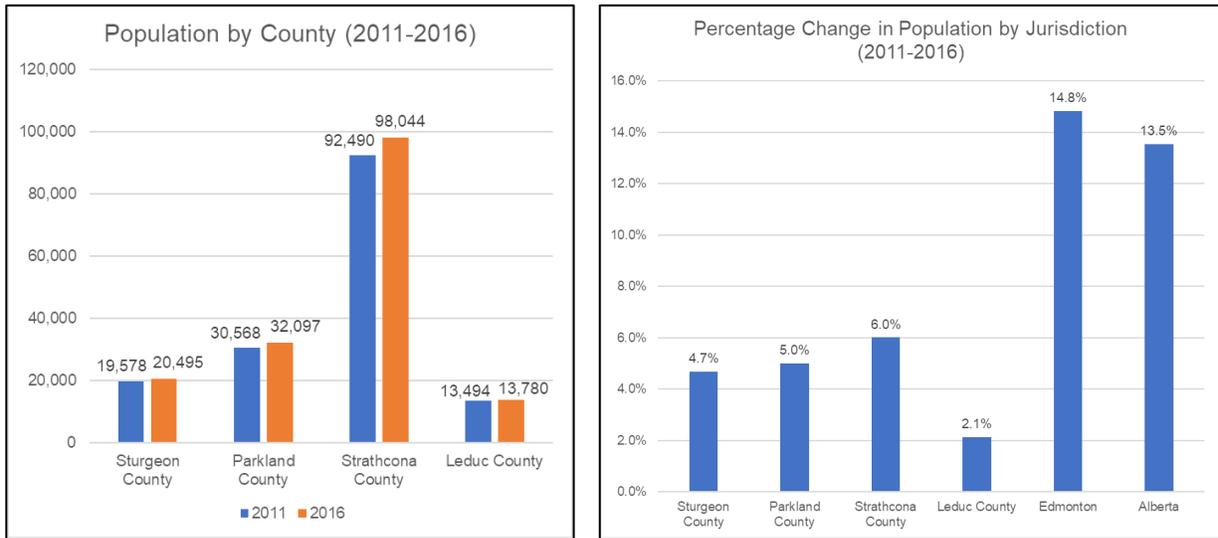


Figure 1-A breaks down Sturgeon County by its six (6) divisions and indicates the corresponding population and its representation relative to Sturgeon County's 2019 total population⁴.

⁴ <http://www.sturgeoncounty.ca/Portals/0/2019%20Municipal%20Census%20Report.pdf>

1.1.1.2 Employment

The four (4) counties (plus Edmonton and the Province of Alberta) boast an employment participation rate that ranges between 70.2% and 73.4%. Leduc County maintained the highest participation rate of 73.4%, followed by Edmonton with 71.8%. Sturgeon County shared a very similar rate (71.4%) to that of the provincial average (71.7%). At 70.2%, Parkland County has the lowest participation rate.

BUSINESS OWNERS LIVE HERE
 Sturgeon County has a growing number of entrepreneurs!
1,929
 respondents said they are self-employed!

When considering the unemployment rate, Strathcona County maintained the lowest numbers, at 6.5%, followed by Sturgeon County at 7.2%. Edmonton and Parkland County both have unemployment rates that exceed the 8.5% provincial average, with 8.8% and 9.4%, respectively.

Chart 1-B Labour Force Participation Rates by Jurisdiction

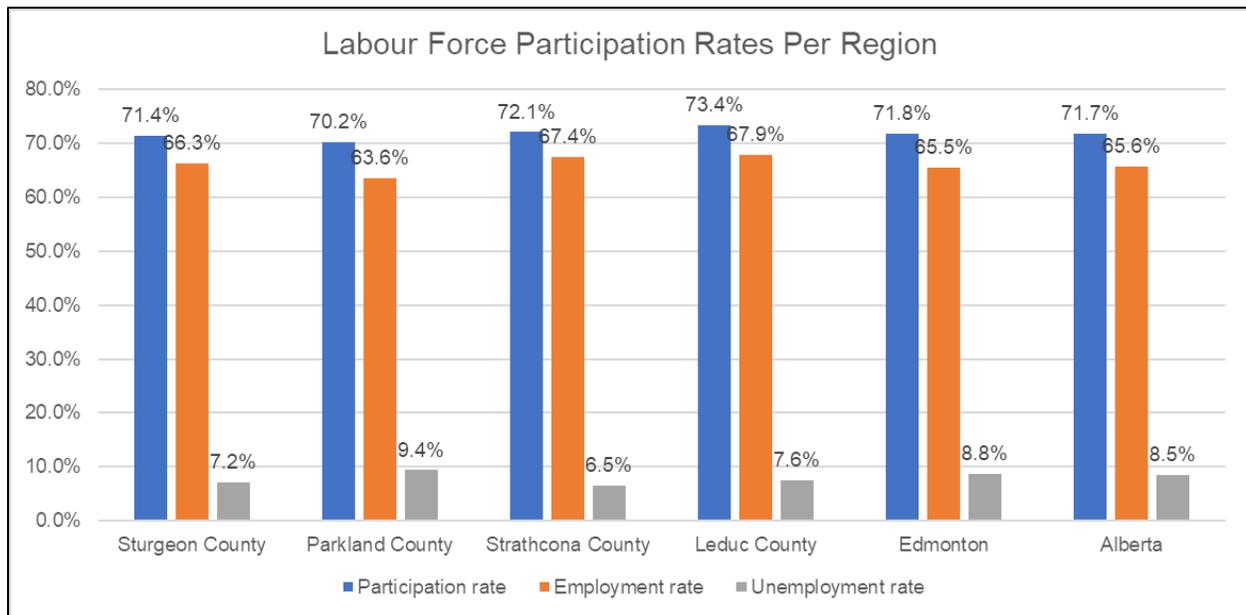
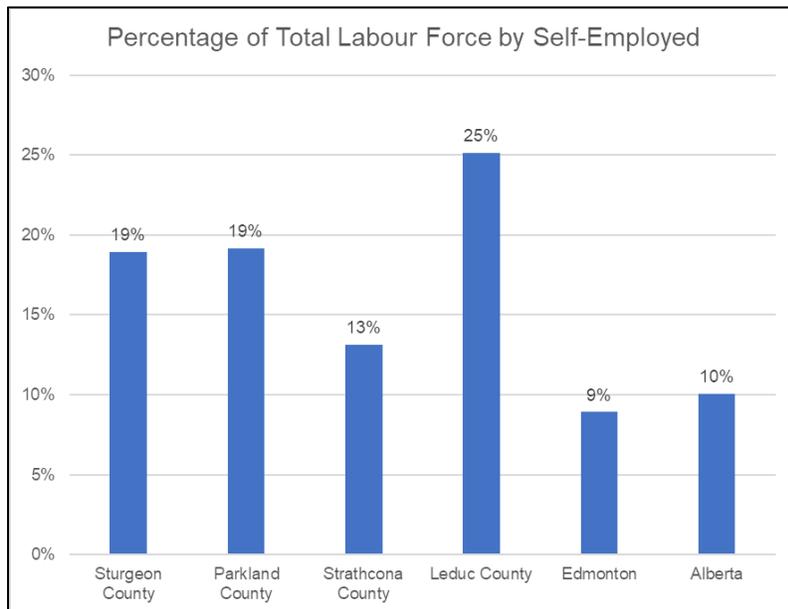


Chart 1-C Percent Self-Employed by Jurisdiction



One way to measure the level of entrepreneurship in a region is to consider its level of self-employment. Chart 1-C illustrates the percentage of each comparable region's population that is self-employed and compares those figures to the provincial average. The results indicate that the Province of Alberta identified only 10% of its labour force as self-employed, while Leduc County identified the highest level of self-employment, with 25%.

Both Sturgeon County and Strathcona County reported equal representation of self-employed workers (at 19%), and Edmonton dipped below the provincial average with 9%. Within Sturgeon County's 2019 Census Report, 1,929⁵ respondents indicated that they were self-employed. When considering the raw numbers between both census datasets, this figure decreased from 2,140 in 2016, representing a decline of 10.9%.

1.1.1.3 Education Level

Chart 1-D identifies the highest level of education achieved for the four (4) counties. A prevailing share of Sturgeon County's residents (46.7%) report having only a secondary school diploma or equivalency certificate, or no certificate, diploma or degree. This is in comparison to the Province of Alberta, which reports that 43.9% of its population has the same level of education. In 2019, 804 respondents of Sturgeon County's 2019 Census Report indicated that they were currently enrolled in post-secondary classes⁶.

⁵ <http://www.sturgeoncounty.ca/Portals/0/2019%20Municipal%20Census%20Report.pdf>

⁶ <http://www.sturgeoncounty.ca/Portals/0/2019%20Municipal%20Census%20Report.pdf>

Chart 1-D Highest Certificate, Diploma or Degree by Jurisdiction

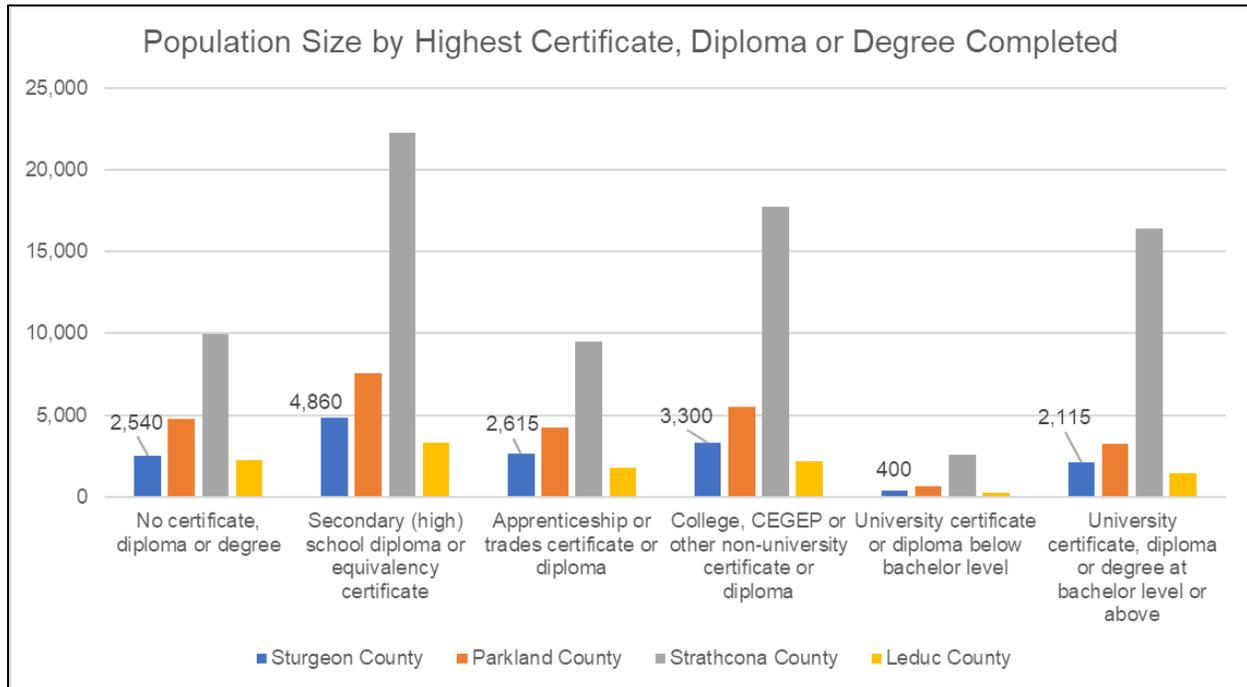
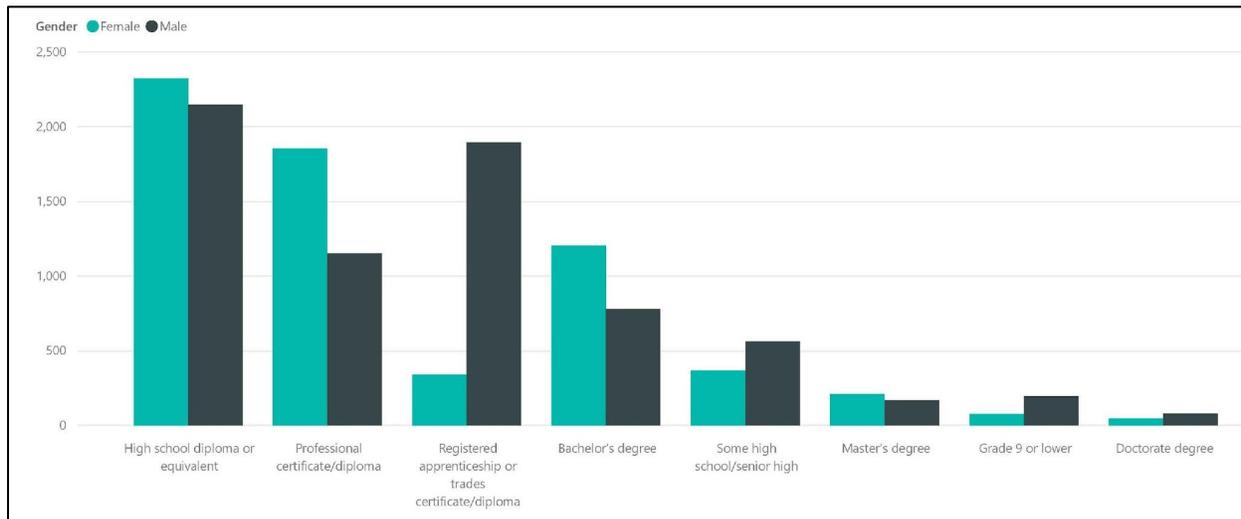


Chart 1-E illustrates the highest level of education that was completed in Sturgeon County in 2019⁷.

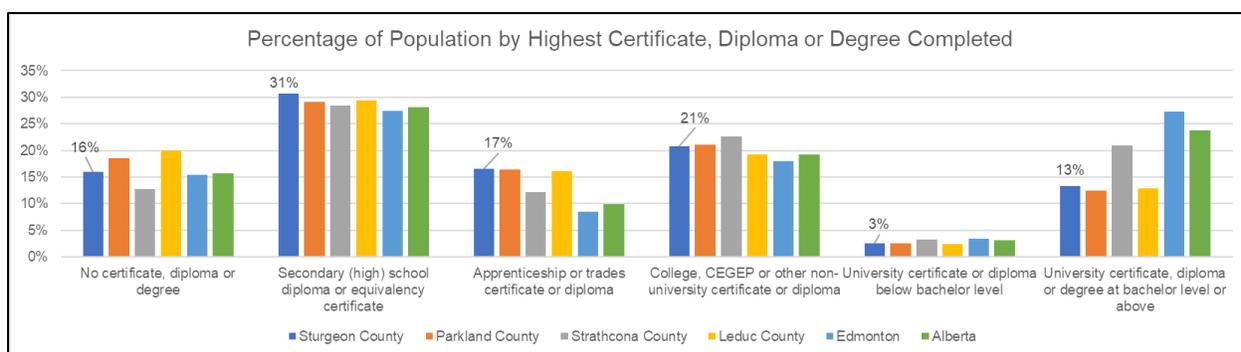
Chart 1-E Highest Level of Education Completed in Sturgeon County (2019)



⁷ <http://www.sturgeoncounty.ca/Portals/0/2019%20Municipal%20Census%20Report.pdf>

When comparing Sturgeon County’s overall level of education to that of the city of Edmonton and the other three (3) counties, 17% of Sturgeon County residents report having an apprenticeship or trades certificate or diploma, 21% have obtained their college, CEGEP or other non-university certificate or diploma, 3% hold a university certificate or diploma below bachelor level, and 13% have received a university certificate, diploma or degree at bachelor level or above. For further comparison purposes, the four (4) county averages reveal that 15% of residents report having an apprenticeship or trades certificate or diploma, 21% have obtained their college, CEGEP or other non-university certificate or diploma, 3% hold a university certificate or diploma below bachelor level, and 15% have received a university certificate, diploma or degree at bachelor level or above. Of particular note is that 27% of Edmonton’s population and 24% of the provincial population holds a university certificate, diploma or degree at bachelor level or above.

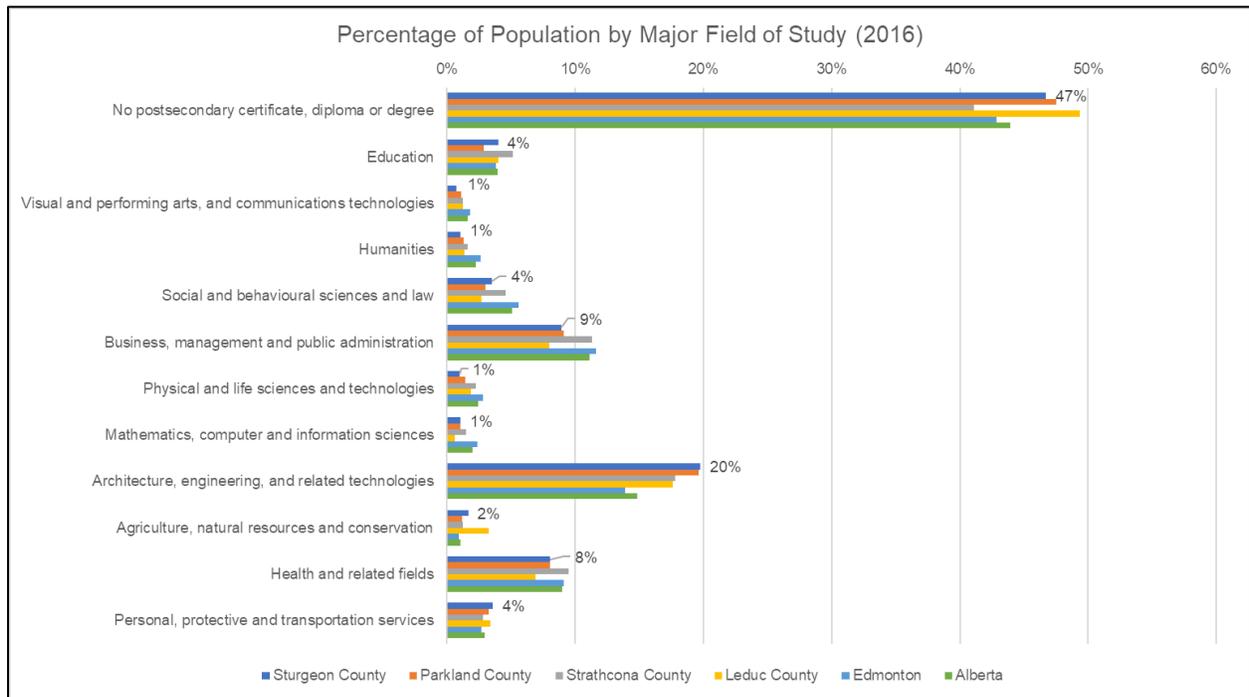
Chart 1-F Highest Certificate, Diploma or Degree by Jurisdiction (% of Population)



1.1.1.4 Labour Force by Field of Study

To further understand the local labour force, Chart 1-G presents the percentage of population by major field of study between the comparable regions. The high percentage of the population who have not attained a post-secondary certificate, diploma or degree is particularly noteworthy for this section of the report. This statistic ranges between 41% and 49%, with Strathcona County reporting 41%. Other prevailing trends include a noticeably high percentage of the population completed studies in the fields of architecture, engineering, and related technologies, ranging from 18% to 20% of the population of the four (4) counties; 8% to 11% of the population have completed studies in the fields of business, management and public administration, and 7% to 9% of the population have completed studies in health and related fields.

Chart 1-G Labour Force by Major Field of Study



1.1.1.5 Labour Force by Industry

Another way to analyze the local labour force is by industry, using the North American Industry Classification System (NAICS), as illustrated in Chart 10. Not only will this provide a glimpse into the prevailing industries with the highest (or lowest) levels of corresponding labour pools, but it can also serve to determine if there are any gaps in the local labour force based on the field of study and business activities (notwithstanding the fact that a position associated with finance and accounting is a transferable skill set, which could be employed in one of many industries presented below).

Other interesting observations about the four (4) counties can also be made from these results: Strathcona County has the highest percentage of labour force of the four (4) counties within the industry classification of agriculture/forestry/fishing/hunting industry and mining/quarrying/oil-gas extraction; Parkland County has the highest percentage of its workforce associated with construction; Strathcona County has the smallest percentage of its population associated with retail trade, health care social assistance, and public administration; and Sturgeon County has the highest percentage (relative to the comparable regions) of its population involved in public administration.

Chart 1-H Percentage of Total Labour Force by NAICS Code

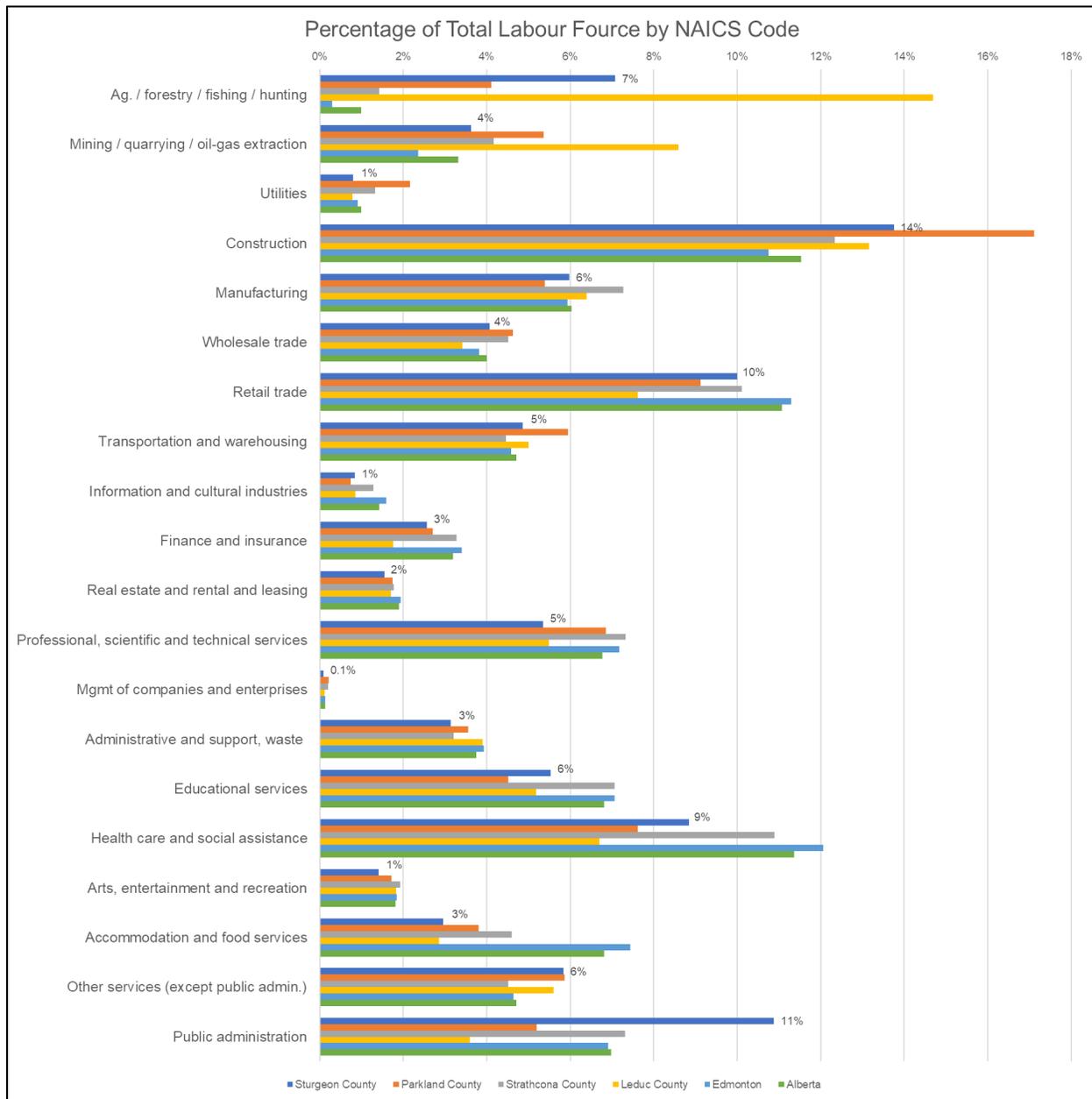
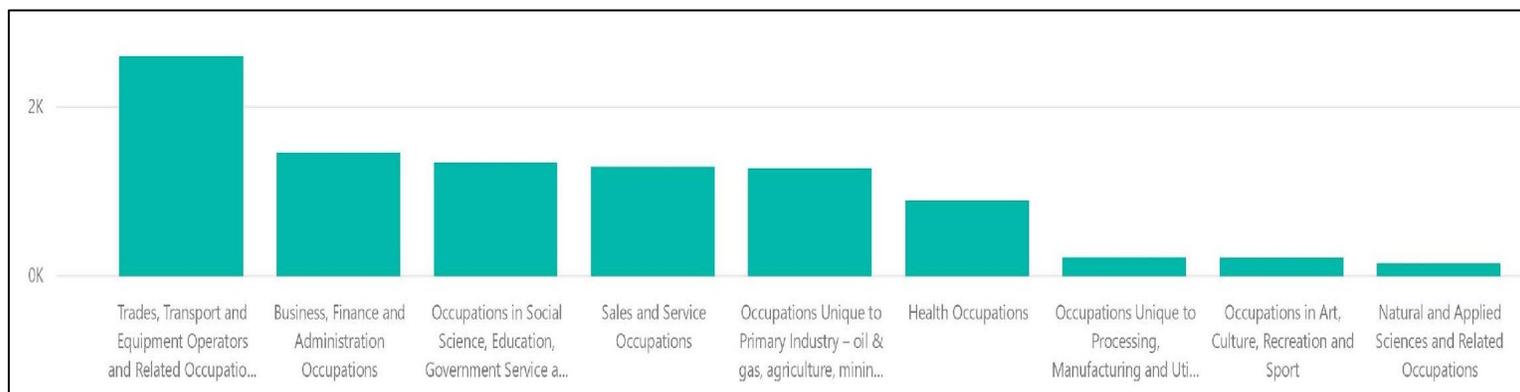


Chart 1-I presents the total number of occupations by sector held by Sturgeon County residents in 2019⁸. The prevailing sector, which encompasses trades, transport and equipment operators, and related occupations, represents 2,598 Sturgeon County residents.

⁸ <http://www.sturgeoncounty.ca/Portals/0/2019%20Municipal%20Census%20Report.pdf>

Chart 1-I Occupation by Sector



1.1.1.6 Income – Individual vs. Household

It is important to analyze each region separately in order to obtain a complete economic spectrum of the distribution of populations in comparable urban and rural areas. Demographics vary between regions, and it is important to break down the information regionally.

After-tax income was among the key economic indicators that were analyzed. Individual and household after-tax income is one of the most common metrics used when analyzing the purchasing power of a population.

Chart 1-J shows that, at the individual level, average after-tax income is fairly uniform between the four (4) counties with a spread of \$7,668. When compared to Edmonton, Sturgeon County has a higher average after-tax income by \$14,108 (representing a margin of 30%). When compared with the provincial average, Sturgeon County is higher again, but by \$11,617 (24%). Of the four (4) counties, Strathcona County reports the highest individual after-tax income (\$63,733), which is representative of being \$2,802 (5%) higher than Sturgeon County.

A similar pattern also exists when considering after-tax household income. The four (4) counties are spread over a range that differs by \$15,454. When compared to the Edmonton after-tax household average, Sturgeon County is higher by \$42,060 (45%), and when compared to the provincial average, Sturgeon County is higher by \$35,936 (36%). Compared to the other three (3) counties, Sturgeon County's after-tax household income is 20.9% higher than Leduc County and 12.5% higher than Parkland County; however, it is 0.3% lower than Strathcona County. Sturgeon County's 2019 Census Report indicated that more than half of responding households reported making more than \$110,000 per year⁹. This is in comparison to the 2016 average household income of \$134,540.

⁹ <http://www.sturgeoncounty.ca/Portals/0/2019%20Municipal%20Census%20Report.pdf>

Chart 1-J Average Individual vs Household After-tax Income (2015)

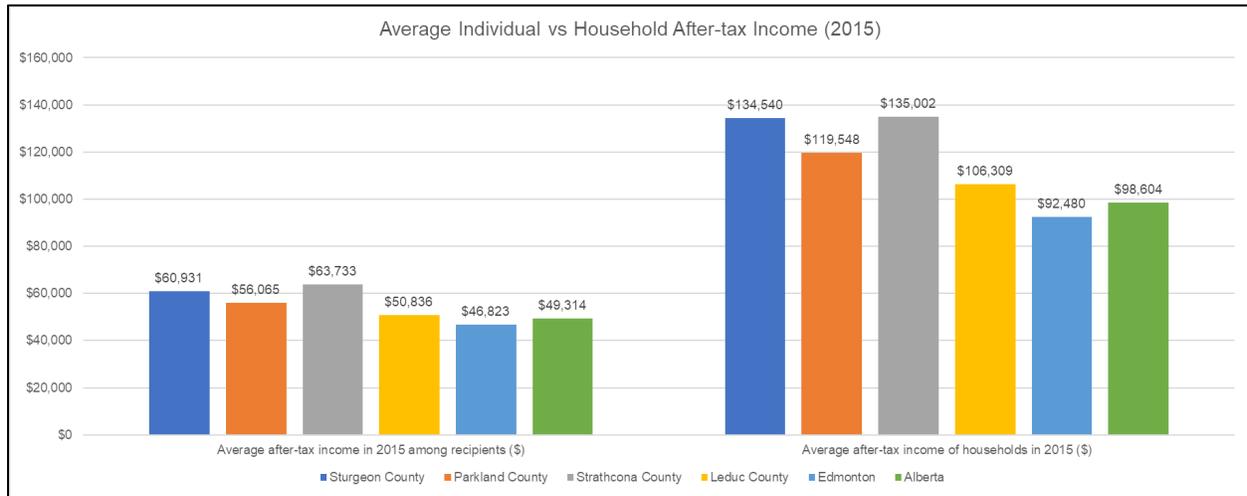
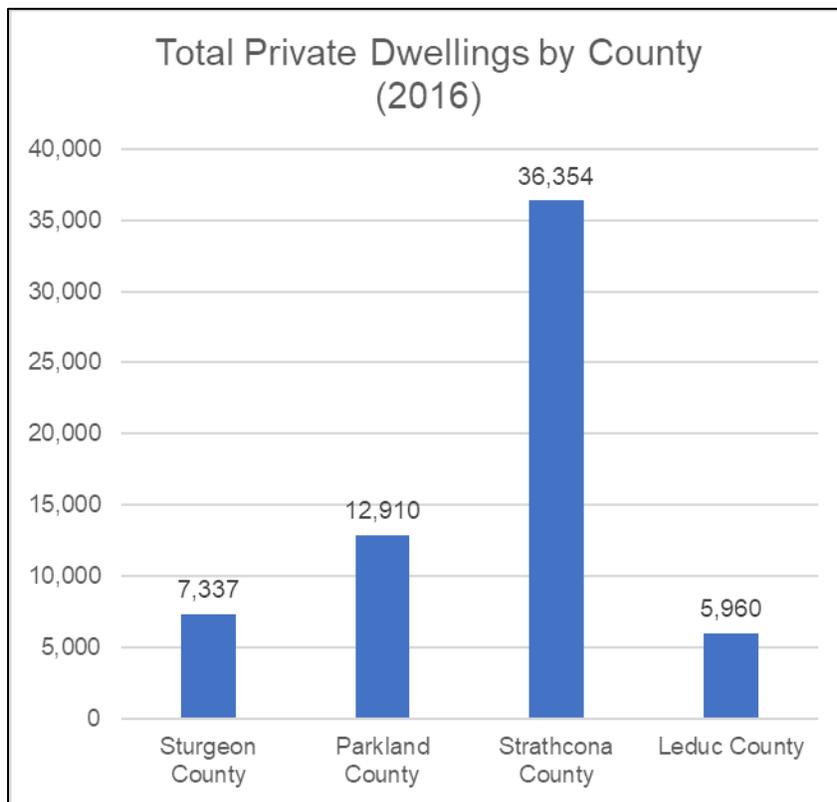


Chart 1-K Total Private Dwellings by Jurisdiction (2016)



In terms of the number of private dwellings by county, Strathcona County has the highest number, with 36,354 private dwellings (as shown in Chart 1-K). In comparison, Parkland County has 12,910 private dwellings, Sturgeon County has 7,337 private dwellings and Leduc County has 5,960 private dwellings. While not included in this visual, Edmonton alone reported 387,950 private dwellings in 2016.

1.1.1.7 Place of Work and Work Commute

As today's workforce continues to adapt to the realities of ever-changing work arrangements, due in part to the COVID-19 pandemic, and are moving to work-from-home arrangements, it will become increasingly important to track these changes. New trends like these have the potential to assist in future municipal planning considerations. Chart 1-L illustrates the primary place of work (as a percentage of the population) for the four (4) counties, Edmonton, and the Province of Alberta. When considering "work from home", 13% of Sturgeon County's population identify with this work arrangement. This is in contrast to 22% in Leduc County (representing the highest percentage of population working from home), and 5% of the population in Edmonton, (representing the lowest percentage of population working from home). Other noticeable trends are that 17% of Sturgeon County's workforce has no fixed workplace address, and 69% of the labour force works at its usual place of employment. Strathcona County (at 79%), the Province of Alberta (at 80%), and Edmonton (at 81%) report having a higher number of their workforce commuting to their usual place of employment.

Chart 1-L Percentage of Employed Labour Force by Place of Work

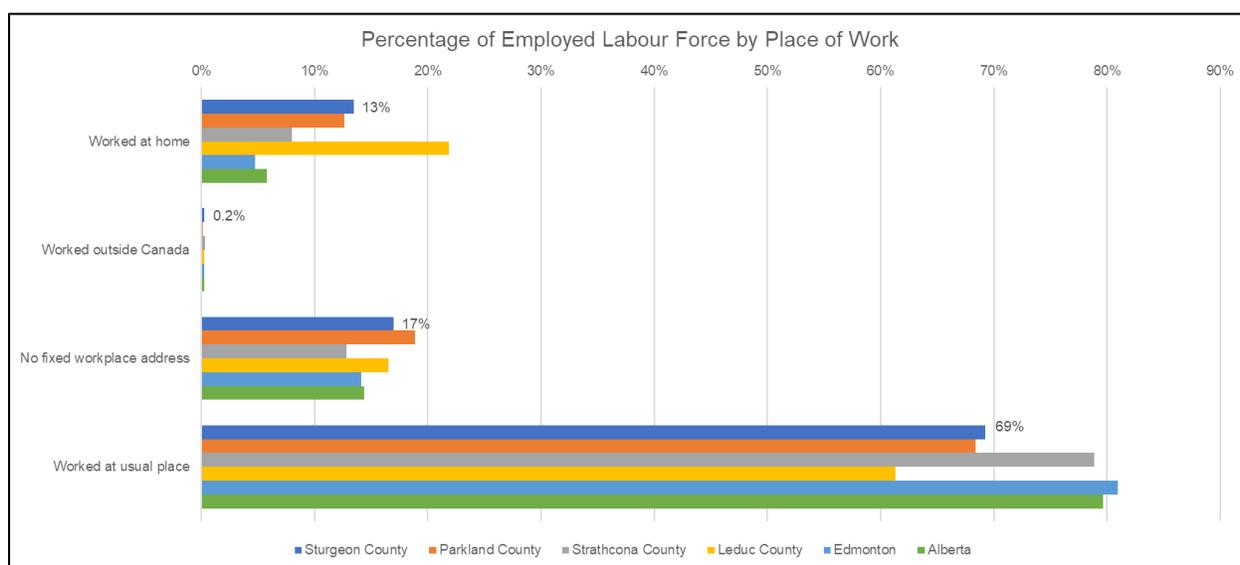
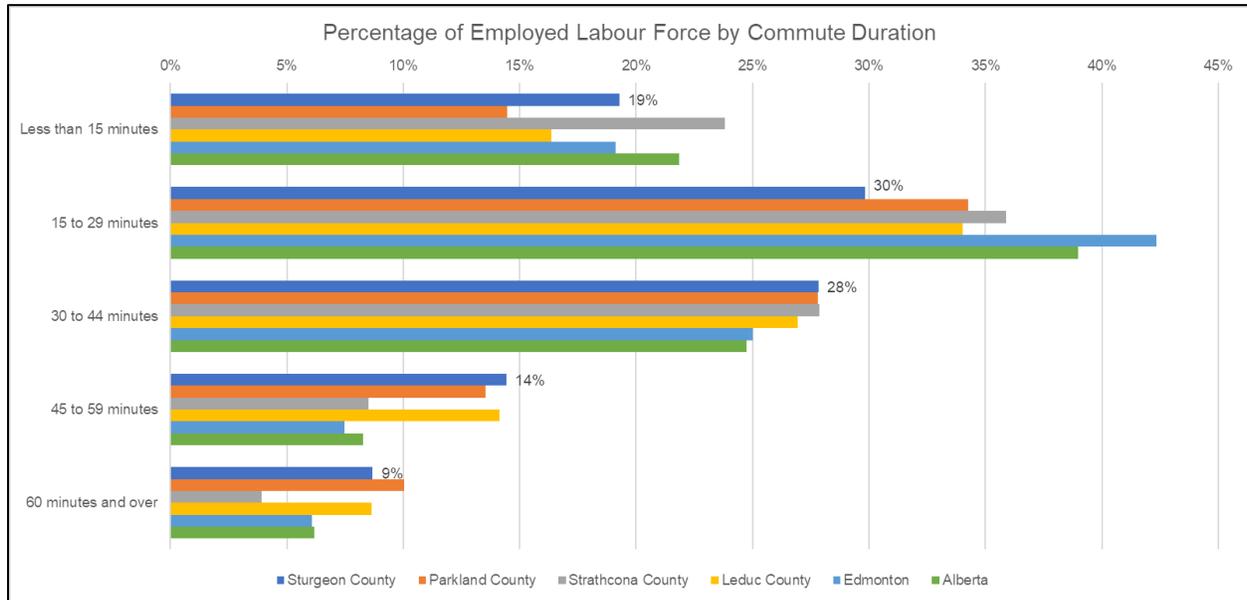


Chart 1-M details the commuting distances (by the duration of time) for employees to their reach their place of work. Sturgeon County sees 19% of its labour force commute less than 15 minutes to work, 30% between 15-29 minutes, 28% between 30-44 minutes, 14% between 45-59 minutes, and 9% travelling for one hour or longer to their place of work.

demographic from the comparable regions. Finally, Sturgeon County falls behind Parkland County for having the second-highest percentage of labour force travelling one hour or more to work.

Chart 1-M Percentage of Employed Labour Force by Commute Duration



If the commuting distances of 15-29 minutes and 30-44 minutes are combined, one may be able to conclude that a prevailing share of this travel time of 15-44 minutes matches with the travel time that it takes to commute from many of the urban centres in Sturgeon County to Edmonton. This extrapolation may help to identify the reason why Edmonton is the most populous location of employment, as noted from Sturgeon County’s 2019 Census Report ¹⁰. From a regional perspective, the findings show that location sensitivities are less observed in the region as people in the EMR are commuting to work. This allows municipalities an easier access to the regional labour pool for any development opportunities.

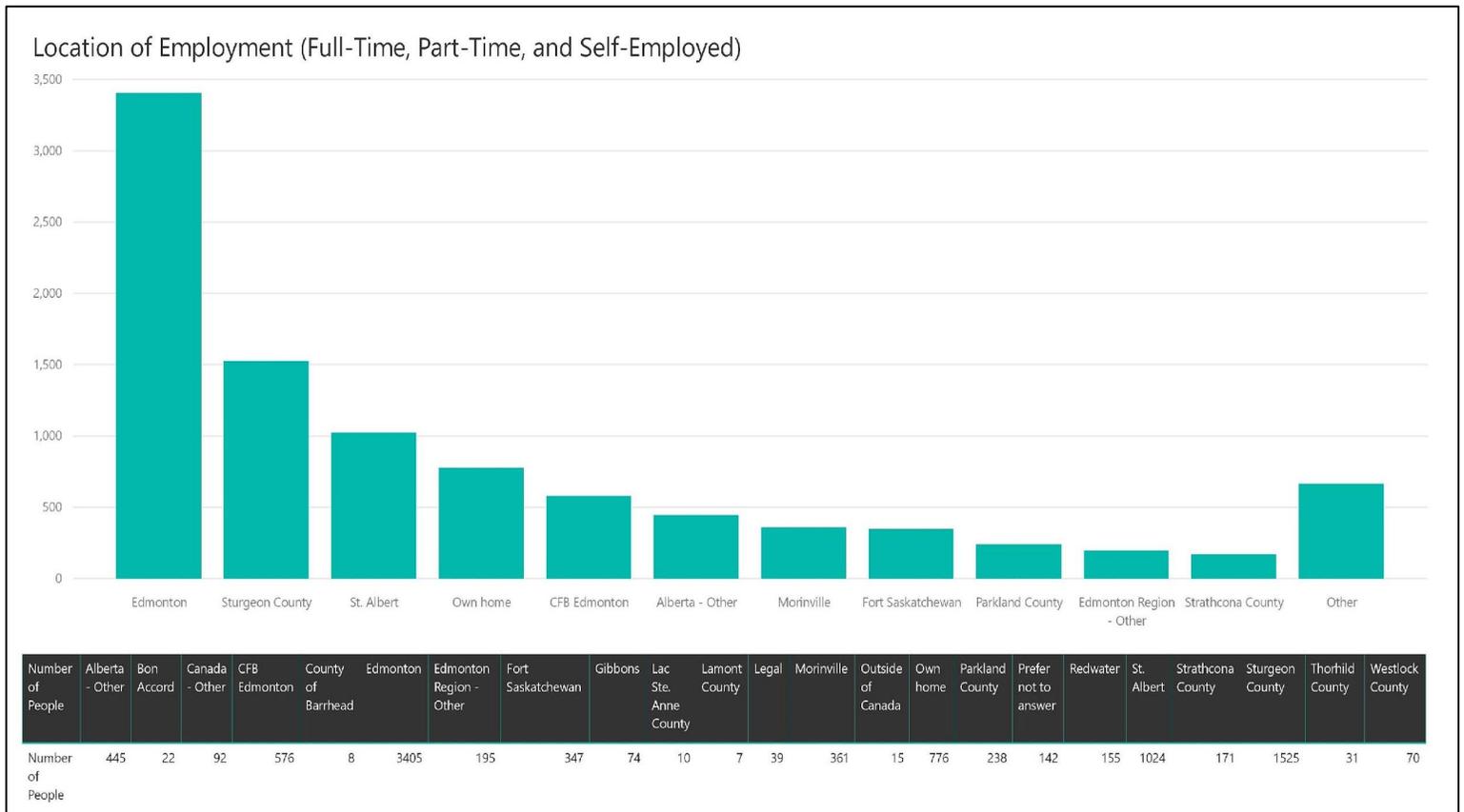
Although Edmonton is the most popular location of employment, Sturgeon County is the second highest location of employment for residents.

Chart 1-N illustrates the locations of employment of Sturgeon County residents. Edmonton, Sturgeon County, St. Albert, and individual home locations were the top four (4) reported employment locations (stemming from Sturgeon County’s 2019 Census Report ¹¹).

¹⁰ <http://www.sturgeoncounty.ca/Portals/0/2019%20Municipal%20Census%20Report.pdf>

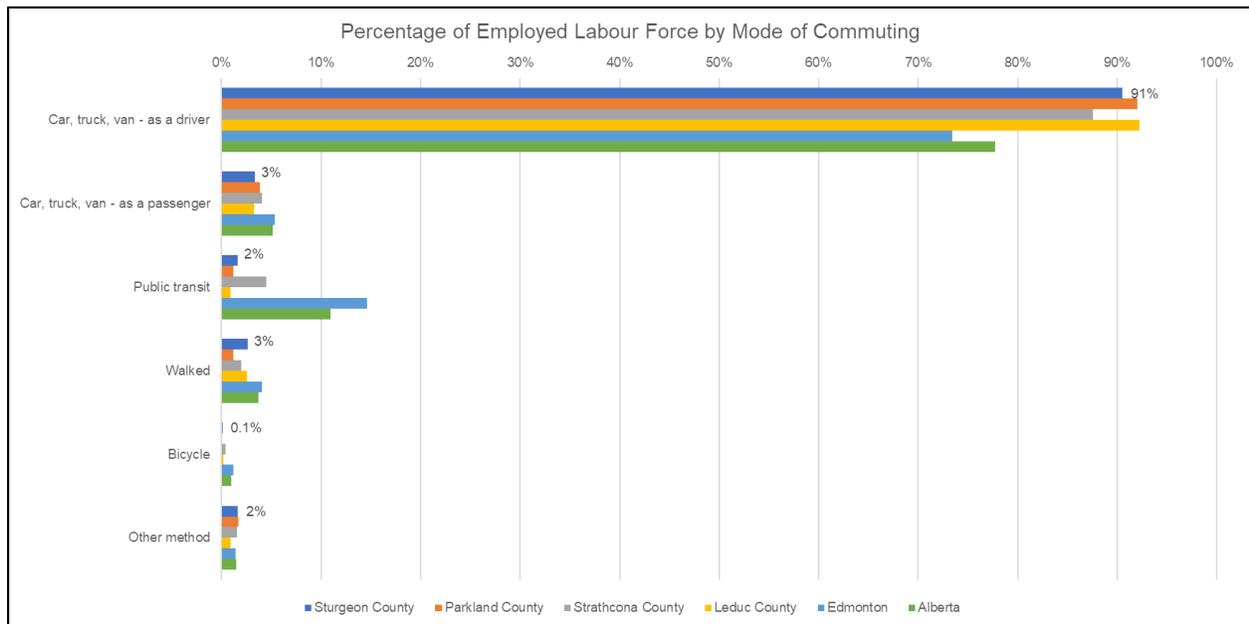
¹¹ <http://www.sturgeoncounty.ca/Portals/0/2019%20Municipal%20Census%20Report.pdf>

Chart 1-N Location of Employment of Sturgeon County Residents (2019)



In considering the percentage of the employed labour force by mode of commute throughout the comparable regions, Chart 1-O reveals that the prevailing share of all modes of transportation to work (88%-92% of the four counties) falls within car/truck/van as the primary mode of transportation. In the category of public transit as a mode of commuting, it is understandable that Edmonton holds the highest share (at 15%), given its municipal public transit infrastructure; this would also explain the lower utilization of car/truck/van as modes of commute. Moreover, Edmonton has the highest share (between the comparable regions) of its employed labour force walking to work, with 4%. This can be explained by the mix and density of residential neighbourhoods and commercial businesses in relatively close proximity to one another. The mode of commute by car/truck/van as a passenger reveals it is a low, but consistent, option in all of the comparable regions (ranging from 3% to 5% of the employed labour force).

Chart 1-O Percentage of Employed Labour Force by Mode of Commuting



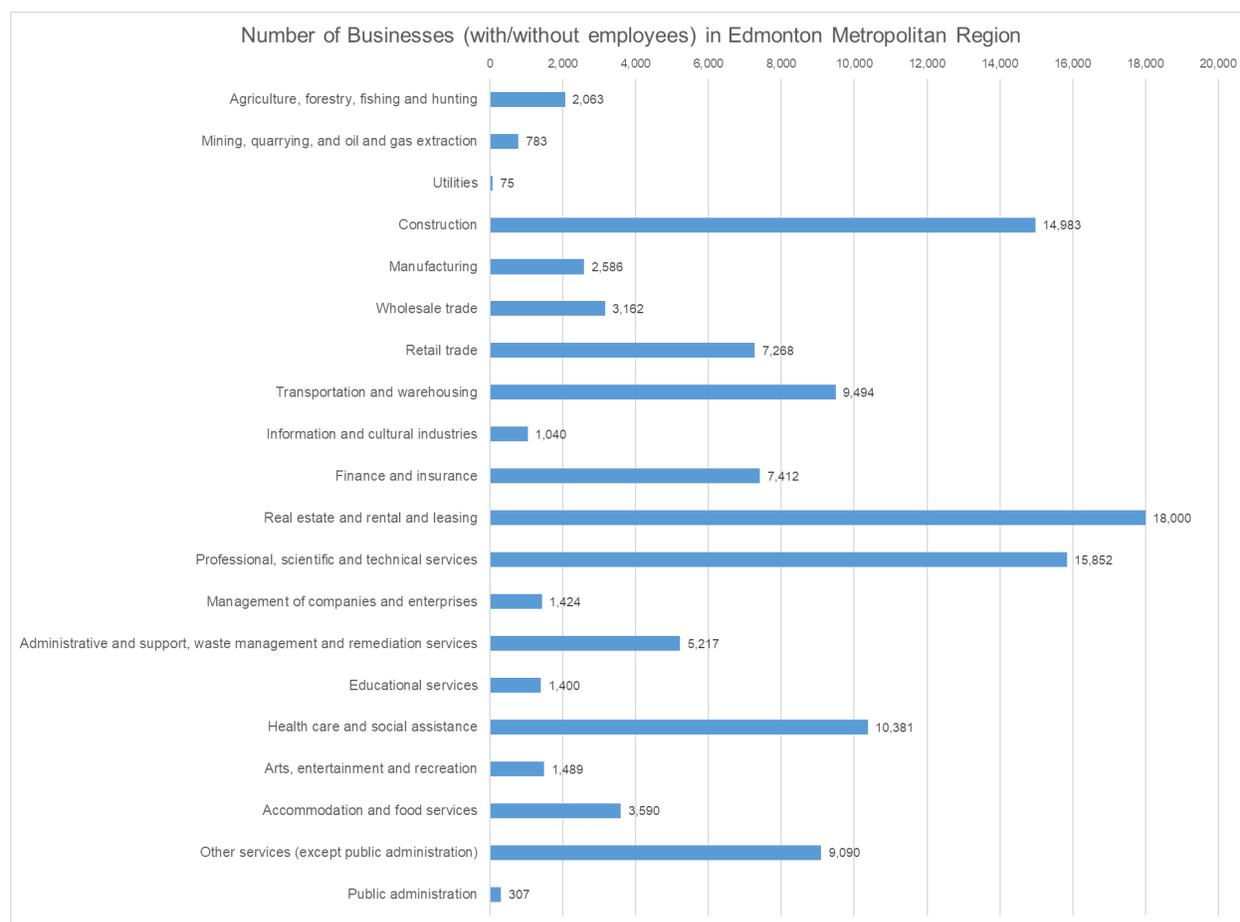
Business Count Analysis

To understand the regional industry profile for the Edmonton Metropolitan Region, which takes into consideration the City of Edmonton and the adjacent counties of Sturgeon, Parkland, Strathcona and Leduc, this section takes a three-pronged approach to illustrate and analyze the prevailing industries using Statistics Canada December 2020 Business Count data.

1.1.1.8.1 Businesses with Employees by Industry

Chart 1-P presents the business counts of all businesses (with and without employees) throughout the defined catchment area. Of the 115,616 registered businesses, 40,577 (35.1%) identified as having employees, and the remaining 75,039 (64.9%) reported no employees.

Chart 1-P Number of Businesses (with/without Employees) in Edmonton Metropolitan Region



A more in-depth look at the total business counts helps gain an understanding of the prevailing industry sectors. Table 1-A presents the top ten (10) industries by business counts and is divided into three (3) sections. The first section considers the size of each industry by analyzing all businesses, regardless of whether they have employees or not. The second section ranks the size of each industry by the number of businesses without employees. The final section categorizes each industry by the number of businesses with employees.

A colour-coding system was created as a means for tracking any movements in the rank of any one industry between the various classifications. Of particular note is that real estate and rental and leasing was identified as the top industry in both the “all businesses” and “businesses by sector – without employees” categories; yet, it ranked tenth in the category of “businesses by sector – with employees”. The top industry by sector based on businesses with employees was “professional, scientific and technical services”, which ranked second to “real estate and rental and leasing” in the categories of “all businesses” and “businesses by sector – without employees.” The construction industry ranked second in terms of the number of businesses with employees and also shared the third top-spot in the categories of “businesses by sector – without employees” and “all businesses”. Other industries that are worth mentioning include health care and social

assistance (the third-largest industry based on businesses with employees), transportation and warehousing (which ranked fifth in “all businesses”), and retail trade (which ranked fourth in “businesses by sector – with employees”).

Table 1-A Top 10 Industry within the Edmonton Metropolitan Region

All Businesses			Businesses by Sector (without employees)			Businesses by Sector (with employees)		
Rank	Industry	Business Count	Rank	Industry	Business Count	Rank	Industry	Business Count
1	Real estate and rental and leasing	18,000	1	Real estate and rental and leasing	16,338	1	Professional, scientific and technical services	5,699
2	Professional, scientific and technical services	15,852	2	Professional, scientific and technical services	10,153	2	Construction	5,159
3	Construction	14,983	3	Construction	9,824	3	Health care and social assistance	5,185
4	Health care and social assistance	10,381	4	Transportation and warehousing	6,996	4	Retail trade	4,451
5	Transportation and warehousing	9,494	5	Finance and insurance	6,116	5	Other services (except public administration)	4,039
6	Other services (except public administration)	9,090	6	Health care and social assistance	5,196	6	Accommodation and food services	2,687
7	Finance and insurance	7,412	7	Other services (except public administration)	5,051	7	Transportation and warehousing	2,498
8	Retail trade	7,268	8	Administrative and support, waste management and remediation services	3,314	8	Wholesale trade	1,965
9	Administrative and support, waste management and remediation services	5,217	9	Retail trade	2,817	9	Administrative and support, waste management and remediation services	1,903
10	Accommodation and food services	3,590	10	Agriculture, forestry, fishing and hunting	1,771	10	Real estate and rental and leasing	1,662

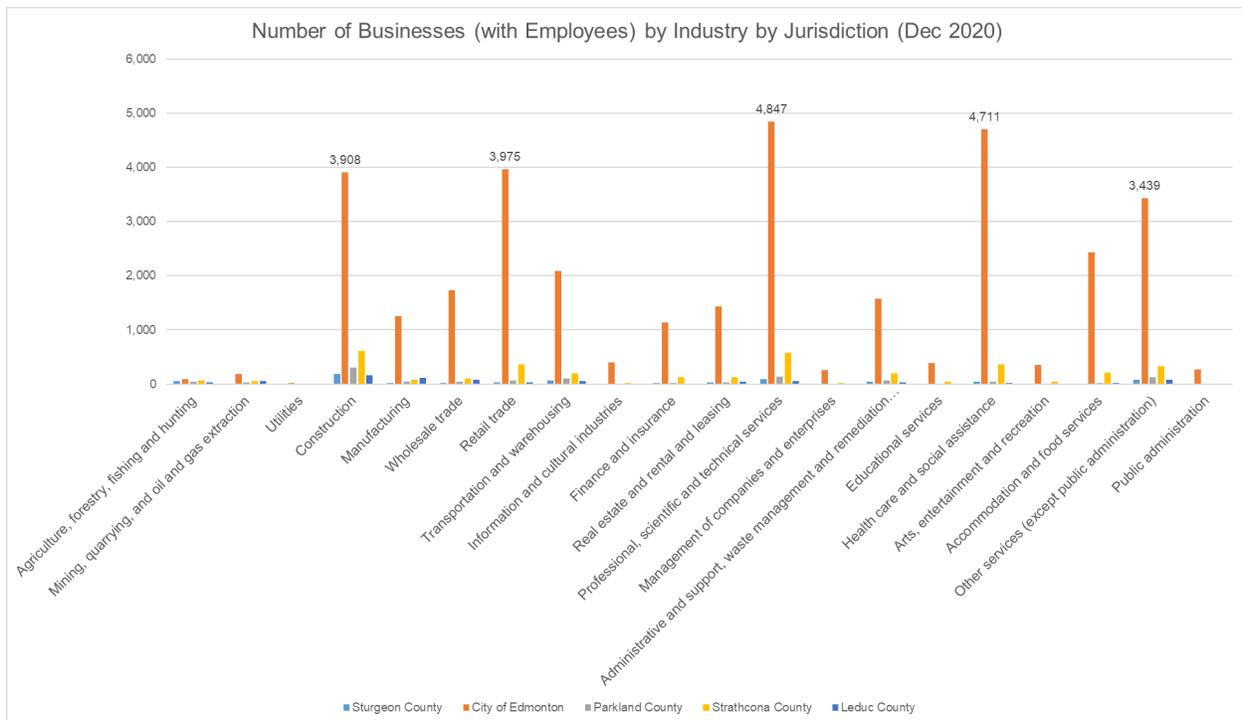
The following two (2) charts incorporate the results from Chart 1-P and separate the number of businesses (with employees) by industry and by jurisdiction. The difference between Chart 1-Q and Chart 1-R is that the former includes the city of Edmonton and the latter does not. These two (2) charts were prepared in this manner to make it easier to visualize and compare the prevailing

industries between jurisdictions without the data being skewed by the much higher results stemming from the city of Edmonton.

The top five (5) prevailing industries (based on business counts with employees) within the city of Edmonton are:

1. Professional, scientific and technical services
2. Health care and social assistance
3. Retail trade
4. Construction
5. Other services (except public administration)

Chart 1-Q Number of Businesses (with Employees) by Industry by Jurisdiction (2018)

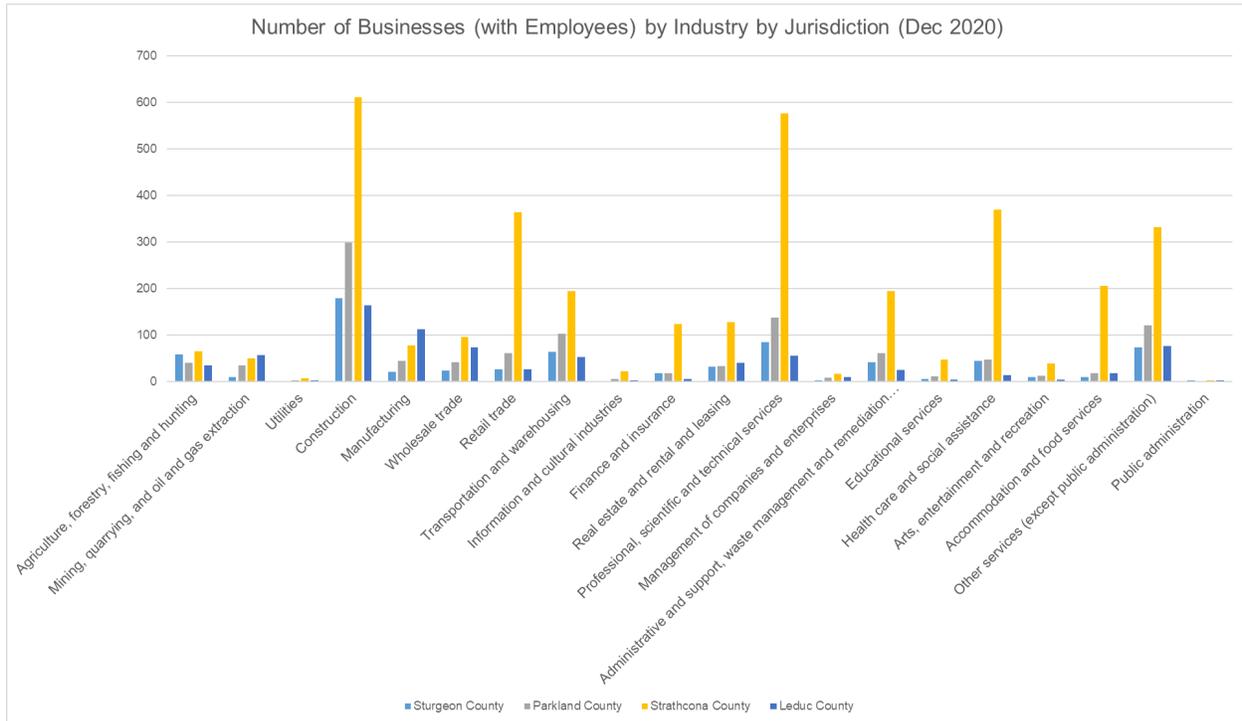


When the city of Edmonton is removed from the comparison and the focus turns to the counties of Sturgeon, Parkland, Strathcona and Leduc, the top five (5) industries in any one county all happen to be situated within Strathcona County:

1. Construction
2. Professional, scientific and technical services
3. Retail trade
4. Health care and social assistance
5. Other services (except public administration)

It is worth mentioning, given its role within the supply chain and logistics industry, the transportation and warehousing industry, which came in the sixth position in this ranking exercise for largest industry based on the number of businesses with employees.

Chart 1-R Number of Businesses (with Employees) by Industry by Jurisdiction (city of Edmonton Excluded) (2018)



1.1.1.8.2 Businesses Without Employees by Industry

While depicting the prevailing business activities by industry (based on aggregating all businesses, both with and without employees) is important for gaining an understanding of a regional economy, it must be noted that a prevailing share of businesses without employees can and do operate as holding companies. As such, this section will merely ranks the prevailing industries based on the number of businesses without employees in three (3) categories: a) across the entire catchment area; b) within the city of Edmonton; and c) throughout the counties of Sturgeon, Parkland and Strathcona. The following five (5) industries occupied the top five (5) spots in all three (3) categories:

1. Real estate and rental and leasing
2. Professional, scientific and technical services
3. Construction
4. Finance and insurance
5. Transportation and warehousing (this industry also ranked seventh in top industries in the three-county region comparison)

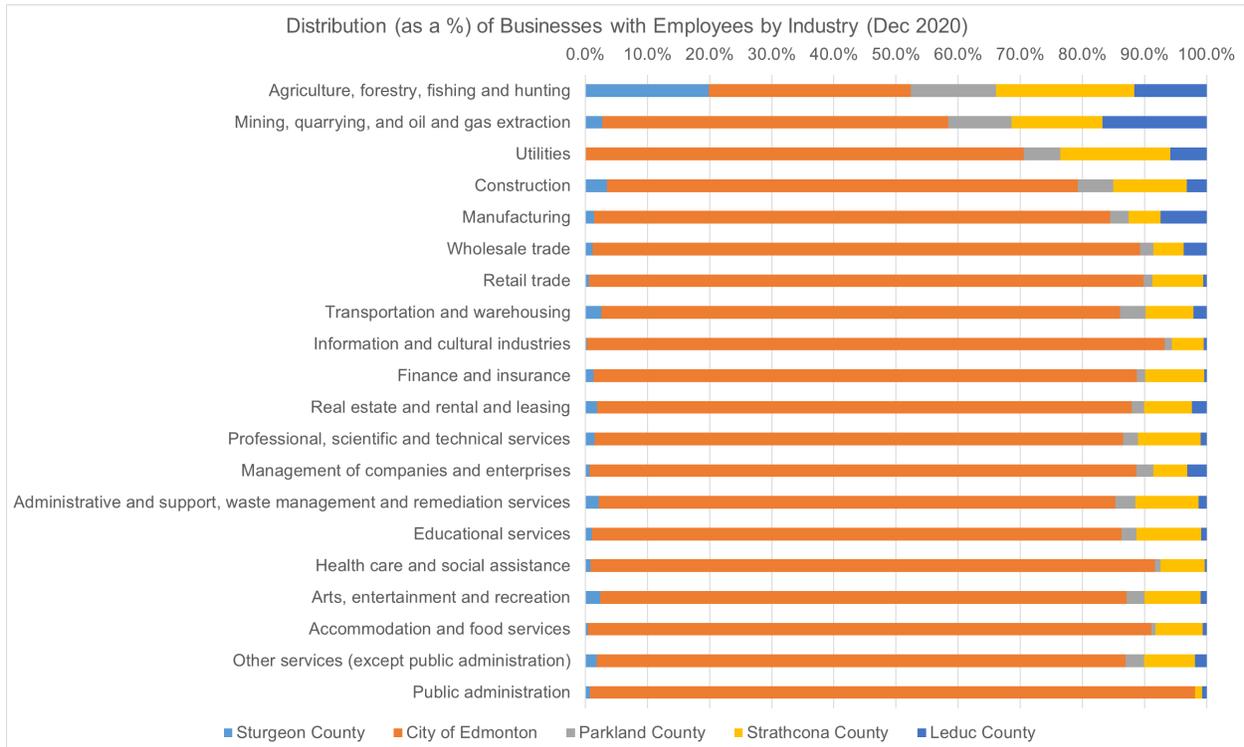
Table 1-B Top 10 Industries in the EMR (by business without employees)

All Businesses without Employees (Edmonton Metropolitan Region)			All Businesses without Employees (city of Edmonton)			All Businesses without Employees (4-County Region)		
Rank	Industry	Business Count	Rank	Industry	Business Count	Rank	Industry	Business Count
1	Real estate and rental and leasing	16,338	1	Real estate and rental and leasing	14,179	1	Real estate and rental and leasing	2,159
2	Professional, scientific and technical services	10,153	2	Professional, scientific and technical services	8,436	2	Construction	1,767
3	Construction	9,824	3	Construction	8,057	3	Professional, scientific and technical services	1,717
4	Transportation and warehousing	6,996	4	Transportation and warehousing	6,369	4	Agriculture, forestry, fishing and hunting	1,291
5	Finance and insurance	6,116	5	Finance and insurance	5,035	5	Finance and insurance	1,081
6	Health care and social assistance	5,196	6	Other services (except public administration)	4,147	6	Other services (except public administration)	904
7	Other services (except public administration)	5,051	7	Health care and social assistance	4,626	7	Transportation and warehousing	600
8	Administrative and support, waste management and remediation services	3,314	8	Administrative and support, waste management and remediation services	2,823	8	Health care and social assistance	570
9	Retail trade	2,817	9	Retail trade	2,406	9	Administrative and support, waste management and remediation services	491
10	Agriculture, forestry, fishing and hunting	1,771	10	Wholesale trade	947	10	Retail trade	411

1.1.1.8.3 Distribution of Businesses Across Jurisdictions by Industry

This section attempts to analyze the distribution of businesses across jurisdictions by industry. Chart 1-S focuses on the percentage of businesses with employees by industry and stacks the results among the four (4) defined areas. While the city of Edmonton maintains the prevailing share of all industries, Sturgeon County and Strathcona County both have a large percentage of businesses that fall within the agriculture, forestry, fishing and hunting industry. Other noticeable trends reveal that Strathcona County and Leduc County play key roles in contributing towards the mining, quarrying, and oil and gas extraction industry and utilities industry relative to Sturgeon and Parkland counties.

Chart 1-S Distribution (as a %) of Businesses with Employees by Industry (2018)



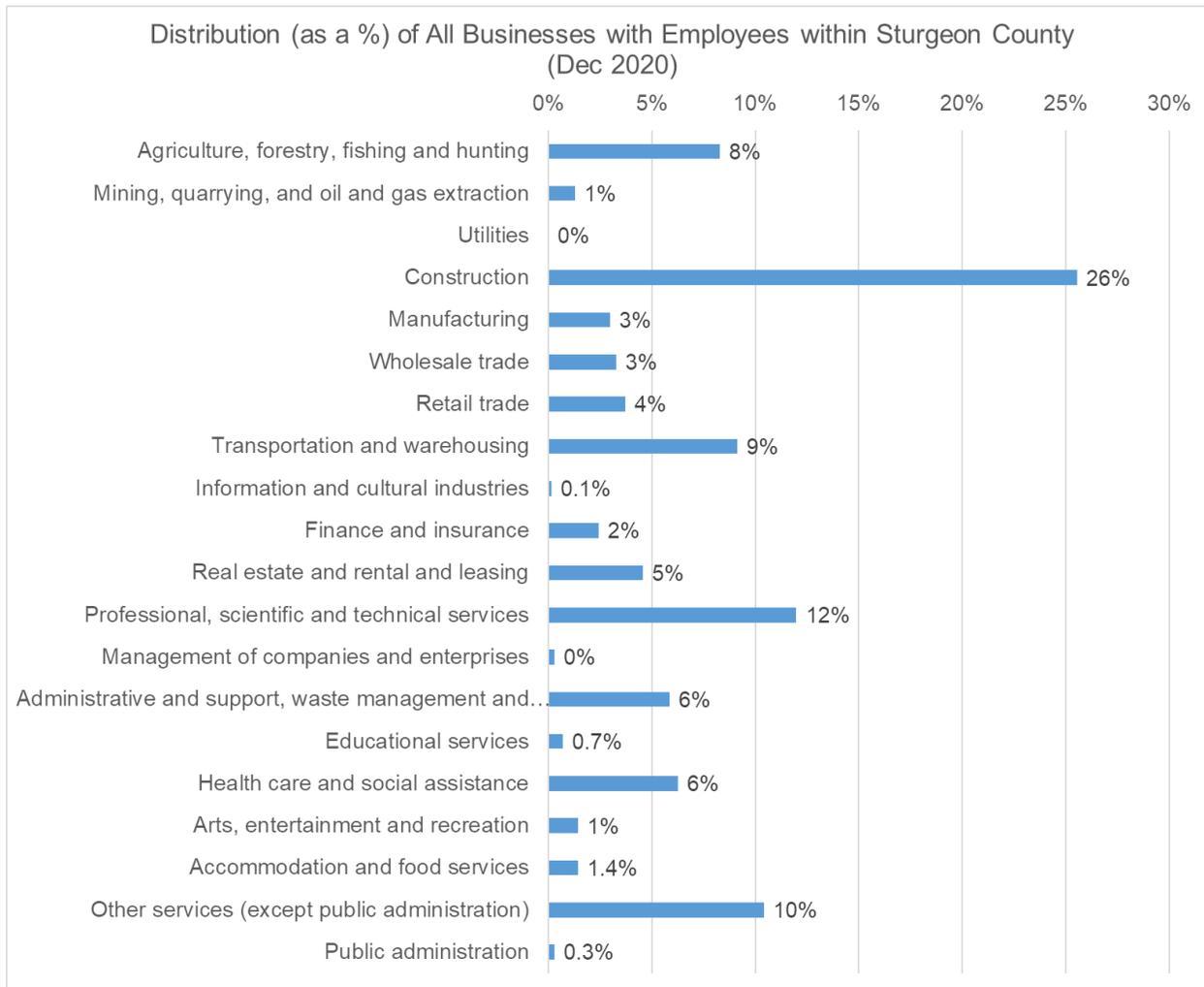
1.1.1.9 Sturgeon County Business Count

1.1.1.9.1 Businesses with Employees by Industry

Looking more specifically at Sturgeon County itself, Chart 1-T considers the distribution (as a percentage) of all businesses with employees within the region. The top five (5) industries that are most prevalent throughout Sturgeon County are:

1. Construction
2. Other services (except public administration)
3. Professional, scientific, and technical services
4. Transportation and warehousing
5. Agriculture, forestry, fishing and hunting

Chart 1-T Distribution of all Businesses with Employees within Sturgeon County (2018)



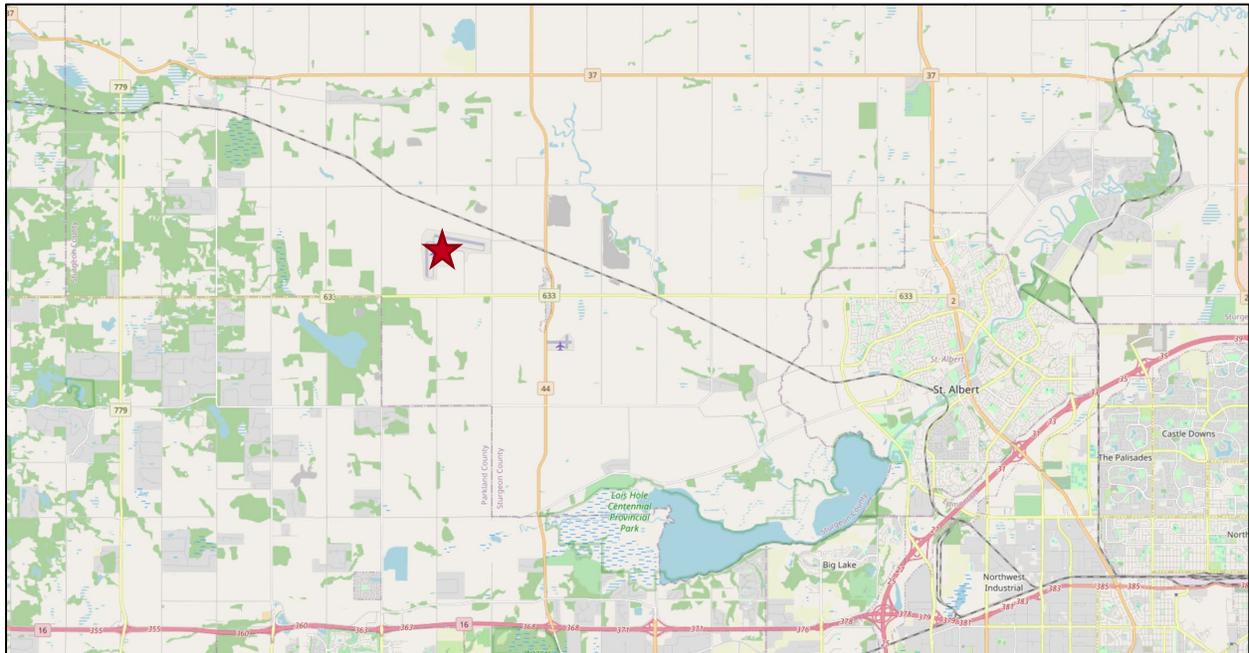
Regional Economic Drivers Identification

1.1.1.10 Key Infrastructures

1.1.1.10.1 Roads

The catchment area is located at the intersection of Alberta Provincial Highway No. 633 (Hwy 633) and Alberta Provincial Highway No. 44 (Hwy 44). Hwy 44 is only 14.5 km away from Highway No.16 (also known as Yellowhead Highway).

Figure 1-B Road Map around Villeneuve Airport Area



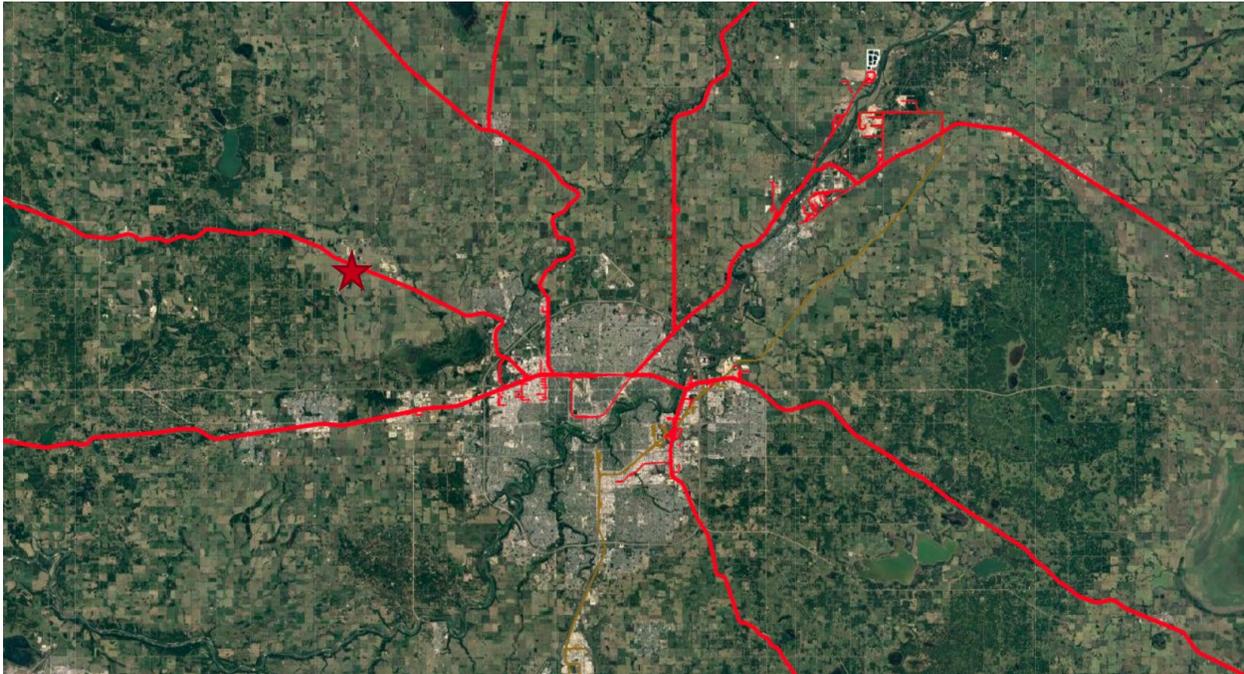
* Red star represents the location of ZVL. The highway marked in pink represents Highway No. 16. and Alberta Provincial Highway No. 44 is marked in orange.

With its close proximity to regional highways, the Villeneuve Airport Area provides easy access to major transportation corridors and helps to facilitate the regional, intra-provincial and inter-provincial transportation of goods. The Villeneuve Airport Area is located on the Edmonton Metropolitan Regional Commuter Shed boundary (as identified in the 2017 EMR Growth Plan, in which Hwy 44 is identified as a potential high-load corridor). The Yellowhead Highway is a major cross-country highway that runs from Winnipeg, Manitoba to Graham Island, British Columbia.

1.1.1.10.2 Railways

The Villeneuve Airport Area is near an active CN rail line. The CN rail line runs from Kaybob, Alberta, to the east of the city of Edmonton and is connected to another CN rail line that passes through the West Yellowhead Corridor (in close proximity to downtown Edmonton).

Figure 1-C Rail Line (CN Rail) Map around Villeneuve Airport Area



* Red star represents the location of ZVL

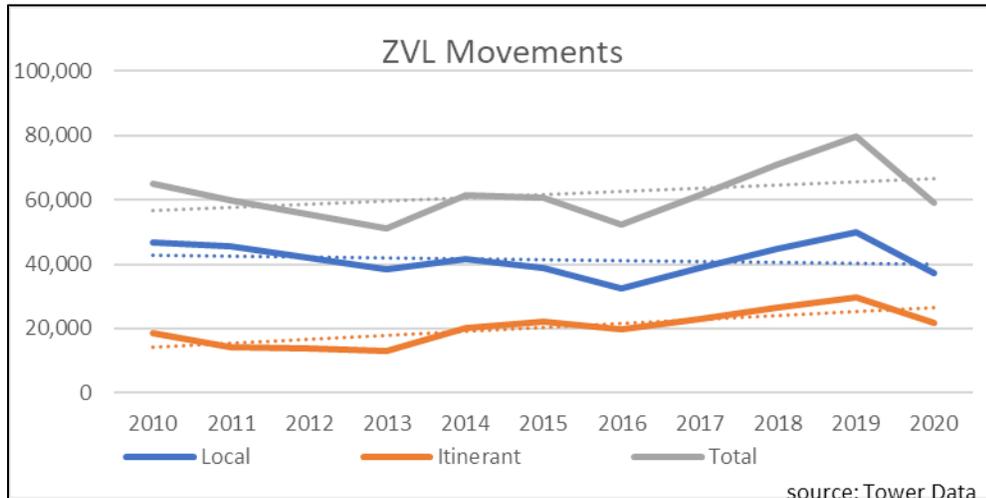
1.1.1.10.3 Airports

The region is home to the Edmonton International Airport (YEG), and three (3) major general aviation (GA) airports: Villeneuve Airport (ZVL), Cooking Lake Airport (CEZ3), and Josephburg Aerodrome (CFB6). YEG is the primary air passenger and air cargo airport, while ZVL is strategically positioned to host GA activities, training, aircraft repair, maintenance, and aircraft (or parts) manufacturing, as mentioned in the previous report sections.

The Edmonton International Airport is Canada's fifth-busiest airport and largest major airport by land size. In 2019, YEG handled 8.15 million passengers and 43,000 metric tons of cargo. In 2020, passenger volume at YEG decreased significantly, falling to 2.6 million passengers due to the COVID-19 pandemic, but cargo volume increased by 7.5% to 46,000 metric tons. YEG serves as the gateway of international passenger travel and cargo transportation for the region.

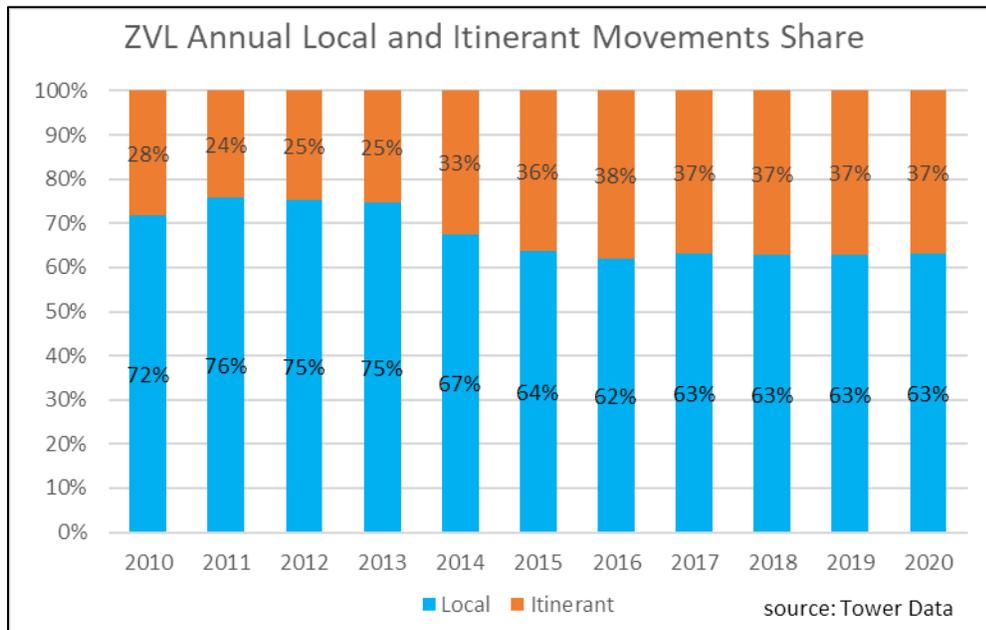
Being the only GA with a NAV Canada control tower, ZVL hosted 37,308 local aircraft movements and 21,710 itinerant aircraft movements in 2020. The following chart presents the changes in annual flight movements at ZVL since 2010. Note that a trend of growth can be observed between the years of 2016 to 2019.

Chart 1-U ZVL Flight Movements 2010 – 2020



At ZVL, 63% of flight movements are attributed to local movements (i.e., flight training activities), and 37% are itinerant movements.

Chart 1-V ZVL Local and Itinerant Movements Share



1.1.1.10.4 Broadband Internet

The 2020 Edmonton Metropolitan Region Board Broadband Situation Analysis revealed that in the majority of areas with greater population density, internet service providers (ISPs), primarily TELUS and Shaw, offer high-speed internet coverage. In urban cores, ISPs are actively upgrading their traditional coaxial cable infrastructure and new fibre optics to provide gigabit per second services; however, in rural areas with a lower population density, ISPs found a less compelling business case for building and upgrading infrastructure and providing high-speed internet services. Figure 1-D provides a summary of internet planning in the EMR.

Figure 1-D Broadband Current State in EMR Municipalities

Policy Tier	Municipality	Broadband Strategy	Dev. / Eng. Guidelines	Municipal Owned Fibre	Service Levels
Metropolitan Core & Metropolitan Area	Beaumont	⚠	⚠	✖	✓
	Edmonton	✓	✖	✓	✓
	Fort Saskatchewan	⚠	✖	✓	⚠
	Leduc	⚠	⚠	✓	⚠
	St. Albert	✓	✓	✓	⚠
	Stony Plain	⚠	✖	✓	⚠
	Spruce Grove	✓	✓	⚠	⚠
Metropolitan & Rural Area	Leduc County	✓	✖	⚠	✖
	Parkland County	✓	⚠	⚠	✖
	Strathcona County	✓	⚠	✓	⚠
	Sturgeon County	✓	✖	⚠	✖
Rural Area	Devon	✖	✖	✖	⚠
	Morinville	✓	⚠	⚠	✖

Legend	Broadband Strategy	Dev. / Eng. Guidelines	Municipal Owned Fibre	Service Level
✓	Dedicated broadband/connectivity strategy in place or is currently being developed	Guidelines are formal and followed by all developers/engineers	Majority of municipal buildings are connected via fibre-optic infrastructure	CRTC standards met across the board
⚠	Broadband/connectivity is referenced in strategy documents but no dedicated strategy is in place	Guidelines are informal and/or the municipality is considering putting guidelines in place	There is currently limited fibre-optic infrastructure connecting municipal buildings	CRTC standards met in all but one area and/or speeds do not exceed CRTC standards in multiple areas
✖	Broadband/connectivity is not referenced in any strategy document	There are no guidelines in place and no guidance is given	There is no municipal owned fibre-optic infrastructure	CRTC standards not met in two or more areas

* Sturgeon County is highlighted in this figure. (Source: Edmonton Metropolitan Region Board Broadband Situation Analysis, 2020)¹²

¹² <https://emrb.ca/Website/files/f7/f7055844-a9d5-445d-9bb5-d938f1faac43.pdf>

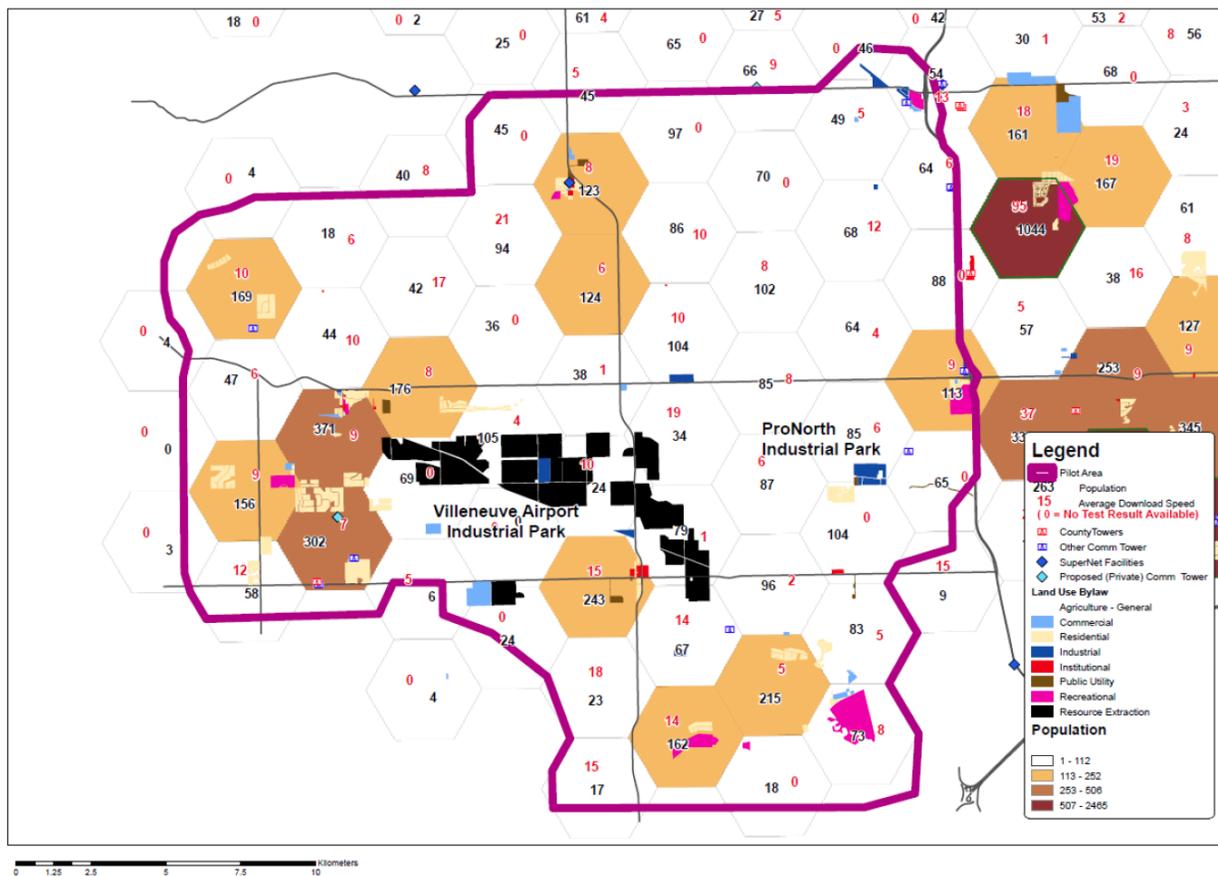
The report also identifies that the limited broadband connectivity in Sturgeon County is impacting the competitiveness of its businesses, despite several carriers providing services in that area.

The following is a list of ISPs in the Sturgeon County region:

- TELUS
- Shaw
- TekSavvy
- Distribute Tel
- MSCNet
- Albertacom
- Xplornet

Despite limited broadband services, the Sturgeon County is actively planning and attracting new internet infrastructure investment(s) to the region. Within the 2020 Sturgeon County Broadband Incentive Program, the Villeneuve Airport Area was within the area that was prioritized for fibre optics and broadband internet service investments and is identified as one of the pilot project areas.

Figure 1-E Sturgeon County Broadband Incentive Program Pilot Area Map

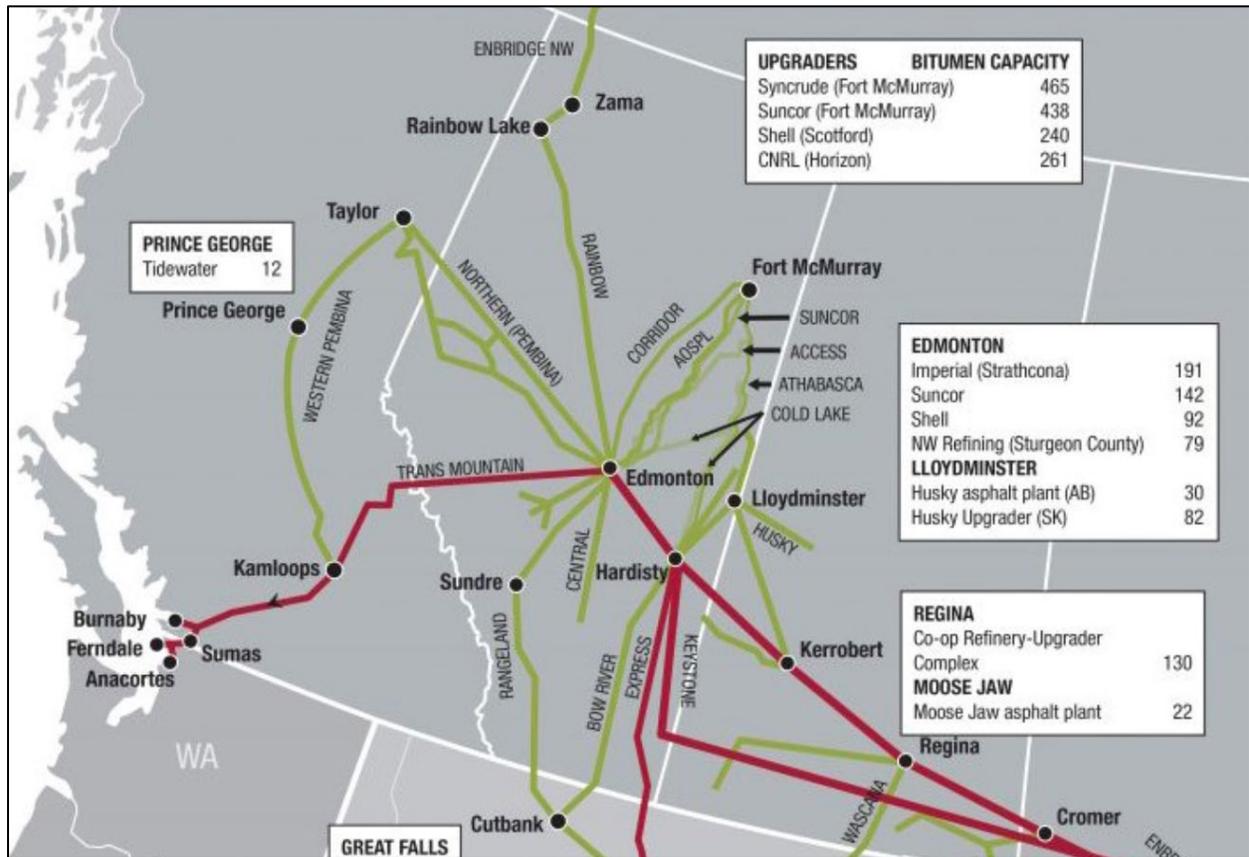


Source: Sturgeon County Broadband Incentive Program, 2020

1.1.1.10.5 Pipelines

The Edmonton Metropolitan Region is the central location where multiple oil and gas pipelines begin or end. Pipelines from northern Alberta and the Northwest Territories carry oil and gas resources to Edmonton for further distribution or processing. Southbound pipelines carry oil and gas products to the neighbouring U.S. states. Figure 1-F depicts a map of major pipelines in the broader region.

Figure 1-F Map of Pipelines in the Edmonton Metropolitan Region



1.1.1.10.6 EMR Located Industrial Parks Benchmarking

A benchmarking analysis was conducted to evaluate other EMR located industrial parks along with their targeted industry sectors, assets and size. The purpose of the benchmarking is to reduce potential conflict and competition between the VAA and other industrial development areas in the region and other industry-specific parks elsewhere in the province. The objective is to position VAA as a value-added development to the Edmonton Metropolitan Region.

In total, we have identified eighteen (18) industrial parks in the Edmonton Metropolitan Region. Those eighteen parks contribute to an overall industrial land allotment of 175,000 acres¹³. In the following sub-sections, our team further categorizes those parks by various benchmarking criteria such as park sizes, targeted industry sectors, infrastructure highlights, anchor tenants, and key competitive advantages. A detailed list of identified parks can be found in Table 1-C.

1.1.1.10.6.1 Park Sizes

Among the eighteen (18) industrial parks in EMR, Alberta’s Industrial Heartland contributes over 80% (140,000 acres) of land to the total acreage (175,000 acres) identified. The Leduc-Nisku Industrial Park is the second-largest industrial area identified in EMR with a size of 13,000 acres. The three Industrial Areas (Northwest Industrial Area, Northeast Industrial Area, and South/Southeast Industrial Area) and two Parks (Edmonton Energy and Technology Park and Edmonton Research Park) in the City of Edmonton represents a total area of 8,700 acres, which is approximately 5% of the total acreage identified.

Out of the 18 industrial parks benchmarked, eight (8) of them have a size greater than 1,000 acres. Five (5) parks fall within the size range of 300-1,000 acres, and five (5) have a size of fewer than 300 acres.

Parks with land size over 1,000 acres	Parks with land size from 300-1,000 acres	Parks with land size less than 300 acres
<ul style="list-style-type: none"> • Alberta’s Industrial Heartland • Leduc-Nisku Industrial Park, City of Leduc/Leduc County • Northwest Industrial Area, City of Edmonton • Northeast Industrial Area, City of Edmonton • South/Southeast Industrial Area, City of Edmonton • Edmonton Energy and Technology Park, City of Edmonton 	<ul style="list-style-type: none"> • Riel Business Parks, City of St. Albert • Campbell Business Park, City of St. Albert • Edmonton Research Park, City of Edmonton • Meridian Business Park, Parkland County • Fort Industrial Park, City of Fort Saskatchewan 	<ul style="list-style-type: none"> • Entwistle Industrial Area, Parkland County • Buckingham Business Park, Strathcona County • Laurin Industrial Park, Strathcona County • Heritage Industrial Park, Sturgeon County • ProNorth Industrial Park, Sturgeon County

¹³ The size for each industrial park/area/zone is derived from municipal websites and might include unserviced lands, or lands planned for commercial/industrial usage but are subject to re-zoning application and approval.

Parks with land size over 1,000 acres	Parks with land size from 300-1,000 acres	Parks with land size less than 300 acres
<ul style="list-style-type: none"> • Acheson Industrial Area, Parkland County • Sturgeon Industrial Park, Sturgeon County 		

1.1.1.10.6.2 Targeted Sectors

Throughout the benchmarking exercise, multiple sectors (industries) are repetitively seen listed as a business and investment attraction target for industrial parks in the EMR, as summarized below.

In the Edmonton Metropolitan Region, Alberta’s Industrial Heartland (AIH) represents the largest clustering of oil & gas companies. Companies and their production in the AIH account for 43% of Canada’s chemical manufacturing industry. As a result of the large and well-developed oil & gas industry in Alberta and in the AIH, a number of regional industrial parks have the energy industry as their targeted sector. The following four industrial parks have listed energy value-adding activities, research and services as their targeted industry:

- Edmonton Energy and Technology Park, City of Edmonton
- Acheson Industrial Area, Parkland County
- Fort Industrial Park, City of Fort Saskatchewan
- Leduc-Nisku Industrial Park, City of Leduc/Leduc County

Logistics, warehousing and distribution is another targeted sector commonly seen among those eighteen (18) industrial parks. In total, eleven (11) out of eighteen (18) parks have listed this industry as a business attraction target.

Overall, three (3) industrial parks in the EMR listed agri-food businesses as their target, two (2) of them are located in Sturgeon County. The Heritage Industrial Park welcomes companies conducting agriculture support services, while the Sturgeon Industrial Park is attracting agri-food processing and production businesses. The Meridian Business Park in Parkland County also listed agri-business as a targeted industry.

Four (4) parks in the EMR have high technologies as its business attraction target. The South/Southeast Industrial Area has a special focus on high-tech use in metal fabrication. The Leduc-Nisku Industrial Park and Sturgeon Industrial Park also list advanced (high-tech) industrial as one of their targeted sectors. The Edmonton Research Park aims to host advanced research in pharmaceutical, biotechnology, nanotechnology, and clean energy. It is also worth noting that the Edmonton Research Park is also the only business park in the region that brands itself as a

research and innovation centre. The Park has lab, office and production space for second-stage companies.

Currently, no business and industrial park in the EMR has aviation and aerospace as their targeted sector of development but the Alberta Aerospace & Technology Centre at the Edmonton International Airport provides spaces and programs for companies in this sector. Still, it is at a hub-level, not at an industrial park level.

1.1.1.10.6.3 Infrastructure

Transportation infrastructure plays an important role in terms of business attraction and park branding. All parks identified in this exercise show direct or close access to highways. However, only ten (10) out of the eighteen (18) parks offer railway access. Among those ten (10) parks, the Northeast Industrial Area and South/Southeast Industrial Area provide easy access to CP Intermodal facilities. The Heritage Industrial Park in Sturgeon County is the only park identified to have close rail access to two-grain terminals.

As for broadband internet infrastructure, only two parks (Campbell Business Park and Entwistle Industrial Area) actively promote the availability of fibre optic internet as part of its marketing materials.

The Edmonton Research Park is the only park found to have an onsite lab in support of tenants in biotechnology and nanotechnology development.

Table 1-C Industrial Parks in EMR

Jurisdiction	Business/Industrial Park	Size	Target Industry	Infrastructure Highlights	Key Competitive Advantages
City of St. Albert	Riel Business Park	498 Acres	Small manufacturing, Contractors, Specialty automotive, Small light industrial	Road, Rail, Natural Gas, Broadband Internet	Anchor Tenant: Pro-Western Plastics Ltd
City of St. Albert	Campbell Business Park	300 Acres	Warehouse/Distribution, Manufacturing, Light industrial	Road, Rail, Natural Gas, Broadband Internet	Anchor Tenant: Alberta Public Works, Alberta Gaming, Liquor & Cannabis Commission
City of Edmonton	Northwest Industrial Area	3,100 Acres	Transportation and logistics, Warehousing, Wholesaling, Manufacturing, and Professional offices	Road, Rail (Access to CN Intermodal Facility)	970 acres of net land with industrial zoning in place. Area serviced by two major highways and CN rail line to an intermodal facility
City of Edmonton	Northeast Industrial Area	1,600 Acres	Branded as a manufacturing and logistics hub; Heavy and medium industrial zone	Road (Direct Hwy access), Rail (Two rail lines and one intermodal facility), Pipeline corridor	465 acres of vacant industrial land; Access to both CN and CP rail lines; Access to pipe corridor; Close proximity to the Resource Industry in Alberta's Industrial Heartland.
City of Edmonton	South/Southeast Industrial Area	1,900 Acres	Business industrial services, High technology uses, General logistics, Metal fabrication uses	Road (Direct Hwy access), Rail (CP line and a CP intermodal terminal)	1,300 acres of vacant industrial land; CP intermodal terminal is located at the west boundary of the Industrial Area

Jurisdiction	Business/Industrial Park	Size	Target Industry	Infrastructure Highlights	Key Competitive Advantages
City of Edmonton	Edmonton Energy and Technology Park (EETP)	1,800 Acres	Chemical and Energy Value-added: upgrading, processing and refining natural gas, natural gas liquids, oil and bitumen by-products; Manufacturing; Logistics.	Road, Rail (CN Rail)	Easy access to Hwy 63, which is the major transportation corridor to Ft. McMurray; The Park is branded to capture value-added and spin-off activities from Alberta's oil sands and natural gas plays
City of Edmonton	Edmonton Research Park	300 Acres	Advanced research in medicine, biotechnology, software, petroleum research, cold climate engineering, nanotechnology and clean energy	Road, Lab (Biotechnology and nanotechnology)	The Park has an onsite incubator and flexible research lab Anchor tenant: Alberta Innovates
Parkland County	Acheson Industrial Area	10,000 Acres	Multiple; Energy services, Information and communication technology, manufacturing, transportation, warehousing, logistics, etc.	Road, Rail (CN main line), Public Transit (Acheson Transit, bus-to-door shuttle service)	The entire area is accessible to city servicing. Both CP and CN rail with spur lines onsite. The Area has a container terminal.
Parkland County	Entwistle Industrial Area	170 Acres	Not specified	Road, Rail, Fibre optic internet	Close to a Community Recreation Centre. Internet infrastructure upgraded to fibre. Anchor Tenant: Pinnacle Renewable Energy

Jurisdiction	Business/Industrial Park	Size	Target Industry	Infrastructure Highlights	Key Competitive Advantages
Parkland County	Meridian Business Park	611 Acres	Highway Commercial and Light Industrial; Agri-business, manufacturing, tourism services, and service and supply facilities	Road	Close proximity to the Town of Stony Plain and City of Spruce Grove; The Park is branded more as a commercial centre
City of Fort Saskatchewan	Fort Industrial Park	300 Acres	Not Specified; Alberta's Industrial Heartland has a number of international energy companies	Road	Multiple existing tenants in the industry of metal fabrication; Close proximity to Alberta's Industrial Heartland Anchor Tenant: YANDA, AFD, Harris Rebar, Access Pipeline
City of Leduc/Leduc County	Leduc-Nisku Industrial Park	13,000 Acres	High end industrial, Medium to light industrial, Energy, Logistics, Machining and Manufacturing	Road, Close to Edmonton International Airport	Close proximity to YEG. Established machining and manufacturing sector. Full city servicing. City standard roads. All land is stripped of topsoil and graded to 6" below finish grade. Anchor Tenant: Baker Hughes, Clean Harbour, Enerflex, Cameron, GE Oil & Gas
Strathcona County	Buckingham Business Park	150 Acres	Not Specified; Current tenants are commercial and light Industrial businesses	Road	The Park focuses on mid to light commercial and industrial. Greenfield developments with a comprehensive pedestrian walkway system.
Strathcona County	Laurin Industrial Park	171 Acres	Not Specified; Current tenants are commercial and light Industrial businesses	Road	Anchor Tenant: GFL Environmental, ArrKann, Ledcor, Sureway

Jurisdiction	Business/Industrial Park	Size	Target Industry	Infrastructure Highlights	Key Competitive Advantages
Sturgeon County	Heritage Industrial Park	35 Acres	Agricultural support, contractor services (major/minor), equipment and fleet sales/service, storage and warehousing.	Road, Rail (Two grain terminals)	The Park is in close proximity to Westmor Grain Terminal and G3 Grain Terminal, with the capacity to process over 1 million metric tonnes of grain/pulses per year.
Sturgeon County	ProNorth Industrial Park	176 Acres	Agricultural support, contractor services (major/minor), equipment and fleet sales/service, storage and warehousing.	Road	Currently has no developable lots but the Park is undertaking plans for re-zoning adjacent lands for expansion.
Sturgeon County	Sturgeon Industrial Park (SIP)	1,200 Acres	Advanced manufacturing; agricultural processing and food production; cold storage; contract packaging/co-packing; conversion and plastics manufacturing; industrial hemp decortication and hemp-based manufacturing; pulse fractionation; transportation and logistics.	Road (Close to Alberta's Industrial Heartland), Rail (CN)	Road network in great condition with \$230 million upgrades in past years. Close proximity to Alberta's Industrial Heartland.

Jurisdiction	Business/Industrial Park	Size	Target Industry	Infrastructure Highlights	Key Competitive Advantages
Alberta's Industrial Heartland Association (non-profit municipal collaboration)	Alberta's Industrial Heartland	140,000 Acres+	Canada's Largest Hydrocarbon Processing Centre; Major energy and chemical production, logistics and processing centre	Road, Rail (CN and CP), Pipeline, Oil and Gas Storage	<p>The largest industrial area in Western Canada with joint-land use planning and development between municipalities. The AIH Is responsible for 43% of the national chemical manufacturing industry.</p> <p>Easy access to major pipelines and oil & gas storages. More than 40 energy value chain companies are on site.</p>

1.1.1.10.7 Other Industrial Parks Benchmarking

Throughout the benchmarking exercise, our team researched additional industrial parks located in the Province of Alberta that are worth noting.

The Vegreville Agri-Food Industrial Park is the only park identified in Alberta to specifically have the agri-food industry as its sole focus. The Vegreville Agri-Food Industrial Park is a greenfield development of 80 acres of land. In total, nearly \$10 million of funding was received for the development, with \$4.9 million from the federal government, \$3.3 million from the Alberta government and \$1.65 million from the town. The Park leverages the existence of InnoTech Alberta (a subsidiary of Alberta Innovates) in town and surrounding farming communities. Currently, the Park aims to attract private businesses in hemp production, processing and research.

Table 1-D Other Industrial Parks in Alberta

Jurisdiction	Business/Industrial Park	Size	Target Industry	Infrastructure Highlights
Town of Vegreville	Vegreville Agri-Food Industrial Park	80 Acres	Hemp production, processing and innovation (Park currently under construction); Vegreville is branded to become the hemp Capital of Canada	Road, close proximity to a major CBD manufacturer (Chromtec)

1.1.1.10.8 Regional Benchmarking

The following sub-section highlights key findings in regional-wide benchmarking. The regional-wide benchmarking compares the Edmonton Metropolitan Region with other metropolitan areas in Alberta, from which a series of regional strengths and weaknesses are captured.

Flight training activities in the EMR are concentrated at Villeneuve Airport, Parkland Airport and Cooking Lake Airport. The Parkland Airport is home to the Edmonton Flying Club, while the Cooking Lake Airport is home to the Cooking Lake Aviation. Villeneuve is home to three flight training organizations: the Namao Flying Club, Centennial Flight Centre and Synergy Aviation, and offers both fixed-wing aircraft flight training and helicopter training. However, despite the existence of multiple flight schools in the EMR, limited regional capacity is observed to host international student pilots. The limitation is brought by a high demand for flight training by domestic students in the region, no dedicated programs to intake international students, limited onsite or near-site housing and accommodation to international student pilots, and local flight schools not being foreign agency-accredited. In comparison, flight schools in other metropolitan areas of Alberta are offering what is needed in EMR. A flight school in Red Deer offers a dedicated international program with onsite housing and living support for students overseas who wish to learn flying in Canada.

When compared to the development of the aviation and aerospace sector in Calgary, the Edmonton Metropolitan Region lacks an anchor OEM manufacturer. Viking Air, the original equipment manufacturer (OEM) of the Series 400 Twin Otter aircraft, operates a final assembly facility at the Calgary International Airport. The Calgary facility is also used for power-ups, engine runs and the first test flights for aircraft coming out from the final assembly line. The existence of an anchor OEM further creates a local supply network and innovation ecosystems at post-secondary institutions. At Southern Alberta Institute of Technology (SAIT), advanced aircraft structural design, avionics, aircraft manufacturing and aircraft maintenance engineering programs are offered at the Art Smith Aero Centre, located at the Calgary International Airport. Aviation and aerospace students at SAIT can experience replicated aviation industry workplaces in the airport facility and stay close to their potential future employers. The airport, a major OEM and the presence of local post-secondary institutions are fostering an innovation ecosystem in Calgary.

Drone/RPAS development and testing is also a sector of importance recognized in Calgary. The Foremost UAS Test Range, which opened in 2017, has more than 700 square nautical miles of restricted airspace away from the population for small to medium companies to test their new drone technologies. Since 2015, the Test Range has received more than \$1.1 million in funding from Prairies Economic Development Canada. The existence of the Test Range helps drone technology companies in western Canada to test and commercialize their product. In the EMR, a number of companies are also researching and developing drone technologies, but the region is lacking dedicated testing space and relevant labs and equipment to foster the development of this sector. Notwithstanding the present shortfalls, the region and Sturgeon County are well placed to play a hub role in the development of RPAS technologies, applications and services toward northern and arctic destinations. This fast-growing sector is just in its infancy and very

much technologies intensive. Most RPAS aerial operations are presently conducted in line-of-sight mode but the future resides in beyond-line-of sight (BVLOS) flight where RPAS system will be able to travel great distances to deliver products and conduct various tasks. With this development trend, the VAA and Sturgeon County can play an active role in supporting such activities and bringing together a nucleus and cluster of companies creating the associated supply chain.

The energy sector in Calgary and Edmonton also shows regional differences. Calgary is being recognized as a place for carbon capture, and storage research and development as more facilities are built and researches are conducted in Calgary. The Alberta Carbon Conversion Technology Centre (ACCTC) in Calgary specifically focuses on Carbon Dioxide Capture and conversion from flue gas from adjacent natural gas-fired power plants. The ACCTC offers equipment, facilities and research bays that are usually unaffordable to small and medium size companies. At the University of Calgary, its Containment & Monitoring Institute (CaMI) is an emerging player in carbon capture and storage research. The CaMI also owns a 200-hectare field research station for bench-scale and full-scale carbon capture and storage research works. The post-secondary research and local supporting facilities is creating a dozen of start-ups in the region in this sector that specializes in engineering services, carbon conversion technologies, modular carbon storage and more.

In the Edmonton Metropolitan Region, several private companies are also researching on carbon capture and storage. In the region, the Alberta Carbon Trunk Line (ACTL) system is the world's newest carbon capture, utilization and storage (CCUS) system and represents the world's largest capacity pipeline for Carbon Dioxide from human activity. Other energy sector companies, such as Pembina, Suncor, ATCO, TC Energy in the region are also planning and developing technologies in this field. It is also worth noting that, in the EMR, industry participants focus more on carbon dioxide conversion from hydrogen production and invest more into the storage part of the value chain, instead of focusing on carbon conversion from flue gas from gas-fired power plants as observed in Calgary. In the region, Suncor and ATCO are partnering to build a world-scale hydrogen production facility with the ability to capture and permanently store CO₂. At the Shell Scotford Complex near Edmonton, the company is planning on an underground carbon storage site that will have the capacity of storing 300 million tonnes of CO₂ across its lifespan.

In terms of Hydrogen research, production and development, the EMR is at a leading position province and nation-wide. The Edmonton Region Hydrogen Hub at Alberta's Industrial Heartland is currently the only hydrogen hub in Canada. State of the art technology development and hydrogen production is currently under planning at the Hub. When fully developed, the Hub will serve as the blueprint for hydrogen hubs in other major industrial centres around Canada. Launched in early 2021, the Hub identified twenty-five (25) potential projects for the production, transportation and end-uses of hydrogen in EMR. Those 25 projects are being planned and reviewed with more specific project details to come as they are available. Sturgeon County has shown leadership in the development of the Edmonton Region Hydrogen Hub as the Sturgeon County Mayor is the Chairperson of the Hub.

The decarbonized production and utilization of Hydrogen and other chemicals is another regional focus in EMR. In June 2021, Air Products, in conjunction with the Government of Canada and the Province of Alberta, announced a multi-billion plan to build a landmark net-zero hydrogen energy complex to expand its clean and sustainable hydrogen production. In October 2021, Dow's Fort Saskatchewan site unveiled the plan to build a net-zero carbon emission ethylene and derivatives facility.

Agri-food research, processing and production is a sector that is gaining attention in recent years. As mentioned previously, the Town of Vegreville is the first municipality to have an industrial park with a specialized focus on agri-food. Across Alberta, a number of agri-food research and development centres are fueling the province's strength in agri-food production and processing. In Lethbridge, the Lethbridge Research and Development Centre (Lethbridge RDC) and its associated Vauxhall Research Farm focus on beef cattle production systems, crop production systems and sustainable agri-food production under dryland and irrigated conditions in semi-desert climate. In Lacombe, the Lacombe Research and Development Centre (Lacombe RDC) is the host of the Agriculture and Agri-Food Canada (AAFC) national honeybee research program. The Simpson Centre for Agriculture and Food Innovation, at the University of Calgary, focuses on Canadian agricultural policy research in the following areas: international trade, climate change, agriculture as a resource, and food technology.

Regionally, the City of Leduc is attracting attention in the agri-food sector. The Food Processing Development Centre (FPDC) and Agrivalve Processing Business Incubator (APBI) in the City of Leduc has a 140,000 sq.ft. of federally inspected food processing facility. The facility is equipped with over \$20 million in equipment and has specialized labs for food product development and commercialization. Current tenants and companies in incubation at FPDC and APBI focus on the value-added process of agri-food production.

In the logistics, warehousing and distribution sector, the EMR has a competitive advantage in the provincial competition due to the existence of Port Alberta. This regional inland port has been designated as a Foreign Trade Zone. In Port Alberta, investors are eligible for duty and tax relief, as well as value-added manufacturing, to create Canadian labelled products. Also, being a major transportation hub in Western Canada, the private sector continues to bring in new investment into the region. For example, e-commerce giants in EMR are looking at last-mile warehousing and logistics opportunities. In Summer 2021, Amazon announced the plan to construct a 600,000 sq. ft fulfillment centre in Parkland County with an automated robotics system.

1.1.1.11 Key Sectors in the Edmonton Metropolitan Region

The Edmonton Metropolitan Region (EMR) is home to multiple industrial clusters and has a strong presence in the energy, food and agriculture, life sciences and manufacturing sectors in Western Canada. The key industry sectors identified in this section align with the analysis presented in the Edmonton Regional Growth Plan and Edmonton Global's FDI attraction initiative.

1.1.1.11.1 Energy

The EMR is a world leader in the energy industry, benefiting from abundant oil and gas resources in Alberta, significant investment from multinational corporation, and strong support from federal and provincial levels of government.

Each year \$13.5 billion worth of annual feedstocks (i.e., propane, ethylene, cellulose acetate, and polyethylene) and \$22.6 billion of refined petroleum products are manufactured from oil and natural gas and are piped into Alberta's Industrial Heartland (and to a number of other destinations). This region possesses Canada's largest cluster of petrochemical and hydrocarbon facilities. A list of world-class energy companies in the region is presented below:

- ATCO Energy Solutions
- Air Liquide Canada Ltd.
- Air Products Ltd.
- Aux Sable Canada Ltd.
- Bunge Canada
- Chemtrade West Ltd.
- Dow Chemicals Canada ULC
- Evonik Degussa Canada
- Horton CBI
- Imperial Oil
- Inter Pipeline
- Keyera Energy
- ME Global
- North West Redwater Partnership
- Nutrien
- Pembina Pipeline/Inter Pipeline
- Plains Midstream Canada
- Praxair Canada
- Shell Canada Ltd.
- Sherritt International Corporation
- Smith & Nephew (Alberta) Inc.
- Sulzer Metco (Canada) Inc.
- Suncor Energy
- Tervita Corporation
- Umicore Canada
- Univar
- Western Asphalt
- Western Hydrogen Ltd.

As identified, the region currently has opportunities to further its value-added energy portfolio in the propylene/polypropylene, methanol, ammonia/urea, hydrogen and ethylene production sectors.

1.1.1.11.2 Agriculture and Agri-food

The EMR represents 1.7 million acres of farmland, covering 80% of the total land in the region. Farmland in the region is well-suited for grains, oilseeds, pulses, cannabis, hemp, and livestock production, and the agri-food sector employs more than 10,000 workers. The region also falls within the Protein Supercluster, a \$4.5 billion federally funded supercluster created to promote and grow the plant-based protein industry.

Of particular note, the EMR represents North America's second-largest producer of hemp. With 325 producers and more than 45,000 acres of hemp grown in the area, the region identifies itself

as the Hemp Corridor. The Edmonton Energy and Technology Park (EETP), located northeast of the city of Edmonton, is strategically zoned as a greenspace for industrial hemp production. Hemp farming and production also resulted in value-added activities in the surrounding region: in Vegreville, 100 kms east of the city of Edmonton, a provincially funded hemp fibre processing pilot plant concentrates on the research and commercial application of decorticating hemp fibres, which can then be used for building construction materials, car parts, and even grow mats for microgreens.

Agri-food opportunities in the region continue to emerge in the fields of agri-tech, cannabis, and hemp production. Recent agri-tech research topics include air seeders, advanced spraying systems, precision GPS seeding technologies, and harvesting machinery. Despite the positive attributes found in this sector, it must also be noted that the cannabis and hemp industries in the region have seen both ups and downs.

1.1.1.11.3 Life Sciences

Pharmaceutical and medicinal research, development, and manufacturing have long been a strength of the Edmonton Metropolitan Region, with the life sciences sector contributing 7.5% of the region's GDP. Edmonton Global estimates that the immediate and sustained demand for made-in-Canada pharmaceuticals will be in the range of \$25 million to \$100 million. With a stable demand being predicted, the life sciences sector in EMR promises many opportunities for R&D and manufacturing start-ups and scale-ups.

The development of the life sciences sector is supported by various provincial, regional, municipal, and institutional initiatives. Located at the University of Alberta, Applied Pharmaceutical Innovation (API) is a non-profit organization that supports innovators looking to commercialize their life science research and drug development projects. Since its launch in 2018, API has attracted more than \$31 million in investments. Another local initiative is Health City, a non-profit organization working with clinicians, innovators, philanthropic organizations, and private companies to develop commercial applications of innovations in the life sciences sector. Other institutions such as Alberta Innovates, Li Ka Shing Institute of Virology, Merck Health Accelerator, and TEC Edmonton Health Accelerator also have their own programs that support the continued development of the life sciences sector in the region.

Currently, the region is actively attracting investments in the life sciences sector; notably, the region is gaining investment attraction in the field of health AI. Institutions in the region already demonstrate strengths in AI and machine learning, possessing accessible health datasets from 4.5 million people. As stated by Edmonton Global, health AI can unite the region's two strengths. AI integration with healthcare has great growth potential and can increase the region's global competitiveness in the life sciences sector.

1.1.1.11.4 Manufacturing

As a result of the long-established energy sector and the recent development of the life sciences and technology sectors, the Edmonton Metropolitan Region now hosts a strong manufacturing base: currently, the manufacturing sector in the EMR employs close to 50,000 workers. With

diversified strength in energy and life sciences, the region’s manufacturing sector represents a wide range of products, from massive earthmovers in oilsands to nanomaterials used in drug development.

As identified by Edmonton Global, the region now possesses three (3) unique development opportunities: pharmaceutical manufacturing, plant protein food & beverage manufacturing, and plant protein fractionation.

Recent trends have shifted this sector’s focus to Industry 4.0, clean-tech, and metals and machinery. The trend of the Internet of Things (IOT) and Industry 4.0 has brought digitization and automation to companies into this sector, and province-wide data reveals that 35% of manufacturers in Alberta have implemented digital technologies. In the EMR, the research and development around clean energy focuses on generating sources of reusable energy and finding improvements for energy efficiency in manufacturing.

Furthermore, both metal and machinery are essential for industrial production and processing, as they serve as a support industry to the local energy sector; these are essential components of industrial production and processing and therefore have similar growth potential as that of the energy sector.

1.1.1.12 Universities, Colleges and R&D Institutions

Being a leading innovation district in Alberta, the Edmonton Metropolitan Region is home to three (3) universities (Grant MacEwan University, the University of Alberta, and Concordia University of Edmonton) and five (5) colleges (Campbell College, NorQuest College, the Northern Alberta Institute of Technology, Taylor University College and The King’s University College). The Alberta Machine Intelligence Institute (AMII) also contributes to regional innovation through its world-leading machine learning and AI research. A list of research centres in EMR and their research focus is provided in Table 1-E. By examining these institutions and their areas of research, it may be possible to find which institutions have the potential for contributing to the intent of this exercise.

Table 1-E Research Centres and Focus Areas within the Edmonton Metropolitan Region

Institution	Research Centre	Research Focus & Strength
MacEwan University	MacEwan Analytical Services	Chemistry analysis; training and support
University of Alberta	Canadian Centre for Clean Carbon and Mineral Processing Technologies	Sustainable and responsible energy and mineral development
	Canadian Centre for Welding and Joining	Welding and joining (productivity, weldability, automation and performance)

Institution	Research Centre	Research Focus & Strength
	Institute for Oil Sands Innovation	Aqueous bitumen extraction optimization; smart mining; tailings; value-added products from tailings
	Cancer Research Institute of Northern Alberta	Cancer diagnostic tests; biomarkers; targeting treatment
	Alberta Cardiovascular and Stroke Research Centre	Cardiovascular ultrasound research; pulmonary hypertension clinic
	Centre for Health and Culture	Multicultural health developments
	Li Ka Shing Institute of Virology	Virology & immunology research; the transition of technology into clinical relevance
	Drug Development and Innovation Centre	Biopharmaceutics; drug delivery quality control regulatory sciences
	Alberta Machine Intelligence Institute	Machine learning and AI
	The Institute for Space Science, Exploration and Technology	Microgravity science and planetary environment; space technology for instrumentation and robotics; planetary materials science; space physics and space environment
	Applied Nonlinear Control Lab	Non-linear control for UAV robotics; vision-based control; machine learning of UAV control
	Laboratory of Turbulent Flows	Two-storey closed-loop wind tunnel for aerodynamic testing
	Energy Systems Design Laboratory	Research on polymer electrolyte fuel cells that, when fed with hydrogen, produce electrical current
	Centre for Smart Transportation	Innovative transportation solutions
	Centre for Applied Business Research in Energy & the Environment	Researches on wind and solar energy developments
Agriculture Research Station	Testing field for agriculture researches	
NorQuest College	Community-Based Research Hub	Community & social innovation; Indigenous community innovation

Institution	Research Centre	Research Focus & Strength
Northern Alberta Institute of Technology	Centre for Oil Sands Sustainability	Oil sand sustainability research with 12,000-square-foot lab
	Applied BioNanotechnology Industrial Research	Clean technologies; chemical engineering; environmental science, and industrial microbiology
	Centre for Grid Innovation	Microgrid platform development
	Centre for Sensors and System Integration	Electro-optical sensor integration for micro and nano particle detection; polymer coating for circuit boards; sensor integration for innovative burner technology
	Centre for Advanced Medical Simulation	Clinical situation simulation
Concordia University of Edmonton	Concordia Centre for Applied Artificial Intelligence	AI research

Since 2017, the region has been leading strong research and development in nanotechnology; this R&D stems from the collaborative nanotechnology initiatives (NI) between the University of Alberta and the National Research Council of Canada (NRC). As a result of this collaborative initiative, the National Institute for Nanotechnology – a 20,000 square foot facility – has been established on the campus of the University of Alberta. NI currently supports research in biomedical nanotechnology, nano-enabled detection and automation sensors, and developmental and analytical microscopy.

Since 2002, the Alberta Machine Intelligence Institute has been supporting companies seeking to build upon their in-house AI and machine learning capacity. As part of the Pan-Canadian AI Strategy and as one of Canada’s three (3) centres of AI excellence, AMII contributes to Alberta’s and the EMR’s economy through research, advice, and education.

1.1.1.13 Key Organizations

1.1.1.13.1 Initiatives, Institutes, Associations and Organizations by Sector

The energy sector in the EMR is guided by various non-profit associations of municipalities, business associations, research and development institutions, and industrial initiatives. The table below presents a portrait of energy-related organizations.

Organizations Support Energy Sector

- | | |
|---|--|
| <ul style="list-style-type: none"> • Alberta Clean Technology Industry Alliance (ACTia) • Emissions Reduction Alberta • Institute for Oil Sands Innovation • Future Energy Systems • Centre for Oil Sands Sustainability (NAIT) • Alberta Chamber of Resources • Association of Professional Engineers and Geoscientists of Alberta (APEGA) • Northeast Capital Industrial Association (NCIA) • Canadian Association of Oilwell Drilling Contractors (CAODC) • Canadian Association of Petroleum Land Administration (CAPLA) • Canadian Association of Petroleum Landmen (CAPL) • Canadian Association of Petroleum Producers (CAPP) • Canadian Centre for Energy Information • Canadian Energy Research Institute (CERI) • Canadian Fuels Association (CFA) • Canadian Gas Association (CGA) | <ul style="list-style-type: none"> • Canadian Heavy Oil Association (CHOA) • Canadian Institute of Mining, Metallurgy and Petroleum (CIM) • Canadian Plastics Industry Association (CPIA) • Canadian Society for Unconventional Resources (CSUR) • Canadian Society of Petroleum Geologists (CSPG) • Canadian Wind Energy Association (CanWEA) • Chemical Institute of Canada (CIC) • Chemistry Industry Association of Canada (CIAC) • Coal Association of Canada (CAC) • Explorers and Producers Association of Canada (EPAC) • Gas Processing Association Canada (GPAC) • Petroleum Services Association of Canada (PSAC) • Petroleum Technology Alliance Canada (PTAC) • Strathcona Industrial Association • Society of Petroleum Engineers Canada • Solar and Sustainable Energy Society of Canada Inc. (SESCI) |
|---|--|

The following table presents institutes, associations and initiatives that support the development of the agri-food sector in the EMR.

Organizations Support Agri-food Sector

- | | |
|---|---|
| <ul style="list-style-type: none"> • Agriculture Research and Extension Council • Alberta Agriculture Programs and Services • Alberta Council of Technologies • Alberta Food Processors Association | <ul style="list-style-type: none"> • Alberta Processing Business Incubator • BioAlberta • Innotech Alberta / Alberta Innovates • The Canadian Hemp Trade Alliance |
|---|---|

The EMR is home to a number of health and life-science industry associations and support organizations that are presented in the following table.

Organizations Support Life Sciences Sector

- | | |
|---|--|
| <ul style="list-style-type: none"> • Alberta Diabetes Institute • Cross Cancer Institute • Glenrose Rehabilitation Hospital • Neuroscience and Mental Health Institute • Mazankowski Heart Institute • Li Ka Shing Institute of Virology • Stollery Children’s Hospital • SMART Network • Alberta Innovates – Health Solutions • Women and Children Health Research Institute | <ul style="list-style-type: none"> • BioAlberta • Genome Alberta • TEC Edmonton Health Accelerators • The Institute of Health Economics (IHE) • Alberta Network for Health Information Exchange • Edmonton Health City • Northern Alberta Clinical Trials and Research Centre • Bionic Limbs for Improved Natural Control Lab • Canadian Blood Services |
|---|--|

The manufacturing sector in EMR offers a wide range of products from metal to nanomaterials. The table below presents initiatives, institutes and associations that support the growth of the manufacturing sector in the EMR.

Organizations Support Manufacturing Sector

- | | |
|---|---|
| <ul style="list-style-type: none"> • Nanotechnology Initiative • nanoFab Centre • Alberta Centre for Advanced Micro-nanotechnology Products (ACAMP) • NanoCanada • Alberta Forest Products Association • Alberta Machine Intelligence Institute | <ul style="list-style-type: none"> • Alberta Metal Building Association • Alberta Steel Manufacturers • Alberta Pressure Vessel Manufacturers’ Association • Canadian Manufacturers and Exporters • Sheet Metal Contractors Association of Alberta (SMCAA) |
|---|---|

1.1.1.13.2 Funding Opportunities

Alberta Innovates, the province’s largest research and innovation agency, provides multiple funding programs that align with the region’s key focuses (identified in previous sections of this document). A summary of currently available funding opportunities that are relevant to this exercise is provided below.

Funding Opportunities – Alberta Innovate

Funding Program	Description
Smart Agriculture and Food Digitization and Automation Challenge	<ul style="list-style-type: none"> • Up to \$500,000 in funding for projects that lead to the development and application of innovative technologies or knowledge generation in smart agriculture • Focus areas include: smart agriculture, genomics & geomatics for agriculture, sustainable crop and livestock management
Clean Technology - Bioenergy	<ul style="list-style-type: none"> • Funding is provided through a combination of open competition and continuous intake process • Focus areas include: waste conversion and renewable fuels

Innovative Hydrocarbon Products	<ul style="list-style-type: none"> • Funding is provided through a combination of open competition and continuous intake process • Focus areas include: bitumen partial upgrading, value-added natural gas, bitumen beyond combustion
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The provincial government also provides funding opportunities for business development. The following table presents funding that is relevant to this exercise.

Funding Opportunities – Government of Alberta	
Funding Program	Description
Alberta Export Expansion Program	<ul style="list-style-type: none"> • Funding to help export-ready companies and non-profit organizations enhance access to international markets and attract global buyers through outbound international business travel and bringing international buyers to Alberta • Eligible companies will be reimbursed in the form of a grant that may range from a minimum of \$1,000 to a maximum of \$25,000 per year for a select range of approved activities and expenses
Innovation Employment Grant	<ul style="list-style-type: none"> • The Innovation Employment Grant encourages economic growth by supporting small and medium-sized businesses that invest in research and development (R&D) with a grant worth up to 20% of qualifying expenditures
Rural and Northern Communities Infrastructure	<ul style="list-style-type: none"> • Rural and remote communities with populations of 100,000 residents or fewer can apply for funding to support projects that improve food security, local road or air infrastructure, broadband connectivity, efficient and reliable energy sources • The federal government will cost share for eligible projects up to 50% for provincial projects or for municipalities with populations more than 5,000 residents and not-for-profit partners

In addition to the funding programs listed above, Community Futures Alberta also provides loans to entrepreneurs and small business owners. Business services offered by Community Futures coach entrepreneurs and business owners when they are looking to start a new business, expand into new markets and/or invest in new technology. The University of Alberta's Technology Transfer Services (TTS) also helps local entrepreneurs in commercializing their products and offering guidance on protecting intellectual property.

1.1.1.13.3 Incubators and Accelerators

The below section introduces incubators and accelerators already present in the EMR and that should be considered in the evaluation of the VAA business concepts.

1.1.1.13.3.1 Startup Edmonton

Startup Edmonton is an entrepreneurial campus and community hub offering free online workshops for students and entrepreneurs to learn about pre-incubator and pre-accelerator preparations. Topics offered include building a business model, securing investment, increasing revenue and applying for accelerators.

1.1.1.13.3.2 TEC Edmonton

TEC Edmonton was a joint venture partnership between the Edmonton Economic Development Corporation (EEDC) and the University of Alberta and offers accelerator programs for inventions, innovation and research stemming from the University of Alberta.

TEC Edmonton	
<i>Offered Program</i>	<i>Description</i>
TEC Launch Program	<ul style="list-style-type: none"> • TEC Launch enables the accelerated growth of companies that are entering the market with a new product or have been in market for some time but are not growing at their desired rate • MITACS approved program • Two phases (6 months each)
Alberta Yield: Ag and Food Tech Advisory Program	<ul style="list-style-type: none"> • The program helps Alberta-based innovation-driven agricultural technology or agri-food company with customer development, market validation, increasing sales, refining business models and improving investor readiness • Participants must be an Alberta-based innovation-driven agricultural technology or agri-food company

Note: TEC Edmonton announced its closure effective June 30, 2021. The joint partners will develop transition plans for TEC Edmonton programs, services and spaces to a new and expanded innovation partnership in the coming months.

1.1.1.13.3.3 Merck Invention Accelerator

In partnership with the University of Alberta, the pharmaceutical giant Merck opened its Edmonton Invention Accelerator in late 2018. The accelerator provides mentorship and funding for scientific inventions/health technology.

1.1.1.13.3.4 University of Alberta Health Accelerator

The University of Alberta Health Accelerator (UAHA) focuses on advancing early-stage health and life science companies created by University of Alberta researchers, faculty and students. A summary of the two (2) programs offered at UAHA is presented in the table below.

University of Alberta Health Accelerator	
<i>Offered Program</i>	<i>Description</i>
Health Hub	<ul style="list-style-type: none"> • Open-application program for health & life science entrepreneurs and companies of all stage to gain access to an online community platform with shared resources and on-demand business coaching
Health Accelerator	<ul style="list-style-type: none"> • A program dedicated to seed stage startups with a proof of concept and problem-solution fit who are seeking to secure financing and grow their venture • One-to-one coaching model towards commercialization milestones

1.1.1.13.3.5 DynaLIFE Accelerator

In partnership with TEC Edmonton (ceased operation in 2021) and Health City Edmonton, the DynaLIFE Medical Labs provides managed programs for life science entrepreneurs. The accelerator provides access to clinical samples for validation of any new diagnostic being developed. Mentorship from DynaLIFE lab also ensures new diagnostic development can be applied to a real laboratory setting.

1.1.1.13.3.6 Northern Alberta Business Incubator

Located in St. Albert, the Northern Alberta Business Incubator offers month-to-month licensing of incubation space comprising small offices and large units, with shared amenities, business support programs and services, meeting room and storage rentals. The incubator helps small business owners and entrepreneurs identify and locate available resources in and around St. Albert.

1.2 Comparable Cases around the World

A number of developments similar in scope to the VAAMP have been very successful around the world. The following section showcases some of these projects, their visions, and their approaches to development. They compare to the VAA in the nature of their industry focuses and their infrastructures and facilities. These case studies will inform the VAAMP as examples of best practices of successful large area development and innovation related developments with similar sector targets. These case studies were identified through industry research and are cited as examples in many industrial park studies and benchmarking¹⁴.

The Sheffield Innovation District and Advanced Manufacturing Park, UK



Sheffield, UK is the eighth largest city in the country. With a population of 650,000, the city has made a name for itself by leveraging the industry-academia partnership to grow innovation

¹⁴ <https://www.brookings.edu/essay/rise-of-innovation-districts/>

development and increase its resiliency to economic changes. The region hosts industries and academic institutions very similar to those found in Sturgeon County and the EMR. The Sheffield Innovation District and Advanced Manufacturing Park is a 400 acres area devoted to advanced manufacturing and innovation. The park's development is partly centred around a collaborative research facility. Branded Factory 2050, this new engineering research centre is a spin-off from Sheffield University.

Supercharging the economy through the Innovation District

Sheffield City Region is home to a globally significant centre for innovation and translational research. The Innovation District produces research-led, technology-based solutions delivered by some of the world's most talented people working in aerospace, defence, transportation, nuclear, oil, gas and healthcare technologies. The Innovation District is the go-to place in the UK for global leaders looking for advanced manufacturing and engineering innovation.

Born out of a unique collaboration between Sheffield's two universities, private business, and the region's local authorities, The Innovation District builds upon the region's established strengths in manufacturing and engineering, accelerating the delivery of new technologies and creating excellent opportunities for trade and investment.

At the heart of The Innovation District sits the Advanced Manufacturing Park (AMP) and Sheffield Business Park. With over a decade of investment, they have both expanded to create a 200-acre research campus connecting Sheffield and Rotherham, acting as a nucleus for the wider geography. The Innovation District itself spans over 2,000 acres and is a major driver of growth in the north of England and across the UK.

The Innovation District is a prominent place in the UK for businesses and people to connect, co-locate, collaborate and innovate; attracting business and investment from all over the world, it is home to world-class brands including Boeing, McLaren Automotive, Rolls-Royce, Arconic, Tata speciality steels, Toshiba, and Forgemasters.

The University of Sheffield's Advanced Manufacturing Research Centre (AMRC) and its high-tech research facilities around Factory 2050 continue to attract an ever-growing cluster of world-leading manufacturers to The Innovation District. Sheffield Olympic Legacy Park is home to the Advanced Wellbeing Research Centre (AWRC), with research partners including Sheffield Hallam University, Canon and Westfield Health. The AWRC is poised to become the most advanced research and development centre for physical activity in the world, presenting exciting opportunities for local businesses to further develop their products and services through the creation of commercial solutions for global healthcare markets.

The Innovation District is a physically and technically connected hub of innovation where research institutions and companies co-locate and collaborate with entrepreneurs, business start-ups and incubators. Development is ongoing and offers a range of housing, workspaces and amenities in an environment that encourages open-innovation. Further information can be found on the

Sheffield Innovation District by visiting the following website:
<https://www.welcometosheffield.co.uk>

National Institute for Aviation Research (NIAR - Wichita State University)



NIAR is part of Wichita State University. For more than 20 years, these world-renowned aerospace labs have focused their work on designing, testing and certification of aerospace parts and components. NIAR can serve as a great example of what the AATC and AATC North at ZVL could grow to be. Annually the labs conduct research valued at more than \$125 million (USD) and employ 850 scientists, engineers, technicians and support workers.

The Mission

To strengthen university research capabilities, provide applied learning opportunities for students, and support the aviation and manufacturing industries while driving innovation and prosperity for the community, region and state.

Your designs need validation. That's where we come in. Whether it's a material, component, system, or full airframe, we'll push it, pull it, heat it, freeze it, zap it and take it to its limits. We work with certification agencies to prove compliance and help design issues arise. Our experience with numerous unique projects brings in a fresh perspective; and our capabilities, technology and expertise are unlike that of any other test lab. Bring us your test plans. You'll get results. The National Institute for Aviation Research at Wichita State University has been providing proprietary

research and test data to the aviation industry (and beyond) since 1985. Each year we do business with nearly 100 different organizations.¹⁵

NIAR has made a name for itself as the most capable university-based aviation research Centre in the United States, providing research, design, testing, certification and training to the aviation manufacturing industry, government agencies, educational entities, and other clients that can benefit from our services.

With over one million square feet of research and office space, the NIAR is home to more than a dozen labs. NIAR laboratories include: Additive Manufacturing, Advanced Coatings, Advanced Machining & Prototyping, Aging Aircraft, Ballistic and Impact Dynamics Research Lab, CAD/CAM, Centre of Innovation for Biomaterials in Orthopaedic Research, Composites & Advanced Materials, Computational Mechanics, Crash Dynamics, Environmental Test, Full-Scale Structural Test, Mechanical Test, Reverse Engineering, Robotics and Automation, Virtual Reality and the Walter H. Beech Wind Tunnel.

As a department of Wichita State University, NIAR operates on a non-profit budget that has steadily increased to more than \$125 million dollars in 2020. And with its location in Wichita, KS, the “air capital of the world,” NIAR is able to integrate business, government, and university entities in cooperative efforts to advance aviation technology.

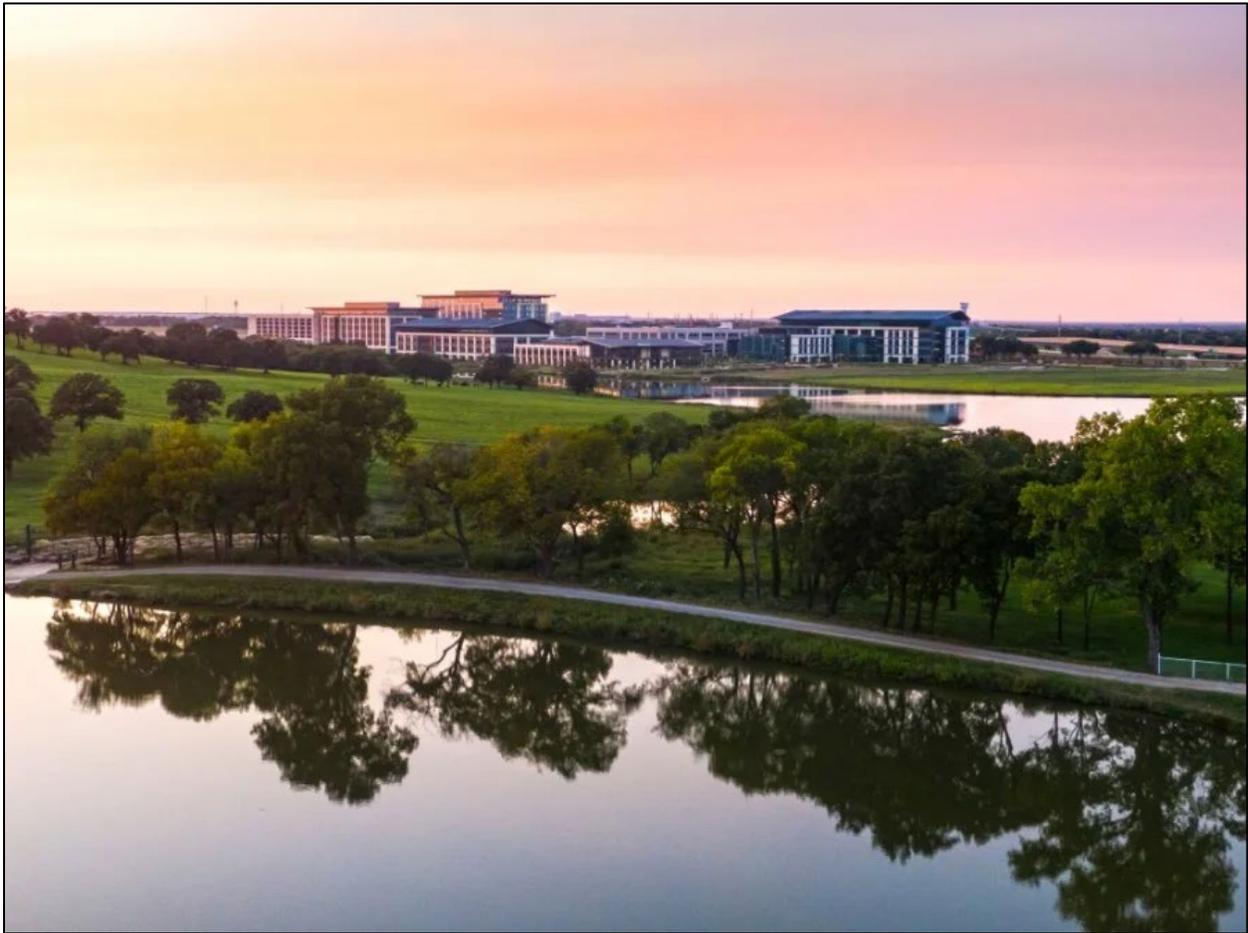
NIAR is also home to the FAA Centre of Excellence for Composites and Advanced Materials (CECAM) and the National Centre for Advanced Materials Performance (NCAMP), which is funded through the FAA and Air Force Research Laboratory.

NCAMP, the National Centre for Advanced Materials Performance, works with the FAA and industry partners to qualify material systems and populate a shared materials database that can be viewed publicly. NCAMP started as a FAA-funded program within the National Institute for Aviation Research at Wichita State University and stemmed from NASA's 1995 Advanced General Aviation Transport Experiment (AGATE)

NIAR employs more than 850 staff, ranging from research scientists with PhDs to undergraduate student lab technicians, and everything in between. Our clients include Boeing, Bombardier Learjet, Cessna, Beechcraft, and Spirit Aerosystems. Further information can be found on the NIAR by visiting the following website: <https://niar.wichita.edu/>.

¹⁵ <https://niar.wichita.edu/>

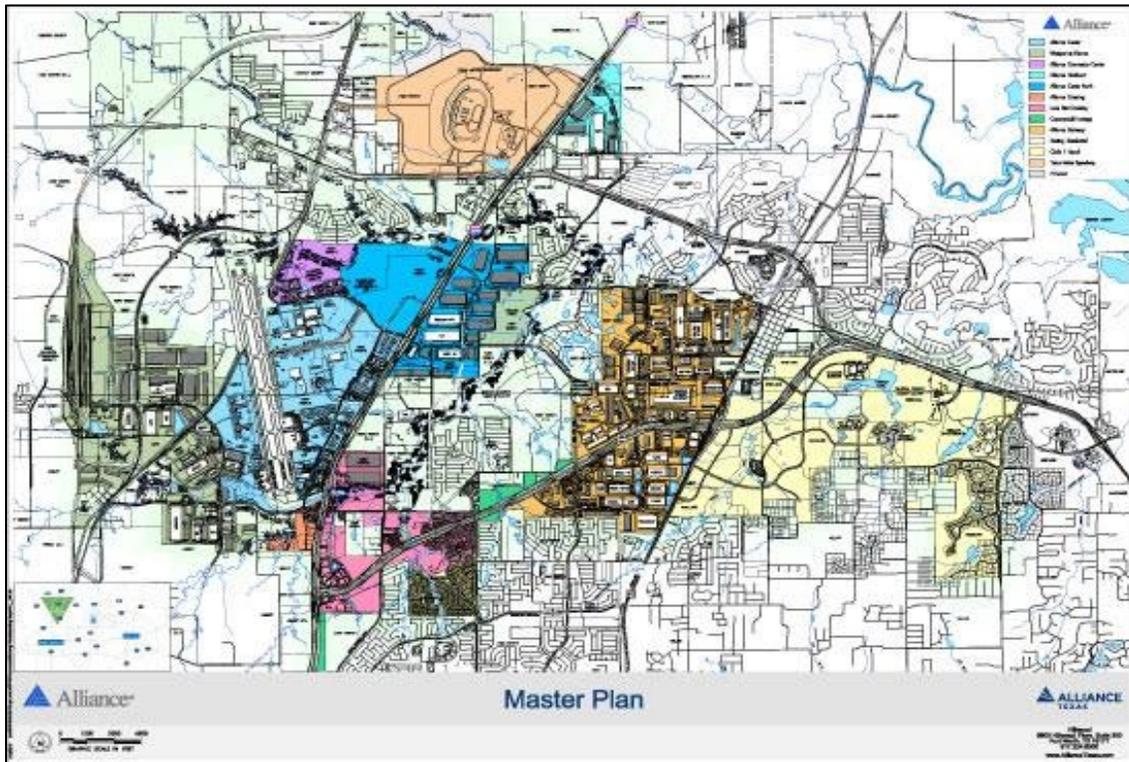
AllianceTexas



AllianceTexas is an unparalleled regional success story that has transformed the North Texas economy and connected the area to global industry. Led by Hillwood's development of the now 27,000-acre master-planned AllianceTexas, which launched with the Fort Worth Alliance Airport in 1989, the region propels growth, technology, employment, and business opportunities. AllianceTexas is home today to more than 63,000 employees and 530 companies and represents a total investment of more than \$11.9 billion dollars in the region. Alliance Texas has built more than 53 million square feet.

The overall development includes an industrial airport, logistics and distribution park, manufacturing park, a technology park, the Texas Motor Speedway, a Ranch and a very large rail yard. It also features nearly 4 million square feet of shopping, dining, health, medical, and entertainment options, seamlessly integrated with a variety of living and community options throughout the development. Since its inception, AllianceTexas has generated an estimated \$92 billion dollars in economic impact for the North Texas region. Other high-profile projects underway are "The Truck Yard", the AllianceTexas Mobility Innovation Zone, and expansion of the Fort Worth Alliance Airport, a public-private partnership between Hillwood and the city of Fort Worth that will continue to increase the region's economic output.

Alliance Texas Development Area Map:



<https://www.alliancetexas.com/alliancetexas-map>

Alliance Texas Anchor Tenants Map:



<https://www.alliancetexas.com/alliancetexas-map>

Further information can be found on AllianceTexas by visiting the following website:

<https://www.alliancetexas.com/>

LabCampus Munich



The Munich Airport Lab Campus is a mix of greenfield and brownfield redevelopment. Located adjacent to the Munich Airport entrance, the site covers 250 acres separated into four (4) blocks. The concept blends with the vision and commitment to innovation by the Munich Airport leaders in a joint undertaking with local post-secondary institution. The LabCampus focuses on offering collaborative research space and facilities while leveraging the airport terminal and facilities for live testing. Industry sectors encompass aviation and aerospace and support trends like artificial intelligence, materials, big data, and the environment in a sustainable approach.

LabCampus Vision

Innovation is the driving force of our time. And while the challenges are huge, so are the opportunities. At LabCampus, they're creating an environment to tackle this head on. An environment capable of boosting the Bavarian economy by supporting its prized players. A place—on the site of Munich Airport—where a variety of industries, technologies and ideas converge. Characterized by a culture of sharing and collaborating—and powered by its community. This concept is literally breaking new ground. And it's going to create a city that redefines how you do the same.¹⁶

¹⁶ <https://www.labcampus.de/en>

Cross-industry Collaboration

LabCampus isn't just about creating a vibrant community comprising different industries, regional champions, global players, research minds and entrepreneurial brains. It's how that community is cultivated that makes the difference. Here, we come into our own. We want to initiate cross-industry collaboration for the benefit of the collective, and still see each individual company achieve their full potential. And we're going to do it by helping you remove barriers to innovation—costs included. The plan is to create a new form of togetherness—one in which at each step of the innovation process—innovators are learning with and from each other.

Munich Airport as a test hub - TERMINAL TESTLAB

The Terminal Testlab at Munich Airport is a tangible example of how LabCampus actively helps companies to innovate. Located in the security area, the Testlab is an ideal place to present new products and services, and to raise awareness amongst your target audiences. Here, you also have the chance to collect feedback for market research, beta testing and research studies.

The work environment: inspiring.

At its core, LabCampus stands for cross-industry collaboration. A place where lines blur between industries and disciplines. Common areas and landscaped outdoor spaces invite you to sit down and stay a while, whether to work, rest, or just hang out with others. And yet, behind the scenes, nothing is left to chance. Together with the Senseable City Lab at the world-renowned Massachusetts Institute of Technology (MIT), complex smart city concepts are being developed. Perhaps in the future, you'll enjoy a new work and new life environment augmented and powered by LabCampus intelligence. Further information can be found on the LabCampus by visiting the following website: <https://www.labcampus.de/en>

Key takeaways

These case studies have multiple similarities with the VAA. They also provide good examples of the necessary vision, guiding principles, and the structure for successful technology and innovation related to business and industrial park development. Among the key takeaways and best practices extracted from the case studies:

- The initial success relies on a strong vision statement and achievable objectives around which the proponents must rally;
- Innovation is the cornerstone of successful development: it drives the future and provides the vision that communities/governments are often looking for;
- Innovation does not happen by itself: the development area should have an innovation strategy (usually mutually developed with academia and anchor manufacturers);
- Work closely and incorporate post-secondary academic institutions as partners of the project;
- Collaborative research and clustering are the next waves of R&D and innovation;
- Innovation drives transversal industry sectors like logistics and distribution;
- Having the right building facilities, labs and equipment supports investment attraction;
- Having the right infrastructure and regulatory environment supports investment attraction;

- Working short-term investments must be combined with thinking, planning, and engineering long-term support economic development;
- Integrate housing and lifestyle components (e.g., housing and accommodations, entertainment, food, leisure, shopping, transportation, and sustainability) in the overall development concept.

1.3 Existing Site Characteristics of the Area and Land Uses

Introduction

Villeneuve Airport is located Northwest of Edmonton, Alberta, surrounded by agricultural land and gravel extraction operations. The Local Study Area (LSA) is generally defined as the area bordered by Highway 633 to the South, agricultural land to the West, the CN rail line to the North, and Range Road 270 to the East (Figure 1-G). Within the LSA, there are multiple tree stands that could be considered habitat for various species, but broadly the LSA consists of grass fields, and the infrastructure of the airport itself. The Regional Study Area (RSA) extends South past Highway 633 by approx. 800 m, West to RR272, North to TWP Road 544, and East approximately 750 m past RR270 (Figure 1-G).

The primary data sources used are listed below in relation to their associated organizations:

- Alberta Biodiversity Monitoring Institute:
 - Wetlands - [ABMI - ABMI Wetland Inventory](#)
- Alberta Agriculture and Forestry, Government of Alberta:
 - Soils and Landforms - [Agricultural Regions of Alberta Soil Information Database Version 4.1](#)
- Alberta Environment and Parks:
 - Fish - [FWIMT Pub \(alberta.ca\)](#)
 - Alberta Water Well Information Database - [Alberta Water Well Information Database - Open Government](#)
- Alberta Parks:
 - Protected Areas, Element Occurrence Part 1 & Part 2 - [Download Data | Alberta Parks](#)
- Government of Alberta:
 - Alberta Water Wells - [Alberta Water Wells](#)
 - Wildlife Sensitivity Maps - [Wildlife sensitivity maps | Alberta.ca](#)
 - Alberta Land Titles and Surveys Spatial Information System - [SpinIIHost \(gov.ab.ca\)](#)
 - Long Term Weather Data - [Interpolated Weather Data Since 1961 for Alberta Townships \(gov.ab.ca\)](#)
- Alberta Culture, Multiculturalism, and Status of Women, Government of Alberta:
 - Listing of Historic Resources - [Listing of Historic Resources \(alberta.ca\)](#)
- Alberta Community Bat Program:

- Alberta Bat Profiles and Ranges - [batprofiles - Alberta Community Bat Program \(albertabats.ca\)](http://batprofiles - Alberta Community Bat Program (albertabats.ca))
- AltaLis:
 - 1:20,000 DEM - [Altalis - Map](#)

The LSA and RSA do not coincide with any provincially protected or environmentally significant areas; however, there is one area that is under “Environmental Protection” via the County (Figure 1-G). This occurs in the East side of the RSA, just South of the rail line, and follows a small stream (Figure 1-H). When this parcel of land was subdivided, the County placed this polygon under environmental reserve through the *Municipal Government Act*. It means that the specific polygon highlighted in red in Figure 1-G cannot be sold nor developed, yet the remainder of the land parcel can be sold.

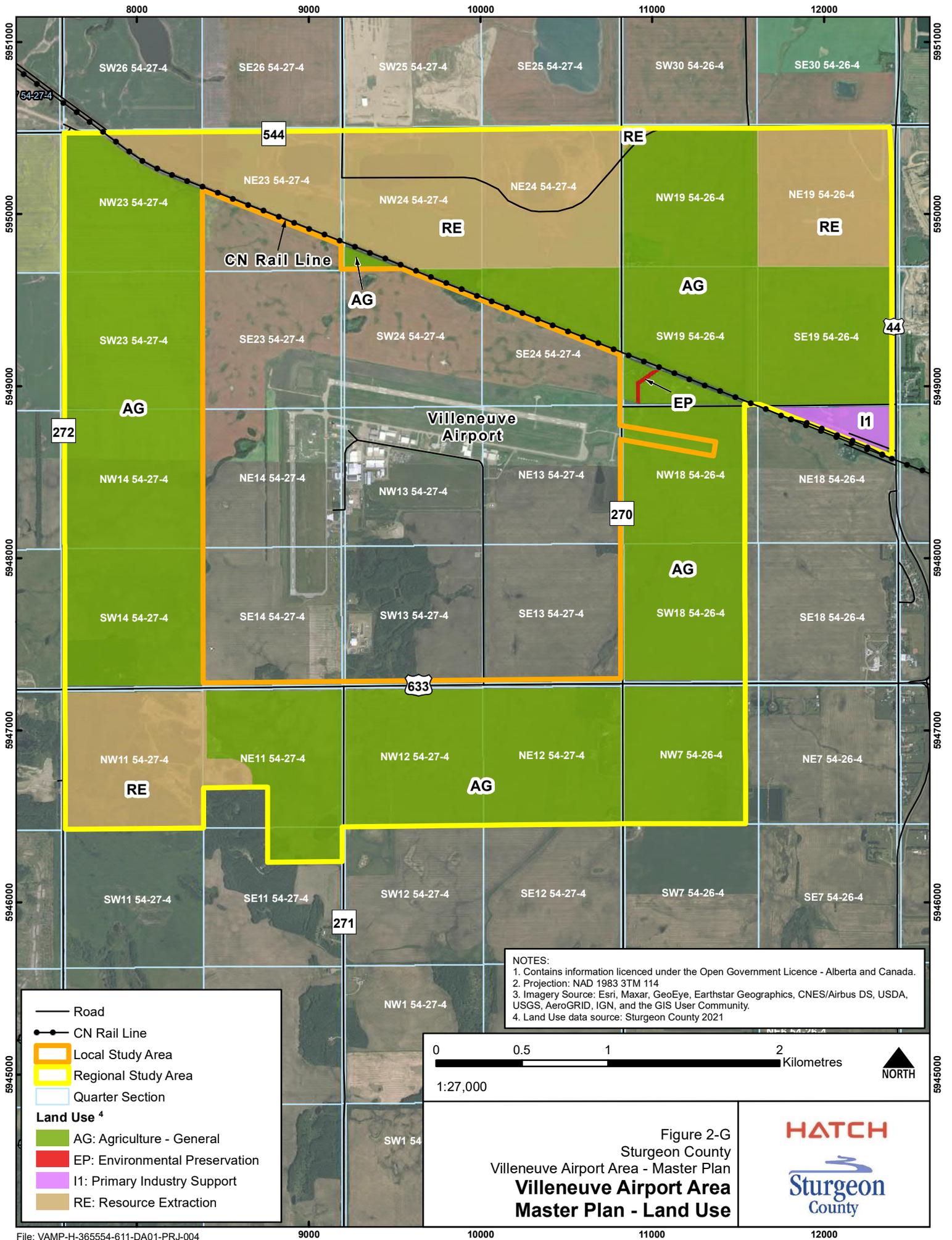
There are sites with the potential for paleontological evidence in both the LSA and RSA; these sites are discussed below. No species at risk have been identified or observed within the LSA or RSA. However, due to a lack of data, wildlife, vegetation, bird, bat, and amphibian surveys will be required to identify at-risk species within the LSA if the development of the Villeneuve Airport expands beyond the current area (Table 1-G).

Land Use

A desktop survey was performed to identify land use classification, surface, and mineral rights for both the LSA and RSA. Land use classification within the RSA was predominantly agricultural, industrial, and gravel extraction. There are three gravel extraction sites located north, east, and south of the Villeneuve Airport (Figure 1-G). None of the land in both the LSA or RSA is protected under the Wildlife Protection Act, or under a nature reserve. There were several sites that are classified as having the potential for paleontological evidence and fall under the Historical Resources Act. In the event these sites are disturbed, regulatory review and approval under the Historical Resources Act will be required. The land title numbers for the surface and mineral rights, and the sites that fall under the Historical Resources Act are shown in Table 1-F and Figure 1-H.

Table 1-F Summary of Land Use Assessment

Study Area/Land Use	Land under Wildlife Protection Act	Land Within/Nearby Nature Reserve/Park	Land Title		
			Surface Rights	Mineral Rights	Historical Resources Act Sites
LSA	No	No	Yes (Title Numbers: 202219944, 49L256)	Yes (Title Numbers: 139I240A6)	Yes (24-54-27-W4). Potential Paleontological sites
RSA	No	No	Yes (Title Numbers: 942011350020, 872080795, 942011350030, 51L256, 982280863, 992151866001, 202219944, 202219944001, 872109224, 0421470466001, 752049235, 49L256, 022042563015, 1632225348, 072591675001, 092373861009, 022042463021, 082064500001, 212034286001, & 212034286)	Yes (Title Numbers: 139240A4, 139240A5, 139I240A7, 072095623, 072095604, 082024362011, 132F223A, 142034627002, 162307398, 082024362011, 132F223A, 162307398, 072591675002, 082024362011, 142034627, 234I190, 982254092, 052350326, 142004097, 142004100, 192273297, 852219943B, 982028867001, 992235948, 002016137, 082024362008, 922013044, 922013147, 922277130001, 932064352)	Yes (24-54-27-W4) Potential Paleontological sites



NOTES:
 1. Contains information licenced under the Open Government Licence - Alberta and Canada.
 2. Projection: NAD 1983 3TM 114
 3. Imagery Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.
 4. Land Use data source: Sturgeon County 2021

— Road
 ●— CN Rail Line
 Local Study Area
 Regional Study Area
 Quarter Section

Land Use ⁴

- AG: Agriculture - General
- EP: Environmental Preservation
- I1: Primary Industry Support
- RE: Resource Extraction

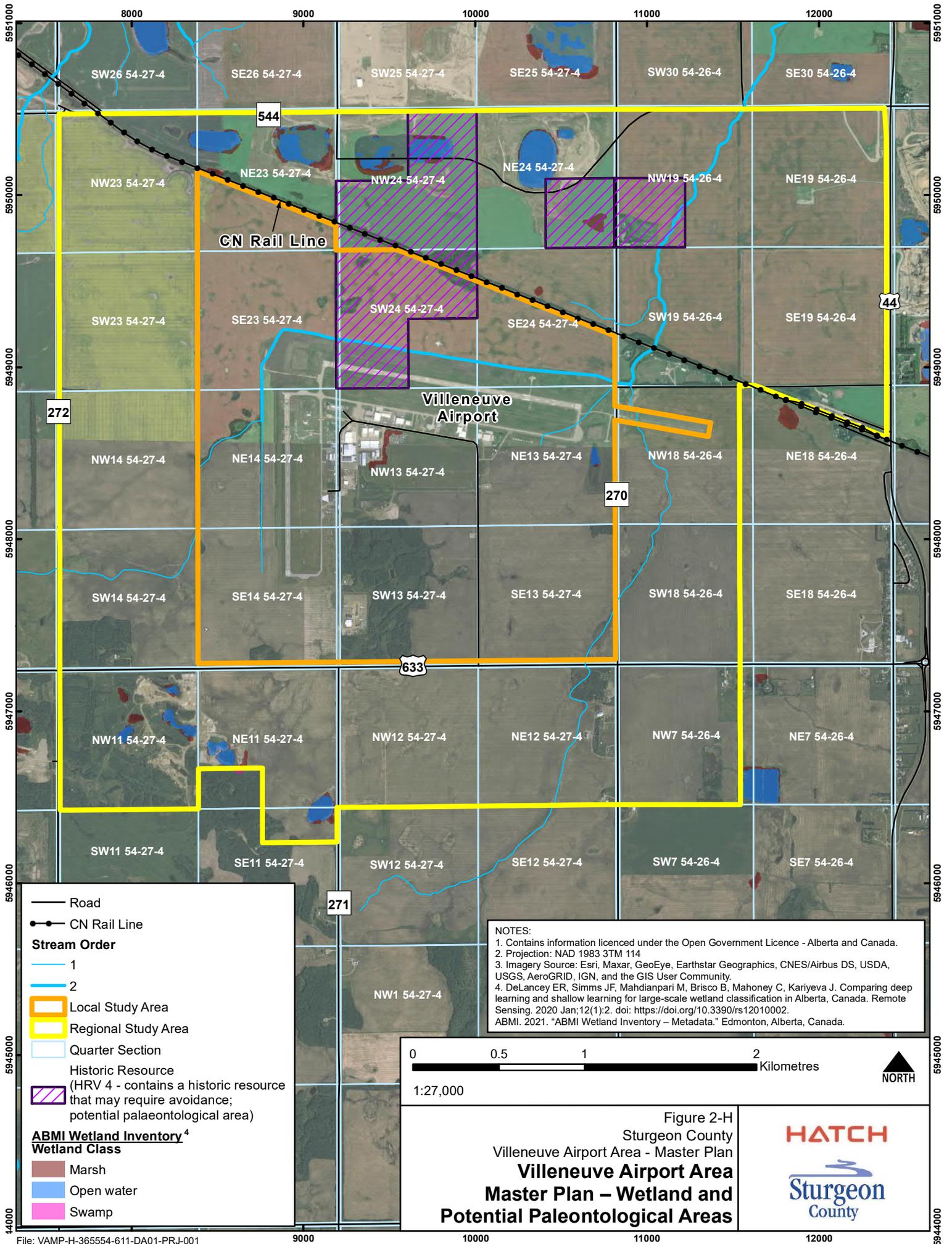
0 0.5 1 2 Kilometres

1:27,000

NORTH

Figure 2-G
 Sturgeon County
 Villeneuve Airport Area - Master Plan
**Villeneuve Airport Area
 Master Plan - Land Use**





— Road
 ●— CN Rail Line
Stream Order
 1
 2
 Local Study Area
 Regional Study Area
 Quarter Section
 Historic Resource
 (HRV 4 - contains a historic resource
 that may require avoidance;
 potential palaeontological area)
ABMI Wetland Inventory⁴
Wetland Class
 Marsh
 Open water
 Swamp

NOTES:
 1. Contains information licenced under the Open Government Licence - Alberta and Canada.
 2. Projection: NAD 1983 3TM 114
 3. Imagery Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.
 4. DeLancey ER, Simms JF, Mahdianpari M, Brisco B, Mahoney C, Kariyeva J. Comparing deep learning and shallow learning for large-scale wetland classification in Alberta, Canada. Remote Sensing. 2020 Jan;12(1):2. doi: <https://doi.org/10.3390/rs12010002>.
 ABMI. 2021. "ABMI Wetland Inventory – Metadata." Edmonton, Alberta, Canada.



Figure 2-H
 Sturgeon County
 Villeneuve Airport Area - Master Plan
Villeneuve Airport Area
Master Plan – Wetland and
Potential Paleontological Areas



Biophysical

A summary of the biophysical characteristics of the LSA and RSA is provided in Table 1-G. The LSA and RSA occur in Alberta's Central Parkland region. The region is a prosperous agricultural area due to its moist climate, relative to the Grasslands to the South, as well as the abundance of wetlands (Figure 1-H) and rich dark soils (Figure 1-I). The Central Parkland region of Alberta has a varied morphology due to past glaciation resulting in ripples across the landscape and till inclusions throughout the soil (Figure 1-I and Figure 1-J). The region experiences hot summers with most of the precipitation occurring in this season, and cold winters, with a temperature range of about 60°C each year.

A desktop survey was performed to determine whether ecologically significant areas, such as wetlands (Figure 1-H), and species at risk are present in the LSA and RSA. Although the records do not identify any sensitive species or species at risk, there is a potential for them to be found in both the LSA and RSA, and because of this, surveys will be required. Due to lack of data within the LSA and RSA, field studies will need to be conducted for vegetation, wildlife, birds, bats, and amphibian species in the LSA and RSA as part of the permitting and approval process.

Table 1-G Summary of Biophysical Assessment and Recommended Survey

Study Area/Land Use	Vegetation Species of Management Concern	Wildlife Species of Management Concern	Bird Species of Management Concern	Bat Species of Management Concern	Habitat for Amphibians of Management Concern	Potential Fish Habitat	Ecologically Sensitive Forest System	Wetlands/ Waterbodies
LSA	Vegetation survey required	Wildlife survey required	Bird survey required	Yes (In range, survey required)	Habitat survey required	Yes	No	Yes
RSA	Vegetation survey required	Wildlife survey required	Bird survey required	Yes (In range, survey required)	Habitat survey required	Yes	No	Yes

Wetlands are present in both the LSA and RSA, and waterbodies are present in the RSA (Figure 1-H); both could potentially be fish habitat; however, no fish surveys in the area have identified fish species of concern.

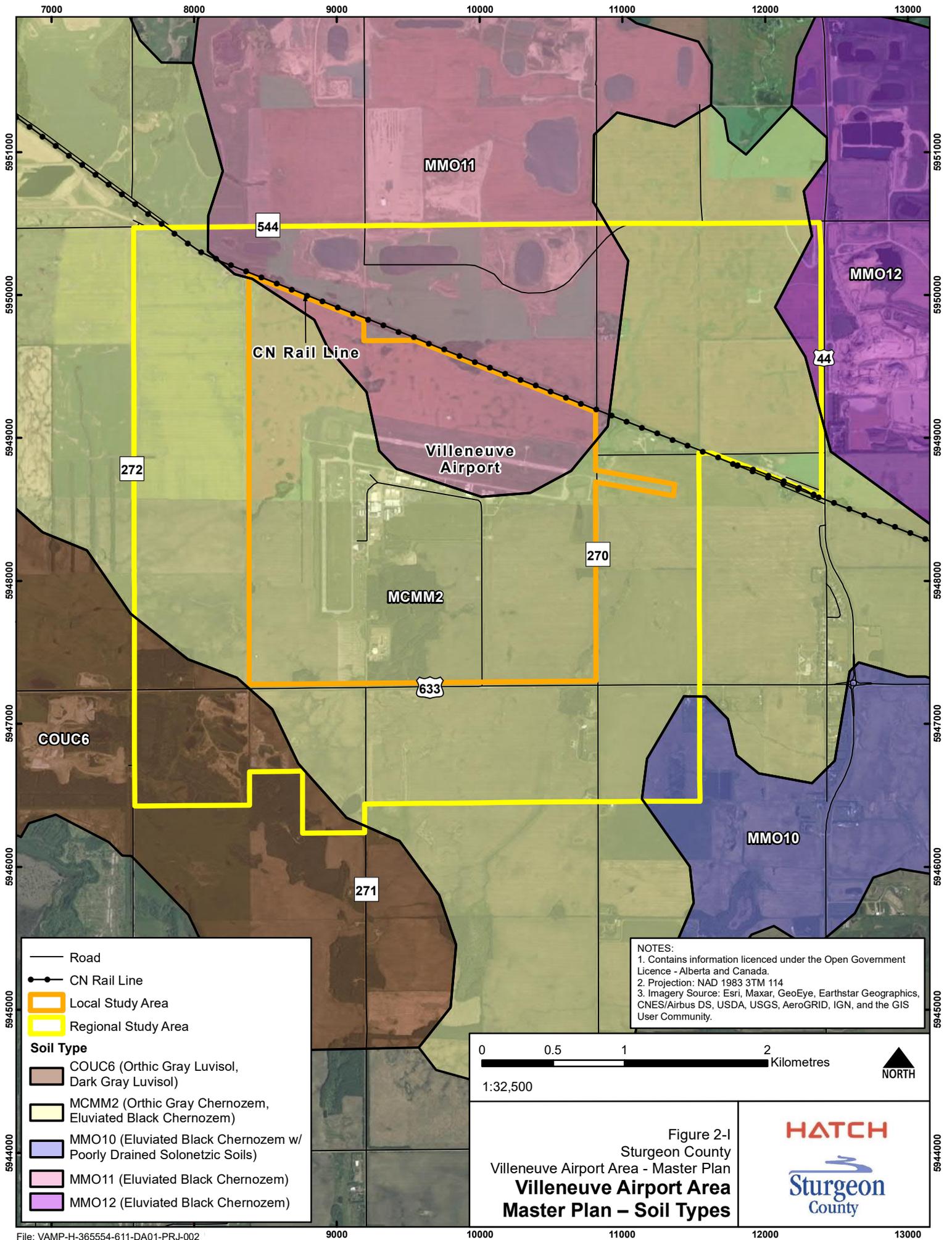
The lithology/geology in the LSA and RSA was determined based on the groundwater well information available. An overall summary of the lithology is shown in Table 1-H and should not be substituted for a formal lithological survey should that be deemed necessary.

Table 1-H Overall Summary of the Lithology

Depth (ft)	Lithology/Geology
1-5	Topsoil (black chernozem)
5-60	Clay with mixed gravel, sand and till
60-160	Shale and some sandstone
160-360	Shale, sandstone, and coal

Within the LSA, there are two different classifications of chernozemic soils; the RSA includes these soil types as well as another chernozemic soil type and a luvisolic soil (Figure 1-I).

The topography of the area is relatively flat, but from the desktop survey, it was evident there is an elevation change from the SW corner of the RSA grading down towards the NE corner of the RSA. There are some landforms within the LSA and RSA; the landform types and general morphology can be seen in Figure 1-J.



7000 8000 9000 10000 11000 12000 13000

5951000

5951000

5950000

5950000

5949000

5949000

5948000

5948000

5947000

5947000

5946000

5946000

5945000

5945000

5944000

5944000

MMO11

MMO12

Villeneuve Airport

MCMM2

MMO10

COUC6

544

44

CN Rail Line

272

270

633

271

- Road
- CN Rail Line
- Local Study Area
- Regional Study Area

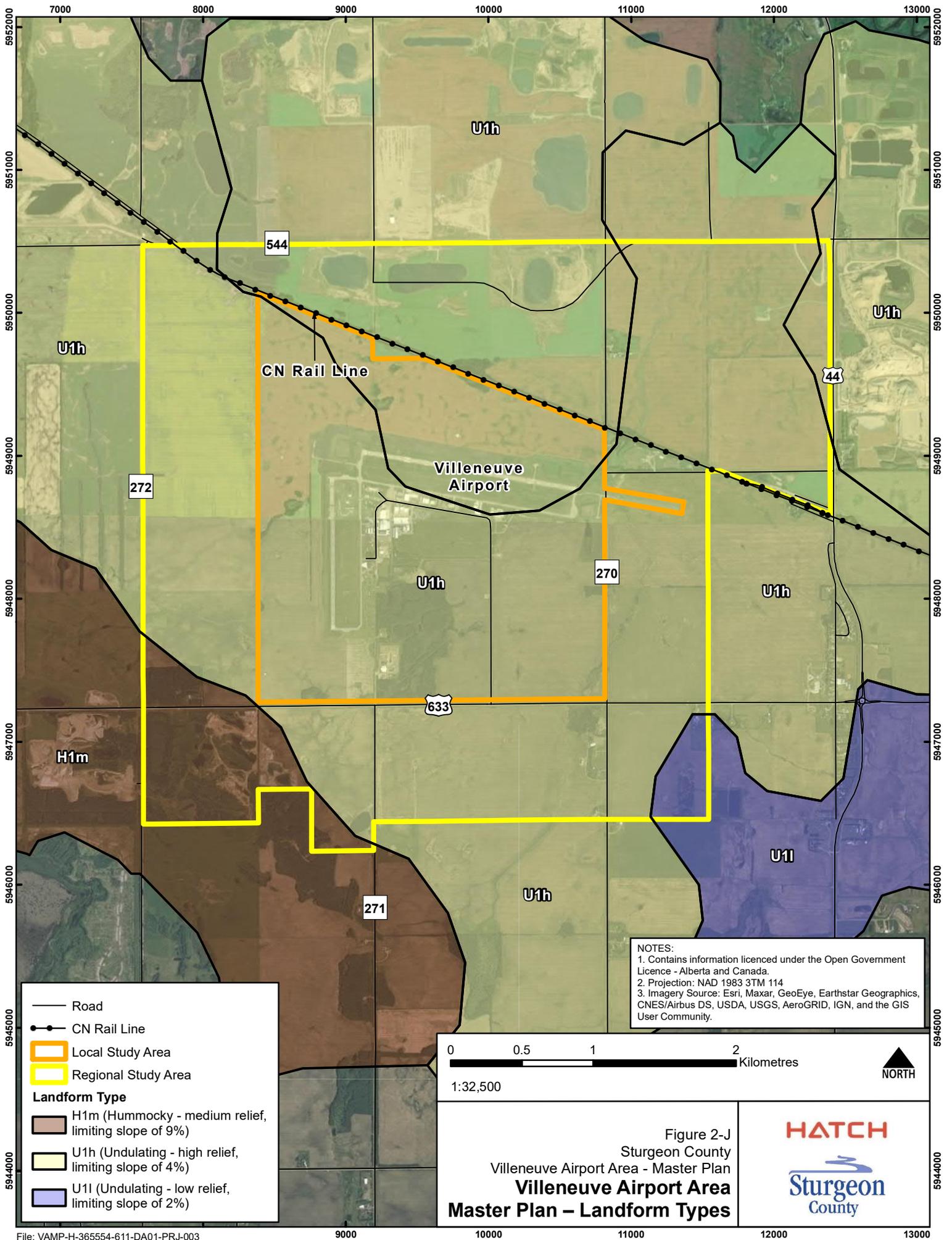
- Soil Type**
- COUC6 (Orthic Gray Luvisol, Dark Gray Luvisol)
 - MCMM2 (Orthic Gray Chernozem, Eluviated Black Chernozem)
 - MMO10 (Eluviated Black Chernozem w/ Poorly Drained Solonchic Soils)
 - MMO11 (Eluviated Black Chernozem)
 - MMO12 (Eluviated Black Chernozem)

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 2. Projection: NAD 1983 3TM 114
 3. Imagery Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.



Figure 2-1
 Sturgeon County
 Villeneuve Airport Area - Master Plan
**Villeneuve Airport Area
 Master Plan – Soil Types**





— Road
 ●— CN Rail Line
 Local Study Area
 Regional Study Area
Landform Type
 H1m (Hummocky - medium relief, limiting slope of 9%)
 U1h (Undulating - high relief, limiting slope of 4%)
 U1l (Undulating - low relief, limiting slope of 2%)

NOTES:
 1. Contains information licenced under the Open Government Licence - Alberta and Canada.
 2. Projection: NAD 1983 3TM 114
 3. Imagery Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

0 0.5 1 2
 Kilometres
 1:32,500
 NORTH

Figure 2-J
 Sturgeon County
 Villeneuve Airport Area - Master Plan
Villeneuve Airport Area
Master Plan – Landform Types



1.4 Characteristics of Villeneuve Airport

Airport Overview

Villeneuve Airport (ZVL) is a regional airport that mainly serves the general aviation needs in the Edmonton Metro Region, including recreational and flight training. With over 70,000 annual aircraft movements (fixed wing and rotary) in 2018, ZVL is considered the largest and busiest general aviation airport in this region. Built in 1976 by Transport Canada as a satellite airport for flight training and recreational activities, it has since been purchased and operated by EIA in 2000 as a strategic asset in the short and long-term planning of the organization's portfolio. Since then, Edmonton Airports has worked closely with Sturgeon County to promote the aviation business and services at ZVL, and the continued expansion of key facilities to promote potential future investments, and advance regional economic and community development.

The airfield consists of two runways, 08/26 and 16/34, and associated taxiways. Runway 08/26 has a length of 1,525.5m (5,001ft) with an asphalt surface and categorized for aircraft classified as AGN IIIB, as per Transport Canada guidelines. The Runway 26 end is equipped for precision approaches, whereas the 08 end is rated for non-instrument approaches. Runway 16/34 is shorter at 1065.5 m (3,496 ft) with an asphalt surface and more suited for general aviation aircraft, as it's categorized for AGN II aircraft. Both runway ends are rated for non-instrument approaches.

The airport does not currently serve commercial aviation traffic, with no plan to do so in the future. Aircraft movements consist mainly of general and recreational flying. The annual movements at ZVL for the years of 2018 and 2019 are 71,054 and 79,567, respectively, with 2020 seeing a decrease to 59,018 due to the COVID-19 pandemic. This traffic is mainly made up of smaller general aviation aircraft in the AGN II category, which can be accommodated with the existing runways and other airfield infrastructure.

Airport Tenants

ZVL is home to various tenants and users, varying from general aviation and flight training schools to innovative start-ups with ambitious and significant growth plans. Most of the lands fronting the taxiways are owned by the businesses themselves, including their apron and parking areas. The businesses on the landside of the airport are currently leasing the land from the airport owners, with some tenants already heavily invested in these plots with the construction of buildings and other on-site developments.

Aerodrome Obstacle Management

Transport Canada and other international aerodrome standards have identified areas that need to be protected from obstacles around an airport to ensure a safe airspace. These 'imaginary' areas vary based on an airport and runway classification, and the type of operations that a runway is equipped to accommodate in terms of navigational aids and landing systems. The critical areas where objects need to be identified, removed, and/or lowered, are called Obstacle Limitation

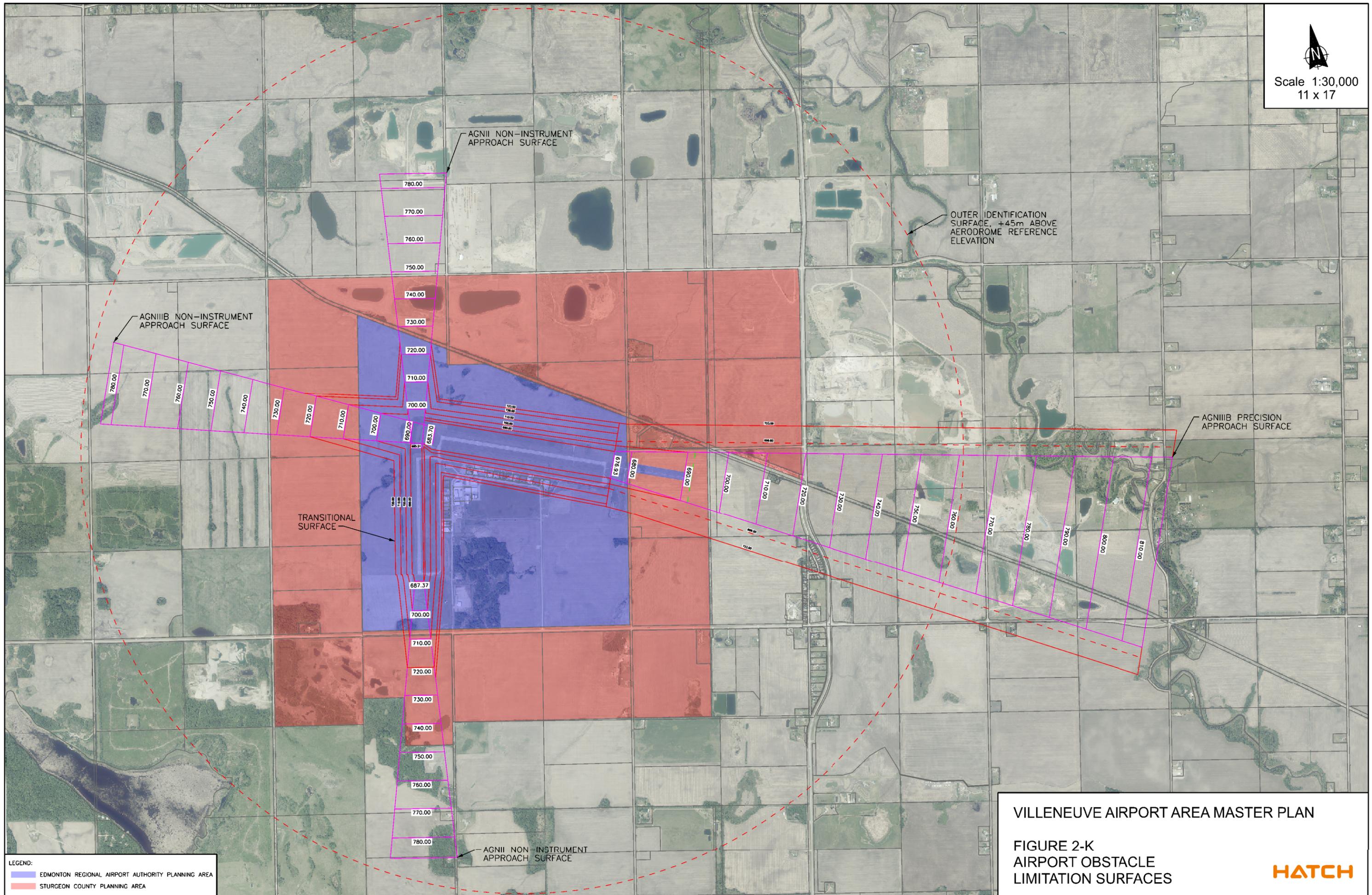
Surfaces (OLS), and consist of an approach, transitional, and inner transitional surfaces. The dimensions of these OLS areas at ZVL, as per TP312 5th Edition, for each of the runway ends are shown in Figure 1-K and are as follows:

Runway 08	Runway 26
<p><u>Approach</u></p> <ul style="list-style-type: none"> • AGN IIIB Non-Instrument • Length of inner edge on each side – 75 m • Distance from Threshold – 60 m • Divergence – 10% • Length – 3,000 m • Slope – 3.33% 	<p><u>Approach</u></p> <ul style="list-style-type: none"> • AGN IIIB Precision CAT I • Length of inner edge on each side – 122 m • Distance from Threshold – 61 m • Divergence – 15% • Length – first section 720 m, second section 4,280 m • Slope – first section 2%, second section 2.9%
<p><u>Transitional</u></p> <ul style="list-style-type: none"> • Height (above threshold) – 45 m • Slope – 14.3% 	<p><u>Transitional</u></p> <ul style="list-style-type: none"> • Height (above threshold) – first segment 0-23 m, second segment 23-45 m • Slope – first segment 25%, second segment 14.3%
<p><u>Inner Transitional</u></p> <ul style="list-style-type: none"> • Distance from Centreline – 61 m • Slope – vertical 	<p><u>Inner Transitional</u></p> <ul style="list-style-type: none"> • Distance from Centreline – 61 m • Slope – first segment vertical, second segment 16.7%
Runway 16	Runway 34
<p><u>Approach</u></p> <ul style="list-style-type: none"> • AGN II Non-Instrument • Length of inner edge on each side – 40 m • Distance from Threshold – 60 m • Divergence – 10% • Length – 2,500 m • Slope – 4% 	<p><u>Approach</u></p> <ul style="list-style-type: none"> • AGN II Non-Instrument • Length of inner edge on each side – 40 m • Distance from Threshold – 60 m • Divergence – 10% • Length – 2,500 m • Slope – 4%
<p><u>Transitional</u></p> <ul style="list-style-type: none"> • Height (above threshold) – 45 m • Slope – 20% 	<p><u>Transitional</u></p> <ul style="list-style-type: none"> • Height (above threshold) – 45 m • Slope – 20%
<p><u>Inner Transitional</u></p> <ul style="list-style-type: none"> • Distance from Centreline – 40 m • Slope – vertical 	<p><u>Inner Transitional</u></p> <ul style="list-style-type: none"> • Distance from Centreline – 40 m • Slope – vertical

There are also other surfaces called the Obstacle Identification Surfaces (OIS), where objects within these areas need to be identified but not necessarily removed or lowered, subject to an assessment of the airspace and flight procedures. The OIS consists of an approach and outer identification surface; however, the approach is only established for precision and non-precision runways serving AGN IIIB aircraft or higher. Based on the information provided by the airport, and the published aerodrome information, there is currently no OIS established for ZVL. However, since an outer OIS is to be established for all aerodromes as per Transport Canada TP312 5th Edition, this surface is shown on Figure 1-K. The outer OIS is centred on the Aerodrome Reference Point (ARP) and comprises a common plane established at a constant elevation 45 m above the ARP, extending horizontally through 360° to a distance of 4,000 m.



Scale 1:30,000
11 x 17



OCTOBER 1, 2021 - H365554-AC-120-S1-0005 - AIRPORT OLS

LEGEND:

- EDMONTON REGIONAL AIRPORT AUTHORITY PLANNING AREA
- STURGEON COUNTY PLANNING AREA

VILLENEUVE AIRPORT AREA MASTER PLAN

FIGURE 2-K
AIRPORT OBSTACLE
LIMITATION SURFACES



Runway Lighting and Navigational Equipment

Both runways have various lighting and navigational systems, with only the Runway 26 end equipped with an ILS approach lighting system rated for CAT I operations. These are as follows:

Runway 08	Runway 26
<ul style="list-style-type: none"> • PAPI Lights • Threshold and runway end lights • High intensity runway edge lights, variable 5 settings 	<ul style="list-style-type: none"> • Centre row approach lighting, Category I high intensity • PAPI Lights • Threshold and runway end lights • High intensity runway edge lights, variable 5 settings
Runway 16	Runway 34
<ul style="list-style-type: none"> • Threshold and runway end lights • Medium intensity runway edge lights, variable 3 settings 	<ul style="list-style-type: none"> • Threshold and runway end lights • Medium intensity runway edge lights, variable 3 settings

Planned Airport Development

Other than the proposed developments around the Airport Area, there is also an opportunity for key developments within the airport and airfield area to help improve the airfield for existing tenants and promote the airport for future users. The following map was derived from the Villeneuve Airport 2019–2023 Strategic Plan¹⁷, showing the Airport’s strategic vision of future developments.

¹⁷ A summary of the Villeneuve Airport 2019-2023 Strategic Plan (including Figure 4-F below) can be found in Appendix B.

Figure 4-F Map of 2023 Villeneuve Airport Strategic Vision



Looking at Figure 1-L, potential new infrastructure is proposed on the airfield, including an expanded apron area to accommodate more aircraft near the existing terminal building, which is also identified for expansion. A new taxiway link from Runway 08/26 is also proposed to increase airfield efficiency, reduce taxi times and carbon emissions, and improve runway occupancy to allow more aircraft movements. As Runway 26 is categorized for AGN IIIB, this new taxiway has been sized to accommodate the same. The final location and configurations of the new taxiway and apron will need to be based on more detailed runway occupancy and aircraft parking assessments, respectively.

It should be noted that there is also another proposed new taxiway from the Villeneuve Airport Development Planning project performed in 2019/2020 that is also shown in Figure 1-L. This

taxiway would provide additional plots with airside frontage that could attract new tenants and businesses to the airport and is therefore also shown as a potential development option as part of this Master Plan.

A high-level runway length assessment was conducted for Runway 08/26 to assess if the existing runway configuration is sufficient for current and potential future aircraft to safely operate to and from the airport. The physical and environmental parameters were taken from published data, and are as follows:

- Aerodrome reference temperature – 22.2°C
- Aerodrome reference elevation – 688 m
- Runway length – 1525.5 m

Using these values to correct the published reference lengths for elevation and temperature, the following take-off runway lengths at maximum take-off weight were calculated for a few aircraft based on what was observed at the airport today, and potential future aircraft that may use the airport:

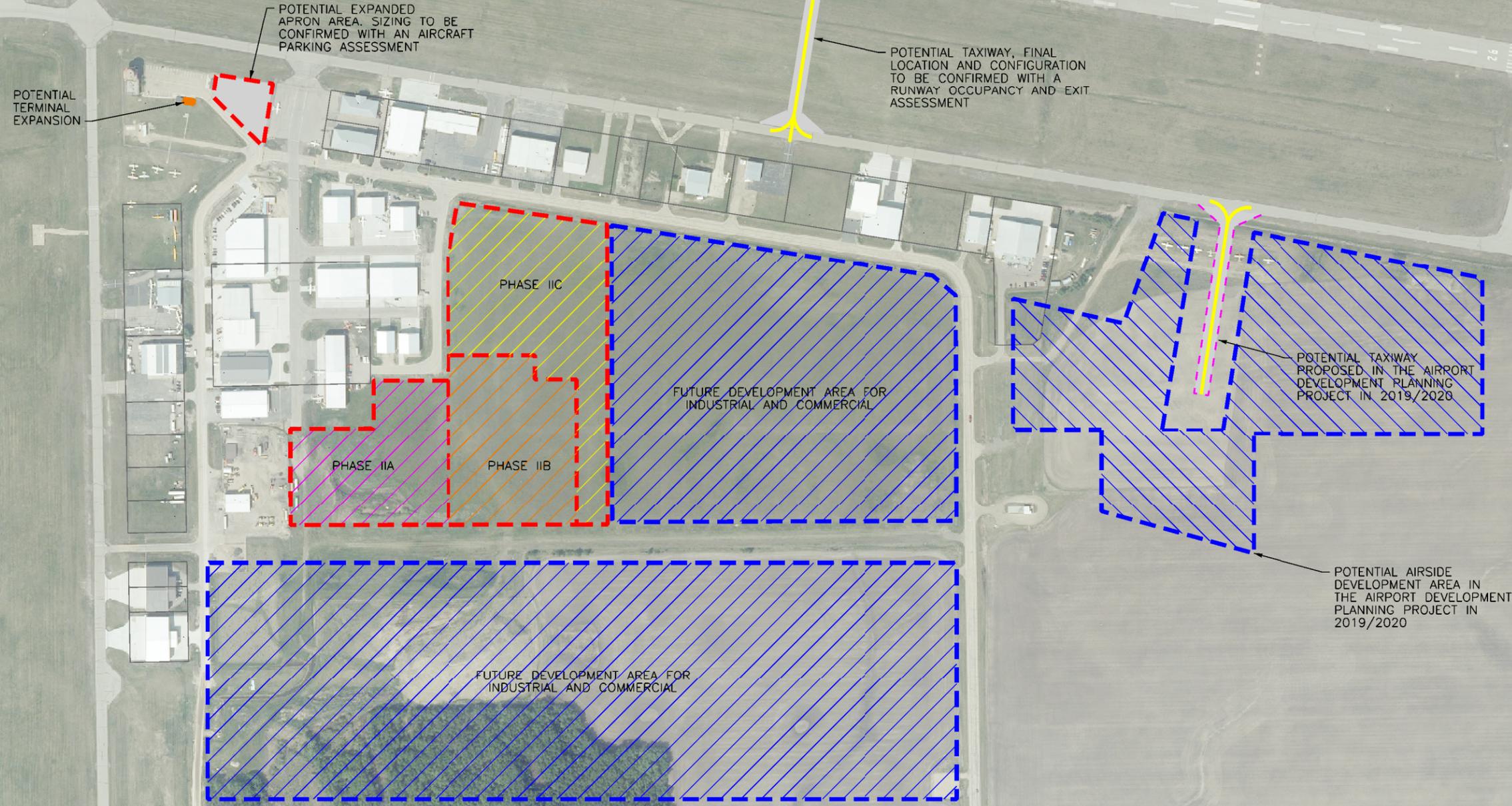
	Beech King Air B350	Beechcraft B1900	Cessna Citation	Challenger 600 Series	B737-700W
Runway Length (m)	1,310	1,480	1,240	2,230	2,270

From these results, it is apparent that Runway 08/26 is not only sufficient to accommodate the general aviation and recreational aircraft that use the airport everyday today, but also some larger aircraft such as the Beechcraft B1900 and Cessna Citation that are commonly used by private operators and even some regional airlines across Canada. With no intentions for commercial operations at the airport, the inability to accommodate the much larger B737 aircraft should not have a major impact on the short and long-term plans for the airport. Of note, should the County or ERAA wish to attract certain types of businesses or industries that utilize longer runways, such as Aerospace and Defence contractors/suppliers, or large-scale Maintenance, Repair and Overhaul (MRO) companies, a longer upgraded runway would be necessary. This is not currently factored into the analysis.

Outside of the airfield area, other than the wider area already discussed in earlier sections of this Master Plan, there is potential for smaller developments such as parking areas and improved road access in the immediate airport vicinity to attract more customers and allow for additional tenant expansion and potential future light industrial developments.



Scale 1:5,000
11 x 17



OCTOBER 1, 2021 - H365554-AC-120-S1-0006 - AIRPORT DEVELOPMENT

LEGEND:

- - - PHASE II DEVELOPMENT AREA

- - - FUTURE DEVELOPMENT AREA

VILLENEUVE AIRPORT AREA MASTER PLAN

FIGURE 2-L
AIRPORT DEVELOPMENT

HATCH

Airfield Infrastructure and Site Visit

A site visit of the ZVL airfield was performed on June 22, 2021, which included touring the runways, taxiways, aprons, and select tenant hangar spaces. General site photos were taken to observe the condition of the surface infrastructure; however, a detailed investigation of the pavement conditions was not undertaken.

General observations during the site visit showed that the runways, taxiways, and several aprons consisted of asphalt pavement while numerous aprons were constructed from rigid pavement.

The existing runways exhibited predominately longitudinal and transverse cracking of the asphalt that are generally the result of age, construction, and subsurface conditions. ZVL staff noted a large portion of their runways do not contain subsurface drainage which help to lower the high-water table. The lack of subsurface drainage results in weakened bearing capacity of the runway pavement structures leading to more structural damage of the pavement. ZVL staff noted that crack sealant repairs including routing and sealing were self-performed through their maintenance budget while patching was also performed in selected areas. ZVL staff also noted that their maintenance program included runway resurfacing projects which will include milling the existing asphalt and repaving with new asphalt over multiple years in the summer months to improve the pavement condition of the runways in the near future.

Figure 1-M Runway resurfacing to occur on ZVL's runways



Large portions of the taxiways and aprons showed signs of longitudinal and transverse cracking, along with areas containing alligator cracking which again are signs of aging infrastructure requiring asphalt resurfacing treatment. The aprons that consisted of rigid pavement were noted to be in relatively good condition.

Figure 1-N Alligator cracking on the taxiways



Figure 1-O ZVL's NAV Canada Control Tower



There is a NAV Canada Control Tower that services the airport while the terminal building and CBSA customs operations are housed in small mobile trailers that ZVL staff noted are used on an as-needed basis.

Figure 1-P ZVL's Terminal Building



Communication System / Broadband Internet

Sturgeon County is currently undertaking an initiative to improve broadband internet accessibility, speed, and reliability for the residents and businesses in the County. The objective of the initiative is to ensure residents and businesses in the County are able to achieve the CRTC minimum target of 50 Mbps download and 10 Mbps upload speeds. A fibre-to-the-premises (FTTP) network will be implemented to achieve this goal starting with the higher density areas. As part of this initiative, the VAA is captured under Phase 1 of the deployment, the “Villeneuve Pilot Project”. Where new collector and local roads are implemented per Figure 2-R in the Master Plan **Error! Reference source not found.**, an underground network of conduits would provide pathways for this expanded communication system. Otherwise, the overhead utility poles could provide the pathways for the expanded communication system. It is anticipated that the fibre network will be extended to occupied residence, businesses, industrial parks, and community and municipal facilities affording them the option, should they desire, to have fibre on the property and become a subscriber.

1.5 Sector Analysis

The results from previously conducted research, combined with stakeholder comments and availability of assets, identified four (4) target sectors as offering the best growth potential and potential value-added investment attraction for the EMR and for the County:

- Aviation and aerospace (including RPAS, and space and defence)
- Green economy (including hydrogen, plastics, carbon capture, and extreme weather)
- Agriculture (including processing, intelligent farming, and future farming)
- Logistics and distribution (including a high-load corridor, bulk terminal, and automation)

These sectors were discussed and validated with Sturgeon County representatives and through the Stage 2 and 3 Engagement Sessions. To better define these target sectors, a market analysis was conducted to identify sector trends, technological development, and the growth potential of the sectors.

These four (4) sectors will serve as the foundation for the proposed business concepts for the Villeneuve Airport Area. The following subsections provide regional and international analyses of the sectors, technology trends, opportunities and a listing of local and regional assets that could be leveraged to support the development of each sector.

Aviation, Aeronautics, RPAS, Space and Defence

1.5.1.1 Regional, National and Global Sector Outlook

Mobility and air transport are critical to Canada's social and economic fabric. They support social connections and drive technology advancement; overall, they facilitate tourism, business growth, international trade, and economic development. Aviation, aerospace, defence, and their related industries continue to be at the forefront of innovation-driven advancement and research.

Globally, the commercial aviation sector showed strong growth prior to the shock produced by the COVID-19 pandemic. Throughout the last decade, the rising demand for commercial aircraft resulted in an order backlog of more than 14,000 aircraft, and industry leaders forecasted a need for 38,000 new aircraft to be produced globally over the next 20 years¹⁸. Before the pandemic, AIRBUS estimated that the global air traffic would grow at 4.3% annually – bolstering the demand for new aircraft. In other parts of the value chain for the aviation and aerospace sector, a similar pace of growth can be observed for parts manufacturing, technology development, and human resource development. In total, the aviation and aerospace sector represent an economic output of \$2.7 trillion (US) (equivalent to 3.6% of the world's gross domestic product), as measured in 2018 by the International Civil Aviation Organization (ICAO) and the International Air Transport Association (IATA). The aviation and aerospace-related defence sector is also showing rapid growth due to an increase in military spending in the past decade. In 2019, global military

¹⁸ <https://www.airbus.com/aircraft/market/global-market-forecast.html>

spending represented US \$1.9 trillion – 2.2% of global GDP. NATO countries are increasing defence budgets, which will be one of the critical drivers for the growth of the defence sector in the near future.

In Canada, the aviation, aerospace, and defence sector generate \$31 billion in revenues, contributes over \$25 billion to GDP, and has added over 213,000 jobs to the Canadian economy, as measured by Statistics Canada¹⁹. In 2019, Canadian suppliers to the aviation, aerospace, and defence sector, who only represent part of the value chain, contributed \$7.2 billion to GDP. The consumer spending by employees in this sector generated \$5.2 billion of economic impact. Within the sector, aviation and aerospace manufacturing represents 69% of the sectoral GDP. The remaining 31% was attributed to aviation and aerospace MRO (maintenance, repair and operation). From 2017 to 2018, Canada's aviation, aerospace, and defense sector grew by 5.39% in GDP. When measuring R&D spending, the aerospace manufacturing industry invests an amount that is five (5) times greater than the overall manufacturing sector. Cooperation on innovation activities among academic institutions, the private sector, and government agencies are three (3) times greater for aerospace manufacturing than the averages reported for the manufacturing sector. With a significant number of R&D players, a growing sectoral economy, and innovation support from academic and government institutions, the aviation, aerospace, and defence sectors will continue to be a strong economic driver for Canada.

When looking at salaries and wages, the aviation, aerospace, space, and defence sector has one of the highest compensation rates in Canada. A study done by the University of Waterloo reveals that the median salary in this sector is growing at a rate of 11% every five (5) years²⁰. In 2019, the median salary was \$80,725 for full-time workers, which is equivalent to \$38.81 per hour. The median hourly rate in the aviation, aerospace, space, and defence sector is 35% higher than the average in the manufacturing sector, which is \$28.69 per hour, as measured by Statistics Canada in 2019. In the aerospace sub-sector, the work environment is considered to be better than that of the average manufacturing sector, as aerospace engineers usually spend most of their time working in offices and laboratories, using computer equipment and software design tools.

In Alberta, aviation, aerospace and defence are some of the key provincial focuses. The province is home to two national airlines (WestJet, headquartered in Calgary, and Flair Airlines, headquartered in Edmonton). The region is also home to the Edmonton International Airport and three (3) major general aviation airports: Villeneuve Airport, Cooking Lake Airport, and Warren Thomas Aerodrome. A provincial emphasis on aviation, aerospace and defence, combined with a robust regional infrastructure, provides an excellent business environment for a cluster to be developed for companies in the fields of aviation, aeronautics, RPAS, space, and defence.

¹⁹ <https://www150.statcan.gc.ca/n1/daily-quotidien/210601/dq210601b-eng.htm>

²⁰ <https://uwaterloo.ca/aviation/careers>

1.5.1.2 Aviation and Aerospace Research & Development

In support of the aviation, aerospace and defence sector, the region benefits from several research and technology development programs promoted and taught at regional post-secondary institutions. Examples of these programs include the Laboratory of Turbulent Flows (which has a two-storey closed-loop wind tunnel for aerodynamic testing) and the Advanced Man-Machine Interfaces Lab (which is researching advanced human-computer interfaces for complex systems); both of these programs are offered at the University of Alberta. Other academic institutions in the region also have the potential to contribute to sector development. The list below summarizes additional regional assets that can support the R&D in the aviation, aerospace and defence sector.

- NanoFAB (Fabrication and Characterization Facility), University of Alberta
 - Focuses on academic and industrial applications in micro- and nano-scale fabrication and characterization. There are over 200 pieces of equipment in the 25,000 sq ft. communal laboratory space
- Nanotechnology Research Centre, NRC
 - Focuses on the development of nanomaterials
- Alberta Machine Learning Institute (AMII)
 - Focuses on machine learning and AI capabilities
- Concordia University
 - Strong focus on AI, information systems and information security

R&D activities are also being supported by other important stakeholders in the region. The Alberta Aerospace & Technology Centre (AATC) at the Edmonton International Airport extends support for testing and advancing emerging technologies for flight training, airport wildlife management, aviation sustainability, and innovative fueling and heating technologies.

The private sector in the region is already utilizing the local talent pool to advance their technology, products, and service development. Throughout the market study and stakeholder engagement sessions, several companies were identified as having the potential to grow in the aviation, RPAS, and space industries. More specifically, a local aerospace company is developing its own satellite technologies, which can be used to capture high-resolution land images for land surveying and geographical analysis. Two (2) other companies are advancing their body monitoring sensor and organ support system development for astronauts in space, and yet another start-up company is prototyping its fixed-wings drones for real-time land surveillance and imagery land scans (which can be used in remote northern communities).

The region also presents areas where improvements and opportunities could be implemented to strengthen its R&D activities in the aviation and aerospace sectors. Currently, industry participants in the region expressed a need for sector-tailored funding opportunities. Testing grounds, shared labs, and advanced equipment (i.e., radiation testing equipment and a vacuum chamber) are also lacking in the region and present challenges for private companies looking to

quickly grow their operations. The region also does not have an anchor OEM or any Tier-1 aerospace manufacturers and suffers from a limited number of suppliers.

Given the number of supporting assets, a growing private sector base and the recognized provincial, national and global importance of the industry sector, the opportunity exists for Sturgeon County to consolidate R&D capabilities and activities into a centralized location where all supports (i.e., funding, policy and technical support) can be provided to sector participants. Such a centralized clustering can also facilitate knowledge sharing, knowledge transfer, and synergy from innovation activities.

1.5.1.3 Flight Training

In 2019, CAE²¹ estimated that the civil aviation industry would require 264,000 new pilots over the next decade, with over 11,000 additional business and commercial aircraft joining the active world fleet. The demand for pilots is further stressed due to an ageing pilot pool: pilots over 50 years of age represent 38% of today's global civil aviation industry pilot pool.

In North America, it is estimated that 12,000 new commercial pilots will be needed in the next (5) five years, with 7,300 demanded in Canada. Although the COVID-19 pandemic resulted in a slowdown of aviation activities and a decrease in air travel demand, that situation is only temporary, easing but not solving the demand for pilots. The COVID-19 pandemic is also creating a major supply shortage of pilot candidates: the cadet program is being trimmed, banks are reconsidering the risk of financially supporting new cadets, and the career path of a pilot looks less secure due to the pandemic. As a result, the supply stream of pilots has been negatively impacted, but the demand for new pilots can quickly rise to the pre-pandemic level as the world economy gradually recovers from the downturn.

The Edmonton Metropolitan Region is home to five (5) flight training schools, three (3) of which are located at the Villeneuve Airport (ZVL). The Villeneuve Airport is the only general aviation airport with a NAV Canada control tower and on-site IFR approaches in the region, which provides advantages for student pilots who would like to pursue a commercial license to study IFR flights. The region also offers multiple benefits for flight training, as it has an average of 325 sunny days and 2,345 hours of sunlight per year.

The estimated pilot shortages and existing flight training in the region create opportunities for Villeneuve Airport and Sturgeon County to strengthen its current flight training capacity and offerings. Flight training for international students in foreign agency accredited programs can help the region attract more overseas students while also building the region's global recognition in this part of the aviation sector.

²¹ <https://www.cae.com/cae-pilot-demand-outlook-2020/>

1.5.1.4 Aerospace Manufacturing and MRO

Aerospace manufacturing involves designing, building, testing, selling, and maintaining aircraft and aircraft parts. Globally, as the demand for commercial aircraft surged in the past decade, manufacturers in the aerospace sector are developing new generations of products to quickly meet the record demand, while also focusing on new technologies such as new materials, fuel-efficiency, electric propulsion, and digitization of mechanical systems. Before the COVID-19 pandemic, the 'big two' players in the commercial aircraft market – AIRBUS and Boeing – were mobilizing their narrowbody production to 130 aircraft output per month globally. The Canadian manufacturer and Brazilian manufacturer were also accelerating their production and delivery of jets.

With an expanding commercial aircraft fleet worldwide, the demand for MRO is also growing. New technologies are being introduced to an emerging series of narrowbody and widebody aircraft, and these technologies are imposing higher quality requirements and labour skill sets for MRO organizations. For example, the current generation of widebody aircraft, the AIRBUS A350 and Boeing 787, utilize composite materials such as carbon fibre and composite metals, which require specialized tools and more complicated protocols for maintenance and repair. Based on the predicted growth of the global aerospace manufacturing sector, AIRBUS estimated that the MRO sector would generate an economic output of US \$120 billion annually by 2036²².

Digitization and electrification are two of the most popular topics being researched in the aerospace manufacturing sector, which are being explored by both aircraft manufacturers and other participants along the supply chain. For example, Rolls-Royce and Siemens are developing hybrid and full-electrified engines and the associated flight control systems needed for these types of engines. In addition, digitization (also known as digital engineering) is being used to improve the design and testing phase of aircraft system manufacturing to improve efficiency, reduce costs, and optimize quality control.

Alberta is a strong presence in aerospace-based geomatics and scientific research. The province is home to more than 25% of Canada's 1,900 geomatics, navigation, and global positioning firms. More than 60% of the province's wireless communications and sensor technology products are exported to the US and European markets. Alberta also has a sub-sector specializing in flight training, maintenance, repairs, and operations of helicopters, which is used to support the energy, forestry, environmental and wildlife sectors throughout province and into Northern Canada.

Despite the province's strong presence in the aerospace geomatics sub-sector, most suppliers are located in the Calgary Metropolitan Region; only a limited number of firms are located in EMR. Also, the Edmonton Metropolitan Region does not have an anchor OEM or Tier-1 aerospace manufacturer. With a strong scientific research ability at local post-secondary institutions, the EMR and Sturgeon County have the opportunity to foster an aerospace ecosystem by clustering local suppliers and attracting an anchor aerospace tenant.

²² <https://www.airbus.com/aircraft/market/global-market-forecast.html>

1.5.1.5 Space

The global space sector has been growing in recent years, driven by satellite broadband, earth observation, space-based application, space exploration, and militarization. From 2015 to 2020, the average number of successful launches was 43 annually; in 2020, despite the economic slowdown, 41 successful launches were made worldwide. This strong growth is primarily driven by the increasing competition in commercial satellite-based broadband internet. In 2020, global investment in the space sector totaled US \$25.6 billion and was expected to grow even more in 2021 due to declining launch costs and advances in technology²³.

In Canada, the space sector is recognized as a national strategic asset. In 2019, the federal government released the Exploration, Imagination, Innovation: A New Space Strategy for Canada, which aims to leverage Canada's strengths in robotics, AI, and biomedical technologies to solve earth challenges, improve access to satellite broadband, improve the delivery of healthcare to remote communities, and protect the country's sovereignty through space-based defence assets.

The Canadian space sector is at the leading edge of innovation and employs more than 10,000 people, generates \$5.7 billion in revenue, and contributes \$2.5 billion to the national GDP. The R&D expense in the space sector is eleven (11) times greater than the average expense allocated to the manufacturing sector in Canada. Government investment is also significant in this sector: in 2019, the federal government announced a \$1.9 billion investment to support Canada's contribution to the NASA-Lunar gateway. A \$150 million investment was also made to support a new Lunar Exploration Accelerator Program (LEAP) in Canada. In 2018, the federal government invested \$11.5 million in Advantech Satellite Networks to develop the nation's satellite communication systems. A year later, another \$85 million investment was made by the government to build and test a low earth orbit (LEO) satellite constellation to improve broadband capability and capacity.

In the Edmonton Metropolitan Region, there is an increase in the research and development of space technology, fueled by the region's abundant scientific research assets. At the University of Alberta, the faculty and students built and launched a mini-satellite, the Ex-Alta 1, into space in 2018 to study space weather. A second-generation mini-satellite, Ex-Alta 2, is currently under development and is planned to be launched in 2022. The Institute for Space Science Exploration and Technology (ISSET) at the University of Alberta focuses on the education and research around space physics, microgravity science, space technology, and planetary materials. In the private sector, a space company in the region is developing its own hyperspectral satellite

²³ <https://sia.org/commercial-satellite-industry-continues-to-dominate-growing-global-space-business-despite-covid-sia-releases-state-industry-report/#:~:text=During%202020%2C%20the%20overall%20global,of%20the%20world's%20space%20business.>

constellation for earth study and land surveying, with a plan to launch three (3) satellites in 2022 and more than 130 satellites by 2025. The opportunity exists to further strengthen the region's advantages in space sector research and development to form an innovation pipeline from post-secondary institutions to the private sector. Sturgeon County and the EMR can facilitate the sector growth by providing support in funding, shared lab space, testing grounds, and operational space (i.e., a satellite ground station) collaboratively with other regional stakeholders.

1.5.1.6 DRONE - RPAS

Traditional aviation continues to undergo a fundamental evolution in light of the increasing use of drones and remotely-piloted aircraft systems. A drone is defined as a powered aerial vehicle without a human operator that can fly autonomously or be piloted remotely. RPAS is defined as a set of configurable elements consisting of a remotely-piloted aircraft, its associated remote pilot station(s), the required command, control links, and any other system elements as may be necessary at any point during flight operation. In the global market, the development of the RPAS sub-sector is driven by research and development in all parts of the supply chain, from the development of new remotely-piloted aircraft at the supplier's position to new use cases and new operations at the end-user's position.

In Canada, drones and RPAS are envisioned to be game-changing technology for society. This technology has great potential to modernize industries and their work, improve people's lives, and provide public benefits to communities, especially those in Northern Canada. In Transport Canada's Drone Strategy to 2025²⁴, supporting the drone and RPAS sub-sector in Canada and its economic growth is a strong focus of the federal government. More specifically, four (4) application scenarios were identified in the strategy: monitoring wildlife, surveys of pipelines, search and rescue missions, and delivering goods to remote areas.

Drone/RPAS development and testing is also a sector of importance recognized in Alberta. The Foremost UAS Test Range, which opened in 2017, has more than 700 square nautical miles of restricted airspace away from the population for small to medium companies to test their new drone technologies. Since 2015, the Test Range has received more than \$1.1 million in funding from Prairies Economic Development Canada. The existence of the Test Range helps drone technology companies in western Canada to test and commercialize their product. In the EMR, a number of companies are also researching and developing drone technologies, but the region is lacking dedicated testing space and relevant labs and equipment to foster the development of this sector. Notwithstanding the present shortfalls, the region and Sturgeon County are well placed to play a hub role in the development of RPAS technologies, applications and services toward northern and arctic destinations. This fast-growing sector is just in its infancy and very much technologies intensive. Most RPAS aerial operations are presently conducted in line-of-sight mode but the future resides in beyond-line-of sight (BVLOS) flight where RPAS system will be able to travel great distances to deliver products and conduct various tasks.

²⁴ <https://tc.canada.ca/en/aviation/publications/transport-canada-s-drone-strategy-2025>

One of the key components of RPAS are BVLOS (Beyond Visual Line of Sight) operations when drones are flown beyond the visual range of the operator, thus covering greater distances. The civil and commercial segment of the RPAS market includes the use of the autonomous BVLOS drones for various purposes, including package delivery, critical infrastructure inspection, aerial surveying and mapping, mining, construction, precision agriculture, firefighting, search and rescue, and in other uses by the law enforcement agencies. The market is gaining traction, as the applications of these autonomous BVLOS drones are increasing, in tandem with the increasing need for enhancing efficiency and industrial productivity. A report from Research and Markets said that the autonomous BVLOS drone industry analysis projects the market to grow at a significant CAGR of 25.91% on the basis of volume during the forecast period from 2019 to 2029.

Since 2010, the drone and RPAS sector has seen sustained development, and the concept of urban air mobility (UAM) is quickly gaining attention. UAM uses air routes instead of roads to address the urbanization challenges and alleviate the pressure on the transportation ecosystem. By introducing drones, RPAS, vertical take-off and landing (VTOL) vehicles, and other forms of air vehicles as new modes of transportation, UAM has the potential to fulfill demands for last-mile parcel delivery, air metro (public transit), and air taxi (door-to-door ride-sharing). Analysts forecast a bright future for the UAM industry, predicting the global market to be more than \$15.2B by 2030 for a compound annual growth rate of over 11.33%. The ever-increasing trend of automation and globalization is driving the development of the urban air mobility industry. For the North American market, the US is the pioneer in adopting UAM in transportation. The market is expected to grow at its fastest during the forecasted period of 2020-2030.²⁵

In the Edmonton Metropolitan Region, academic institutions and a small number of companies are building the region's sub-sector in drones and RPAS. At the University of Alberta, the Applied Nonlinear Control Lab leads advanced research on vision-based control and machine learning-based control of unmanned aerial vehicles (UAVs). At the Edmonton International Airport (YEG), drones are being used for runway inspections and wildlife management. YEG is also the first airport in Canada to have drones functioning at night for airport operations. In the private sector, a company located at ZVL is developing several prototype drones that will be used for land surveying projects. With this development trend, the VAA and Sturgeon County can play an active role in supporting such activities and bringing together a nucleus and cluster of companies creating the associated supply chain.

The emerging technologies in this sub-sector can be used as an opportunity for Sturgeon County to become a leader in drone and RPAS development, testing, demonstration, and commercial application. A local drone and RPAS sub-sector could also enable the region to competitively participate in future research and developments around UAM.

²⁵ <https://www.nasa.gov/sites/default/files/atoms/files/uam-market-study-executive-summary-v2.pdf>

1.5.1.7 Defence Development

The defence sector is constantly evolving to meet new and developing challenges from potential enemies while also embracing new technologies. It is a sector closely tied to aviation and aerospace as well as all ground and naval activities. As mentioned previously, the rising military and defence budgets in NATO countries are driving business and product development in the defence sector. Not only are combat-used technologies evolving, but countries are also investing in making their defence products and equipment more energy-efficient, sustainable and reliable.

In Canada, developments in the defence sector are guided by policies and plans from the Department of National Defence. The Strong, Secure, Engaged policy (2017)²⁶ focuses on increased support for Canadians in uniform and a commitment to increase the defence budget to ensure that Canada has the equipment and capabilities that the country requires. The Strong, Secure, Engaged policy has identified \$108 billion (accrual) in spending on projects and \$105.4 billion in sustainment activities. In 2020, the federal government launched a new Defence Energy and Environment Strategy, calling for energy-efficient, sustainable innovation, and technology development in this sector.

Domestically, the current and future needs of the Canadian military present great opportunities related to air and land equipment manufacturing, training and simulation, joint support and sustainment, C4ISR (Command, Control, Communications, Computers Intelligence, Surveillance and Reconnaissance), RPAS, and other emerging technologies. The following table highlights the key opportunities in the short- to medium-term, summarized from the 2020 Sturgeon County Defence & Security Investment Attraction Study.

Green Economy and Low-carbon Transition

In the past decade, the Edmonton Metropolitan Area has shown its commitment to transforming the region's economic base into a greener economy. Regional policies, programs and plans are reshaping and diversifying the region's portfolio towards a green economy and sustainability. As the entire region moves towards a green future, opportunities exist to foster the clustering of companies, organizations, and institutions around the common goals of achieving a green, sustainable and low-carbon business ecosystem.

Hydrogen production and application are becoming a global focus as it can become an accessible form of clean energy. Worldwide, hydrogen has the potential to supply between 18% to 24% of global energy demand by 2050, and the global market for hydrogen is expected to reach US \$2.5 trillion by 2050. Currently, Canada is among the world's lowest-cost producers of hydrogen. In 20 years, the hydrogen export from Canada to the world can generate eight (8) times the current GDP of clean hydrogen from natural gas.²⁷

²⁶ <https://www.canada.ca/en/department-national-defence/corporate/policies-standards/canada-defence-policy.html>

²⁷ <https://www.iea.org/reports/the-future-of-hydrogen>

The Edmonton Metropolitan Region has a long history of producing hydrogen, and it is transitioning to a low-carbon model, which creates a minimum level of greenhouse gases throughout the hydrogen-producing process. In recent years, the development of the Edmonton Region Hydrogen Hub has become an important topic in Alberta's Recovery Plan. Hydrogen is seen as a new avenue for Alberta's energy industry. The Edmonton Region Hydrogen Hub is the first hydrogen hub in Canada and serves as a blueprint for future hydrogen developments across the country. Low-carbon production and application of hydrogen will soon create commercial and industrial development opportunities in the region. Opportunities exist for the research, commercial development, and testing of hydrogen applications for residential, commercial, and industrial uses.

In the private sector, especially in the transportation industry, commercial development of hydrogen applications is entering the testing phase. In Alberta, various private companies from the energy sector, transportation industry, and logistics industry are developing hydrogen-powered and hydrogen-diesel-hybrid-powered heavy vehicles, which are now being tested on the highway corridor between Edmonton and Calgary. In Fort Saskatchewan, a utility distributor is studying the possibility of mixing hydrogen into a portion of the natural gas distribution system.

The development of a green economy is not limited to hydrogen production and application. Other forms of green energy production and application are also being explored in the Edmonton Metropolitan Region. Universities and colleges are building on the knowledge and expertise from the energy sector to lead innovative and world-renowned research around green, sustainable, and clean technologies. For example, the University of Alberta is part of the Biorefining Conversion Network (BCN), which aims to foster a province-wide bioindustry through industry-academic collaborations. The Centre for Applied Business Research in Energy and the Environment (CABREE), also at the University of Alberta, is researching wind and solar energy developments. At the Northern Alberta Institute of Technology, its Centre of Grid Innovation focuses on green and innovative power generation and transmission. The Alternative Energy Technology post-secondary program at NAIT focuses on solar, geothermal, wind, biofuels, hydrogen, fuel cell and co-generation technologies. Municipal infrastructure also plays a role in the development of green energy in the region. The Edmonton High Solids Anaerobic Digestion Facility enables the City of Edmonton to process up to 40,000 tonnes of organic waste per year, diverted from landfills, to create renewable energy in the forms of electricity and heat.

Regarding employment in this sector, the North American green economy and green energy sector development offer workers high-paying jobs. According to the U.S. Labor and Energy data, workers in renewable energy, energy efficiency, grid modernization and storage, clean fuels and clean vehicles earned a median hourly wage that is 25% higher than the industry median wage. A 2019 study done by Statistics Canada also reveals that the average annual salary in the environmental and clean technology sector is typically higher than the average salary in the

Canadian economy. Canadian workers in this sector with a university degree reported the highest compensation, averaging \$97,694 in 2019.²⁸

Globally, countries are recognizing the importance of environmental protection and sustainable development in all industries. To better support knowledge sharing, technology transfer and economic development purposes, some countries are establishing Centres of Excellence for low-carbon and green research and development. Such facilities usually serve as the central location where expertise, best practices, and innovations are concentrated. For example, the Dubai Carbon Centre of Excellence is leading its nation's transition to a low-carbon and green economy through the consolidation of knowledge in the energy sector in Dubai. The Power House in the UK is the central organization leading industry development around floating offshore wind power generation. In Singapore, the Sustainable Energy Centre of Excellence aims to equip policymakers in the region with information and shares with them experiences on matters of policy, technology, and project financing in the sustainable energy sector. Given the number of innovation assets available throughout the Edmonton Metropolitan Area, the region has an opportunity to concentrate its expertise and knowledge to develop a clustering of companies. The opportunity can start with a specific focus on hydrogen and expand into the broader topics of carbon capture and reduction and low-carbon energy. Eventually, the region has the potential to become a world leader in the education, training, production, and application of low-carbon energy.

Agriculture and Agri-food

The agriculture and agri-food sector span a wide range of industries – from primary production in agriculture and aquaculture to produce, meat, seafood, dairy, crops, and beverage processing. Canada has long been recognized as a supplier of safe and high-quality products in the world market. On the production side, Canada is the world's largest canola exporter (\$4.45 billion per year) and pulse exporter (\$7.5 billion per year). As outlined in Canada's Economic Strategy Tables in Agri-food, the federal government aims to achieve \$140 billion in domestic agri-food sales and \$85 billion in agri-food exports by 2025. To achieve this target, Canada will continue to develop the agriculture and agri-food sector with an emphasis on food safety, sustainability, high quality, and innovation in value-added production.

The Edmonton Metropolitan Region represents 35% of Alberta's best agricultural land. The EMR also has a long history of farming and currently has trade agreements with 51 countries, giving access to a global agri-food market of 1.5 billion consumers. With high-quality primary production, a cluster of processing plants, globally-connected logistics and a supplementary manufacturing sector, the region has many opportunities to strengthen its agricultural presence through the implementation of new, innovative practices.

²⁸ <https://www.usenergyjobs.org/>

Innovative technology development for agricultural applications is a popular research topic at local post-secondary institutions. The University of Alberta is ranked 33rd in the world for agriculture and food science research. The Faculty of Agriculture, Life & Environmental Sciences at the University of Alberta is leading research around innovative farming, environmental soil science and conservation biology. The University also owns multiple research stations (farms and greenhouses) for researchers and students to conduct in-field testing. At NAIT, studies around sensors, automation, and the Internet of Things (IoT) for farming usage are trying to bridge the gap between conventional farming and new technologies.

Opportunities are not limited to farming. Agri-food production, processing and distribution are other areas where the region can take a lead position. The region falls within Canada's Protein Supercluster, which is an industry-led initiative that aims to position Canada as a global source of high-quality plant protein and plant-based co-products. The Canadian Agri-Food Automation and Intelligence Network (CAAIN) also supports projects on agri-food production and processing automation and data collection. On the transportation side, the Edmonton Region has excellent access to the U.S. and European markets through its robust road and rail networks. At Edmonton International Airport, EIA is partnering with a local agri-food producer to convert a former flight kitchen into a new federally certified food production and contract packaging facility. The Fresh Cargo Centre at the airport also enables local agri-food products to reach Asia through temperature-controlled air cargo.

The following list summarizes several supporting organizations and research projects in the region.

- Results Driven Agriculture Research (RDAR)
 - Accelerate the impact of agriculture research in Alberta by directing strategic investments in research and innovation and by collaborating with producers and researchers.
- Protein Supercluster (Protein Industries Canada)
 - An industry-led, not-for-profit organization created to position Canada as a global source of high-quality plant protein and plant-based co-products and is one of Canada's five (5) innovation superclusters. PIC works with private sector industry partners to create co-investment projects that have the potential to transform the agriculture and food production sector.
- Canadian Agri-Food Automation and Intelligence Network (CAAIN)
 - CAAIN is a group of technology and agri-food companies, universities, colleges, and research institutions working together to create technological solutions for Canada's agricultural and food producers.
 - Sample projects include developing a pan-Canadian network of smart farms, which will focus on the assessment and validation of crop, climate and soil data collection and sensor connectivity, including the exploration of alternative methods of connectivity.
- Alberta Machine Intelligence Institute (AMII)

- Farms in Canada generate about 8% to 10% of the country's greenhouse gas emissions, and much of AMII's work will be to find ways to optimize different farm processes.²⁹
- Alberta Innovates
 - Smart agriculture and food are a primary focus at Alberta Innovates. Dedicated funding programs are available for companies developing new applications for digitalization and autonomous initiatives for the agri-food sector.

Innovation in the agriculture and agri-food sector can also be seen in the private sector. Many local businesses in this sector are gradually embracing smart technologies in their facilities. A vegetable producer in the region uses smart LED lighting to control the size, shape, colour, flavour, and nutrients of their products grown in a vertical farm. Closed-loop irrigation and hydroponics are also being introduced to indoor farms in the region, resulting in a great conservation of water when compared to conventional open-field farming.

Globally, farming labs, indoor farming development and innovative agri-food processing initiatives are gaining attention in the industry. Research institutions and the private sector are looking into bringing revolutionary changes to conventional farming activities. Specifically, researchers in this field concentrate on autonomous farming, big data, sensors, IoT, 5G connectivity for agriculture and agri-food use, and indoor vertical farming. The industry estimates that by 2027, the global Agri-innovation (also known as Agri-tech) market will reach US \$42 billion.

The EMR now has the means to explore the future of smart and sustainable farming and take the lead in the national sector development. With a lot of agricultural lands and industrial development opportunities, Sturgeon County can take a leadership position in developing the agriculture and agri-food cluster.

Transportation, Logistics and Warehousing

The transportation, logistics and warehousing sector is at the centre of the current global economy. The rise of e-commerce, a strengthening of the global trade network, and an increase in the production and demand in emerging markets are driving the rapid growth of the transportation, logistics and warehousing sector. In Western Canada, this sector accounted for 5.2% of the total GDP in 2017, with a growth rate of around 1.7% per year. In Alberta, the sector contributes \$12.3 billion annually to the economy and employs more than 140,000 people. The transportation and warehousing industry accounted for approximately 4.7 % of Alberta's Gross Domestic Product in 2018 – an increase from the 4.3% share in 2008. The province is served by over 10,358 trucking firms that move 23.5% of non-pipeline freight, valued at approximately \$9 billion. There are more than 370,000 registered commercial vehicles in Alberta carrying goods within the province, between provinces, and internationally.³⁰

²⁹ <https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/greenhouse-gas-emissions.html>

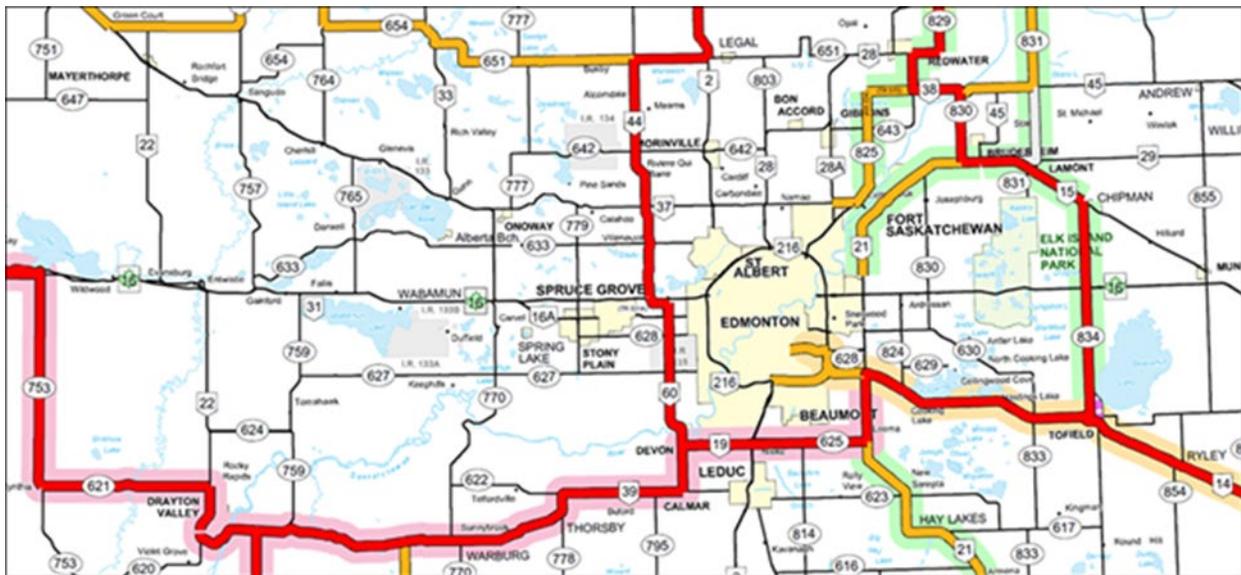
³⁰ <https://www.mordorintelligence.com/industry-reports/canada-freight-logistics-market-study>

The Edmonton Metropolitan Region is a major supply and service centre for northern communities and resource industries and serves as the gateway to the thriving Western Canadian market of over 10 million people. The EMR is strategically located in central Alberta and has robust rail, road, air, and pipeline transportation networks. Over the last ten (10) years, employment in the regional logistics and warehousing sector grew by 29.7% and is expected to continue this trend of high-speed growth.

The robust regional road network is at the foundation of the EMR's transportation, logistics and warehousing sector. The CANAMAX Highway links the region through the U.S. to Mexico, while Highways 43 and 44 connect the region to northern Canada and the Arctic. The region also has a high-load corridor network, with Highway 44 (adjacent to ZVL) being a part of that corridor. A high-load corridor highway route allows a load width of 7.32 metres (24 feet) in comparison to a regular load width of 2.6 metres. A high-load corridor also allows a load height of 9 metres compared to a regular load height requirement of less than 4.15 metres. Annually, more than 150,000 permits are issued for transportations on the high-load corridor in the province.

Figure 1-Q shows the designated high-load corridor routes in the EMR and Figure 1-R provides a closer look at the same routes in the province.

Figure 1-Q Map of the EMR High-Load Corridor Network



seven (7) grain elevators. The CP Rail also has railway assets in the region and operates out of the Southside Intermodal Facility and Lambton Park Yard. A few third-party rails and transloading companies also serve the regional economy.

Air cargo and drones are now changing the way in which goods are shipped and transported to their destinations. The Edmonton International Airport is Canada's largest airport by area. In 2020, despite the economic slowdown due to the COVID-19 pandemic, the airport moved 46,000 metric tons of cargo, representing a 7.5% increase from the 2019 volume. The airport is also Canada's closest major airport to Asia by circumpolar routes. In February 2021, EIA announced a \$36 million cargo expansion at YEG that is planned to expand the cargo apron by 47,000 square metres, build a new hydrant fueling system, and expand the cold storage cargo capacity by 1,400 square metres.³¹

As of 2020, the distribution and warehouse cluster located in northwest Edmonton still has room to grow with the imminent completion of the final east leg of Edmonton's ring road to industrial locations in Edmonton's northeast and south quadrants. Newly established manufacturers in the EMR would find it easy to secure inexpensive shipping out of Edmonton to the east, west or south because Edmonton/Calgary is a consumption area, and there are currently few products coming out of the area to support backhauls. For oil sand technology companies (based out of Calgary) that serve Northern Alberta, having ample warehousing space in the EMR would cut their travel time in half (which currently takes about two (2) days).

Globally, the focus on a green technology/economy and sustainability is also impacting the logistics and warehousing industry. New technologies are being introduced to create energy-efficient or even self-sustainable warehousing options (through the in-house recycling of materials). Intermodal transportation that connects rails with roads and airports with cross-docking capabilities is another major development theme because of its improved efficiency and connectivity.

With a growing economy, a wide range of transportation modes, and a regional focus on the green economy, opportunities exist to explore the demand gap for specialized warehousing options and green and sustainable logistics options. More specifically, the region has opportunities for developing climate-controlled warehousing and food-grade warehousing.

³¹ <https://flyeia.com/corporate/about-eia/annual-quarterly-reports/>

2. Recommendations and Implementation

One of the main objectives of the VAAMP was to structure a specialized industrial area of international reputation. At the intersection of road, rail, and air infrastructure, the Villeneuve Airport Area is to become a premier destination for industry-led innovation and investment projects.

The Villeneuve Airport Area development vision integrates some of the most prominent economic assets of the Edmonton Metropolitan Region, while also offering diversification options that will help to provide Sturgeon County and its partners with a stable and sustainable future.

The proposed development vision is based on industry market research and data, identified growth sectors, engagement suggestions and insights from key stakeholders, and economic development trends.

The VAA is foreseen as an integrated innovation and technology hub dedicated to supporting regional, national, and international research and technological development. The VAA is envisioned to be an ideal location for investment, innovation, workforce-related education and training, advanced manufacturing, transportation, and logistics in the fields of:

- Aerospace, Aviation, Defence, Space, and RPAS
- Sustainability and the Green Economy
- Digital Agriculture and Advanced Food Processing
- Logistics and Supply Chain to North American destinations

2.1 Mission and Vision Statements for the Villeneuve Airport Area

A vision statement and a mission statement are proposed for the VAA, defining the purpose and direction of the organization. The vision statement focuses on the goals and aspirations of the VAA. It guides the long-term development of the organization and area. The mission statement defines the organization's purpose and primary objectives.

VAA Vision Statement

To develop a world-leading investment and innovation hub, centred around the Villeneuve Airport, that enables the economic diversification of Alberta and the Edmonton Metropolitan Region.

VAA Mission Statement

To assemble regional, provincial, and national partners with the goal of working together to develop an attractive business innovation ecosystem and training hub that leverages the competitive and sustainable advantages of the region and Western Canada.

The VAA will support the clustering of industry and the attraction of investors and developers in an environment that is conducive to regional collaboration.

2.2 Guiding Principles

In support of the vision and mission statements, the development of the Villeneuve Airport Area is based on a series of guiding principles that are aligned with the strategic goals of:

- Sturgeon County
- Edmonton Airports (the Edmonton Regional Airports Authority)
- Villeneuve Landing Network (VLN) members

These guiding principles provide context to the actions, initiatives, regulatory needs, planning, and development measures needed to support growth in the planning area.

Innovation: Innovation is a fundamental principle of the VAA. This theme guides and defines the strategic initiatives, actions, decisions, objectives, and planned service offerings within the study area. The VAA will grow by developing an environment conducive to achieving demonstrated results in innovation by clustering research and development projects, resources, and infrastructure.

Collaboration: As the associated costs of development continue to rise, collaboration becomes important to sustained development success. Productive partnerships will positively impact all parties, including investors, research and development organizations, post-secondary institutions, public entities, indigenous entities, and industry. Collaborative efforts and pooling of resources are a catalyst for accelerating investment and driving innovation.

Diversification: The VAA initiatives and business concepts should reflect global market and industry trends. In so doing, the VAA initiatives and business concepts should be aligning development plans with national, provincial, and regional competencies to support the economic diversification of Alberta and the EMR.

Sustainability: The VAA developments must be financially and environmentally sustainable, providing the highest and best use of lands and associated infrastructure while also aligning with the environmental, social, and governance (ESG) policies of Sturgeon County and higher orders of government.

2.3 Objectives

The development and success of the VAA is based on four (4) main objectives. Each main objective also has a series of sub-objectives: these sub-objectives further clarify the tasks, timelines, budget considerations, and roles and responsibilities that are associated with the main objectives.

- **Objective 1 - Innovation and Technology**
Grow and position Sturgeon County as a key player in global innovation and technology development within the business concept focus areas.

- **Objective 2 - Investment Attraction and Readiness**
Mobilize all stakeholders in the development of industry ecosystems that target the international, national, and provincial growth sectors which are most in line with the business concept focus areas.
- **Objective 3 - Regulatory & Infrastructure**
Offer a supportive environment for industry development by providing the required infrastructure and business services. Ensure proactive advocacy efforts are undertaken to promote a regulatory setting free from red tape.
- **Objective 4 - Workforce Development**
Create a working environment conducive to the development, attraction/retention, and well-being of workers, students, visitors, and Villeneuve residents.

Sub-objectives

Objective 1

Grow and position Sturgeon County as a key player in global innovation and technology development within the business concept focus areas.

- Sub-objective 1A: Lead the development of technology and innovation-related facilities and programs, supporting each of the targeted industry sectors.
- Sub-objective 1B: Network with provincial academic institutions, private research entities and associated funding partners to have active participation in the development of the VAA.
- Sub-objective 1C: Develop a series of programs, infrastructure, and services aimed at accelerating the innovation process and increasing the productivity of businesses.
- Sub-objective 1D: Launch a marketing campaign to promote the VAAMP and its components as part of a strategy to position Sturgeon County on the Canadian, North American and world scene.

Objective 2

Mobilize academic, private, and public stakeholders in the development of industry ecosystems that target the international, national, and provincial growth sectors that are in line with the business concept focus areas.

- Sub-objective 2A: Create an environment in which world-class businesses and partners centred around innovation in the green economy, agriculture and food processing, aviation, aerospace, space, defence, RPAS and logistics can come together.
- Sub-objective 2B: Identify key industry assets and supply chain gaps that can be leveraged into mobilizing industry leaders.

- Sub-objective 2C: Create a collaborative innovation round table to pool resources and accelerate the commercialization of innovations.
- Sub-objective 2D: Coordinate the structured development of municipal and private utilities and infrastructure to support the development and future growth of the VAA.

Objective 3

Offer a supportive environment for industry development by providing the required infrastructure and desired business services.

- Sub-objective 3A: Develop a series of infrastructures and services supporting investment attraction, business retention and expansion, and the creation of added value projects.
- Sub-objective 3B: Develop a series of incentives and programs conducive to supporting businesses, attracting specialized workers, educating the workforce, and retaining talents.
- Sub-objective 3C: Launch an investment attraction outreach and marketing campaign to the targeted industries.
- Sub-objective 3D: Develop a business-friendly and streamlined set of legislative measures, bylaws, and processes catering to the efficient and structured development of the VAA.
- Sub-objective 3E: Update County plans, policies, and processes that will enable the development of the VAA.

Objective 4

Create a working environment conducive to the development, attraction, and well-being of workers, students, visitors, and residents.

- Sub-objective 4A: Coordinate the structured development of municipal and private utilities, in addition to transportation and other infrastructures that cater to the needs and aspirations of the VAA's present and future workers, visitors, students, and residents.
- Sub-objective 4B: Integrate the allowance for neighbourhood commercial services within the VAA into County bylaws, plans, and policies.
- Sub-objective 4C: Integrate active transportation infrastructures, (such as walking and cycling paths, parks, sidewalks, and similar assets) to increase the quality of life-at-work into the VAA.

2.4 Project Governance and Leadership

The following section provides context and recommendations for the governance and leadership in the development of the Villeneuve Airport Area. Today, the lands within the VAA are owned by seven (7) different private and corporate landowners. The Edmonton Regional Airports Authority

(a community-based, financially independent, non-share corporation) owns and operates the Villeneuve Airport.

All of the proposed development lands are located within Sturgeon County. Sturgeon County is responsible for the overall planning, regulation, and economic development of this land, including industrial parks and investment attractions, infrastructure, transportation, and taxation.

Sturgeon County is undergoing substantial changes as it transitions from a primarily agricultural community to one that is nurtured by a strong and increasingly diversified economy.

As of early 2021, the County's Council has a Strategic Plan that defines several priorities and goals that guide the approach for delivering services to the community and how to best support communities and residents while focusing on growth in the region. These priorities are:

- Planned growth and prosperity
- Maintaining and enhancing strong communities
- Local and regional governance
- Community identity and spirit
- Environmental stewardship

In line with these priorities, Sturgeon County recently started a regional initiative, grouping a collection of municipal and economic development-focused entities that have come together to determine the potential of developing the Villeneuve Airport Area. Known as the Villeneuve Landing Network (VLN), the various members have defined a series of principles that mandate their activities and interests.

VLN Governance Principles

- Collaborative investment and support for the Villeneuve Airport's development that will bring shared economic benefits to the Edmonton Metropolitan Region.
- Regional collaboration among businesses, governments, and economic development partners to advance the Villeneuve Airport's future development.
- All collaborative decisions and investments will support the needs of regional industries and Villeneuve Airport's financial, environmental, and social sustainability over the long-term.
- Collaborative efforts will align with Sturgeon County's and the EIA's strategic direction.
- Fostering transparency, honesty, and trust among the partners is central to developing the Villeneuve Airport and the surrounding areas as strategic regional assets.

The VLN Governance principles can be achieved through the collective efforts of regional partners and will help secure regional and Alberta-wide benefits. These benefits are planned to be achieved through:

1. Future industry-led partnerships to help propel the Villeneuve Airport and the surrounding land's economic diversification potential and increase prosperity for the Edmonton Metropolitan Region.

2. Committed partnerships that are required to develop the airport and surrounding lands into a general aviation, manufacturing, transportation, and logistics hub, connecting specialized regional products and services with global markets.
3. An alignment with Sturgeon County, Edmonton International Airport, Edmonton Global Partners, and the Government of Alberta's economic development plans.

The VLN partners have also defined a series of time-based goals:

1. To continue building Villeneuve Airport and the surrounding lands as a premier general aviation and flight training centre (1-2 years).
2. To attract new manufacturing and aerospace investors and transportation and logistics partners (3-5 years).
3. To build the Villeneuve Airport and the surrounding lands into a responsible, internationally significant centre for commerce and major events, connecting high-value goods and services via complementary road, rail, and air infrastructures (5+ years).

The VLN initiative has also commissioned a governance and operational structure study to be conducted, in part, parallel to the VAAMP. At the time of the VAAMP, discussions are still underway between the partners to finalize their preferred choices and receive their commitment to the VLN as a formal collaborative arrangement in the long term.

Organizational Structure

The envisioned organizational structure that will lead the future development of the VAA is twofold. It is recommended that the overall leadership be the responsibility of Sturgeon County. The County would lead the planning and governance efforts, economic development activities, land use, infrastructure, and transportation initiatives on lands surrounding the airport and in collaboration with ERAA for lands within the existing ZVL boundaries. This recommendation considers the pending discussions and decisions regarding a joint commitment or undertaking by the VLN partners on the future development of the Villeneuve Airport Area.

Within Sturgeon County, it is recommended that a lead person be assigned to manage the development of the area (considering the size and economic impact of the VAA on the planned growth and prosperity of the County, on the development of a community identity and spirit, and its environmental stewardship).

Proposed Operational Model

The main tasks and responsibilities devoted to Sturgeon County would encompass some of the following activities.

Table 2-A Proposed Operation Model Activities and Responsibilities

Activities	Responsibilities
Planning and Development	Supporting policies, bylaws, and regulations; land use; development permits; building permits and safety code permits; subdivisions; compliance certificate requests; transportation, etc.
Infrastructure and Utilities	Sizing requirements; management of assets and facilities; utility providers relationships.
Investment Attraction	Outreach campaigns; investor hosting; incentive programs; lead management.
Business Retention and Expansion	Support programs and services to local businesses, and workforce-related support.
Financial, Funding and Budgets	Capital plan; monetary incentive; taxation and assessment.
Marketing and Communications	Branding; communication and marketing; media management and public relations.
Innovation Management	Innovation strategy; innovation ecosystem; equipment and facilities requirements.
Administration	Contracting; team coordination; business friendly services; funding applications; provincial and federal agencies networking.

Ownership of Buildings and Strategic Assets

To support innovation and technology development in the VAA area, it is recommended that Sturgeon County considers involvement in the ownership (or co-ownership) of innovation-related buildings, labs, equipment, and facilities.

The objective is to accelerate the development of the assets that will be needed for attracting key investors and businesses to the site. For example, Sturgeon County could get involved in projects that have a targeted percentage of innovation spaces and activities within the building.

The County could also become involved in the development of strategic assets like the ecoPark proving grounds, the biodigester, or rail spurs to the bulk terminal. A business case showing the financial return on investment and viability of these projects can be prepared to support the decision-making process.

Such involvement would support small- to mid-sized businesses that are often short of investment capital but very open to leasing space on mid-to-long-term leases.

2.4.1.1 Innovation Investment Fund

Another tool the County could consider is the pooling of venture capital (public and private) to develop a fund that provides grants, loans and/or equity into businesses for the development of innovation projects. To help guide the decision-making process, an innovation evaluation matrix can be established that considers the overall number of jobs created, total investment, anticipated return on investment, and fiscal impact for the County.

Administering off-site levies would be another option to consider. The province, through the Municipal Government Act³² and the Off-site Levies Regulation³³ (AR 187/2017), has granted municipalities the ability to establish an off-site levy bylaw, with the main purpose of addressing and defining existing and future infrastructure, transportation infrastructure and facility requirements. It is recommended that Sturgeon County develop an off-site levy bylaw for the VAA to enable the construction and maintenance of infrastructure and facilities in the VAA. The off-site bylaw would establish the collection, payment, and use of monies collected for this purpose as lands within the VAA are developed.

2.4.1.2 Incentive Program

Financial and non-financial incentive programs could also be considered as methods for enticing prospective investors into choosing the VAA and Sturgeon County. These programs can take multiple forms such as:

1. Spousal support and employment program.
2. Family integration programs for senior management (owners).
3. Taxation reduction over a number of years (decreasing advantages year over year).
4. Financial aid to support implementation.
5. Financial aid to support technology, university spin-off(s), and business start-up(s).
6. Ambassador and coaching program (mainly for international firms arriving in Canada).

Partnerships

To support an external perspective of the VAA, it is also suggested that the County creates a VAA Advisory Committee composed of mainly private sector and industry leaders appointed by the County, ERAA and/or the VLN partners. The committee's role would be to provide

³² For more information about the Municipal Government Act please visit:
<https://www.qp.alberta.ca/documents/Acts/m26.pdf>

³³ For more information about the Off-site Levies Regulation please visit:
https://www.qp.alberta.ca/documents/Regs/2017_187.pdf

recommendations on policies, development programs, innovation, land use, and other planning, financial, and economic development topics.

Members of the VAA Advisory Committee should be representatives of their respective organizations. They should possess skills and knowledge in the targeted industry sectors and any other activity they deem critical to the advancement and success of the VAA. In addition, it is intended that, over time, the board will consist mainly of leaders from the private sector.

Key regional leaders like Edmonton Global, Alberta Innovates, Alberta’s Ministry of Jobs, Economy and Innovation, and Prairies Economic Development Canada could be called upon to sit as observers. Representatives of the various municipal services involved in the development of projects may also be present on the VAA Advisory Committee.

The proposed composition of the advisory board, notwithstanding the Sturgeon County Team, is presented in the following Table 2-B.

Table 2-B Proposed VAA Advisory Committee Composition

Category	Organization(s)
Co-leader	<ul style="list-style-type: none"> Edmonton Regional Airport Authority (ERAA)
Academia	<ul style="list-style-type: none"> University of Alberta Northern Alberta Institute of Technology (NAIT) MacEwan University Concordia University
Private and Public sector Research and Innovation	<ul style="list-style-type: none"> Hydrogen Hub Alberta Machine Intelligence Institute Alberta Aerospace Technology Centre Institute for Space Science Exploration and Technology (ISSET) Centre for Sensors and System Integration Canada Nanotechnology Research Centre
Private Sector	<ul style="list-style-type: none"> Rep. from the Defence Steering Committee Rep. from the Canadian Agri-Food Automation and Intelligence Network Rep. from real estate agencies Rep. from airport tenants Rep. from the transportation sector Rep. from the space sector Rep. from the sustainability sector Rep. from labour and workforce organizations

Category	Organization(s)
Observers	<ul style="list-style-type: none"> ● Edmonton Global ● Alberta Innovates ● Alberta's Ministry of Jobs, Economy and Innovation ● Prairies Economic Development Canada

The VAA Advisory Board could also create a number of working groups capable of providing business intel and added-value ideas that suggest the best possible course of actions and opportunities to take for developing the VAA. These non-decision-making groups are intended to give advice, formulate opinions and/or make recommendations on matters submitted. The vocation of the groups can be adjusted according to the needs of the VAA and the VAA Advisory Board.

An initial step would be to create four (4) working groups composed of VAA Advisory Board members and invited topic specialists. The working groups could focus on the following main VAA topics:

- Innovation
- Branding and marketing
- Labour, workforce and training
- Land use, planning and infrastructure

Other working group topics could focus on supply chain and productivity, partnerships and growth, industries 4.0, and sustainability.

2.5 Business Concepts

Based on the review of the sector analyses, asset inventory, engagement sessions and other work conducted during this initiative, Sturgeon County has the potential to structure the development of the VAA on up to four (4) thematic industry sectors and associated business concepts.

Each business concept relates to a different industry sector, but interconnecting activities, projects, and facilities allow these concepts to build on and complement one another. Developed around recognized worldwide growth sectors, these business concepts leverage available regional assets and support the development of private, academic, and public innovation and growth projects identified during the engagement sessions.

As stated in the introduction to Section 3, these business concepts are tied to the following industry sectors:

- Aerospace, aviation, defence, space and RPAS;
- Sustainability and the green economy;
- Digital agriculture and advanced food processing; and

- Logistics and supply chain to North American destinations.

The first business concept supports the development of the aviation and aerospace sector; it also focuses on sub-sector activities in the fields of aviation, defence, space, and RPAS-related projects and trends. The proposed branding for this business concept is to be the Villeneuve Aviation & Aerospace Centre (VAAC).

Concept 1 – The Villeneuve Aviation & Aerospace Centre (VAAC)

The VAAC is envisioned as a unique innovation and education hub, industrial park, research, development, and testing centre dedicated to aviation, aerospace, space, remotely piloted aerial systems, and defence projects. It brings together the strengths, capabilities and knowledge of industry leaders into open source, collaborative or private ventures.

VAAC is the result of VAAMP project research and engagement session comments supporting and leveraging the unique strengths of the EMR and key industry leaders. The VAAC could support and strengthen the offerings of the Alberta Aerospace & Technology Centre located at EIA. The initial primary focus of VAAC will be to support flight training research and innovation associated with the growth of the three (3) flight training schools currently located at ZVL. The VAAC can provide infrastructure and facilities that allow ZVL-based flight schools to become international students' complaint, become more efficient and at the forefront of advanced flight training tools and technologies.

The VAAC will also play an active role in the EMR's nascent space sciences cluster by offering facilities, labs and testing environment to sustain the growth of local businesses and attract new entrants to the region. The University of Alberta (U of A) has a space program lead by the Institute for Space Science Exploration and Technology (ISSET), focusing on Space Physics, Microgravity Science, Space Technology and Planetary Materials. The program is driving spin-off companies and supporting labour availability. Some of these companies are already gravitating around ZVL. The VAAC can play a key role in supporting early-stage companies by providing lab space, equipment and test facilities. As an example, a formalized partnership arrangement with the U of A could allow VAAC companies to use the Laboratory of Turbulent Flows located at the U of A's main campus, and potentially support expansion of university programs and services out to the airport. The Laboratory of Turbulent Flows provides a two-storey closed-loop wind tunnel for aerodynamic testing. Also supporting space-related work is the Centre for Sensors and System Integration at NAIT. The VAAC can provide an aerodrome research and development area for space-based ground applications and development of the associated technology ecosystem.

The VAAC should also target defence sector partnerships and investment. The VAAC can support aerospace and defence industry investment attraction efforts already underway in Sturgeon County and the EMR. With over 170 defence-related manufacturers in the region, the VAAC can provide infrastructure and services that support industry clustering and partnership initiatives. The VAAC would support technology testing and development and could be used to attract an anchor defence contractor to the airport. Supporting aerospace and defence industry testing, research

and development helps strengthen the supply chain the EMR, making the Villeneuve Airport Area (VAA) more attractive to large Original Equipment Manufacturers (OEM) and Integrators. Many EMR labs can play a supporting and/or leading role in this venture:

- NanoFAB (Fabrication and Characterization Facility) at University of Alberta - Focus on academic and industrial applications in micro and nanoscale fabrication and characterization.
- Nanotechnology Research Centre, NRC – Focus on the development of nanomaterials
- Alberta Machine Intelligence Institute (Amii) – Machine Learning and Artificial Intelligence
- Advanced Man-Machine Interfaces Lab, University of Alberta – Research on advanced human-computer interfaces

The availability of developable land at ZVL, both airside and groundside, also supports creation of the VAAC. Through its master plan exercise, ERAA has already identified and planned tentative usage of the lands which include aviation and aerospace related activities. ZVL also hosts the Alberta International Airshow, an annual summer event gathering airshow enthusiasts, aerospace, defence and aviation industry representatives, armed forces personnel and elected officials from all levels of Government. The Airshow provides an annual mechanism to host potential investors and partners and is a good business attraction tool for Sturgeon County and the EMR.

Similar to the space sector expansion, the VAAC will support RPAS development activities inclusive of research. This nascent sector in the EMR is also in need of testing services and stronger WIFI capabilities both of which VAAC can offer. This sector is also supported by the Applied Nonlinear Control Lab at University of Alberta, providing Non-linear control for UAV robotics, Vision-based control, Machine learning of UAV control.

In the EMR, a number of companies are also researching and developing drone technologies, but the region is lacking dedicated testing space and relevant labs and equipment to foster the development of this sector. Notwithstanding the present shortfalls, the region and Sturgeon County are well placed to play a hub role in the development of RPAS technologies, applications and services toward northern and arctic destinations. This fast-growing sector is just in its infancy and very much technologies intensive. With this development trend, the VAA and Sturgeon County can play an active role in supporting such activities and bringing together a nucleus and cluster and companies creating the associated supply chain.

VAAC will be developed through a number of anchor projects and facilities required from industry leaders and suppliers to support the accelerated development of innovation projects and other activities. VAAC will also include a unique environment and supporting programs for workforce training and education to provide tenants and industry with a highly skilled workforce.

2.5.1.1 Anchor Projects

The development of the VAAC is based on five (5) anchor projects identified through VAAMP project engagements and discussions with regionally based private companies and academia.

Proposed anchor projects will spearhead development of the sector, while also attracting private ventures and projects not currently identified at this stage but enticed by the clustering of activities of the VAAC.

Project 1-1: The Aerospace Research Complex

This project revolves around the construction of a Research, Incubation and Office Space Building as the lead-in facility of a future Innovation Complex. The building is required to group all research and testing activities identified through this project with small innovative companies that do not have the financial capability necessary to acquire needed infrastructure and equipment.



The sample case studies highlighted in Section 2.3 show that an anchor innovation complex often leads the development of an industry cluster. Innovation centres are also attractive to medium and large sized manufacturers and academia-industry innovation joint-ventures as they provide a neutral and secure location for research, testing and validation, often involving government partnership and/or funding.

The Aerospace Research Complex will host a series of laboratories dedicated to aviation, space, RPAS and aerospace research, testing, prototyping and light manufacturing for companies actively involved in these activities. The complex can be developed through a joint undertaking of private, academic and even public partners. These facilities are often custom-built, with sophisticated infrastructure and equipment that is purpose-built for identified end-users. As such, construction costs and/or leasing rates reflect the higher-end nature of the building. Academic institutions are often part of these kinds of innovation projects, staffing them with faculty members so they can conduct applied research in collaboration with industry partners and peers.

A number of companies identified through VAAMP engagement efforts have identified projects that may support development of the ARC.

- Pegasus Imagery: expanded research and development inclusive of lab space, office space and production facilities;
- Space Engine Systems: fuel and engine testing;
- Wyvern Space: satellite manufacturing facilities;
- Wyvern Space: vibration testing, electromagnetic testing, thermal testing labs.

The project includes:

- Leasing of vibration lab, electromagnetic lab, thermo lab, white room and associated amenities and facilities;
- Leasing of commercial office space, boardrooms, joint cafeteria, and accessibility to wellness areas;

- Incubator and accelerator services, coaching and mentoring;
- Makerspace facilities, product development and prototyping and;
- This building and complex could be an extension/satellite of the Alberta Aerospace & Technology Centre (example: AATC North at ZVL)

Project 1-2: Aviation Training Centre of Excellence (ATCE)

There are already three (3) flight schools located at ZVL. They provide flight training services to student pilots from the greater Edmonton region. There is interest from some of the flight schools to expand their market to attract international students. Many amenities are missing at ZVL and at the flight schools to move forward with such a project.



The purpose of the Aviation Training Centre of Excellence will be to bridge the gap in infrastructure, services and support the development of advanced training tools like virtual and augmented reality to make the attraction of international students a more feasible and sustainable reality. The ATCE will also support the flight schools with obtained the required international student certification.

The vision of the ATCE is to integrate twenty-second century training technologies to provide an innovative, stronger, safer and better learning environment that positions ZVL as a world-renowned certified flight training destination. The ATCE should allow student pilots to access mainstream air carrier jobs faster while meeting Transport Canada and other regulatory agencies skill levels and technical requirements.

The following projects have been identified through stakeholder engagements and subsequent conversation:

- Synergy Aviation: expansion of flight training activities;
- Namao Aviation: expansion of flight training activities development of a new 5,000 to 10,000 square foot hangar;
- Centennial Flight Centre: expansion of flight training activities and obtaining international student certification, construction of a dormitory or similar facilities/accommodations and development of a new 10,000 square foot hangar;

Also identified by ZVL tenants though not part of the business objectives of the companies is the need for food services, such as a nearby restaurant or bistro or dining facilities located on-site at ZVL.

The following global trends and innovations are recommended for further evaluation and potential integration into the ATCE:

- Virtual reality;
- Augmented reality (ex. Helmets (such as google glass) which superimpose digital information over a person's view of the real world;
- Distance learning;
- Adaptive learning; and
- Wearable smart-clothing (gathering a variety of health data such as respiration, heart rate, body temperature, etc.)

The Centre of Excellence can also offer a series of courses dedicated to complementary aerospace and aviation sub-sectors. The vision is to have RPAS training programs, aircraft mechanics and technicians, space application-related training, flight dispatchers, recurrent and specialty training, flight instructors and emergency preparedness initiatives including firefighting / disaster simulation and training to be also available through the COE.

Among its core responsibilities, the ATCE could:

- Assist local training establishments and related businesses in growing their business and obtaining the required certifications (including CAAC-EASA), expertise and qualifications to support their expansion and growth;
- Raise interest, attract and recruit cohorts of students seeking to pursue a career in aviation/RPAS/space/aerospace/firefighting as well as existing pilots wishing to obtain new ratings, complete specialty training and/or take classes to obtain their recurrent training and checks;
- Provide a suite of support services to its members such as marketing and promotional activities, financial aid, and administrative inquiries related to leasing, services, and legal requests. Support a recruitment campaign to recruit national and international students and complementary businesses that strengthen the ATCE and member training partners offering and;
- Potentially develop and manage student housing and accommodation services for international clientele, including transportation needs, tourism and leisure, food medical requirements, translation, and others.

Project 1-3: Defence-Related Initiatives

This project differs in its model as it is not tied to any facilities or infrastructure development. The Defence Initiatives focus initially on the creation, management and consolidation of a Defence industry-related task force with the objective of leveraging Department of Defence procurement opportunities and attracting an anchor defence contractor to grow the Edmonton Metropolitan Region Defence cluster. The project builds



on the findings of the defence study conducted by Sturgeon County in 2020 and the subsequent creation of a defence Task Force committee working to bring EMR based partners together to build this cluster.

Project Objectives:

- Support EMR Defence Task Force initiatives to aggregate competencies, products and equipment to be able to respond to DND RFP's.
- Evaluate the synergies of Sturgeon County-based (and EMR) industry clusters and targeted sectors to support growth of the Defence sector (ex: hydrogen and green energy or RPAS development);
- Build business intelligence on upcoming procurement opportunities;
- Developed leadership and an advocacy team;
- Attract Defence OEM and major Tier-1 manufacturers.

The Defence Task Force can also play a leading role in developing supporting assets like defence-related training programs, joint research facilities, innovation collaboration, testing proving grounds and areas. This project is well-positioned to leverage the synergy of infrastructures and equipment from the various other business concepts (like the ecoPark Proving Grounds and the VAAC research and innovation facilities and the logistics assets of the Great Northern Logistics Park). While no immediate investment projects were identified for this anchor project through VAAMP engagement sessions, Sturgeon County Economic Development is aware of multiple federal defence procurements that are currently underway and is actively targeting investment in those areas.

Project 1-4: Space Ground Stations

There are a fair number of space-related businesses in the Edmonton Metropolitan Region. Many of these private companies and some of the education programs at the University of Alberta and the Northern Alberta Institute of Technology are involved in developing and using lower earth orbit satellites and the associated data/imagery. Over the last decade, a new space revolution driven by IoT leaders like Oracle, Virgin, Google, SpaceX, OneWeb and others are shaping the role satellites play in understanding the earth and living on it. A brand-new category of nano, mini, micro and small satellites positioned in low-earth orbit are providing data, images, internet and communication services to multiple industry sectors and populations around the global.

Companies of all sizes (including a few in the EMR) are sending up constellations of satellites to offer these services. It is anticipated that more than 12,000 new satellites will reach orbit in the next 10 years. These smaller satellites (constellations) are launched into low-earth-orbit to work together and effectively operate as one system or entity. Large satellite constellations are required to achieve global coverage given their location relative to Earth. Since LEOs are closer to the Earth, they cover less territory because of the limited field of view from the antennas onboard each spacecraft.

By locating space ground stations in the VAA, we are positioning the region in a growing global network of such sites collecting and managing space-based data and information. This anchor project also supports Canada's role in the space sector, creating partnership opportunities with the Canadian Space Agency and industry leaders. The space ground station(s) project provides critical infrastructure that will support the growth and expansion of businesses and support the development of a space industries cluster.

A Space ground station is a terrestrial radio station designed for extraplanetary telecommunication with spacecraft (constituting part of the ground segment of the spacecraft system), or reception of radio waves from astronomical radio sources. Ground stations may be located either on the surface of the Earth, or in its atmosphere. Earth stations communicate with spacecraft by transmitting and receiving radio waves in the super high frequency (SHF) or extremely high frequency (EHF) bands (e.g. microwaves). When a ground station successfully transmits radio waves to a spacecraft (or vice versa), it establishes a telecommunications link. A principal telecommunications device of the ground station is the parabolic antenna.



Identified projects

- Wyvern Space has shown interest in locating antenna(s) on site;
- University of Alberta – satellite production and data collection.

The project includes:

- The development of an antenna farm targeting designated and proprietary satellites and capturing data and information;
- An antenna farm control and command Centre and associated maintenance capabilities;
- A Data Analytics Centre;
- Space-related companies have requested access to various laboratories that would support the development of the VAAC;
- Supporting space-related office and manufacturing space.

Project 1-5: General & Business Aviation Hub Expansion

The Edmonton Regional Airport Authority has developed the ZVL strategic plan to support the growth of the general aviation hangar farm, and overall airport activities. This anchor project aligns with ERAA's goals and plans to make ZVL the premier destination for general aviation in the Edmonton Metropolitan Region.



By growing the number of based aircraft, this anchor project supports the attraction of aviation services suppliers (maintenance organizations, paint

shops, propeller shops, engine repairs, refinishing shop and aviation parts and components) enticed to the location by the number of based-aircraft. This project will also increase revenues for ERAA through more land leases, fuel sales, some landing fees and aircraft parking fees. The ZVL strategic plan also shows lands supporting groundside development and major aviation projects could be located on the westside of runway 16-34 or the northside of runway 08-26.

As hangar leasing provides a better return on investment than land leasing, Sturgeon County and ERAA could jointly look at owning aircraft hangars, thus attracting more aircraft owners and more aviation services businesses while making the airport more financially sustainable.

Identified project through the engagements:

- Energy Efficient Homes and Hangars: project to built three (3) to five (5) stand-alone hangars as part of an integrated complex

The project includes:

- Expansion of the GA and BA Hangar Farm and attraction of aircraft owners
- Joint ownership and construction of hangars
- Attracting Aviation Services Development
- Airside and Groundside Infrastructure Upgrades

Concept 2 - Villeneuve ecoPark (VeP)

The Villeneuve ecoPark is a proposed commercial and industrial park that will feature state-of-the-art innovation labs, research and development facilities, advanced manufacturing areas, and commercial office space. The VeP will provide a clustering opportunity for public and private sectors to collaborate on research and development projects and advance commercialization efforts. The VeP business concept embraces the region's commitment to the green economy, not only in the well-established energy sector but across all parts of the economy as well. Specifically, the development of the VeP will act as a catalyst for the development of a hydrogen industrial ecosystem in the EMR and will serve as a central resource point for regional and national knowledge sharing, technology transfer and expertise development. The areas of focus include:

- Green Energy Development
- Green Economy Development
- Hydrogen Application Research
- Plastic Recycling
- Greenhouse Gas Emission Reduction Research
- Extreme Weather Phenomena Research
- Climate Change Studies

As previously summarized in the Sector Strategic Analysis, the global market for clean technologies, renewable energy and the green economy is growing rapidly. Among all development activities happening worldwide, hydrogen is gaining attention as a form of energy that is cleaner and more flexible compared to traditional fossil fuels. It is estimated that hydrogen

will provide at least 18% of global energy demand by 2050 and account for \$2.5 trillion of the economic value in the energy sector. In Canada, international hydrogen exports over the next two decades are expected to generate eight (8) times the current GDP from hydrogen production.

Today, among other green technologies such as carbon capture, hydrogen is an important part of Alberta's Recovery Plan and a potential lifeline of Alberta's Oil and Gas Industry. As the home to Canada's first and only Hydrogen Hub, the Edmonton Metropolitan Region is expected to embrace an increasing number of research and product development facilities surrounding the hydrogen sub-sector. Currently, the Hub has identified 25 projects related to hydrogen production, transportation and end-use, all in the planning phase. As AIH is ideally positioned to produce, use and export hydrogen, there is presently no centralized location in the EMR offering infrastructure tied to the creation and commercialization of hydrogen demand sources, including testing, validation and hydrogen-related research and innovation. The VeP is strategically positioned to fill this gap by providing ample space, equipment, proving grounds and incubation space and services tied to future uses of hydrogen, complementing the production activities in Alberta's Industrial Heartland.

The VeP will also be dedicated to research activities around carbon emission, carbon reduction and carbon reuse. This sub-sector is gaining increased recognition in the province and more particularly in Calgary, where a few companies work on post-combustion carbon dioxide capture and storage from research and development. But this field of research is still in its infancy, which gives the VeP opportunities to leverage its regional strength in the energy sector and focus on niche opportunities such as: carbon capture and storage from oil and gas and hydrogen production, sensors for carbon storage applications, and geoscience study of permanent underground storage of CO₂, and potential for use in geothermal heating.

The Villeneuve ecoPark will also play an active role in research in relation to air pollution, extreme weather phenomena and climate change, leveraging regional strengths in those fields. The EMR is home to the National Laboratory for Hydrometeorology Arctic Meteorology (NLHAM), the Prairie Northern Laboratory for Environmental Testing (PNLET) and the Plastics Alliance of Alberta. Those regional assets, alongside a shared flexible lab space provided in the VeP enable companies and organizations to advance their research and commercialization projects by removing barriers due to cost concerns, lack of tools and challenges of accessing experts. VeP's unique focus on greenhouse gas and climate change also help to tackle a national concern as Canada, especially Northern Canada, is one of the most impacted territories by climate change. From a community standpoint, the unique focus at VeP can provide higher-paying jobs (25% higher than the manufacturing industry median wage). The sector is currently growing rapidly, creating significant potentials to broaden Sturgeon County's tax base.

To achieve the proposed goals and to align with the strategic objectives of the Villeneuve Airport Area, the Villeneuve ecoPark will be developed through multiple anchor projects to support sector growth and ecosystem formation. The VeP will house a Hydrogen Innovation Village, a Hydrogen

Innovation Proving Grounds Complex, an Environmental R&D Centre and the Alberta Carbon Centre of Excellence.

2.5.1.2 Anchor Projects Introduction

Project 2-1: Hydrogen Innovation Village

Currently, the EMR is Canada's first hydrogen hub and has identified 25 projects for the production, transportation and end-use of hydrogen (currently in planning phase). With some of the production facilities located in the Alberta's Industrial Heartland, we recommend the VeP host research and development activities tied to the multiple future usages of hydrogen (demand-side commercialization). The village concept entails developing a community of interest around hydrogen innovation; grouping businesses, scientists, infrastructure, facilities, equipment and programs supporting this clustering.



Specifically, the Hydrogen Innovation Village will target companies and organizations developing the following technologies and offerings:

- Hydrogen-natural gas blending solutions;
- Hydrogen fuel-cell for service vehicles (i.e., public transportation bus and waste collection truck);
- Hydrogen refuelling solutions;
- Hydrogen transportation and use for remote communities in Northern Canada;
- Hydrogen production from methane pyrolysis; and
- Hydrogen production from biomass.

Those areas of focus complement the production activities at AIH on three aspects – accelerating scientific research, improving production techniques, and expanding use cases to create market demand for hydrogen. Currently, no industrial/research park in EMR has specified hydrogen-related research as a sector of interest. The Hydrogen Innovation Village will fill this role by providing incubation programs (in partnership with local post-secondary institutions), a research and development facility with leading-edge equipment, and other supporting services.

The project includes:

- A Hydrogen Research and Development Facility with associated prototyping, testing and development equipment but also demonstration and commercialization venues
- A hydrogen incubator in partnership with Alberta's Industrial Heartland Hydrogen Task Force and one of the local universities with based development services for start-ups and academic spin-offs
- A training Centre with programs and courses on the public acceptance of hydrogen and use and applications of hydrogen (industrial and private usage)
- A forum to host innovation and open house discussions among industry specialists and other industry events

- Ample lands to host industry projects. (Note: The Edmonton Region Hydrogen Hub has more than 25 planned projects, some targeting hydrogen use and applications).

Project 2-2: Hydrogen Innovation Proving Grounds

In support of the Hydrogen Innovation Village-based research and development activities, we recommend establishing the Hydrogen Innovation Proving Grounds. This area will group a series of testing and demonstration environments, both indoor and outdoor, to support validation, commercialization and implementation of hydrogen and greener-based technologies.



As the Edmonton Region Hydrogen Hub continues to grow and when the planned projects at the Hub reach their near-commercialization phase, testing activities will happen in the region. Currently, no proving grounds are identified in Canada with a specific focus on hydrogen applications. The Hydrogen Innovation Proving Grounds can help to foster sector development in the EMR by promoting synergies among participating organizations and reducing cost through space/equipment sharing. More specifically, the Proving Ground will provide a small-scale village-style road network for companies to test hydrogen fuel-cell vehicles. The outdoor space of the Village mimics the real-life environment for better data gathering and more accurate testing. Indoor facilities will be provided for companies conducting testing for indoor application of hydrogen, such as stationary hydrogen fuel cells for residential homes and hydrogen home heating. The tenant will also have access to an onsite hydrogen refuelling station and small-scale storage and distribution facility.

Potential project: The Edmonton Region Hydrogen Hub is planning on future testing of hydrogen municipal vehicles (bus, waste collection trucks, etc) that may require a testing ground with onsite hydrogen storage and refuelling options. This is still at the planning stage.

The project includes:

- Hydrogen, electric or hybrid automotive (bicycle/motorcycle/cars/buses/trucks/ trains) testing site and facilities (a road network comprising a few streets, movement areas and specialized tracks to allow testing of various types of vehicles, including unmanned vehicles) and data collection system and control Centre (in partnership with public transportation providers, Alberta Motor Transport Association and Emissions Reduction Alberta to explore experimental opportunities).
- Hydrogen Home Application - A few houses and commercial buildings with supporting sensors and equipment to allow multi range testing of hydrogen fuel cells, smart grids, hydrogen-based appliances, hydrogen home heating and other applications.
- Community-scale hydrogen storage and refueling station.
- Engine test Cell (automotive, rail and aircraft).
- Cold weather testing equipment and supporting facilities.
- Alternative Energy System Lab and Grounds.

Project 2-3: Environmental R&D Centre

Another segment of the green economy relates to greenhouse gas emissions, recycling, weather phenomena and climate changes. These growing environmental realities directly impact our day-to-day activities, including future manufacturing techniques/processes and overall product development. This sector is recognized as a key sector for Alberta's future and economic diversification. As such, it is one of Alberta Innovate's priorities, supported by associated funding programs.



The proposed Environmental R&D Centre will collaborate with existing entities like the EMR based National Laboratory for Hydrometeorology and Arctic Meteorology (NLHAM) and the Prairie Northern Laboratory for Environmental Testing (PNLET). The NLHAM provides improved scientific understanding and prediction of high-impact weather, primarily focusing on predicting hydro-meteorological and northern latitude weather phenomena and processes. The PNLET provides testing and technical advice to Wildlife and Environmental Enforcement officers, assisting in regulation development, compliance and investigative activities. The PNLET's laboratories are equipped to conduct a wide variety of physical property, inorganic, organic and toxicological analyses on environmental samples and articles of commerce. Those collaborative efforts and a shared environmental laboratory will enable companies and organizations more affordable and easy access to equipment and facilities, such as a Chemical Analyzer, Ultra-Low Temperature Freezer, Biological Safety Cabinet, Chromatography and Spectroscopy equipment.

The vision of the Environmental R&D Centre is to build regional strengths in environmental research, development and potential commercialization opportunities by providing a central location with lab sharing, equipment sharing, and knowledge transfer. The Environmental R&D Centre aims to address development barriers due to concerns about equipment costing, the lack of specialized tools for specific research needs, the difficulty in accessing professional services or research experts, and the lack of small-scale prototyping/production space.

Through the establishment of the R&D Centre, the demand for supporting services such as education, training, marketing and business incubation can be addressed collaboratively.

The project includes:

- Environmental laboratories offering equipment and facilities supporting research and development of cradle-to-cradle technologies (circular economy) and recycling;
- Supporting labs dedicated to plastics and resin management, lifecycle and recycling;
- A plastics testing and re-manufacturing facility;
- Extreme weather & pollution lab complementary to the NLHAM and the applied research centre at NAIT.

Project 2-4: Alberta Carbon Centre of Excellence

Among the various avenues to reduce the rise of the earth's temperature, reducing atmospheric GHGs is the lead objective of many governments worldwide. Another solution is the capture and permanent storage of GHGs after emission.



In Calgary, the Alberta Carbon Conversion Technology Centre (ACCTC) is leading research around carbon capture and conversion using flue gas from the Centre's nearby gas-fired power plant. In Edmonton, industry participants focus more on carbon dioxide conversion from hydrogen production and invest more into the storage part of the value chain. In Fort Saskatchewan, Suncor and ATCO are partnering to build a world-scale hydrogen production facility with the ability to capture and permanently store CO₂. At the Shell Scotford Complex near Edmonton, the company is planning on an underground carbon storage site that will have storage capacity of 300 million tonnes of CO₂ across its lifespan. The proposed Alberta Carbon Centre of Excellence would focus on emerging opportunities in this sector that align with regional strengths in energy and hydrogen. The topics of interest include carbon capture from oil & gas and hydrogen production, permanent carbon capture and underground storage, predictive solutions for CO₂ movement in subsurface geology, sensors for underground carbon storage monitoring, geochemical and geomechanical modelling for geological storage of carbon.

Innovation and research related to carbon management is not limited to carbon dioxide. The COE will offer an innovation ecosystem fostering knowledge sharing, technology transfer and industry expertise in all areas of Green Economy developments. It can consolidate all resources in the region and act as a leader in research and development of a Green Economy. Various provincial and federal funding programs are available and many of the potential partners, including academia, are part of the EMR Hydrogen Task Force today.

This project revolves around constructing a Research, Incubation and Office Space Building as the inaugural facility of a future Centre of Excellence. The building will host a series of laboratories dedicated to carbon capture technologies, testing, prototyping and light manufacturing for companies actively involved in this field.

- Leasing of dedicated rooms and spaces hosting associated equipment
- Leasing of commercial office space, boardrooms, joint cafeteria and accessibility to wellness areas;
- Incubator and accelerator services, coaching and mentoring, in partnership with local post-secondary institutions;
- Makerspace facilities, product development and prototyping.

Concept 3 - Villeneuve Agri-Innovation Hub (VAIH)

The Agri-Innovative Hub will be a full-service solution for increasing sustainability in agriculture. The VAIH aims to combine applied research facilities and commercialization opportunities with initiatives that increase value-added agribusiness and food development investment for the

regional and provincial agricultural industry. The VAIH supports Edmonton's Food and Urban Agriculture strategy and some of its desired outcomes along with the EMRB's Regional Agriculture Master Plan (RAMP).

Alberta's agriculture is world-renowned but lacks value-added processing capabilities and technologies to meet growing global needs. A strong push led by government and industry leaders is underway to raise productivity levels and yields, introduce new cash crops, design more efficient supply chains, and increase revenues for producers. A good part of this effort centres on the automation and digitalization of farming activities and introduction of new production methods. The covid-19 pandemic, the impacts of climate change and disease on arable lands, the associated costs of transportation, and fluctuations in commodity pricing have drawn attention to the challenges the agribusiness industry faces to produce, process and ship a diverse year-round supply to domestic and global markets.

Despite these challenges, Alberta remains a leading contributor to Canada's agricultural industry. In, 2019 the province produced 32% of Canadian wheat, 29% of canola, 48% of the nation's barley, and 20% of Canada's oats. It also led the nation in cattle and calf inventory, accounting for more than 40% of Canada's total. Alberta exported \$11.4 billion worth of primary and processed agricultural and food products.³⁴

The Agri-Innovative Hub (VAIH) business concept is aligned to support a coordinated effort to address the issues previously identified and access growing global markets. While there are other Agri Innovation locations in the province, VAIH will focus on technologies tied to indoor and vertical farming and higher value products like specialized food, produce and bio production.

Indoor and vertical farming is a new industry trend which lessens environmental impacts and increases sustainability through reduced water use, reduction of greenhouse gas emissions and while increasing food security and safety for jurisdictions that have shorter growing seasons or poor outdoor growing conditions. Indoor and vertical farming involves greenhouses and warehouse-like buildings that are several storeys high, networked with irrigation and lighting systems. State-of-the-art facilities also include robots that pick and transport crops from one area to another.

Technological development focusing on the optimal number of plants and stacks, the most effective configuration of LED lamps, and the recipes for soil and hydroponic liquid can all become precious intellectual property.

The VAIH will support Sturgeon County and EMR producers with facilities that aid in value-added processing and transformation of raw materials. The hub will also facilitate market access and support the development of new products and the overall profitability of farmers and producers.

³⁴ <https://investalberta.ca/key-sectors/agriculture/>

Services will include food aggregation, packaging, and access to a storage and distribution centre alongside food preparation and business support services.

Through the VAIH, businesses will work closely with EMR based post-secondaries, potentially hosting their academic programs, scientists and students. Partnerships may also extend beyond the EMR to entities like Olds College or The Food Processing Development Centre, located 65kms South in Leduc, to leverage expertise and avoid redundancy of efforts.

The Agri-Innovative Hub will lead development of new value-added processing capabilities and technologies necessary to meet growing global needs. As previously stated, the agricultural industry is seeking innovative solutions that raise productivity and yields, introduce new cash crops, and/or create new and more efficient supply chains – all of which increase opportunities for producers. The VAIH will join a strong network of producers, primary processors, R&D organizations, supporting agencies and various funding programs. The Villeneuve ecoPark and the Agri-Innovation Hub are highly complementary. Farms in Canada generate about eight to ten per cent of the country's greenhouse gas emissions. Novel technologies that reduce farm and agribusiness supply chain GHGs, or facilities that can readily use CO₂, such as indoor or vertical farms, will be well-served by co-locating in the VAA.

2.5.1.3 Anchor Projects

The development of the VAIH is based on four (4) anchor projects supported by project analysis, regional socio-economic conditions and global market trends. The concepts will lead the development of the VAIH in Sturgeon County and become a critical piece of the EMR agriculture ecosystem. As part of VAAMP project engagements, several post-secondary institutions and private businesses have expressed interest in participating in the development of the VAIH and its innovation ecosystem.

Project 3-1: Future Farming Innovation Centre (FFIC)



Alberta has an abundance of agricultural research and innovation facilities, though none of them are dedicated to indoor and vertical farming. The Future Farming Innovation Centre will provide research and development capabilities, testing, calibration and validation facilities that allow industry to become more proficient with this new type of farming. The

FFIC will support the EMR role as a hub and strategic node for expertise and vision for northern and Arctic regions. It will also support food quality, safety and security issues common to remote northern communities by providing processes, technologies and coaching on the management of indoor and vertical farming facilities.

The FFIC will be instrumental in assessing and documenting the changes in environmental impact associated to indoor and vertical farming facilities. This anchor project received strong interest from the University of Alberta which is already working with greenhouses and is interested in expanding their capabilities within the EMR.

The FFIC will act as a hub where challenges in the agriculture industry are identified and innovative solutions found to solve these problems, allowing FFIC partners to take an active role in shaping the future of food and agriculture. The vision is to foster and implement new technologies or strategies which increase efficiency, conserve resources or significantly improve the lives of farmers and consumers while strengthening food security of remote communities and reducing the environmental footprint of the industry. The FFIC and VAIH will further complement the EMR's launch and adoption of the Regional Agriculture Master Plan (RAMP) by allowing for less loss of arable farmland to development pressure and urbanization.

The Future Farming Innovation Centre will assist promising/innovative agribusiness companies in the implementation and scale-up of their disruptive business models through a range of corporate services including R&D, testing, mentoring and coaching.

The project includes:

- Main FICC building inclusive of food-grade and CFIA certified labs with associated equipment, office and meeting/conference space;
- Future Farming Incubator (can be located in the FFIC building);
- Protein and Plant Fractionation Test Centre;
- and an Agri-Food Discovery Place.

Project 3-2: Indoor Agriculture Testing and Production Facilities

As a sub-component to the FFIC, the Indoor Agriculture Testing and Production Facilities act as an experimental indoor farm. The facility will support private, academic and public production, testing and product development to look at augmenting the variety of fruits, vegetables and other types of produce that can be grown indoors locally. There are few facilities of this type in Alberta providing Sturgeon County with a unique position in this up-and-coming industry sub-sector.

Indoor farming is not impacted by extreme weather events and is not exposed to pests — meaning the produce can be grown without the use of pesticides, herbicides or fungicides. The result is a safer, more nutrient dense and sustainably grown food source, providing a local alternative in a produce aisle dominated by imports from the United States or Mexico.



The Indoor Agriculture Testing and Production Facilities received academic interest but also large food suppliers the likes of McCain Foods and its vertical farming spin-off GoodLeaf have confirmed interest to expand production and research activities in western Canada.

Beyond the production advances the project can generate, it will also address other related challenges tied to water consumption and hydroponic liquids recycling, management of energy requirements for production and heating, automation of the various steps tied to planting, production, maintenance and harvesting.

The project includes:

- Construction of a joint indoor farming production and testing facility
- Construction of a Greenhouse Lab, Testing and Teaching Centre
- Lands availability to host other indoor farming facilities
- Technology development areas for self-sustainable indoor farming (water conservation and recovery and energy systems)

Project 3-3: Aggregation and Food Processing Centre

The aggregation of foods is a common feature when designing a Food Hub. Aggregation facilities provide a physical location to amass locally grown or produced foods for distribution to larger markets. Aggregation Centres are unusual in that they take a values-based approach to their suppliers and buyers. Moving away from a commodity mentality allows new farmers to enter the wholesale marketplace, allows those farmers to take risks to grow their operations, and has a local economic multiplier effect, keeping the wealth in the community.



The U.S. National Food Hub Collaboration (National Good Food Network) defines a regional food hub as “a business or organization that actively manages the aggregation, distribution, and marketing of source-identified food products primarily from local and regional producers to strengthen their ability to satisfy wholesale, retail, and institutional demand.”

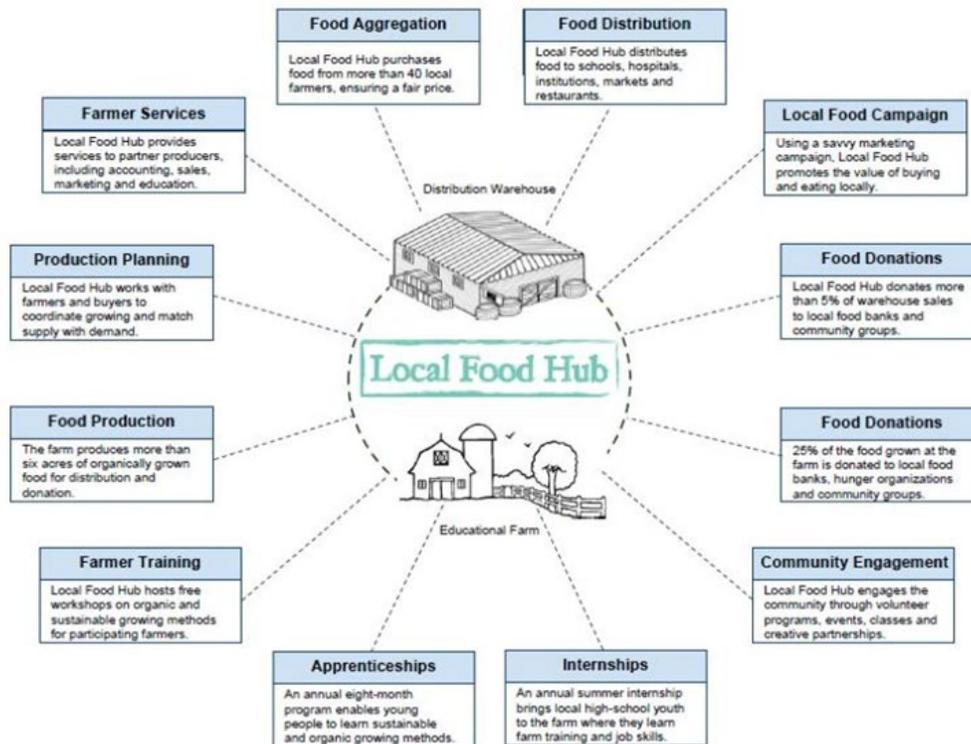
Food hubs provide small and medium sized producers greater access to institutional and retail markets, create new jobs along the supply chain, and (crucially) increase access to fresh healthy food for consumers through more mainstream food system outlets such as retail stores, corner stores, schools and hospitals.

The aggregation and distribution center (Food Hub) plays a key role supporting the growth and sustainability of local food producers in Sturgeon County along with those in neighboring municipalities and regions by providing increased access to markets through a range of services and facilities. The hub provides:

1. **Aggregation/distribution:** A food hub can operate as a drop-off point for multiple farmers and/or a pick-up point for distributors/wholesalers/retailers who want to buy source-identified local and regional food
2. **Active coordination:** The business management team of the food hub actively coordinates various supply chain logistics such as identifying markets for producers and coordinating efforts with distributors, processors, buyers, consumers, etc
3. **Permanent facilities:** There must be some identified space and equipment for food to be stored, processed, packed, palletized, labeled, etc. An exception to this is a virtual hub, which can serve as an online directory, database, and/or marketplace.

- Other possible roles tied to community services: A food hub can provide space for wholesale and retail vending, health and/or social service programs, community kitchens, meetings, etc.

The image below shows a Food Hub model and its various components



This project will centralize and grow Sturgeon County and the EMR local food processing activities and supporting facilities which in turn drive crop and produce transformation, allow access to higher-value markets, and provide smaller farmers with consolidation and marketing tools to access new buyers and consumers.

The project includes:

- Construction of an aggregation centre inclusive of office spaces, food cleaning, sorting, packaging and storage capabilities and services;
- A Canola Crushing Facility and processing plant;
- Lands to attract other value-added food processing plants;

Project 3-4: Industrial Kitchen

The Industrial Kitchen will offer food-grade production facilities to support food entrepreneurs and farmers. Businesses best suited to launch production at the Kitchen includes those looking for economic sustainability through shared “pay to play” production and storage spaces, and



those seeking a way to continue scaling up production while working out the details of moving into a purpose-built facility or partnering with a co-manufacturer.

The vision of the Kitchen is to support emerging businesses and organizations in the surrounding communities with the necessary infrastructure and equipment to assist with small volume processing and packaging of agri-food products that help develop value-added production.

Working with clients who have a proven production process, the Kitchen provides access to safe, clean food manufacturing spaces and qualified production support staff. Clients join our network of food entrepreneurs and industry supporters whose unique experiences and resources help the Kitchen drive opportunities for innovation that benefits all.

Business case development for the Kitchen is largely from proximity. Travel and distribution costs for small producers can easily make the difference between a food entrepreneur's profit or loss. Acknowledging the presence of the Food Processing Development Centre in Leduc with its high-end facilities and higher cost, the proposed Kitchen can position itself differently targeting clientele looking for a more affordable and user-friendly site.

Regional agri-food businesses and real estate groups have also identified a need for additional co-bottling and/or co-packaging services. Regional co-packaging providers are fully contracted and they are also scarce, given the availability of products needing these services. Smaller volume co-packing services often can't be procured on an ad hoc basis with little advance notice as ad-hoc co-bottle or co-pack runs are often scheduled between regular client orders. Existing providers are not attracted to smaller production volumes, providing the opportunity to offer a co-packaging service as part of this proposed anchor project.

The project includes:

- Kitchen and food preparation area with associated equipment;
- Food packaging and labeling area;
- Co-bottling and co-packaging plant
- Office space and meetings rooms;
- Production Assistance;
- Product Development and Merchandising Services;
- Food-Safe Storage (cooler, refrigerator, various level freezer).

Concept 4 - The Great Northern Logistics Park (GNLP)

The Great Northern Logistics Park (GNLP) will bring together warehousing, storage, cross docking, road/rail support services, and logistics innovation to create a dedicated logistics park that maximizes the combined road, rail, and air assets of the VAA.

The GNLP concept stems from VAAMP project research, engagement session comments and Sturgeon County's willingness to support and leverage the unique strengths of the VAA area and the EMR. The GNLP will take advantage of the VAA's location northwest of Edmonton to fulfill the

growing demand for enhanced transportation and logistics throughout the province and Western Canada. The VAA location is a logical staging area for shipments of goods and services bound for northern and Arctic destinations, ports on Canada's west coast, and markets south of the EMR.

Given the region already boasts a number of industrial parks hosting transportation and logistics companies and assets, the proposed anchor projects were identified by VAAMP stakeholders as missing or complementary assets that could support regional economic growth.

The transportation and warehousing sector contribute \$12.3 billion annually to Alberta's economy and employs approximately 140,000 people. There are more than 370,000 registered commercial vehicles in Alberta carrying goods within the province, between provinces, and internationally. CN and CP railways operate approximately 9,600 route kilometres in Alberta and transport in excess of 60 million tonnes into and out of the province each year. Growing volumes and the multi-market access from Edmonton reinforces the growth potential for Sturgeon County in the transportation and logistics sector for the near and long term. Furthermore, large online suppliers (such as Amazon, Uline and PC Urban) are expanding with multiple smaller distribution centres to make delivering product to customers faster and more efficient.

The proposed GNLP supports the growing demand by businesses for faster, more efficient and cost-effective solutions for transporting freight over short and long distances. The GNLP also benefits from Alberta Transportation's plan to redesignate Highway 44 (adjacent to the VAA) to a high-load capacity corridor.

One way that the GNLP will respond to these industry demands and regulatory changes is through an onsite High-Load Hub. The supporting facilities and amenities will be designed specifically to accommodate the needs of oversized transportation providers. Such an anchor project will offer businesses and fabricators a range of indoor and outdoor staging areas for both short- and long-term laydown or storage with specialized equipment capable of handling these high, wide, heavy and oversized items. The High-Load Hub will also be adjacent to a future rail spur to facilitate the efficient cross-docking of oversized items arriving from the west or overseas for final delivery by road transport. A dedicated truck stop with driver amenities and maintenance services capable of accommodating these oversized loads will help to reduce any scheduled or unexpected disruptions. Major components of the GNLP will consist of:

- Indoor and outdoor staging and storage of high-load equipment
- Assembly warehouse of high-load equipment
- Specialized equipment capable of handling high, wide, heavy and long loads
- Rail/road transload facilities
- Truck Stop facilities and services
- Transportation crew quarters and;
- Truck maintenance shop and associated services.

The GNLP will also support Edmonton-based fabricators by providing them with appropriate staging areas just beyond the city's limits. Since current regulatory measures limit their timeframe for deploying oversized loads out of the city, the GNLP will offer indoor and outdoor staging and storage of high-load and specialized capable of handling these specialized loads. For fabricators and businesses situated in southern Alberta which routinely ship to northern parts of the province, providing both indoor and outdoor storage facilities can reduce time and costs associated with the added transportation between Edmonton and southern Alberta.

As previously stated, the need for faster, more efficient and cost-effective logistics solutions has highlighted the need and growing demand for multi-faceted cross-docking services. A key component to address this need is the development of a bulk rail terminal capable of handling dry, liquid and solid material types through a network of rail spurs, onsite silos and staging areas.

Further supporting cross-docking activities, the GNLP will offer rail-to-road or road-to-rail cross-docking services through robotic and automated handling, conveyor and packaging technologies. Such facilities can support large crop producers in the region while also attracting companies seeking innovative and efficient solutions capable of handling and moving different types of freight out of the EMR, across Canada and into the US.

In completing cross-docking requirements and to further strengthen Alberta's agriculture and agri-food industry supply chain needs, various-sized temperature-controlled warehousing options will provide short and long-term solutions and the abundance of developable land onsite will provide large companies and/or distributors with the ability to construct dedicated facilities to meet their warehousing needs.

The GNLP will also have an innovation component. The continued development of robotics, drones and computing technologies allow for continued automation of logistics activities. VAAMP engagement feedback noted that research and innovation be conducted in support of sustainable logistics. The proposed Sustainable Logistics and Warehousing Demonstration Centre will be the first facility in the EMR with a specific focus on sustainability in a logistics hub setting in response to the region's strong commitment in going green. The Centre will bring together researchers and companies looking to innovate and create sustainable, energy efficient and autonomous solutions to store, handle and move various product types.

The GNLP will also host additional projects and facilities required by industry leaders, trucking and logistics companies to support their evolving need for fast and efficient handling and movement of all types and sizes of freight and cargo.

2.5.1.4 Anchor Projects

The development of the GNLP is based on five (5) anchor projects identified through VAAMP engagements and discussions with regionally based private companies, realtors, public stakeholders and academia. The concepts will spearhead the development of the area, while also allowing for additional investment from companies attracted by the clustering of activities the GNLP offers.

Project 4-1: Food Grade Freezer and Temperature Control Warehousing

As a strategic focal point for the storage and distribution of a multitude of different products, the EMR has experienced a number of large single-source investments capable of providing ambient and temperature-controlled storage solutions.

While many of the current options are individually owned and operated, the proposed Food Grade Freezer and Temperature Controlled Warehousing anchor project could be developed and owned by Sturgeon County and leased out to industry partners. It will expand EMR's capabilities necessary to support a variety of emerging and established agri-food businesses with varying food grade storage and warehousing needs without the need for them to finance the buildout of their own facility.



Commercial real estate professionals in the EMR noted that current market demand for Food Grade Freezer and Temperature Controlled Warehousing facilities is high. The GNLP should move quickly to bridge this gap and seize the opportunity.

With the recent announcement of a \$25 million expansion to the Food Processing Development Centre in Leduc, the facility will create two (2) new larger-sized bays, but is not investing in expanding its food grade, temperature-controlled warehousing amenities which commonly operate at full capacity throughout the year. These new bays, which are designed to attract larger users will lead to increased warehousing demands that will have to be sourced externally.

Furthermore, since the Food Processing Development Centre is a CFIA federally inspected facility, it only permits users to utilize CFIA approved ingredients and meat products from federally inspected meat plants. This limits the number of potential users that are seeking commercial kitchen facilities in addition to appropriate places to store ingredients and/or final product(s).

The project includes;

- Various-sized Freezers and Temperature-Controlled Warehouses meeting client requirements;
- Available Lands for expansion; and
- Possible Rail Access.

Project 4-2: High-Load Corridor Hub

The Province of Alberta is expanding its high-load corridor network in response to increased usage and demand for more 'core' and 'connector' routes. Stemming from this network expansion, Highway 44 (adjacent to the VAA) is being redesignated as a 'core route'. The strategic location of the proposed High-Load Corridor Hub to Highway 44, and its proximity to the City of Edmonton, provides fabricators and speciality logistics providers with a



purpose-built staging and storage opportunity. Fabricators and logistics providers are only permitted to move oversized loads beyond City of Edmonton limits between midnight and 6:00am. These companies require these loads to be easily accessible until they are deployed.

Furthermore, the province maintains different weight restrictions on its highway network throughout the year which affect when many oversized shipments are able to be transported. For oversized product(s) coming into the EMR by rail which are to be cross-docked onto outbound trucks to their final destination, the High-Load Corridor Hub (in conjunction with proposed Cross-Docking Centre below) will offer services and laydown areas (depending on the time of year) to provide carriers with short and long-term storage options. The lowest weight restrictions are in effect during the spring season, compared to the heaviest weight restrictions during the summer, fall and winter months.

Roadside pullouts are an essential service for the safety of truck drivers throughout the province. While such pullouts exist every 50-60 kilometres, the province only maintains a few of these roadside pullouts that are specifically designed to accommodate oversized loads. Such a service, in conjunction with proposed truck stop facilities within the High-Load Corridor Hub would provide greater support for truck drivers responsible for movements of oversized loads across the province and those shipping oversized product from Calgary (and areas further south) to the northern parts of Alberta.

There are over 900 unique load types, including high, heavy, wide, and long loads. Alberta awards over 150,000 permits annually for these types of loads.

Located on the Highway 44 High-Load Corridor, the GNLP will offer an attractive location to support high-load activities. It can also be used as a maintenance, repair and reloading station to allow for the required stoppage and route requirements. Part of the facilities will also cater to the personnel involved with these movements with truck stop services available 24/7.

The project includes:

- Indoor and outdoor staging and storage of high-load equipment
- Assembly warehouse of high-load equipment
- Specialized equipment capable of handling high, wide, heavy and long loads
- Rail/road transload facilities
- Truck Stop facilities and services
- Transportation crew quarters and;
- Truck maintenance shop and associated services.

Project 4-3: Villeneuve Bulk Rail Terminal

The proposed Villeneuve Bulk Rail Terminal is the result of an assessment of the expected future transportation and logistics needs of the region with a trend towards increased efficiencies and cost savings. Currently, the EMR is home to a few CN and CP rail yards and short line carrier Cando Rail with its rail yard and support services. All three (3) carriers provide services to the Alberta's Industrial Heartland for heavy industrial requirements. Besides these yards, CN also operates a multi-modal and container yard in Edmonton and the same for CP Rail which also services a scrap metal provider on the southeast side of the city.



There are also a number of grain elevators, each with its own private rail spur. The proposed Villeneuve Bulk Rail Terminal will provide a growing market need for dry bulk storage and transload services in the EMR. It provides a site located away from the urban core in case of any accident or leakages while offering room for long-term expansion.

While the trucking industry is a reliable and efficient mode of transport, the trucking industry's ability to meet growing demand for transportation services is deteriorating due to driver shortages, equipment shortages, high fuel costs, and proposed changes to driver regulations. The Bulk Rail Terminal will assist in resolving these issues by offering increased rail options.

There may also be opportunities for the GNLP to leverage the existing Cando Sturgeon Terminal which has direct connection to the CN mainline and offers first-mile, last-mile service to existing customers in the region. Rail operations are safety critical and heavily regulated so having Cando Rail provide third-party rail operator experience and infrastructure may be a much more cost-effective solution.

The identified need for a bulk scrap metal yard with rail access forms the basis of this anchor project to further build upon and support the initial Bulk Rail Terminal concept. Such a facility would require space to house equipment necessary for the dismantling of vehicles plus space for an industrial-sized shredder; multiple outdoor storage areas; space and equipment for the loading and unloading of product on/off rail cars; office space for employees, break areas, greeting customers and the selling used parts; and additional space to support possible growth and expansion. The county is also aware of bulk fuel distributors that are considering expansion in the EMR. These companies require large storage tanks, warehousing space, rail spur access and transloading infrastructure. Investors are looking for strategic locations (with rail spur access) in the EMR to help relieve stress on the grain-handling system by increasing additional capacity. Such facilities would require bulk storage silos, mill systems and container loading sites.

The project includes:

- Solid and liquid rail terminal with bulk containers, silos and staging area;
- Two (2) to three (3) rail spurs;
- Transload equipment and services;
- Third party rail short line service and car staging; and
- Freight forwarder offices and services.

Project 4-4: Cross-Docking and Transload Facilities

Faster and more efficient logistics and distribution networks are at the heart of global commerce and critical to the success of many companies. Time to market is a key factor in negotiations that can directly impact the price of the delivered product. The proposed Cross-Docking Centre is a commercial business centre supporting more efficient logistics. It leverages the rail-to-road connectivity of the Villeneuve Airport Area while providing GNLP clients, freight forwarders and logistics groups with key assets to meet business objectives.



Since cross-docking facilities are more of a “sorting centre” - a place where goods quickly pass through, cross docking warehouses take far less storage space than traditional distribution centres as the cross-docking terminal consists of inbound and outbound lanes and typically contains shop space with overhead crane(s), forklifts and ample outdoor space. With the GNLP being situated on the west side of Edmonton and slightly north of Highway 16, such facilities and services will be favourable to support product originating from Canada that is destined for multiple locations throughout the EMR, or goods coming into North America from the Port of Prince Rupert.

The shared services of the Cross-Docking Centre are also designed to provide support to the High-Load Corridor Hub. While a private sector investment is required to move forward this initiative, commercial and industrial real estate professionals in the region foresee the GNLP becoming a strategic location once the current inventory of available lands (with rail spur access) become fully occupied.

Market demand for such facilities is presently high and the GNLP should move quickly to bridge this gap and seize the opportunity.

The project includes:

- Road-to-Rail and Rail-to-Road Cross-Docking Centre;
- Robotic and automated handling including storage equipment and services;
- Freight forwarder offices and staging area;
- Temperature controlled environments and bays and;
- Rail spur access.

Project 4-5: Advanced Logistics & Warehousing Demonstration Centre

This research and testing facility could be a joint undertaking serving the needs of private-sector businesses with logistics requirements while also allowing for the development, testing and commercialization of automation technologies for storage, packaging and labeling. The Centre will support projects similar to the recently announced Cooperative Truck Platooning System, taking place between Calgary and Edmonton, which studies the safety and benefits of connected commercial transportation on Canadian roadways through the use of artificially intelligent semi-trucks in partnership with the University of Alberta. As regulations change, private-sector businesses will be required to innovate in order to adapt. A dedicated location such as the Advanced Logistics & Warehousing Demonstration Centre will centralize expertise, lab and office space, indoor and outdoor testing space, access to technology and communication systems, and benefit from its proximity to major transportation networks and the City of Edmonton.

In collaboration with the proposed anchor projects and activities within the ecoPark business concept, this project will also look at making warehouses more sustainable through alternate sources of energy, water reclamation and material recycling.

The project includes:

- Robotics handling, labelling and storage research warehouse;
- Conveyor and packaging technologies;
- Unmanned and autonomous storage capabilities and technology development
- Material recycling and conversion development and testing labs.
- Self-sustaining warehouse - energy and water technology development;

2.6 Design Approach

The Villeneuve Airport Area is well suited to grow into a world scale centre for innovation with enhanced environmental, economic, and social performance. The masterplan is conceived as a flexible framework for incremental economic development that will build-out over time and is commercially and environmentally sustainable.

The VAAMP proposes the development of a creative campus and work environment that is conducive to cross-industry communication facilitated by open community design principles, coherent placemaking, and well-designed transportation networks.

Figure 2-A VAAMP Development Approaches



The envisioned design characteristics of the area have been driven by a series of development assumptions tied to place making design principles and a contextual response to the site conditions, the proposed land use and building functions.

From the initial development area, the proposed envisioned design required expanding the area by approximately 500 acres in the northeast corner of area to allow more room for business concept No. 4 Greater Northern Logistic Park and better access to road and rail infrastructure. The extended area is depicted in Figure 2-B below.

Figure 2-B Expansion of the Villeneuve Airport Area



From this expanded area, the VAA concept comprises four (4) industrial zones, a commercial area, future land reserve in the areas located between the main runway and CN rail alignment and the land west of the airport between Highway 633 and Road 544.

At the heart of the innovation hub will be a business forum building and public plaza with flexible space for temporary expositions, conferences, events, and networking. A high-quality walkable public realm will connect business clusters and facilitate business collaboration and shared innovation between interdependent companies, academic researchers, and manufacturers.

Environmental and visual impacts of the development will be reduced by using soft landscaping, native plantings, and natural materials. The proposed design encourages the use of green roofs on buildings to create opportunities for biodiversity. Campus utilities and infrastructure can include recharging points for electrical vehicles, stormwater drainage into balancing ponds, and low-energy lighting. Figure 2-C below provides a rendering of the twenty (20) year perspective of the future VAA development and its economic forecast. At that stage, the VAA is about 50% developed with close the 1,300 acres still available.

Figure 2-C Rendering of the proposed VAA development



2.7 Fiscal and Economic Impact Analysis

This section of the report identifies and quantifies the fiscal impact (revenues, expenses, and capital requirements) of the VAA development. It also estimates the direct, indirect, and induced economic impacts generated by each of the VAAMP business concepts. The economic contribution of the business concepts can be measured by reviewing factors such as the size of

a facility, the estimated number of its full-time workers, its operating expenses, and the amount of taxes owed/paid to the government at the municipal, provincial and federal levels.

Development Overview

2.7.1.1 Buildings and Facilities

The following table presents a list of the planned buildings and facilities that are to be developed for each of the four (4) business concepts in the VAA. The buildings and facilities are proposed in a way that will meet the corresponding demands from each of the anchor projects (as illustrated in the previous section).

Table 4-G Villeneuve Airport Area Master Plan Proposed Buildings and Facilities

Concept	Planned Facilities (building footprint only)	Sizes (Sq. Ft)	Sizes (Sq. M)
Villeneuve Aviation & Aerospace Centre	Airside Hangars (2 x 5,000 sq. ft)	10,000	929
	Airside Hangar (2 x 20,000 sq. ft)	40,000	3,716
	Airside Hangar (1 x 50,000 sq. ft)	50,000	4,645
	General Aviation Hub Expansion	145,000	13,471
	Hotel/Boarding Room (Four storeys of 6,000 sq. ft each)	24,000	2,230
	Research and Innovation Building (with Incubator)	30,000	2,787
	Groundside Manufacturing Facilities (2x50,000 sq. ft)	100,000	9,290
	Groundside Manufacturing Facilities (1x100,000 sqft)	100,000	9,290
	Convenience Store - Food & Beverage	5,000	465
	Space Ground Stations	200,000	18,580
	Total	704,000	65,403
Villeneuve ecoPark	Research and Innovation Building (with Incubator)	30,000	2,787
	Mix-Use Building (Light Manufacturing and Research/Testing)	25,000	2,323
	Hydrogen Proving Grounds and Village	700,000	65,032
	LEED Manufacturing Facility (2 x 25,000 sq. ft)	50,000	4,645
	LEED Manufacturing Facility (2 x 50,000 sq. ft)	100,000	9,290
	LEED Manufacturing Facility (1 x 100,000 sq. ft)	100,000	9,290
	Waste Recovery R&D Centre	75,000	6,968
	Total	1,080,000	100,340
Villeneuve Agri-Innovation Hub	Future Farming Innovation Centre (FFIC)	30,000	2,787
	Industrial Kitchen	50,000	4,645
	Indoor Agriculture Testing and Production Facilities (5 building x 150 000 sq. ft each)	750,000	69,677
	Aggregation and Food Processing Centre (two plants - 50 000 sq. ft each)	100,000	9,290

Concept	Planned Facilities (building footprint only)	Sizes (Sq. Ft)	Sizes (Sq. M)
	Total	930,000	86,393
Great White North Logistics Park	Villeneuve Bulk Terminal	2,000,000	185,805
	Bulk Silos (6)	included	included
	Warehouses (4 x 500,000 sq. ft)	2,000,000	185,805
	Warehouse (1 x 1,000,000 sq. ft)	1,000,000	92,902
	Freezer Space (2 x 75 000 sq. ft)	150,000	13,935
	Total	5,150,000	478,447
Total:		7,864,000	730,578

For the VAAC, two (2) hangars at 5,000 sq. ft, two (2) hangars at 20,000 sq. ft., one (1) hangar at 50,000 sq. ft., and a general aviation hub expansion of 145,000 sq. ft. are proposed for the airside development in order to meet the growing aviation demand at the airport. On the ground side, a total of three (3) manufacturing facilities, two (2) at 50,000 sq. ft. and one (1) at 100,000 sq. ft., are envisioned. A 30,000 sq. ft. research and innovation building will provide commercial spaces, labs and an incubator for the private sector and post-secondary institutions that would like to be situated in the VAA. In addition, a space ground station of 200,000 sq. ft. is proposed to meet the growing needs of the space sector. A four-storey hotel containing board rooms and a convenience store with food and beverage services will also be part of the VAAC. In total, the VAAC is estimated to have 704,000 sq. ft. of buildings and facilities.

For the VeP, a research and innovation building with incubator space (of 30,000 sq. ft.), a mix-use building with a focus on light manufacturing and research/testing (of 25,000 sq. ft.), and a waste recovery research and development centre (of 75,000 sq. ft.) will provide ample space for companies, institutions, and organizations looking to advance their business operations and development projects. Five (5) LEED-certified manufacturing facilities are also proposed for the ecoPark, with a size of 25,000 sq. ft. (two buildings), 50,000 sq. ft. (two buildings) and 100,000 sq. ft. (one building), respectively. The hydrogen proving ground and village will have a large space of 700,000 sq. ft. Overall, 1,080,000 sq. ft. of buildings and facilities are proposed for the development of the ecoPark.

The Villeneuve Agri-Innovation Hub has four (4) types of facilities and a research and innovation building of 30,000 sq. ft. The four (4) types of facilities are an industrial kitchen (of 50,000 sq. ft.), five (5) buildings of indoor agriculture production facilities (of 150,000 sq. ft. each) and two (2) food processing plants (of 50,000 sq. ft. each). In total, this development concept represents 930,000 sq. ft. of buildings and facilities.

The Great Northern Logistics Park is proposed to have a bulk terminal and four (4) silos (ground tanks) with five (5) warehouses (four (4) at 500,000 sq. ft. and one (1) at 1,000,000 sq. ft.). Two (2) freezer spaces (of 75,000 sq. ft. each) will provide ample space to store temperature-sensitive goods. Overall, this development concept has a total building and facility size of 5,150,000 sq. ft.

Employment

It is estimated that the VAA will attract approximately 1,766 direct jobs over the next twenty (20) years. This number is very conservative, as the employment density study shows an average density of (10) industrial jobs per acre. 500 FTE will be located north of the CN Rail line in the Great Northern Logistics Park with main access from Highway 44 and Road 544. The additional 1,266 FTE will be located south of the CN Rail line, with main access from Highway 633 and surrounding roads. The table below presents the FTE distribution at each of the buildings/facilities as listed in the previous section.

Table 4-H Villeneuve Airport Area Master Plan Employment per Proposed Buildings and Facilities

Concept	Planned Facilities (building footprint only)	Sizes (Sq. Ft)	Sizes (Sq. M)	Estimated Employees
Villeneuve Aviation & Aerospace Centre	Airside Hangars (2 x 5,000 sq. ft)	10,000	929	10
	Airside Hangar (2 x 20,000 sq. ft)	40,000	3,716	30
	Airside Hangar (1 x 50,000 sq. ft)	50,000	4,645	30
	General Aviation Hub Expansion	145,000	13,471	0
	Hotel/Boarding Room (Four storeys of 6,000 sq. ft each)	24,000	2,230	50
	Research and Innovation Building (with Incubator Space)	30,000	2,787	50
	Groundside Manufacturing Facilities (2 x 50,000 sq. ft)	100,000	9,290	145
	Groundside Manufacturing Facilities (1 x 100,000 sq. ft)	100,000	9,290	145
	Convenience Store - Food & Beverage	5,000	465	30
	Space Ground Stations	200,000	18,580	10
	Total	704,000	65,403	500
Villeneuve ecoPark	Research and Innovation Building (with Incubator Space)	30,000	2,787	50
	Mix-Use Building (Light Manufacturing and Research/Testing)	25,000	2,323	50
	Hydrogen Proving Grounds and Village	700,000	65,032	25
	LEED Manufacturing Facility (2x25,000 sq ft)	50,000	4,645	56
	LEED Manufacturing Facility (2x50,000 sq ft)	100,000	9,290	127
	LEED Manufacturing Facility (1x100,000 sq. ft)	100,000	9,290	128
	Waste Recovery R&D Centre	75,000	6,968	50
Total	1,080,000	100,340	486	
Villeneuve Agri-Innovation Hub	Research and Innovation Building (with Incubator)	30,000	2,787	20
	Industrial Kitchen	50,000	4,645	50
	Indoor Agriculture Production Facilities (5 building x 150 000 sq. ft each)	750,000	69,677	160

Concept	Planned Facilities (building footprint only)	Sizes (Sq. Ft)	Sizes (Sq. M)	Estimated Employees
	Food Processing Plant (two plants - 50 000 sq. ft each)	100,000	9,290	50
	Total	930,000	86,393	280
Great White North Logistics Park	Villeneuve Bulk Terminal	2,000,000	185,805	50
	Bulk Silos (6)	included	included	50
	Warehouses (4 x 500,000 sq. ft)	2,000,000	185,805	100
	Warehouse (1 x 1,000,000 sq. ft)	1,000,000	92,902	150
	Freezer Space (2 x 75 000 sq. ft)	150,000	13,935	150
	Total	5,150,000	478,447	500
Total:		7,864,000	730,578	1766

Cumulative Fiscal Analysis and Economic Impact Results

The proposed business concepts will act as accelerators of economic growth that will strengthen existing industries in the Edmonton Metropolitan Region (and throughout the province) and also help to diversify the province's economy and economic base. In addition to creating wealth through the economic activity generated at the VAA, creating the proposed business concepts will allow Sturgeon County to reap significant tax benefits in the form of property taxes that will be collected on the buildings and assets that are slated for construction.

A detailed explanation of terminologies, assumptions and methodologies used in the following analysis can be found in Appendix D. The (estimated) overall direct, indirect, and induced economic impacts generated by each of the VAAMP business concepts, based on the proposed buildings, facilities, and employment assumptions, can be found in Appendix E.

Combined, the four (4) business development concepts have 28 types of buildings and facilities that are proposed to be built throughout the 20-year planning and development period. The following subsections illustrate the phased fiscal and economic impact per year throughout the 20-year timeframe, the cumulative fiscal and economic benefit in the planning period, and the annual fiscal and economic impact extended beyond the 20-year period, after all building and facility developments have been completed. A summary of potential sources of funding can be found in Appendix F.

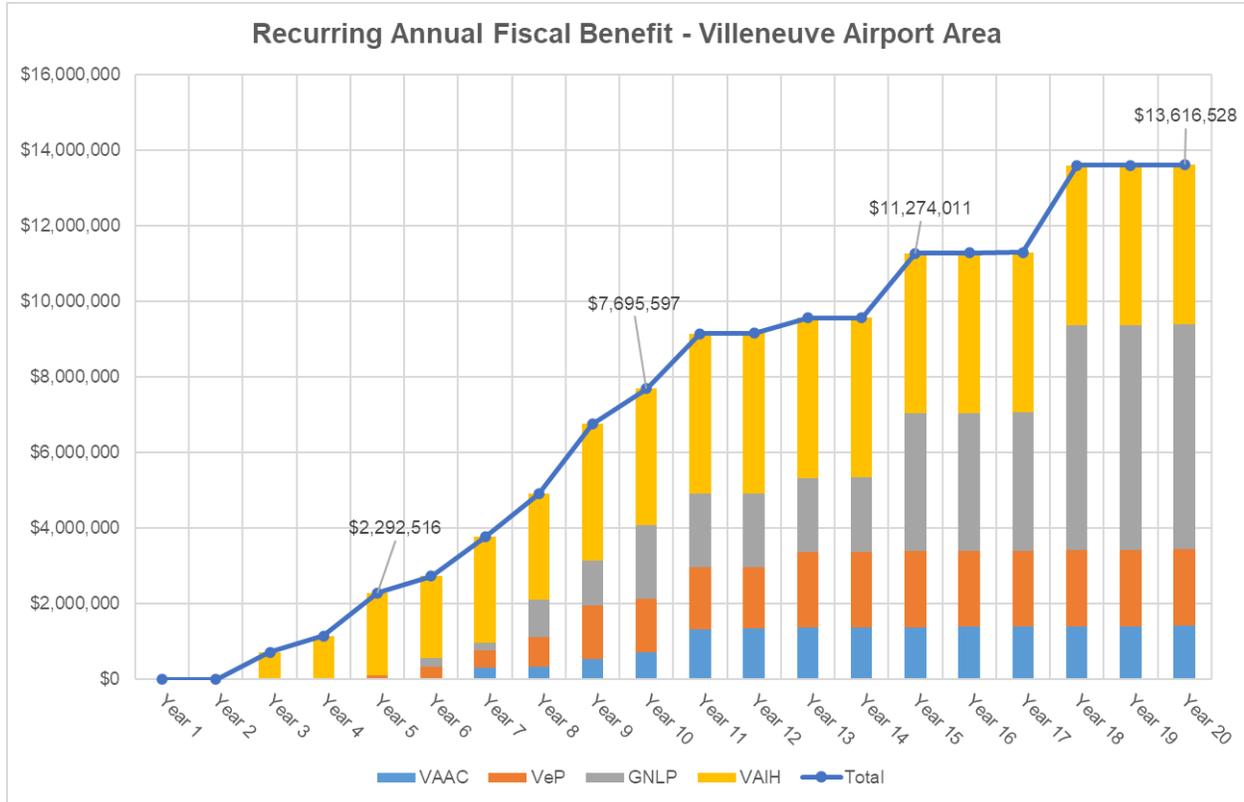
2.7.1.2 Summary of Overall Fiscal Impact

The following tables and charts summarize the total fiscal and economic impact for the VAA, combining the results from the four (4) business concepts as illustrated above.

Chart 2-A summarizes the annual fiscal impact generated by each of the four (4) business development concepts over the 20-year development timeframe. The fiscal benefit exhibits a continuous growth in the first decade and shows significant growth occurring in Years 1 and 18.

By the twentieth year, it is estimated that the VAA will generate an annual \$13 million in property tax to Sturgeon County.

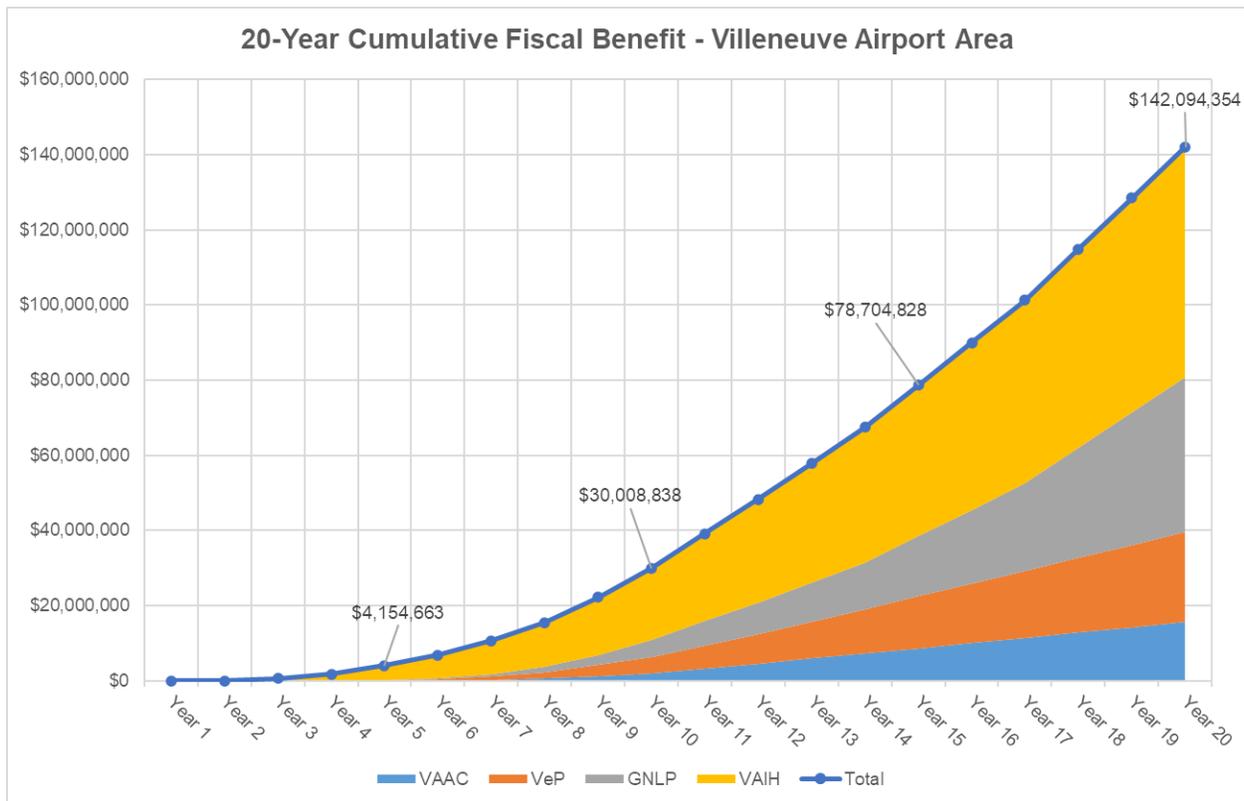
Chart 2-A VAA Recurring Annual Fiscal Benefit



2.7.1.3 20-Year Cumulative Fiscal Impact

The 20-year cumulative fiscal impact projection reveals a total property tax of \$142.01 million paid to Sturgeon County over the 20-year development period. Even though the GNLP has a higher property value than the VAIH, the VAIH contributes more to the cumulative fiscal benefit in the first 20-years because major facilities in the GNLP only become functional in the latter part of the development timeframe. However, it must be noted that as the four (4) business concept areas continue to serve the regional economy after the projection period, the fiscal benefit is expected to continue its growth in line with new investments.

Chart 2-B VAA 20-Year Cumulative Fiscal Benefit



2.7.1.4 Overall Annual Fiscal and Economic Impact Upon Completion

After all of the developments are complete, the four (4) business concepts and their anchor projects are expected to generate a total economic impact (including indirect and induced impacts) of \$233.13 million in gross payroll, \$24.31 million in the provincial payroll tax, \$39.66 in federal payroll tax, and \$16.02 million in municipal tax on an annual basis; these figures also extend beyond the 20-year projection period. After it is fully developed, the VAA is estimated to have \$1.15 billion worth of properties. The 20-year cumulative fiscal benefit is an estimated total of \$142.09 million for Sturgeon County, while the cumulative economic benefit (including indirect and induced impacts) will total an estimated \$1.788 billion and lead to the creation of approximately 3,040 jobs.

Table 2-C Economic Impact (Annual) Generated by the Villeneuve Airport Area

Themes and Categories		All Concepts	
Workforce Development Benefits	Categories		Total (All Concepts)
	Total Full-time Jobs Created		3,040
	Gross Payroll		\$233,137,600
	Provincial Government Revenues	Payroll Tax	\$23,313,760
	Federal Government Revenues	Payroll Tax	\$39,664,176
	Total Tax from Payroll		\$62,977,936
Commercial & Industrial Development Benefits	Value of Properties Developed		\$1,017,651,000
	Municipal Taxes Paid to Sturgeon County		\$14,173,640
Airport Utilization Benefits	Additional Flight Movements Generated		13,840
	Land Lease Revenues		\$328,692
	Airport Revenues & Fees		\$138,400
	Total Revenue Generated for EIA		\$467,092
Total Impact	Recurring Fiscal Impact to Sturgeon County	Annual Amount	\$14,173,640
		20-Year Cumulative Amount	\$142,094,354
	Recurring Economic Impact (excluding taxation)	Annual Amount	\$170,626,756
		20-Year Cumulative Amount	\$1,788,423,830
	Non-Recurring Economic Impact		\$1,017,651,000

2.8 Infrastructure Cost Estimation

Infrastructure such as stormwater management, water supply, sanitation, and transportation networks, is essential for the development of the Villeneuve Airport Area, with some being pre-requisites for investment attraction and business development in the area.

Assumptions

The following list summarizes the assumptions used to obtain the infrastructure cost estimation.

- Costs are presented in 2021 Canadian dollars.
- GST is excluded.
- The Class 'E' Cost Estimate was developed using concept sketches and was based on a target accuracy of -50% to +50% of the estimated project costs.
- The unit rates used were taken from cost estimates from past reports provided by Sturgeon County, as well as from Hatch's database of awarded bid contracts of civil and electrical contractors on similar type and scale of work at YVR, and a 2.3% yearly inflation rate to obtain 2021 Canadian dollars.
- 20% general conditions and 12% engineering contingencies were included in the unit rates.
- Land acquisition costs are not included.
- These costs are based on the Explorer Solutions business development concept.
- Utility costs were derived from the figures in Section 5.3 of the VAAMP document.
- Electrical infrastructure costs leading to development areas are to be provided by Fortis Alberta. Any underground infrastructure costs will be negotiated between Sturgeon County and Fortis Alberta.
- Gas infrastructure costs leading to development areas are to be provided by ATCO.
- The cost of capping and covering any abandoned wells for the development is to be provided by the developers.
- The cost of the underpass below Highway 633 for pedestrians' movement is not included at this stage.
- Environmental mitigation is to be determined at a future date, after an environmental site investigation is performed.

Results

The following tables present the estimated infrastructure cost for the development of the Villeneuve Airport Area. In total, stormwater management is estimated to cost \$4.16 million and water supply will cost \$24.08 million. Sanitary infrastructure is estimated to cost \$27.4 million.

The transportation network will require \$157,43 million of investments. Upgrades at the airport (ZVL) are estimated to cost \$5.27 million. The Villeneuve Bulk Terminal, consisting of six (6) silos (tanks), the rail spur, and the construction, is estimated to cost \$66.97 million. When factoring in a 30% add-on for contingency, the total infrastructure cost is estimated to be an upwards of \$370.904 million.

Table 2-D VAA Infrastructure Cost Summary

Infrastructure	Estimated Cost
Storm	
Dry Pond at Great Northern Logistic Park	\$ 2,600,000.00
Dry Pond Management Facility at Villeneuve Agri-Innovation Hub and EcoPark	\$ 1,560,000.00
Dry Pond Management Facility at Villeneuve Aviation & Aerospace Centre	By EIA
Storm Total	\$ 4,160,000.00
Water	
300mm dia. HDPE watermain to service Great Northern Logistic Park	\$ 4,290,000.00
Reservoir, Chlorination System, and Pumping Facility at Great Northern Logistic Park	\$ 7,230,000.00
300mm dia. HDPE watermain to service Villeneuve Agri-Innovation Hub and EcoPark by directional drill	\$ 5,330,000.00
Reservoir, Chlorination System, and Pumping Facility at Villeneuve Agri-Innovation Hub and ecoPark	\$ 7,230,000.00
Water Total	\$ 24,080,000.00
Sanitary	
150mm dia. HDPE sanitary from Great Northern Logistic Park to Central Lift Station by directional drill	\$ 5,760,000.00
Pumping Station at Great Northern Logistic Park	\$ 1,400,000.00
200mm dia. HDPE sanitary from Villeneuve ecoPark to Lagoon by directional drill	\$ 3,900,000.00
Pumping Station at Villeneuve ecoPark	\$ 1,400,000.00
Decommission lagoon	\$ 2,560,000.00
200mm dia. HDPE sanitary from Villeneuve Aviation & Aerospace to ecoPark	\$ 1,430,000.00
New Pump Station South of Hamlet	\$ 1,400,000.00
New 300mm dia. HDPE Sanitary Forcemain to ACRWC Trunk Sewer by directional drill and central lift station	\$ 9,550,000.00
Sanitary Total	\$ 27,400,000.00
Power	
	by Fortis Alberta
Power Total	\$ -
Natural Gas	
	by ATCO
Natural Gas Total	\$ -

(continues on the next page)

Infrastructure	Estimated Cost
Transportation Network	
Highway 44 widening between Highway 16 to north of Township Road 544	\$ 62,921,000.00
Highway 44 Frontage Road	\$ 6,145,000.00
Highway 633 widening	\$ 16,365,000.00
Future Collector Roads	\$ 44,597,000.00
Future Local Roads	\$ 21,358,000.00
Hwy 44 and Hwy 633 roundabout	\$ 1,120,000.00
Hwy 44 and Twp 543 northbound left-turn lane and southbound right-turn lane	\$ 964,000.00
Hwy 44 and Twp 544 roundabout	\$ 1,120,000.00
Hwy 633 and RR270 roundabout	\$ 1,120,000.00
Hwy 633 and RR271 roundabout	\$ 1,120,000.00
Rail Systems Enhancements - 2 cantilever gates	\$ 600,000.00
Transportation Network Total	\$ 157,430,000.00
ZVL Upgrades	
New Taxiway	\$ 1,570,000.00
Apron Expansion	\$ 1,960,000.00
Runway Exit	\$ 1,740,000.00
ZVL Upgrades Total	\$ 5,270,000.00
Rail Spur	
Single track build	\$ 4,703,000.00
#10 turnouts at either end	\$ 510,000.00
SWPT derails at either end	\$ 132,000.00
Ballast	\$ 4,230,000.00
Subballast	\$ 2,381,000.00
Geotextile	\$ 66,000.00
Native excavation for rail spur, agri storage area and oil/gas	\$ 105,000.00
3-silo grain handling facility including storage, truck unloading station, truck/rail scale, inloading transfer conveyor, bin loading transfer conveyor, reclaim conveyor, train loading transfer conveyor, conveyor gallery, bucket elevators	\$ 14,844,000.00
3-7 million litre oil/gas storage tanks, rail offloading system and two lane truck loading racks	\$ 40,000,000.00
Rail Spur Total	\$ 66,971,000.00
Infrastructure Total	\$285,311,000.00
Contingency (30%)	\$ 85,593,300.00
Infrastructure Subtotal	\$370,904,300.00

To further summarise what is included as part of the Transportation Network upgrade costs, the following are key upgrades recommended in the study:

- Two upgraded highway accesses to accommodate full development traffic volumes: a future collector road connecting to Highway 633 at RR270 and existing RR271 in conjunction with removal of the Road 270A connection to the highway; and an upgraded TWP Road 543 connection to Highway 44.
- Highway 44, from Highway 16 to north of TWP Road 544, to be widened to 4 basic traffic lanes by the full build-out horizon.

- Highway 633 widening to 4 basic traffic lanes between Highway 44 and west of Road 270A to accommodate growth in background traffic and airport development traffic at full buildout.
- Intersection improvements along the adjacent highways as shown in Table 2-J in Section 2.8.3 in the Master Plan.
- The existing TWP Road 543 rail crossing to be maintained but restricted to local use only. The existing RR270 crossing to be removed and road terminated in turnarounds on both sides of the tracks in conjunction with provision of a north–south collector/local road in the RR270 corridor.
- Active transportation facilities including sidewalks and cycling facilities (either buffered bike lanes on or off road) adjacent to collector and local roads.
- Right of way widths for internal roads and boundary roads as shown in Table 2-P in Section 2.8.10.5 in the Master Plan.

The initial traffic analysis identified capacity upgrade requirements to maintain road efficiency and safety. A more detailed traffic impact assessment will be required as part of the local plan preparation process for the County Servicing standards. The designation and design of internal roads including classification, street sizing, intersections, and access planning will be refined as part of the ASP.

Appendix A – Financial Analysis Assumptions and Methodologies

i. Definitions

Definitions of the terminology used in the financial analysis are given below.

Direct economic impacts

Direct economic impacts measure the magnitude of the economic impact generated at the airport area from the tenants and guests visiting the VAA (including tourism spending and attraction). This is the effect generated by the operating expenses, the labour force, their remuneration, and other elements contributing to GDP (e.g., investments, gross profits, inventories/stocks, social benefits, and taxes) and government revenues.

Indirect economic impacts

Indirect economic impacts refer to the chain reactions that the activities in the VAA generate in the regional economy – particularly the jobs and activities generated by regional subcontractors and suppliers collaborating with the VAA tenants. In other words, companies in the EMR and across Alberta, whose income-generating activities are positively impacted by the vitality of the VAA and its business activities, are included in this category.

Induced economic impacts

These are the multiplier effects generated by the indirect expenses. Expenditures have direct and indirect effects, and a portion of this revenue is re-injected into the economy in the form of new expenditures on goods and services (consumer spending). These new expenditures will become, in part, revenue for other economic agents who will use, in turn, a fraction of this revenue to make new expenses, and so on.

ii. Methodology

To obtain the necessary data for completing the estimated fiscal and economic impact analysis, clear growth and development assumptions for each business concept must be defined and leveraged as a part of multiple sources of data. The sources of data include information obtained from past projects and plans from Sturgeon County and Edmonton Metropolitan Region, the Statistics Canada 2016 Census, the Statistics Canada Industry Income Measurements, building cost estimations from industry leaders, and information from the VAAMP consultant's engineering partners.

The collected data and information was then consolidated into a comprehensive information matrix. The economic impact table, as presented below, illustrates the direct, indirect, and induced impacts for each of the business concepts when compared against the following measurement indicators:

- Total payroll
- Provincial (payroll) taxes paid
- Federal (payroll) taxes paid
- Municipal (property) taxes paid
- Total value of properties (buildings & facilities) developed
- Additional flight movements generated at ZVL
- Airport land lease revenue generated at ZVL
- Other airport revenues & fees generated at ZVL

iii. Building & Facility Value Assumptions

The estimated total property value of the VAAC is based on the proposed building and facility sizes and the unit construction cost in the Edmonton Metropolitan Region in 2021 (derived from the Altus Group 2021 Canadian Cost Guide). For simplicity, it is assumed that the property value will reflect the cost of construction and will remain the constant across the forecasted 20-year time span. The following table summarizes the unit cost assumptions used for each proposed building/facility.

Table 4-I Unit Cost of Construction for Proposed Buildings & Facilities

Concept	Planned Facilities (building footprint only)	Unit Cost of Construction (\$/Sq. Ft)
Villeneuve Aviation & Aerospace Centre	Airside Hangars (2 x 5,000 sq. ft)	\$100
	Airside Hangar (2 x 20,000 sq. ft)	\$150
	Airside Hangar (1 x 50,000 sq. ft)	\$175
	General Aviation Hub Expansion	\$100
	Hotel/Boarding Room (Four storeys of 6,000 sqft each)	\$220
	Research and Innovation Building (with Incubator Space)	\$285
	Groundside Manufacturing Facilities (2 x 50,000 sq. ft)	\$285
	Groundside Manufacturing Facilities (1 x 100,000 sq. ft)	\$285
	Convenience Store - Food & Beverage	\$180
	Space Ground Stations	\$200
Villeneuve ecoPark	Research and Innovation Building (with Incubator Space)	\$220
	Mix-Use Building (Light Manufacturing and Research/Testing)	\$250
	Hydrogen Proving Grounds and Village	\$40
	LEED Manufacturing Facility (2 x 25,000 sq. ft)	\$300
	LEED Manufacturing Facility (2 x 50,000 sq. ft)	\$300
	LEED Manufacturing Facility (1 x 100,000 sq. ft)	\$300

	Waste Recovery R&D Center	\$250
Villeneuve Agri-Innovation Hub	Research and Innovation Building	\$220
	Industrial Kitchen	\$250
	Farm and Agri-Equipment Development and Testing Facility	\$300
	Indoor Agriculture Testing and Production Facilities (5 building x 150 000 sqft each)	\$300
	Aggregation and Food Processing Centre	\$300
The Great Northern Logistics Park	Villeneuve Bulk Terminal	-
	Bulk Silos (6)	-
	Warehouses (4 x 500,000 sq. ft)	\$110
	Warehouse (1 x 1,000,000 sq. ft)	\$110
	Freezer Space (2 x 75 000 sqft)	\$200

iv. Gross Payroll Estimation

The gross payroll estimation starts by dividing the estimated number of employees per each proposed building/facility into three (3) levels of positions. For this exercise, it is assumed that the workforce at each building/facility will be allocated as ten percent (10%) senior/management level positions, seventy-five percent (75%) at the technician/engineer/production level, and the remaining fifteen percent (15%) will be administrative positions. For the senior/management level positions, an annual salary between \$100,000 and \$125,000 is assumed.

For the technician/engineer/production level positions, the assumed annual salary falls within a range of \$65,000 – \$80,000; and for the administrative positions, an annual salary between \$40,000 and \$60,000 is assumed. Based on the nature of each building/facility, the number of positions and salaries used to calculate the gross payroll can vary slightly, due to industry differences and market conditions, but all salaries will remain within the pre-determined range.

v. Airport Revenue Estimation

For buildings and facilities on the Villeneuve Airport lands, a land lease of \$0.588/sq. ft. is assumed. The hangar and general aviation hub expansion at ZVL is also expected to increase annual flight traffic. It is assumed that each cluster of hangars will generate 3,460 additional annual flight movements at ZVL, based on the per-hangar average traffic in the year 2018. In total, an estimated 13,840 new flight movements will be generated by the VAAC when the development is fully completed. For each additional flight movement at the airport, it is assumed that \$10.00 in airport fees (i.e., landing fees, parking fees) and fuel sales will be collected.

vi. Taxation Estimation

The provincial and federal payroll tax is estimated using the 2021 Province of Alberta and federal tax rate. The table below summarizes the tax rate used to calculate gross payroll taxes in the following section.

Table 4-J Tax Rates Used for Payroll Tax Estimation

Taxation	Tax Bracket	Tax Rate
Alberta Personal Income Tax Rates	Up to \$131,220	10%
	\$131,220.01 to \$157,464	12%
	\$157,464.01 to \$209,952	13%
	\$209,952.01 to \$314,928	14%
	\$314,928.01 and up	15%
Canadian Income Tax Rates for Individuals	Up to \$49,020	15%
	The next \$49,020	20.50%
	The next \$53,939	26%
	The next \$64,533	29%
	Over \$216,511	33%

The municipal property tax amount for each of the buildings/facilities is estimated using the 2021 Sturgeon County tax rate for non-residential buildings. A 1.39% rate is applied to the estimated property value in order to obtain the property tax amount contribution to Sturgeon County. It is worth noting that the machinery and equipment (M&E) on properties has a tax rate of 1.03% in Sturgeon County (as of 2021). For the scope of this exercise, the potential value of M&Es in each of the buildings and facilities was not estimated; thus, the M&E tax is not calculated as part of the fiscal analysis section. The following table summarizes the municipal tax rates used for the calculation.

Table 4-K Tax Rate Used for Municipal Property Tax Estimation

Taxation	Tax Breakdown	Tax Rate
Sturgeon County Non-Residential Property Tax Rates	Municipal	0.0102808
	Alberta School Foundation Fund	0.0035894
	Homeland Housing	0.0000576
	Total	0.0139278

The results of the fiscal and economic impact analysis are presented in the following section and are based on the methodologies and assumptions listed above.

Appendix B – Summary of Fiscal and Economic Impact Per Business Concept

Villeneuve Aviation & Aerospace Centre

The VAAC has a proposed thirteen (13) buildings and facilities to be constructed throughout the 20-year planning timeframe.

Chart 0-A illustrates the estimated annual fiscal benefit generated by the VAAC throughout the 20-year development period. The recurring fiscal benefit represents the annual municipal property tax paid to Sturgeon County. In Year 7, a significant increase in property tax can be observed due to the completed construction of multiple buildings and facilities in that year; the hotel, the research and innovation building, and a groundside manufacturing facility are all predicted to be fully constructed in Year 7.

By the tenth year, an estimated annual property tax of \$721,948 will be paid to Sturgeon County; the benefit stabilizes after Year 11, by which time most of the buildings and facilities will be developed. In Year 15, a fiscal benefit of \$1,375,927 is estimated to be contributed to Sturgeon County. In Year 20, the estimated annual fiscal impact will increase to \$1,420,357.

Chart 0-A VAAC Recurring Annual Fiscal Benefit

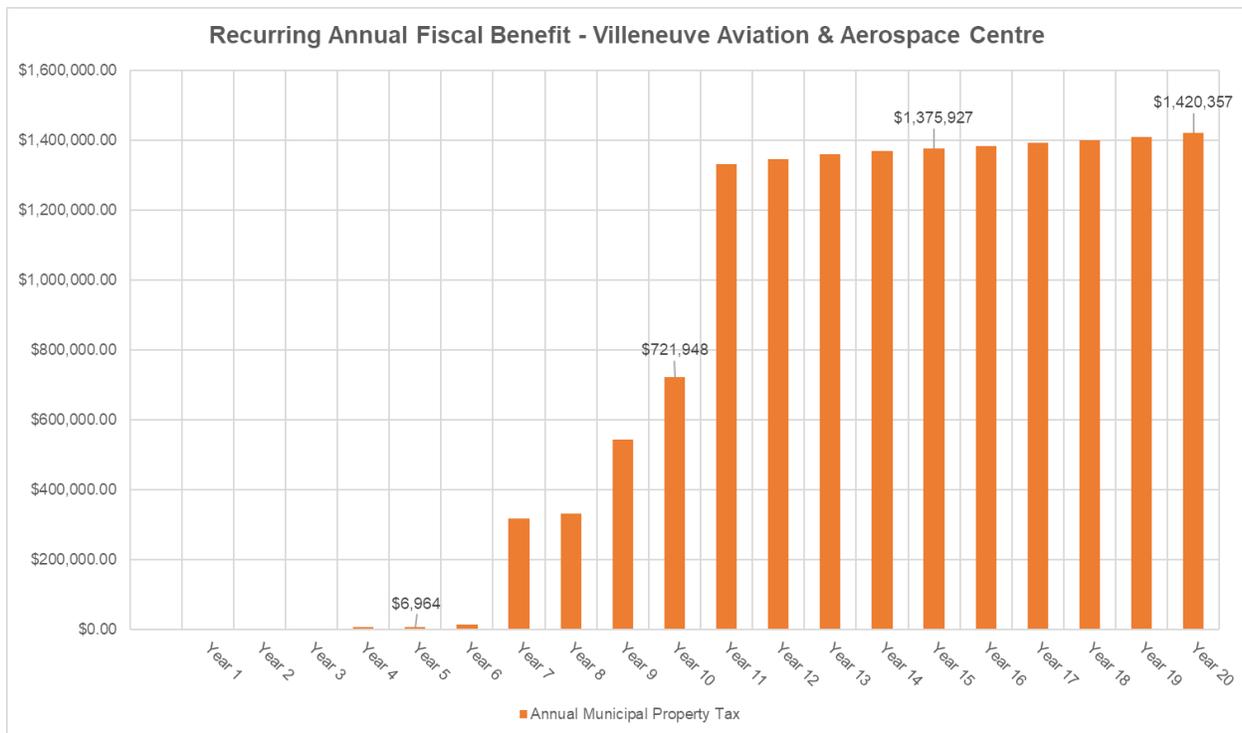
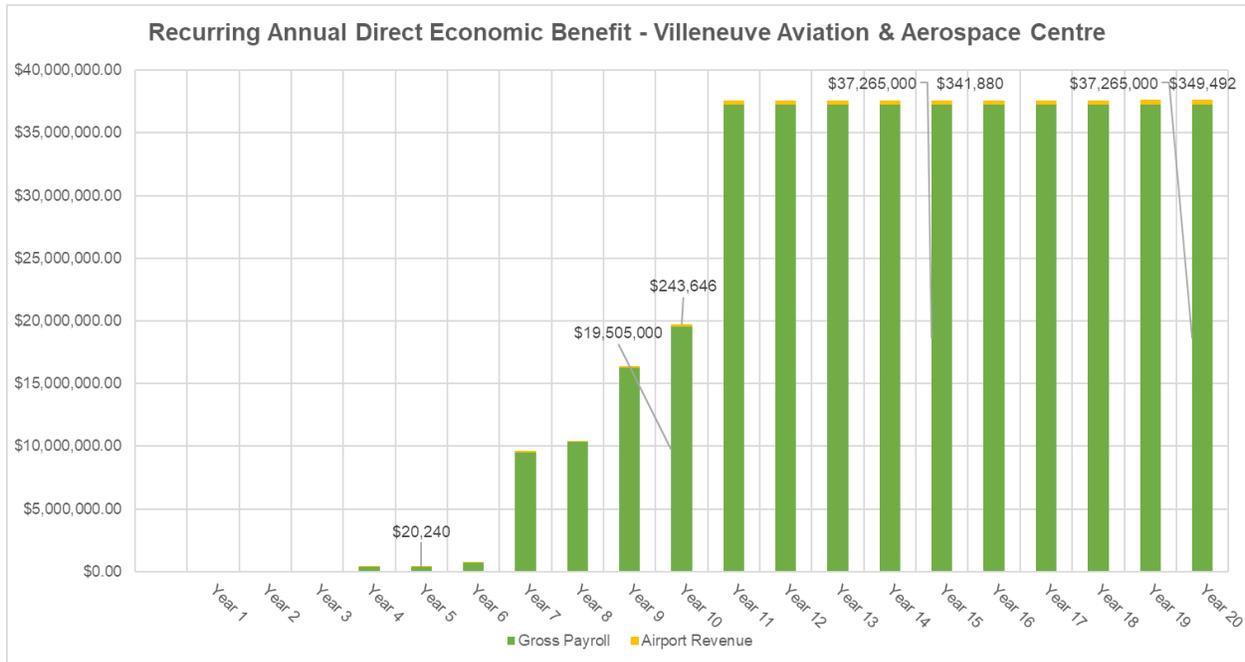


Chart 0-B displays the estimated annual direct economic benefits (direct gross payroll to the workforce at the VAAC plus the airport revenue) generated by the VAAC. In its tenth year, \$243,646 of airport revenue and \$19.5 million of gross payroll will be generated at the VAAC. In Year 20, the annual airport revenue will climb to \$349,492, while the gross payroll will increase to \$37.2 million.

Chart 0-B VAAC Recurring Annual Direct Economic Benefit



20-Year Cumulative Fiscal and Economic Impact

Chart 0-C displays the estimated cumulative fiscal benefit that will be generated by developments at the VAAC. The cumulative amount begins increasing in Year 7 and will reach \$1,942,928 by Year 10. The second decade of the development timeframe represents a high growth pace in cumulative fiscal benefit, increasing from \$1.94 million in Year 10 to \$15 million in Year 20.

Chart 0-C VAAC 20-Year Cumulative Fiscal Benefit

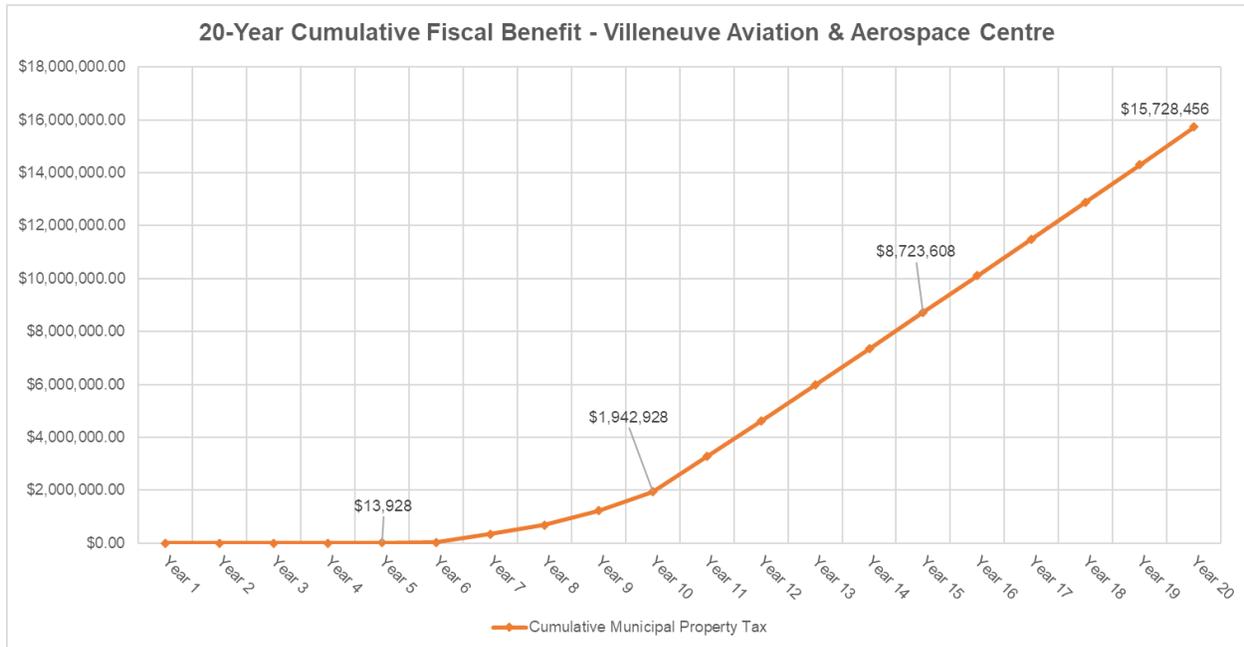


Chart 0-D displays the estimated value of properties at the VAAC as the development unfolds during the projected 20-year timeframe. The cumulative property values will experience significant growth between Years 7 and 11, as most of the proposed construction occurs during that period. By Year 20, the estimated total value of buildings and facilities at the VAAC is \$141.98 million.

Chart 0-D VAAC 20-Year Cumulative Property Value



Annual Fiscal and Economic Impact Upon Completion

After all buildings and facilities at the VAAC are fully developed, the properties will have an estimated value of \$141,980 million. The estimated 500 direct FTEs are projected to generate a gross payroll of \$37 million. The provincial payroll tax (derived from direct payroll) is estimated to be \$3.73 million and the federal payroll tax will generate an estimated \$6,325,010. When combining the direct, indirect, and induced effects, the VAAC is expected to generate \$5,664,280 of provincial payroll tax revenue, \$9,614,015 of federal payroll tax revenue, and \$1,977,469 of municipal property tax revenue annually.

For Sturgeon County, the buildings and facilities in the VAAC are expected to generate a municipal tax of \$1,977,469 annually (after all construction development is completed). The development of the VAAC will also generate 13,840 additional flight movements at ZVL every year and will contribute an additional \$467,092 to EIA – \$328,692 of which is sourced from land leases.

The 20-year cumulative fiscal impact to Sturgeon County is estimated to be \$15.7 million. After 20 years, the VAAC will continue to generate an (estimated) annual fiscal revenue of \$1,977,469. The cumulative economic impact in the initial 20-year timeframe totals \$433.78 million. After completion of all developments, it is estimated that the VAAC will continue to generate \$41.8 million annually.

Table 0-A Economic Impact Generated by the Villeneuve Aviation & Aerospace Centre

Themes and Categories		Villeneuve Aviation & Aerospace Centre				
Workforce Development Benefits	Categories		Direct Effect	Indirect Effect	Induced Effect	Total
	Total Full-time Jobs Created		500	160	100	760
Gross Payroll		\$37,265,000	\$11,924,800	\$7,453,000	\$56,642,800	
Provincial Government Revenues		Payroll Tax	\$3,726,500	\$1,192,480	\$745,300	\$5,664,280
Federal Government Revenues		Payroll Tax	\$6,325,010	\$2,024,003	\$1,265,002	\$9,614,015
Total Tax from Payroll		\$10,051,510	\$3,216,483	\$2,010,302	\$15,278,295	
Commercial & Industrial Development Benefits	Value of Properties Developed		\$141,980,000	-	-	\$141,980,000
	Municipal Taxes Paid to Sturgeon County		\$1,977,469	-	-	\$1,977,469
Airport Utilization Benefits	Additional Flight Movements Generated		13,840	-	-	13,840
	Land Lease Revenues		\$328,692	-	-	\$328,692
	Airport Revenues & Fees		\$138,400	-	-	\$138,400
	Total Revenue Generated for EIA		\$467,092	-	-	\$467,092
Total Impact	Recurring Fiscal Impact to Sturgeon County	Annual Amount	\$1,977,469			
		20-Year Cumulative Amount	\$15,728,456			
	Recurring Economic Impact (excluding taxation)	Annual Amount	\$41,831,597			
		20-Year Cumulative Amount	\$433,788,830			
	Non-Recurring Economic Impact		\$141,980,000			

Villeneuve ecoPark

The VeP has ten (10) proposed buildings and facilities that are to be constructed throughout the 20-year planning timeframe.

Chart 0-E displays the estimated fiscal benefit generated by the ecoPark in each of the 20-Year planning and development periods; the fiscal benefit starts with \$104,459 in Year 5 when the first construction (a LEED-certified manufacturing facility) is estimated to be completed. In Year 10, the fiscal benefit generated to Sturgeon County increases to \$1.41 million. After Year 13, all construction should be complete and an estimated annual fiscal impact of \$2.01 million will be generated by the ecoPark.

Chart 0-E VeP Recurring Annual Fiscal Benefit

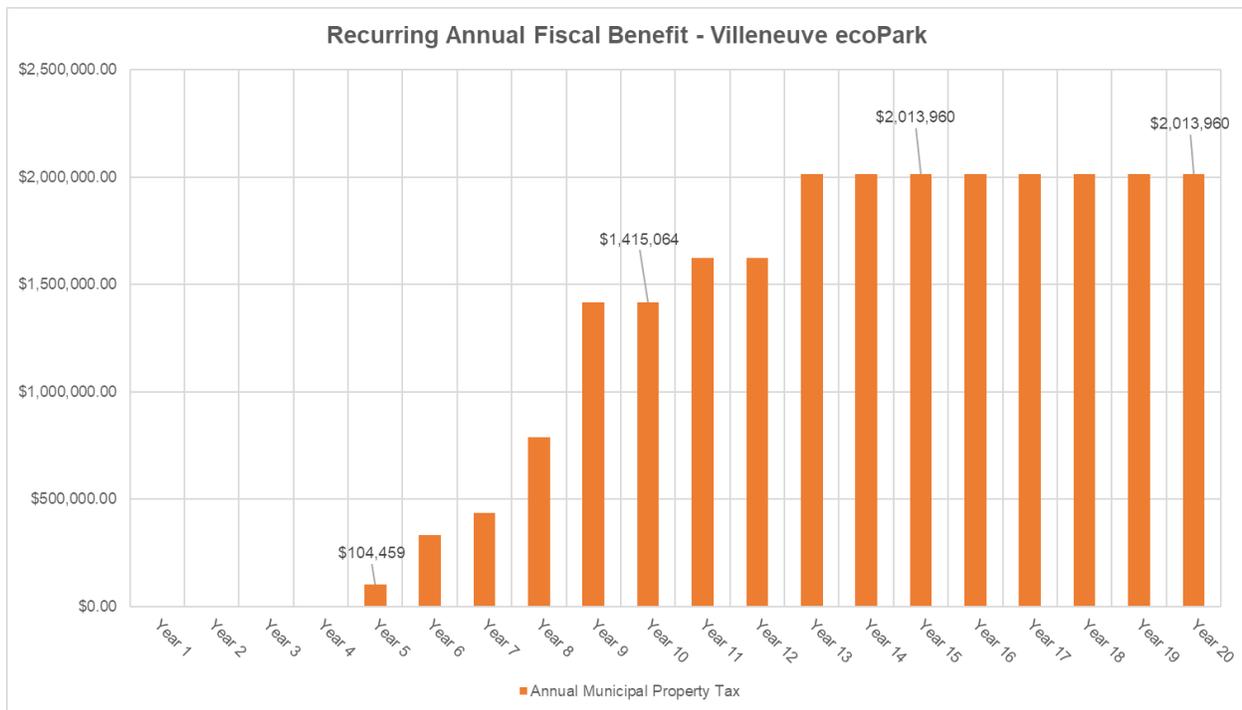
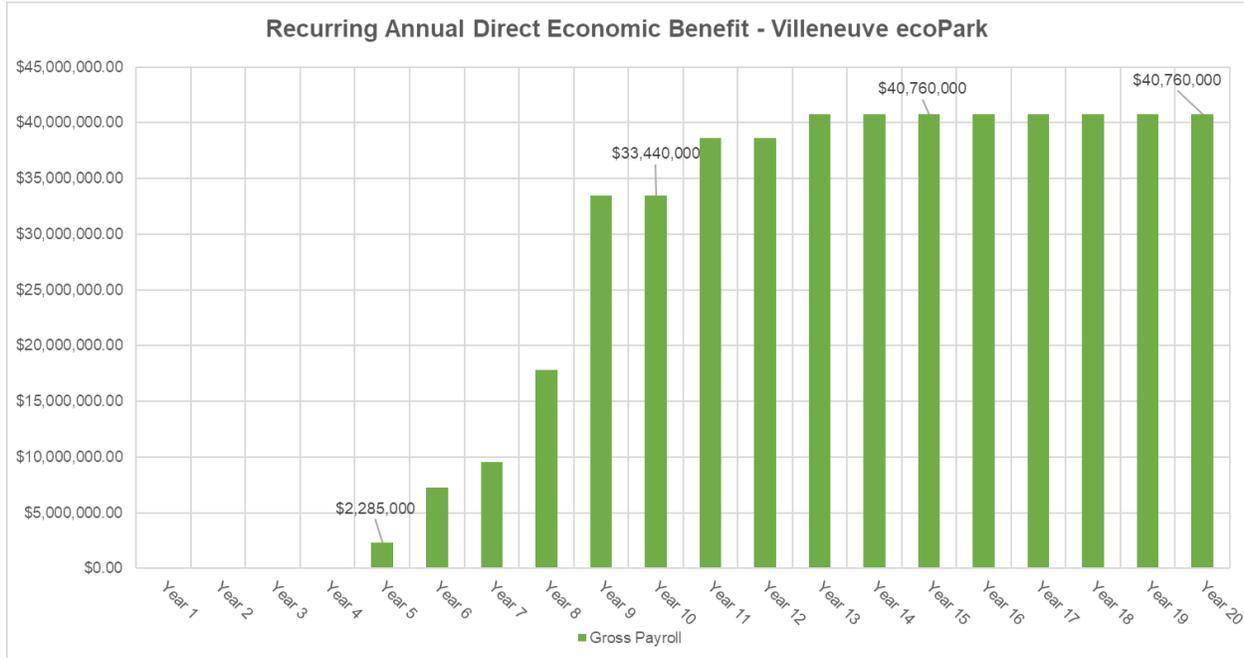


Chart 0-F displays the estimated annual direct economic benefit in the 20-year period, following the same pattern as the development phasing. In Year 5, the direct economic impact is \$2.28 million. In Year 13, the annual direct economic impact is estimated to increase to \$40.7 million and remain at that value for the next seven (7) years.

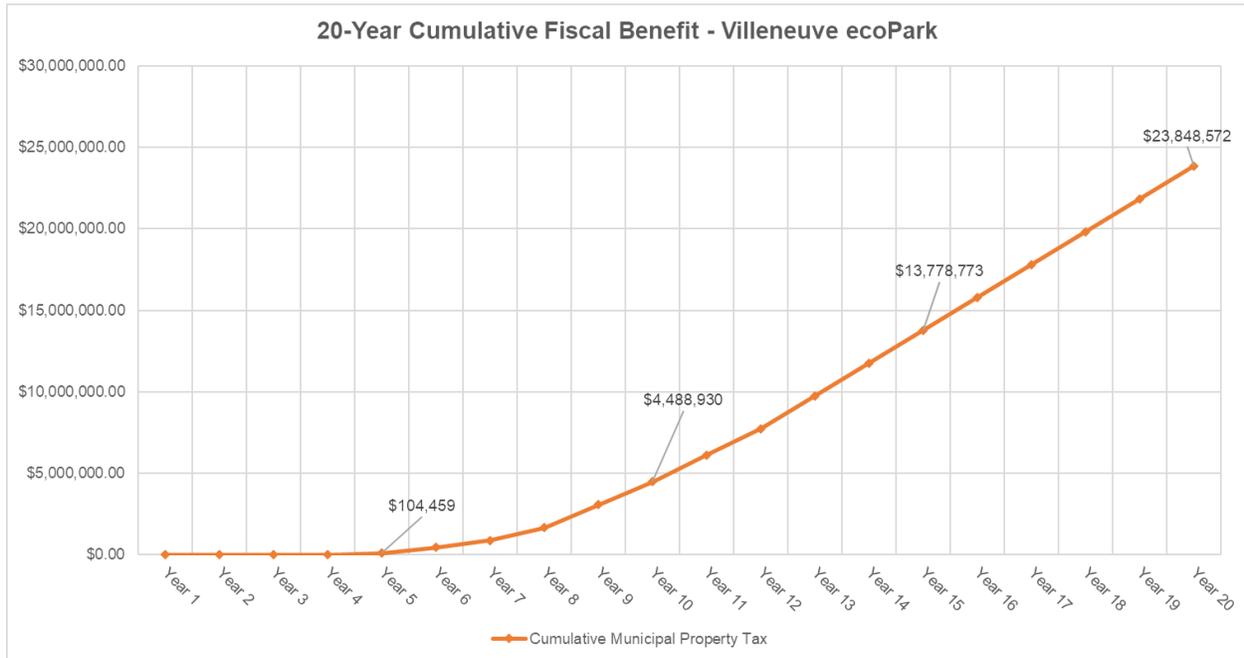
Chart 0-F VeP Recurring Annual Direct Economic Benefit



20-Year Cumulative Fiscal and Economic Impact

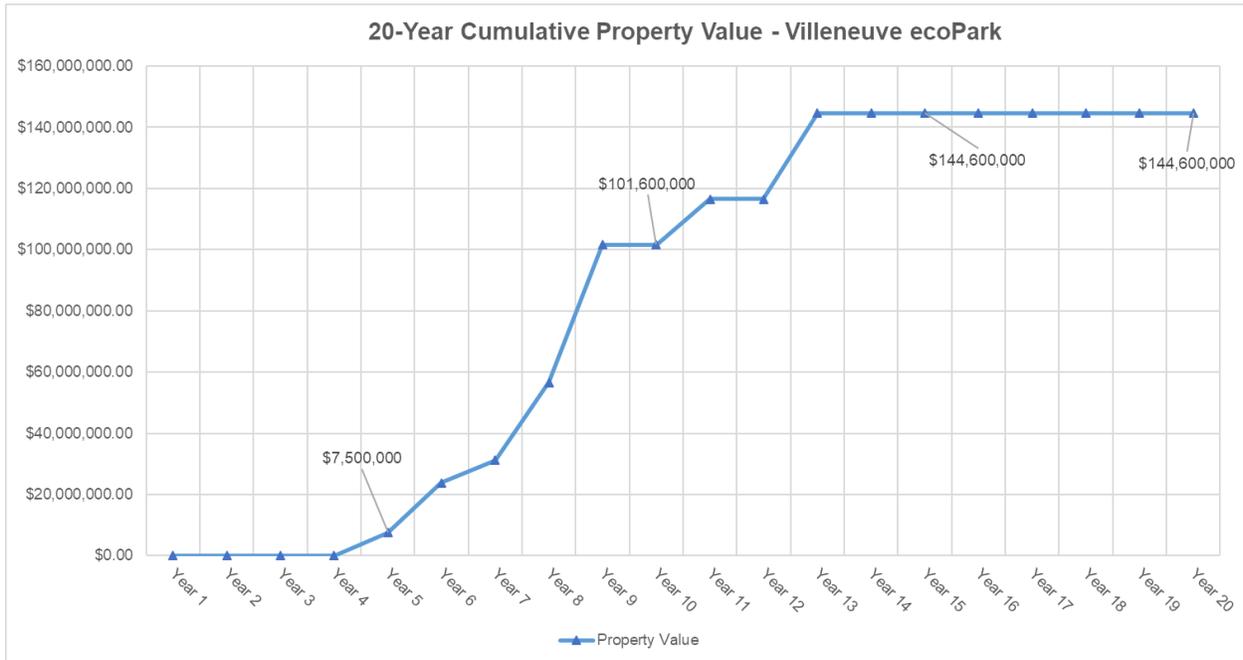
Chart 0-G displays the estimated cumulative fiscal benefit generated by the VeP to Sturgeon County. A stable growth trend can be observed, with the cumulative benefit increasing from \$104,459 in Year 5 to \$23.8 million in Year 20.

Chart 0-G VeP 20-Year Cumulative Fiscal Benefit



As displayed in Chart 0-H, development at the VeP will experience a high growth period from Year 7 to Year 9, followed by another major round of development in Year 12. By the end of the 20-year period, the cumulative property value of buildings and facilities at the VeP is estimated to be \$144.6 million.

Chart 0-H VeP 20-Year Cumulative Property Value



Annual Fiscal and Economic Impact Upon Completion

Once it is fully developed, the VeP will enable Sturgeon County to generate \$2,013,960 annually in additional property tax revenue from the VeP's buildings and facilities, which will total \$144.6 million in value. The workforce in the VeP will have a gross payroll of \$40.76 million, and this will result in an estimated provincial payroll tax revenue of \$4.076 million and federal payroll tax revenue of approximately \$7 million. When factoring the indirect and induced impacts into this equation, the ecoPark is estimated to generate a gross payroll of \$61.95 million, a provincial payroll tax of \$6.19 million, and a federal payroll tax of \$10.65 million.

The 20-year cumulative fiscal benefit to Sturgeon County is estimated to be \$23.8 million. From this model, the recurring economic impact (excluding taxation and the buildings and facilities) will total \$507 million across the 20-year timeframe.

Table 0-B Economic Impact Generated by the Villeneuve ecoPark

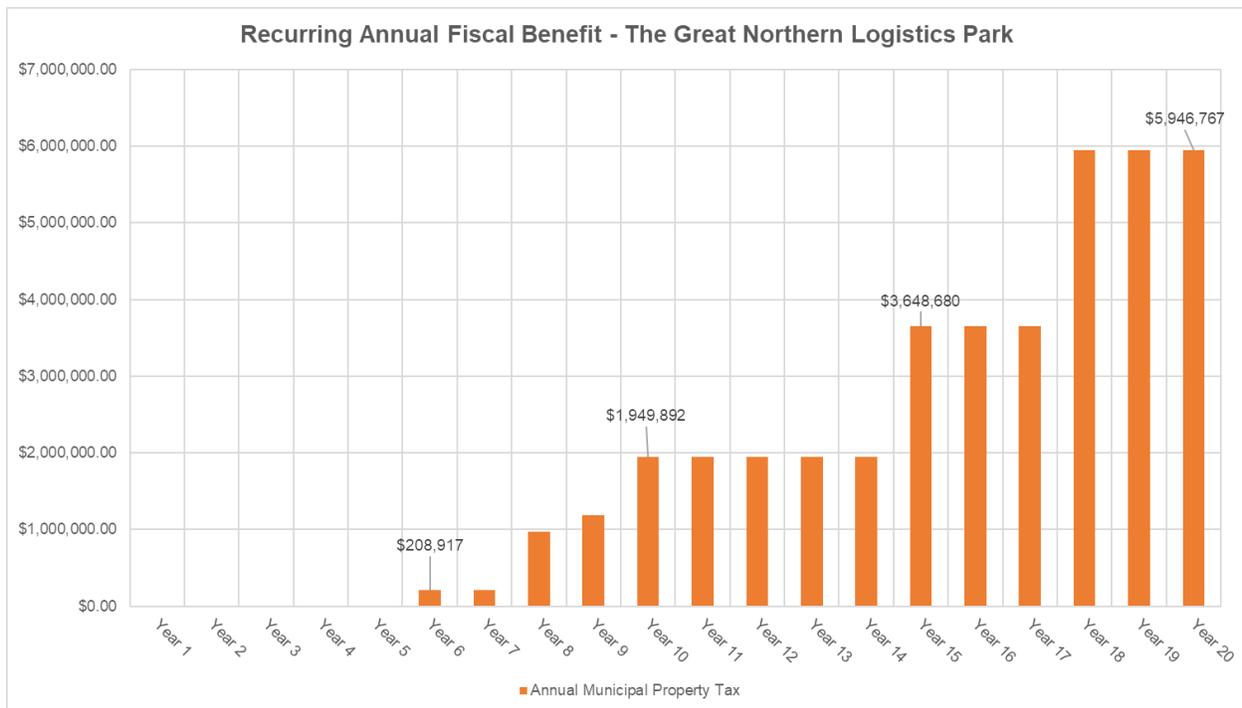
Themes and Categories		Villeneuve ecoPark				
Workforce Development Benefits	Categories		Direct Effect	Indirect Effect	Induced Effect	Total
	Total Full-time Jobs Created			500	160	100
Gross Payroll			\$40,760,000	\$13,043,200	\$8,152,000	\$61,955,200
Provincial Government Revenues		Payroll Tax	\$4,076,000	\$1,304,320	\$815,200	\$6,195,520
Federal Government Revenues		Payroll Tax	\$7,008,742	\$2,242,798	\$1,401,748	\$10,653,288
Total Tax from Payroll			\$11,084,742	\$3,547,118	\$2,216,948	\$16,848,808
Commercial & Industrial Development Benefits	Value of Properties Developed		\$144,600,000	-	-	\$144,600,000
	Municipal Taxes Paid to Sturgeon County		\$2,013,960	-	-	\$2,013,960
Airport Utilization Benefits	Additional Flight Movements Generated		0	-	-	0
	Land Lease Revenues		\$0	-	-	\$0
	Airport Revenues & Fees		\$0	-	-	\$0
	Total Revenue Generated for EIA		\$0	-	-	\$0
Total Impact	Recurring Fiscal Impact to Sturgeon County	Annual Amount	\$2,013,960			
		20-Year Cumulative Amount	\$23,848,572			
	Recurring Economic Impact (excluding taxation)	Annual Amount	\$45,106,392			
		20-Year Cumulative Amount	\$507,130,000			
	Non-Recurring Economic Impact		\$144,600,000			

The Great Northern Logistics Park

The Great Northern Logistics Park (GNLP) has fourteen (14) proposed buildings and facilities that are to be constructed throughout the 20-year planning timeframe.

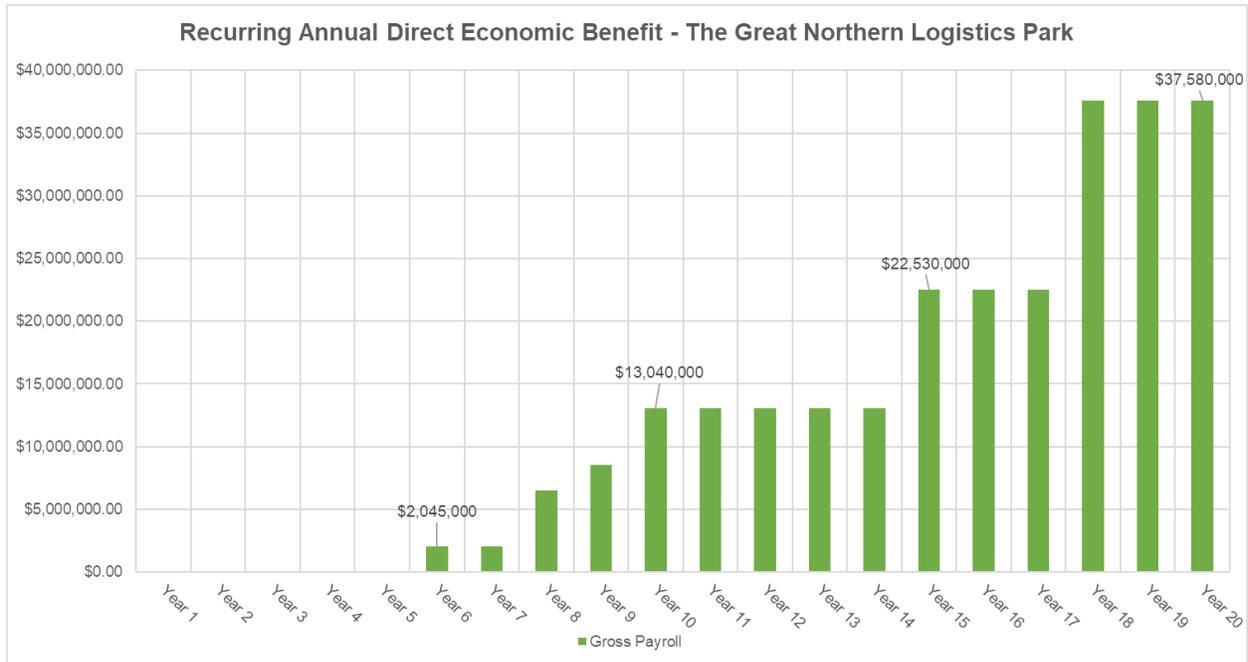
Chart 0-I displays the estimated annually recurring fiscal benefit generated by the GNLP to Sturgeon County in each year of the 20-year timeframe. When the first facility (the freezer space) becomes operational in Year 6, the GNLP is estimated to generate \$208,917 in property tax to Sturgeon County. As the development unfolds in the following years, the fiscal benefit will increase to \$1.94 million in Year 10 and \$3.64 million in Year 15. By the twentieth year, the estimated fiscal impact will be \$5.94 million in property tax to the County.

Chart 0-I GNLP Recurring Annual Fiscal Benefit



The estimated recurring direct economic benefit (the direct gross payroll) also increases following the 20-year phased development schedule. A significant increase can be observed in Year 10, when a warehouse becomes operational, and in Year 15, when the Villeneuve Bulk Terminal will be in operation. In Year 20, the annual direct recurring economic impact is estimated to be \$37.5 million.

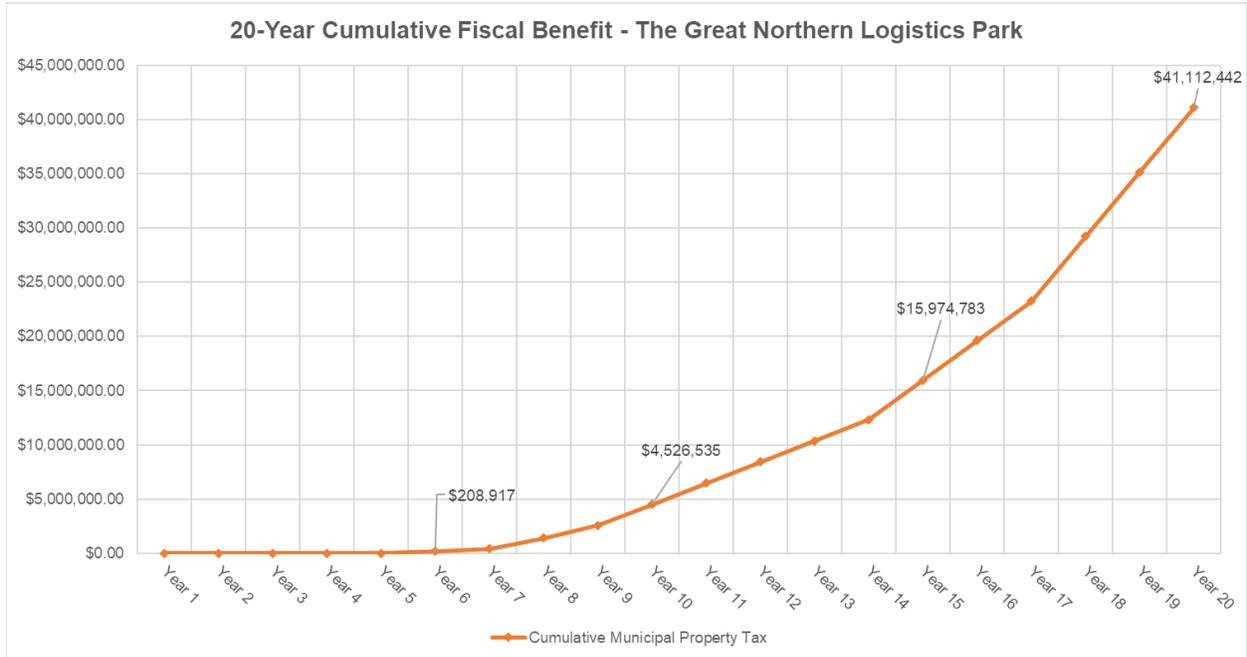
Chart 0-J GNLP Recurring Annual Direct Economic Benefit



20-Year Cumulative Fiscal and Economic Impact

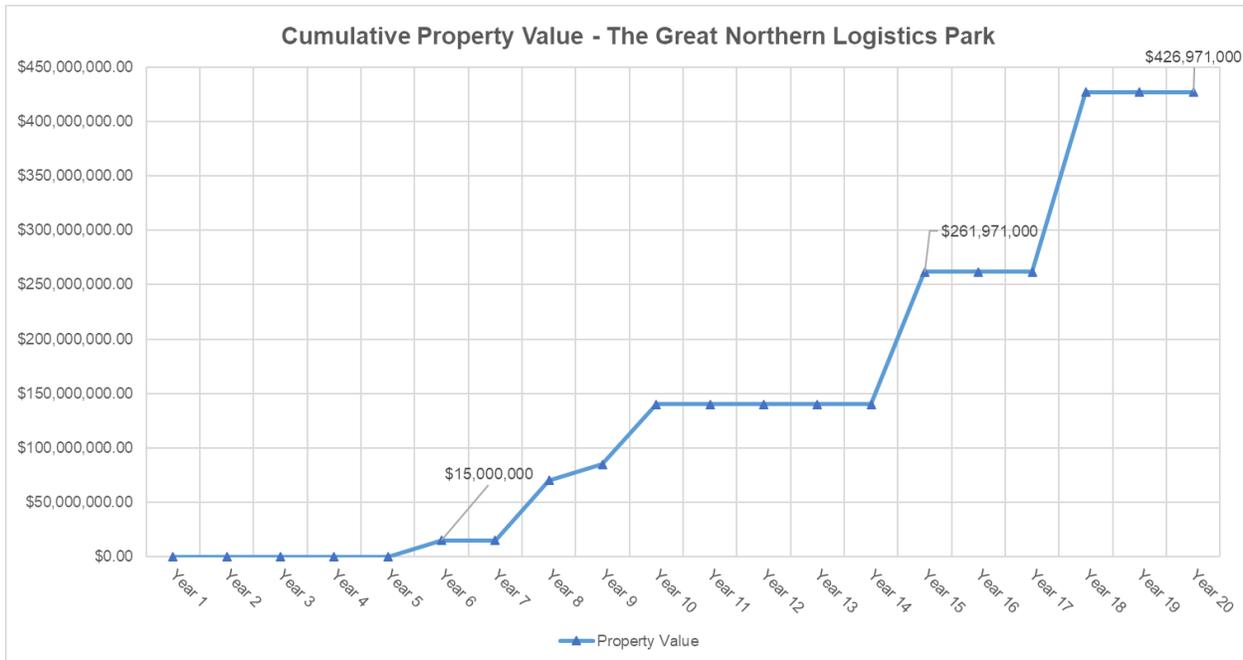
Chart 0-K displays the estimated cumulative fiscal benefit generated to Sturgeon County by the GNLP. The cumulative value starts to climb from \$208,917 in Year 5 and reaches \$41.1 million in Year 20. A higher growth rate is observed after Year 14, when the Villeneuve Bulk Terminal will start its operation.

Chart 0-K GNLP 20-Year Cumulative Fiscal Benefit



The cumulative property value in the Great Northern Logistics Park will total an estimated \$426.9 million after all buildings and facilities are developed (completed in Year 18). Chart 0-L displays the changes in total property value as the development is carried out in the 20-year timeframe.

Chart 0-L GNLP 20-Year Cumulative Property Value



Annual Fiscal and Economic Impact Upon Completion

The Great Northern Logistics Park is estimated to generate a gross payroll of \$37.58 million every year after all building and facility developments are completed. The direct total tax from payroll generated each year is estimated to be \$10.11 million, with \$3.75 million of provincial payroll tax, and \$6.35 million of federal payroll tax. The direct, indirect, and induced employment will generate a total payroll of \$57.12 million after the park is fully developed. The value of the buildings and facilities in the park is estimated to total \$426.9 million, which can generate a property tax revenue of \$5.94 million for Sturgeon County after all developments are completed.

The 20-year cumulative fiscal benefit to Sturgeon County is an estimated total of \$41.1 million, while the cumulative economic benefit is an estimated total of \$264 million. After Year 20, it is estimated that the GNLP will continue to generate an annual fiscal impact of \$5.9 million and an economic impact of \$41.7 million every subsequent year.

Table 0-C Economic Impact Generated by the Great Northern Logistics Park

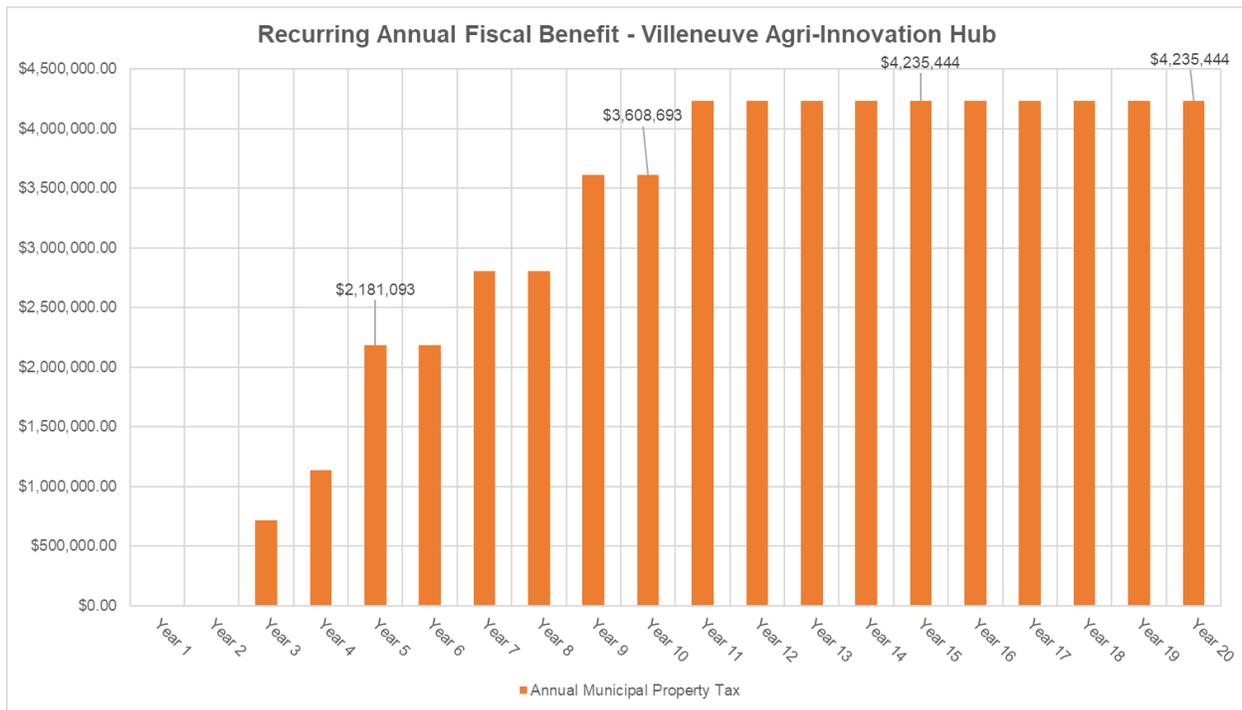
Themes and Categories			The Great Northern Logistics Park			
Workforce Development Benefits	Categories		Direct Effect	Indirect Effect	Induced Effect	Total
	Total Full-time Jobs Created			500	160	100
Gross Payroll			\$37,580,000	\$12,025,600	\$7,516,000	\$57,121,600
Provincial Government Revenues		Payroll Tax	\$3,758,000	\$1,202,560	\$751,600	\$5,712,160
Federal Government Revenues		Payroll Tax	\$6,359,819	\$2,035,142	\$1,271,964	\$9,666,925
Total Tax from Payroll			\$10,117,819	\$3,237,702	\$2,023,564	\$15,379,085
Commercial & Industrial Development Benefits	Value of Properties Developed		\$426,971,000	-	-	\$426,971,000
	Municipal Taxes Paid to Sturgeon County		\$5,946,767	-	-	\$5,946,767
Airport Utilization Benefits	Additional Flight Movements Generated		0	-	-	0
	Land Lease Revenues		\$0	-	-	\$0
	Airport Revenues & Fees		\$0	-	-	\$0
	Total Revenue Generated for EIA		\$0	-	-	\$0
Total Impact	Recurring Fiscal Impact to Sturgeon County	Annual Amount	\$5,946,767			
		20-Year Cumulative Amount	\$41,112,442			
	Recurring Economic Impact (excluding taxation)	Annual Amount	\$41,742,515			
		20-Year Cumulative Amount	\$264,705,000			
	Non-Recurring Economic Impact		\$426,971,000			

Villeneuve Agri-Innovation Hub

The Great Northern Logistics Park has ten (10) proposed buildings and facilities that are to be constructed throughout the 20-year planning timeframe.

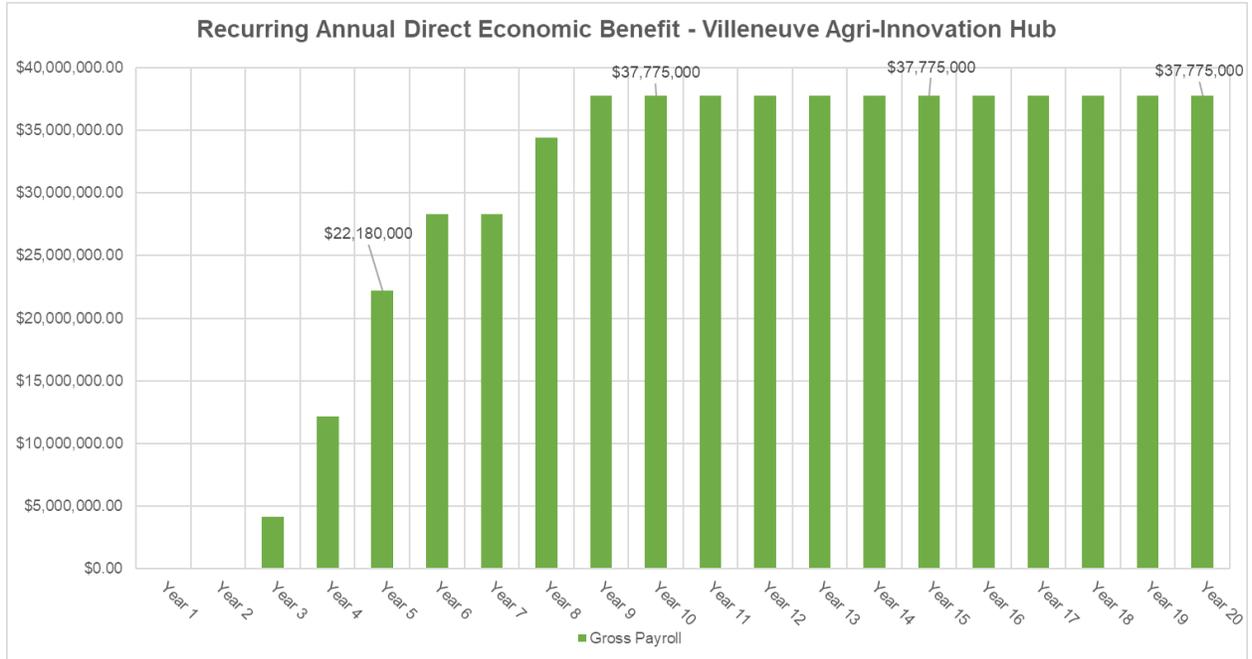
Chart 0-M displays the estimated recurring fiscal benefit from the Villeneuve Agri-Innovation Hub for Sturgeon County in each year of the 20-year timeframe. The fiscal benefit starts with \$718,674 in Year 3, when the first two (2) buildings (a research and innovation building and an indoor agriculture production facility) become operational. In Year 11, after all developments are completed, the recurring annual fiscal benefit increases to \$4.23 million.

Chart 0-M VAIH Recurring Annual Fiscal Benefit



The recurring annual direct economic benefit is estimated to be \$22.1 million by Year 5 and will reach \$37.77 million in Year 9, after all buildings and facilities are developed.

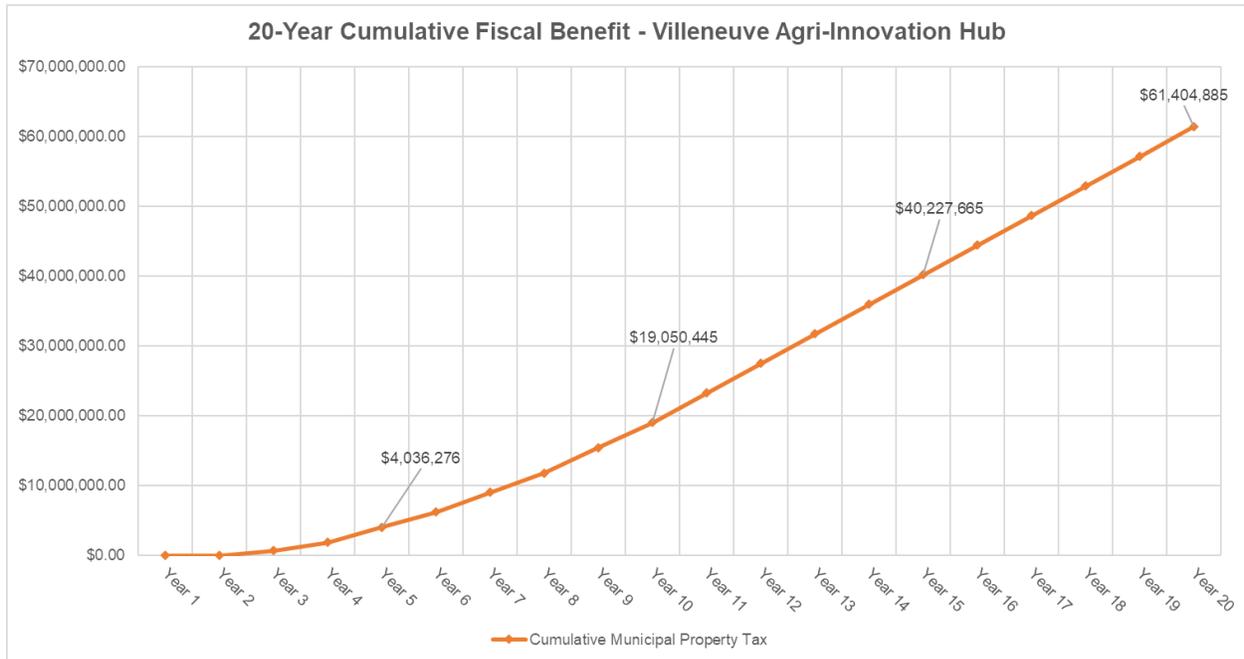
Chart 0-N VAIH Recurring Annual Direct Economic Benefit



20-Year Cumulative Fiscal and Economic Impact

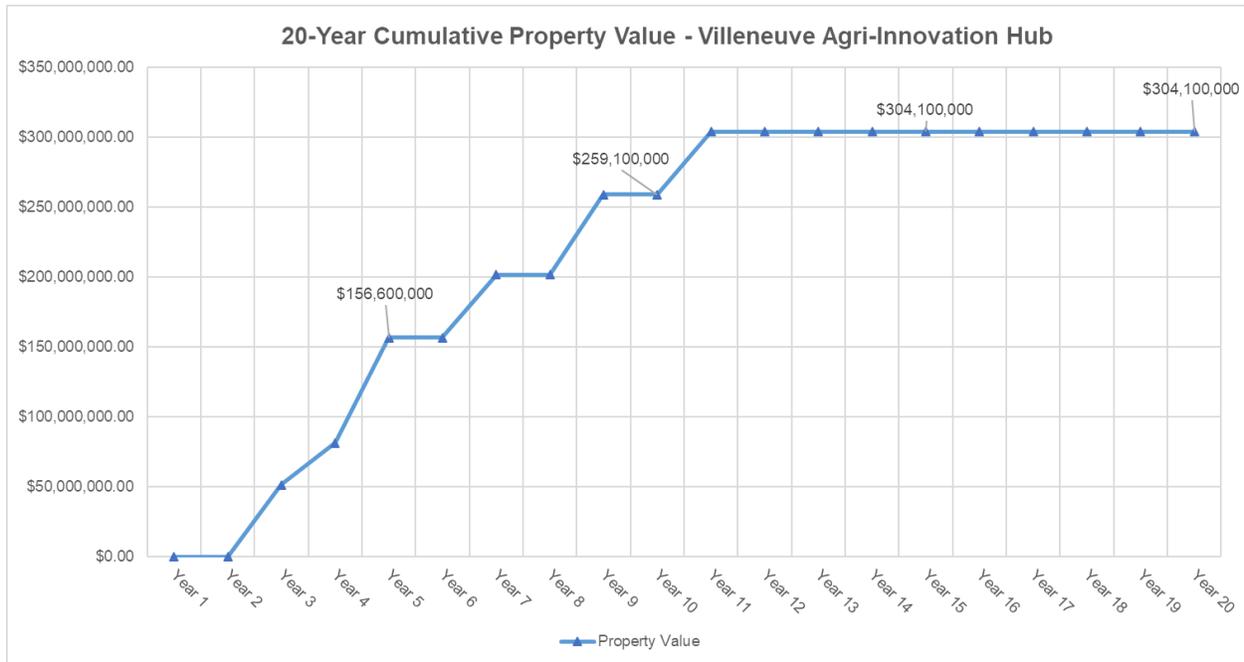
As displayed in Chart 0-O, the 20-year cumulative fiscal benefit generated by the VAIH to Sturgeon County is estimated to be \$61.4 million. The cumulative value shows moderate growth in the first five (5) years but accelerates after Year 5, after the majority of buildings and facilities become operational.

Chart 0-O VAIH 20-Year Cumulative Fiscal Benefit



The 20-year cumulative property value is estimated to be \$304.1 million after all construction is completed. The growth in property value throughout the first ten (10) years follows the phased development schedule.

Chart 0-P VAIH 20-Year Cumulative Property Value



Annual Fiscal and Economic Impact Upon Completion

After it is fully developed, the Villeneuve Agri-innovation Hub (VAIH) is expected to generate an estimated gross payroll of \$37.77 million for the workforce that is directly employed by VAIH. In turn, that gross payroll amount will generate \$3.77 million of provincial payroll tax and \$6.40 million of federal payroll tax annually (after the development is completed). When factoring the indirect and induced impacts into this equation, the gross payroll estimates total \$57.4 million and will generate a total payroll tax of \$15.4 million.

The property value in VAIH is estimated to be \$304.10 million after all developments are completed, which will generate an annual municipal property tax revenue of \$4.23 million for Sturgeon County. The 20-year cumulative fiscal benefit to Sturgeon County is estimated to be \$61.4 million, while the cumulative economic impact (including indirect and induced impacts) will total \$582.8 million.

Table 0-D Economic Impact (Annual) Generated by the Villeneuve Agri-Innovation Hub

Themes and Categories		Villeneuve Agri-Innovation Hub				
Workforce Development Benefits	Categories		Direct Effect	Indirect Effect	Induced Effect	Total
	Total Full-time Jobs Created			500	160	100
Gross Payroll			\$37,775,000	\$12,088,000	\$7,555,000	\$57,418,000
Provincial Government Revenues		<i>Payroll Tax</i>	\$3,777,500	\$1,208,800	\$755,500	\$5,741,800
Federal Government Revenues		<i>Payroll Tax</i>	\$6,401,282	\$2,048,410	\$1,280,256	\$9,729,949
Total Tax from Payroll			\$10,178,782	\$3,257,210	\$2,035,756	\$15,471,749
Commercial & Industrial Development Benefits	Value of Properties Developed		\$304,100,000	-	-	\$304,100,000
	Municipal Taxes Paid to Sturgeon County		\$4,235,444	-	-	\$4,235,444
Airport Utilization Benefits	Additional Flight Movements Generated		0	-	-	0
	Land Lease Revenues		\$0	-	-	\$0
	Airport Revenues & Fees		\$0	-	-	\$0
	Total Revenue Generated for EIA		\$0	-	-	\$0
Total Impact	Recurring Fiscal Impact to Sturgeon County	<i>Annual Amount</i>	\$4,235,444			
		<i>20-Year Cumulative Amount</i>	\$61,404,885			
	Recurring Economic Impact (excluding taxation)	<i>Annual Amount</i>	\$41,946,251			
		<i>20-Year Cumulative Amount</i>	\$582,800,000			
	Non-Recurring Economic Impact		\$304,100,000			

Appendix C – Sources of Funding

Sources and Types of Funding

The development of the four (4) concepts in the VAA will benefit the whole regional economy. It will bring new investments, create jobs, and increase the tax revenue base. As such, to help finance any rehabilitation and/or new infrastructure projects, it is recommended that Sturgeon County leverages financial support from multiple sources and investors as part of a collaborative development partnership. For the business development within each of the four (4) concept areas, fundings, grants and incentives would be beneficial catalysts for accelerating the development schedule. In the following section, a summary of currently open funding opportunities for Sturgeon County, stakeholders, and prospective tenants is given.

Infrastructure Fundings

The following table summarizes funding opportunities for infrastructure developments in the VAA.

Funding Opportunities – Infrastructure		
Organization	Funding Program	Description
Government of Alberta	Alberta Municipal Water/Wastewater Partnership	<ul style="list-style-type: none"> The Alberta Municipal Water/Wastewater Partnership (AMWWP) provides cost-shared funding to eligible municipalities to help build municipal facilities for water supply and treatment and wastewater treatment and disposal. Program funding is determined each budget cycle. Eligible projects can receive up to 75% of project costs. Funding is calculated as a percentage of eligible project costs (rounded to two decimal points) based on the municipality's official population when the grant is approved.
Government of Alberta	Community Revitalization Levy Program	<ul style="list-style-type: none"> The Community Revitalization Levy (CRL) allows municipalities to borrow against future property tax revenues to help pay for the infrastructure that is required to spur new development in a specific area. The levy is typically in place for 20 years, but it could be longer or shorter.
Government of Alberta	Strategic Transportation Infrastructure Program (STIP)	<ul style="list-style-type: none"> The Strategic Transportation Infrastructure Program (STIP) provides funding to municipalities to: <ul style="list-style-type: none"> improve accessibility and the movement of goods and people increase the capacity of municipal transportation infrastructure to support economic growth enhance safety and efficiency extend the service life of key transportation infrastructure Projects are rated on a provincewide, competitive basis.

Sector-Specific Development Fundings

The following funding opportunities are sector-specific and can be leveraged to attract prospective tenants to the VAA.

Funding Opportunities – Villeneuve Aviation & Aerospace Centre		
Organization	Funding Program	Description
Alberta Innovate	Innovation Employment Grant	<ul style="list-style-type: none"> The Innovation Employment Grant encourages economic growth by supporting small- and medium-sized businesses that invest in research and development. This grant is worth up to 20% of qualifying expenditures.
Canada Foundation for Innovation	College-industry Innovation Fund	<ul style="list-style-type: none"> The College-industry Innovation Fund is intended to support substantial research infrastructure projects that will augment the existing applied research and technology development capacity of colleges. The research infrastructure stream provides funding for research infrastructure. Colleges can submit up to two (2) proposals per competition under each stream of the CIIF and request up to \$1M per proposal from the CFI.
Government of Canada (Canadian Space Agency)	Lunar Exploration Accelerator Program (LEAP) Technology development	<ul style="list-style-type: none"> The Announcement of Opportunity (AO) will award non-repayable contributions for space technology projects that expect to enhance their commercial potential in the lunar economy in the short to medium term. \$2M in funding per project with the possibility to extend to \$4M exists.
Government of Canada (Defence Research and Development Canada)	Canadian Safety and Security Program	<ul style="list-style-type: none"> The Canadian Safety and Security Program's (CSSP) mission is to strengthen Canada's ability to anticipate, prevent, mitigate, prepare for, respond to, and recover from natural disasters, serious accidents, crime, and terrorism through the convergence of science and technology (S&T) with policy, operations, and intelligence. The Canadian Safety and Security Program funds and oversees science and technology projects and activities through three (3) funding mechanisms: calls for proposals, targeted investments, and technology acquisitions.

Funding Opportunities – Villeneuve ecoPark		
Organization	Funding Program	Description
Alberta Innovate	Clean Technology - Bioenergy	<ul style="list-style-type: none"> Funding is provided through a combination of open competition and a continuous intake process. Focus areas include waste conversion and renewable fuels.
Alberta Innovate	Innovative Hydrocarbon Products	<ul style="list-style-type: none"> Funding is provided through a combination of open competition and a continuous intake process. Focus areas include bitumen partial upgrading, natural gas value-add, and bitumen beyond combustion.
Government of Canada	Canadian Industry Partnership for Energy Conservation	<ul style="list-style-type: none"> CIPEC is an award-winning partnership between the Government of Canada and the Canadian industry. CIPEC partners have access to cost-shared assistance to perform ISO 50001 and other energy management projects and to process integration studies and computational fluid dynamics studies.

Funding Opportunities – The Great Northern Logistics Park		
Organization	Funding Program	Description
Alberta Innovate	Alberta Export Expansion Program	<ul style="list-style-type: none"> Funding to help export-ready companies and non-profit organizations enhance access to international markets and attract global buyers through outbound international business travel and the bringing of international buyers to Alberta. Eligible companies will be reimbursed in the form of a grant that may range from a minimum of \$1,000 to a maximum of \$25,000 per year for a select range of approved activities and expenses.

Funding Opportunities – Villeneuve Agri-Innovation Hub		
Organization	Funding Program	Description
Alberta Innovate	Smart Agriculture and Food Digitization and Automation Challenge	<ul style="list-style-type: none"> Up to \$500,000 in funding for projects that lead to the development and application of innovative technologies or knowledge generation in smart agriculture. Focus areas include smart agriculture, genomics and geomatics for agriculture, and sustainable crop and livestock management
Government of Canada	Agricultural Clean Technology Program	<ul style="list-style-type: none"> The Agricultural Clean Technology (ACT) Program aims to create an environment for the development and adoption of clean technology that will help drive the changes required to achieve a low-carbon economy and promote sustainable growth in Canada’s agriculture and agri-food sector. The adoption stream will support the purchase and installation of commercially available clean technologies and processes with a priority given to those that show evidence of reducing greenhouse gas emissions, and other environmental co-benefits. The research and innovation stream will support pre-market innovation. This includes research, development, demonstration, and commercialization activities to develop transformative clean technologies and enable the expansion of current technologies.
CAAIN (Canadian Agri-Food Automation and Intelligence Network)	2021 Collaborative Technology Development and Application Competition Program	<ul style="list-style-type: none"> CAAIN invests in research and innovation projects in automated technologies ecosystems, data-driven decision frameworks and smart farm platforms. CAAIN will invest up to \$15 million CAD in projects submitted to this competition. CAAIN’s programs may reimburse project partners for up to 40% of eligible project costs.
RDAR (Results Driven Agriculture Research)	Accelerating Agriculture Innovations	<ul style="list-style-type: none"> RDAR is funding agricultural research that will drive real benefits for producers in the barn and on the field. Four (4) research priorities are identified: <ul style="list-style-type: none"> Enhanced productivity, profitability, and competitiveness Sustainable and responsible agriculture programs Market demands: food safety, quality, value-added products, and diversification Extension and knowledge transfer The program provides grants on a cost-shared basis to cover eligible expenses for approved projects for each applicant, up to a maximum of \$750,000 in any April 1st to March 31st period.

Other Business Development Funding Opportunities

The following table summarizes other development-related funding opportunities that may serve to foster workforce development, commercial business development, municipal administration, and business growth in the VAA.

Organization	Funding Program	Description
Government of Canada (Prairies Economic Development Canada)	Regional Innovation Ecosystems (RIE)	<ul style="list-style-type: none"> • The Regional Innovation Ecosystems (RIE) program stream aims to create, grow, and nurture inclusive regional ecosystems that support business needs throughout the innovation continuum, and foster an entrepreneurial environment conducive to innovation, growth, and competitiveness.
Government of Alberta	Canada-Alberta Job Grant	<ul style="list-style-type: none"> • The Canada-Alberta Job Grant is a training program where an employer applies on behalf of their present or future employees for eligible training costs. • The government contributes two-thirds of the cost to a maximum of \$10,000 per trainee per fiscal year. If hiring and training an unemployed Albertan, up to 100% of training costs could be covered (up to \$15,000 per trainee).
Government of Canada	Strategic Innovation Fund - Business Innovation and Growth Stream	<ul style="list-style-type: none"> • The Business Innovation and Growth stream aims to: <ul style="list-style-type: none"> ○ Encourage R&D that can accelerate technology transfer and the commercialization of innovative products, processes, and services ○ Facilitate the growth and expansion of firms in Canada ○ Attract and retain large-scale investments to Canada • Applicants must request a minimum SIF contribution of \$10 million for a proposal with total costs of at least \$20 million.

Government of Canada	Strategic Innovation Fund - Collaborations and Networks Stream	<ul style="list-style-type: none"> • The Collaborations and Networks stream aims to: <ul style="list-style-type: none"> ○ Advance industrial research, development, and technology demonstration through collaboration between the private sector, researchers, and non-profit organizations ○ Support large-scale, national innovation ecosystems through high-impact collaborations across Canada • Applicants must have collaborations with Canadian universities and/or colleges, research institutes, for-profit corporations, and/or not-for-profit entities. • Applicants must request a minimum SIF contribution of \$10 million for a proposal with total costs of at least \$20 million.
Government of Canada	Strategic Partnerships Initiative	<ul style="list-style-type: none"> • The Strategic Partnerships Initiative (SPI) provides a way for federal partners to coordinate their efforts, reduce administrative burdens, and pool resources in support of Indigenous communities. • Federal partners work with Indigenous communities to identify opportunities to bring to SPIs interdepartmental investment committee for consideration. The committee vets and then supports the co-development of chosen initiatives.
Canada Foundation for Innovation	2023 Innovation Fund	<ul style="list-style-type: none"> • The 2023 Innovation Fund competition will provide support for research infrastructure across the full spectrum of research, from the most fundamental, to applied, through to technology development. • The fund will invest up to \$400 million in research infrastructure funding and will fund up to 40% of a project's eligible infrastructure costs.



APPENDIX G

Villeneuve Airport Zoning Regulations



CANADA

CONSOLIDATION

CODIFICATION

Villeneuve Airport Zoning Regulations

Règlement de zonage de l'aéroport de Villeneuve

SOR/81-568

DORS/81-568

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<http://lois-laws.justice.gc.ca>

OFFICIAL STATUS OF CONSOLIDATIONS

Subsections 31(1) and (3) of the *Legislation Revision and Consolidation Act*, in force on June 1, 2009, provide as follows:

Published consolidation is evidence

31 (1) Every copy of a consolidated statute or consolidated regulation published by the Minister under this Act in either print or electronic form is evidence of that statute or regulation and of its contents and every copy purporting to be published by the Minister is deemed to be so published, unless the contrary is shown.

...

Inconsistencies in regulations

(3) In the event of an inconsistency between a consolidated regulation published by the Minister under this Act and the original regulation or a subsequent amendment as registered by the Clerk of the Privy Council under the *Statutory Instruments Act*, the original regulation or amendment prevails to the extent of the inconsistency.

LAYOUT

The notes that appeared in the left or right margins are now in boldface text directly above the provisions to which they relate. They form no part of the enactment, but are inserted for convenience of reference only.

NOTE

This consolidation is current to May 2, 2022. Any amendments that were not in force as of May 2, 2022 are set out at the end of this document under the heading "Amendments Not in Force".

CARACTÈRE OFFICIEL DES CODIFICATIONS

Les paragraphes 31(1) et (3) de la *Loi sur la révision et la codification des textes législatifs*, en vigueur le 1^{er} juin 2009, prévoient ce qui suit :

Codifications comme élément de preuve

31 (1) Tout exemplaire d'une loi codifiée ou d'un règlement codifié, publié par le ministre en vertu de la présente loi sur support papier ou sur support électronique, fait foi de cette loi ou de ce règlement et de son contenu. Tout exemplaire donné comme publié par le ministre est réputé avoir été ainsi publié, sauf preuve contraire.

[...]

Incompatibilité — règlements

(3) Les dispositions du règlement d'origine avec ses modifications subséquentes enregistrées par le greffier du Conseil privé en vertu de la *Loi sur les textes réglementaires* l'emportent sur les dispositions incompatibles du règlement codifié publié par le ministre en vertu de la présente loi.

MISE EN PAGE

Les notes apparaissant auparavant dans les marges de droite ou de gauche se retrouvent maintenant en caractères gras juste au-dessus de la disposition à laquelle elles se rattachent. Elles ne font pas partie du texte, n'y figurant qu'à titre de repère ou d'information.

NOTE

Cette codification est à jour au 2 mai 2022. Toutes modifications qui n'étaient pas en vigueur au 2 mai 2022 sont énoncées à la fin de ce document sous le titre « Modifications non en vigueur ».

TABLE OF PROVISIONS**Regulations Respecting Zoning at Villeneuve Airport**

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SCHEDULE**TABLE ANALYTIQUE****Règlement de zonage concernant l'aéroport de Villeneuve**

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ANNEXE

Registration
SOR/81-568 July 10, 1981

AERONAUTICS ACT

Villeneuve Airport Zoning Regulations

P.C. 1981-1893 July 9, 1981

His Excellency the Governor General in Council, on the recommendation of the Minister of Transport, pursuant to section 6 of the *Aeronautics Act*, is pleased hereby to approve the annexed *Regulations respecting Zoning at Villeneuve Airport* made by the Minister of Transport.

Enregistrement
DORS/81-568 Le 10 juillet 1981

LOI SUR L'ÂÉRONAUTIQUE

Règlement de zonage de l'aéroport de Villeneuve

C.P. 1981-1893 Le 9 juillet 1981

Sur avis conforme du ministre des Transports et en vertu de l'article 6 de la *Loi sur l'aéronautique*, il plaît à Son Excellence le Gouverneur général en conseil d'approuver le *Règlement de zonage concernant l'aéroport de Villeneuve*, ci-après, établi par le ministre des Transports.

Regulations Respecting Zoning at Villeneuve Airport

Short Title

1 These Regulations may be cited as the *Villeneuve Airport Zoning Regulations*.

Interpretation

2 (1) In these Regulations,

airport means the Villeneuve Airport, in township 54, range 27, west of the Fourth Meridian, in the Province of Alberta; (*aéroport*)

airport reference point means the point described in Part I of the schedule; (*point de repère de l'aéroport*)

approach surface means an imaginary inclined plane that extends upward and outward from each end of a strip, which approach surface is more particularly described in Part III of the schedule; (*surface d'approche*)

Minister means the Minister of Transport; (*ministre*)

outer surface means an imaginary surface located above and in the immediate vicinity of the airport, which outer surface is more particularly described in Part IV of the schedule; (*surface extérieure*)

strip means the rectangular portion of the landing area of the airport including the runway prepared for the take-off and landing of aircraft in a particular direction, which strip is more particularly described in Part V of the schedule; (*bande*)

transitional surface means an imaginary inclined plane that extends upward and outward from the lateral limits of a strip and its approach surfaces, which transitional surface is more particularly described in Part VI of the schedule. (*surface de transition*)

(2) For the purposes of these Regulations, the assigned elevation of the airport reference point is 2,227 feet above sea level.

Application

3 These Regulations apply to all the lands, including public road allowances, adjacent to or in the vicinity of

Règlement de zonage concernant l'aéroport de Villeneuve

Titre abrégé

1 Le présent règlement peut être cité sous le titre : *Règlement de zonage de l'aéroport de Villeneuve*.

Interprétation

2 (1) Dans le présent règlement,

aéroport désigne l'aéroport de Villeneuve, township 54, rang 27, à l'ouest du quatrième méridien, dans la province d'Alberta; (*airport*)

bande désigne la partie rectangulaire de l'aire d'atterrissage de l'aéroport comprenant la piste spécialement aménagée pour le décollage et l'atterrissage des aéronefs dans une direction déterminée; cette bande est décrite plus en détail à la partie V de l'annexe; (*strip*)

ministre désigne le ministre des Transports; (*Minister*)

point de repère de l'aéroport désigne le point décrit à la partie I de l'annexe; (*airport reference point*)

surface d'approche désigne un plan incliné imaginaire s'élevant vers l'extérieur à partir de chaque extrémité d'une bande; cette surface d'approche est décrite plus en détail à la partie III de l'annexe; (*approach surface*)

surface de transition désigne un plan incliné imaginaire s'élevant vers l'extérieur à partir des limites latérales d'une bande et de ses surfaces d'approche; ladite surface de transition est décrite plus en détail à la partie VI de l'annexe; (*transitional surface*)

surface extérieure désigne une surface imaginaire située au-dessus et dans le voisinage immédiat de l'aéroport; cette surface extérieure est décrite plus en détail à la partie IV de l'annexe. (*outer surface*)

(2) Aux fins du présent règlement, le point de repère de l'aéroport est à 2 227 pieds au-dessus du niveau de la mer.

Application

3 Le présent règlement s'applique à tous les terrains, y compris les emprises de voies publiques, qui sont

the airport, that are within the outer limits described in Part II of the schedule.

General

4 No person shall erect or construct on any land to which these Regulations apply any building, structure or object or any addition to any existing building, structure or object, the highest point of which will exceed in elevation at the location of that point, any

- (a) approach surface;
- (b) outer surface; or
- (c) transitional surface.

Natural Growth

5 Where an object of natural growth on any land to which these Regulations apply exceeds in elevation any of the surfaces referred to in section 4, the Minister may make a direction that the owner or occupier of the land on which that object is growing remove the excessive growth.

Disposal of Waste

6 No owner or occupier of any land to which these Regulations apply shall permit that land or any Part of it to be used for the disposal or accumulation of any waste, material or substance edible by or attractive to birds.

attendants à l'aéroport ou dans son voisinage, et qui sont situés à l'intérieur des limites extérieures décrites à la partie II de l'annexe.

Dispositions générales

4 Il est interdit d'ériger ou de construire, sur un terrain visé par le présent règlement, un bâtiment, un ouvrage ou un objet, ou un rajout à un bâtiment, ouvrage ou objet existant, dont le sommet serait plus élevé que

- a) les surfaces d'approche;
- b) la surface extérieure; ou que
- c) les surfaces de transition.

Végétation

5 Lorsque, sur un terrain visé par le présent règlement, la végétation croît au-delà du niveau des surfaces mentionnées à l'article 4, le ministre peut établir une directive ordonnant au propriétaire ou à l'occupant du terrain d'enlever l'excédent de végétation.

Dépôt de déchets

6 Il est interdit au propriétaire ou à l'occupant d'un terrain visé par le présent règlement de permettre qu'on y dépose des déchets, matières ou substances comestibles pour les oiseaux ou propres à les attirer.

SCHEDULE

(ss. 2 and 3)

PART I

Description of the Airport Reference Point

The airport reference point is a point commencing at the end of the centre line of runway 26L; THENCE westerly along the said centre line of runway 08R-26L for a distance of 1,752 feet, THENCE southerly and perpendicular to the said centre line of runway 08R-26L a distance of 2,050 feet to a point being the airport reference point.

PART II

Description of the Outer Limits of Lands

The following described boundaries are the outer limits of lands:

Commencing at the South-East corner of Section Thirty-six (36), Township Fifty-four (54), Range Twenty-seven (27), West of the Fourth Meridian; THENCE Northerly along the East boundary of said section to the North-East corner of the South-East quarter thereof; THENCE Westerly along the North boundaries to the South halves of Sections Thirty-six (36) and Thirty-five (35) and their productions across the intervening road allowance to the North-West corner of the South-West quarter of said Section Thirty-five (35); THENCE Southerly along the West boundary of the said quarter to the South-West corner thereof; THENCE Westerly along the North boundary of the North-East quarter of Section Twenty-seven (27) of said Township and Range and its production across the intervening road allowance to the North-West corner of said quarter; THENCE Southerly along the West boundary of said quarter of the South-West corner thereof; THENCE Westerly along the North boundary of the South-East quarter of said Section Twenty-seven (27) to the North-East corner thereof; THENCE Southerly along the West boundary of the said quarter and its production across the intervening road allowance to the North-West corner of Section Twenty-two (22) of said Township and Range; THENCE Westerly along the North boundary of the North-East quarter of Section Twenty-one (21) of said Township and Range and its production across the intervening road allowance to the North-West corner of said quarter; THENCE Southerly along the West boundaries of the East halves of Sections Twenty-one (21) and Sixteen (16) of said Township and Range to the South-East corner of the South-East quarter of said Sections Sixteen (16); THENCE Easterly along the south boundary of said quarter and its production across the intervening road allowance to the South-West corner of Section Fifteen (15) of said Township and Range; THENCE Southerly along the West boundary of Section Ten (10) of said Township and

ANNEXE

(art. 2 et 3)

PARTIE I

Point de repère de l'aéroport

À partir de l'extrémité de l'axe de la piste 26L; DE LÀ, vers l'ouest, le long de l'axe de la piste 08R-26L, une distance de 1 752 pieds; DE LÀ, vers le sud et perpendiculairement audit axe de la piste 08R-26L, une distance de 2 050 pieds jusqu'au point de repère de l'aéroport.

PARTIE II

Limites extérieures des terrains

Voici la description des limites extérieures des terrains :

À partir de l'angle sud-est de la section trente-six (36), township cinquante-quatre (54), rang vingt-sept (27), à l'ouest du quatrième méridien; DE LÀ, vers le nord, le long de la limite est de ladite section jusqu'à l'angle nord-est du quart sud-est de ladite section; DE LÀ, vers l'ouest, le long des limites nord des moitiés sud des sections trente-six (36) et trente-cinq (35) et de leurs prolongements au-delà de l'emprise de voie publique jusqu'à l'angle nord-ouest du quart sud-ouest de ladite section trente-cinq (35); DE LÀ, vers le sud, le long de la limite ouest dudit quart jusqu'à l'angle sud-ouest dudit quart; DE LÀ, vers l'ouest, le long de la limite nord du quart nord-est de la section vingt-sept (27) desdits canton et rang et de son prolongement au-delà de l'emprise de voie publique jusqu'à l'angle nord-ouest dudit quart; DE LÀ, vers le sud, le long de la limite ouest dudit quart jusqu'à l'angle sud-ouest dudit quart; DE LÀ, vers l'ouest, le long de la limite nord du quart sud-est de ladite section vingt-sept (27) jusqu'à l'angle nord-est de ladite section; DE LÀ, vers le sud, le long de la limite ouest dudit quart et de son prolongement au-delà de l'emprise de voie publique jusqu'à l'angle nord-ouest de la section vingt-deux (22) desdits canton et rang; DE LÀ, vers l'ouest, le long de la limite nord du quart nord-est de la section vingt et un (21) desdits canton et rang et de son prolongement au-delà de l'emprise de voie publique jusqu'à l'angle nord-ouest dudit quart; DE LÀ, vers le sud, le long des limites ouest des moitiés est des sections vingt et un (21) et seize (16) desdits canton et rang jusqu'à l'angle sud-est du quart sud-est de ladite section seize (16); DE LÀ, vers l'est, le long de la limite sud dudit quart et de son prolongement au-delà de l'emprise de voie publique jusqu'à l'angle sud-ouest de la section quinze (15) desdits canton et rang; DE LÀ, vers le sud, le long de la limite ouest de la section dix (10) desdits canton et rang et de son prolongement au-delà de l'emprise de voie publique jusqu'à l'angle sud-ouest de ladite section; DE LÀ, vers l'est, le long de la limite nord du quart nord-ouest de la section trois (3) desdits canton

Range and its production across the intervening road allowance to the South-West corner thereof; THENCE Easterly along the North boundary of the North-West quarter of Section Three (3) of said Township and Range to the North-East corner of said quarter; THENCE Southerly along the East boundary of said quarter to the South-East corner thereof; THENCE Easterly along the North boundary of the South-East quarter of said Section Three (3) and its production across the intervening road allowance to the North-West corner of the South-West quarter of Section Two (2) of said Township and Range; THENCE Southerly along the West boundary of the said South-West quarter to the South-West corner thereof; THENCE Easterly along the South boundaries of said Section Two (2) and Section One (1) of said Township and Range and their productions across the intervening road allowances to the South-West corner of Section Six (6), Township Fifty-four (54), Range Twenty-Six (26), West of the Fourth Meridian and continuing Easterly along the South boundary of said Section Six (6) to intersect the Western limit of the road allowance along East boundary of the former Michel Indian Reserve No. 132 as shown on a plan of record in the Land Titles for the North Alberta Land Registration District as No. 1321 E.U.; THENCE Northerly along the said Western limit of said road allowance to intersect the North boundary of the South half of said Section Six (6); THENCE Easterly along the North boundary of the South half of said Section Six (6) and its production across the intervening road allowance to intersect the West limit of the highway as shown on a plan of record in the said Land Titles Office as No. 350 T.R.; THENCE Northerly along the said West limit to the North boundary of said Section Six (6); THENCE Easterly along the North boundary of the North-West quarter of Section Five (5) of said Township and Range and its production across the highway as shown on said Plan 350 T.R. to the North-East corner of the said North-West quarter; THENCE Northerly along the West boundary to the East half of Section Eight (8) of said Township and Range and its production across the intervening road allowance to the South-West corner of the South-East quarter of Section Seventeen (17) of said Township and Range; THENCE Easterly along the South boundary of the said South-East quarter to the South-East corner thereof; THENCE Northerly along the East boundaries of said Section Seventeen (17) and the South-East quarter of Section Twenty (20) of said Township and Range to the North-East corner of the South-East quarter of said Section Twenty (20); THENCE Westerly along the North boundary of the said quarter to the North-West corner thereof; THENCE Northerly along the East boundary of the North-West quarter of said Section Twenty (20) to the North-East corner thereof; THENCE Westerly along the North boundary of the said quarter and its production across the highway as shown on said Plan 7821436 to the West boundary thereof; THENCE Northerly along said West boundary of road Plan 7821436 and its production across the intervening road allowance to intersect the East boundary of the South-East quarter of Section Thirty (30); THENCE Northerly along the East boundary of said quarter to its intersection with the West boundary of road Plan 3949 T.R.; THENCE Northerly along the West boundary of said road Plan 3949 T.R. to intersect the North boundary of Section Thirty (30) of said Township and Range; THENCE Westerly along the North boundary of said Section Thirty (30)

et rang jusqu'à l'angle nord-est dudit quart; DE LÀ, vers le sud, le long de la limite est dudit quart jusqu'à l'angle sud-est dudit quart; DE LÀ, vers l'est, le long de la limite nord du quart sud-est de ladite section trois (3) et de son prolongement au-delà de l'emprise de voie publique jusqu'à l'angle nord-ouest du quart sud-ouest de la section deux (2) desdits canton et rang; DE LÀ, vers le sud, le long de la limite ouest dudit quart sud-ouest jusqu'à l'angle sud-ouest dudit quart; DE LÀ, vers l'est, le long des limites sud desdites sections deux (2) et un (1) desdits canton et rang et de leurs prolongements au-delà des emprises de voies publiques jusqu'à l'angle sud-ouest de la section six (6), township cinquante-quatre (54), rang vingt-six (26), à l'ouest du quatrième méridien et continuant vers l'est le long de la limite sud de ladite section six (6) jusqu'au point d'intersection avec la limite ouest de l'emprise de voie publique longeant la limite est de l'ancienne *Michel Indian Reserve* n° 132, tel qu'il est indiqué sur le plan n° 1321 E.U. déposé au bureau d'enregistrement des titres fonciers pour le district cadastral du nord de l'Alberta; DE LÀ, vers le nord, le long de ladite limite ouest de ladite emprise de voie publique jusqu'au point d'intersection avec la limite nord de la moitié sud de ladite section six (6); DE LÀ, vers l'est, le long de la limite nord de la moitié sud de ladite section six (6) et de son prolongement au-delà de l'emprise de voie publique jusqu'au point d'intersection avec la limite ouest de la route, tel qu'il est indiqué sur le plan n° 350 T.R. déposé audit bureau d'enregistrement des titres fonciers; DE LÀ, vers le nord, le long de ladite limite ouest jusqu'à la limite nord de ladite section six (6); DE LÀ, vers l'est, le long de la limite nord du quart nord-ouest de la section cinq (5) desdits canton et rang et de son prolongement au-delà de la route, tel qu'il est indiqué sur ledit plan n° 350 T.R., jusqu'à l'angle nord-est dudit quart nord-ouest; DE LÀ, vers le nord, le long de la limite ouest de la moitié est de la section huit (8) desdits canton et rang et de son prolongement au-delà de l'emprise de voie publique jusqu'à l'angle sud-ouest du quart sud-est de la section dix-sept (17) desdits canton et rang; DE LÀ, vers l'est, le long de la limite sud dudit quart sud-est jusqu'à l'angle sud-est dudit quart; DE LÀ, vers le nord, le long des limites est de ladite section dix-sept (17) et du quart sud-est de la section vingt (20) desdits canton et rang jusqu'à l'angle nord-est du quart sud-est de ladite section vingt (20); DE LÀ, vers l'ouest le long de la limite nord dudit quart jusqu'à l'angle nord-ouest dudit quart; DE LÀ, vers le nord, le long de la limite est du quart nord-ouest de ladite section vingt (20) jusqu'à l'angle nord-est de ladite section; DE LÀ, vers l'ouest, le long de la limite nord dudit quart et de son prolongement au-delà de la route, tel qu'il est indiqué sur le plan n° 7821436, jusqu'à la limite ouest de ladite route; DE LÀ, vers le nord, le long de ladite limite ouest de la route, plan n° 7821436, et de son prolongement au-delà de l'emprise de voie publique jusqu'au point d'intersection avec la limite est du quart sud-est de la section trente (30); DE LÀ, vers le nord, le long de la limite est dudit quart jusqu'à son intersection avec la limite ouest de la route, plan n° 3949 T.R.; DE LÀ, vers le nord, le long de la limite ouest de ladite route, plan n° 3949 T.R., jusqu'au point d'intersection avec la limite nord de la section trente (30) desdits canton et rang; DE LÀ, vers l'ouest, le long de

and to its production across the intervening road allowance to the point of commencement.

PART III

Description of the Approach Surfaces

The approach surfaces, shown on Department of Public Works Plan No. E1455 dated June 21, 1978, are surfaces abutting each end of the strips associated with the runways designated 08L-26R, 08R-26L, 16L-34R and 16R-34L and are described as follows:

- (a)** a surface abutting the end of the strip associated with runway approach 08L,
- (b)** a surface abutting the end of the strip associated with runway approach 26R,
- (c)** a surface abutting the end of the strip associated with runway approach 08R,
- (d)** a surface abutting each end of the strip associated with runway approach 26L,
- (e)** a surface abutting each end of the strip associated with runway approach 16L,
- (f)** a surface abutting each end of the strip associated with runway approach 34R,
- (g)** a surface abutting each end of the strip associated with runway approach 16R, and
- (h)** a surface abutting each end of the strip associated with runway approach 34L,

consisting of an inclined plane having a ratio of one foot measured vertically to 50 feet measured horizontally rising to an imaginary horizontal line drawn at right angles to the projected centre line of the strip, 200 feet measured vertically above the elevation at the end of the strip, except at the end of runway approach 26L where 600 feet is measured vertically above the elevation at the end of the strip and 10,000 feet measured horizontally from the end of the strip, the outer ends of each imaginary horizontal line being 1,250 feet from the projected centre line.

PART IV

Description of the Outer Surface

The outer surface, shown on Department of Public Works Plan No. E1455 dated June 21, 1978, is an imaginary surface located at a common plane established at a constant elevation of 150 feet above the assigned elevation of the airport reference point, except where that common plane is less than 30 feet above the surface of the ground, the imaginary surface is located at 30 feet above the surface of the ground.

la limite nord de ladite section trente (30) et de son prolongement au-delà de l'emprise de voie publique jusqu'au point de départ.

PARTIE III

Surfaces d'approche

Les surfaces d'approche, figurant sur le plan n° E1455 du ministère des Travaux publics, daté du 21 juin 1978, sont des surfaces attenantes à chacune des extrémités des bandes associées aux pistes 08L-26R, 08R-26L, 16L-34R et 16R-34L et sont décrites plus en détail de la façon suivante :

- a)** une surface attenante à l'extrémité de la bande associée à l'approche de la piste 08L,
- b)** une surface attenante à l'extrémité de la bande associée à l'approche de la piste 26R,
- c)** une surface attenante à l'extrémité de la bande associée à l'approche de la piste 08R,
- d)** une surface attenante à l'extrémité de la bande associée à l'approche de la piste 26L,
- e)** une surface attenante à l'extrémité de la bande associée à l'approche de la piste 16L,
- f)** une surface attenante à l'extrémité de la bande associée à l'approche de la piste 34R,
- g)** une surface attenante à l'extrémité de la bande associée à l'approche de la piste 16R, et
- h)** une surface attenante à l'extrémité de la bande associée à l'approche de la piste 34L,

chacune étant constituée d'un plan incliné à raison de un pied dans le sens vertical contre 50 pieds dans le sens horizontal, qui s'élève jusqu'à une ligne horizontale imaginaire tracée perpendiculairement au prolongement de l'axe de chaque bande, à 200 pieds de hauteur par rapport au niveau de l'extrémité de chaque bande dans le sens vertical, sauf dans le cas de l'approche de la piste 26L où il faut mesurer 600 pieds de hauteur par rapport au niveau de l'extrémité de la bande et à 10 000 pieds de l'extrémité de la bande dans le sens horizontal, les extrémités extérieures de chaque ligne horizontale imaginaire étant à 1 250 pieds du prolongement de chacun des axes.

PARTIE IV

Surface extérieure

La surface extérieure, figurant sur le plan n° E1455 du ministère des Travaux publics, daté du 21 juin 1978, est une surface imaginaire qui consiste en un plan commun situé à une altitude de 150 pieds au-dessus de l'altitude déterminée du point de repère de l'aéroport, sauf que, là où le plan commun est à moins de 30 pieds au-dessus de la surface du sol, la surface imaginaire est située à 30 pieds au-dessus de la surface du sol.

PART V

Description of the Strips

The strips, shown on Department of Public Works Plan No. E1455 dated June 21, 1978, are described as follows:

- (a)** the strip associated with runway 08L-26R is 500 feet in width, 250 feet being on each side of the centre line of the runway and 4,400 feet in length, 200 feet extending beyond each end of the runway;
- (b)** the strip associated with runway 08R-26L is 500 feet in width, 250 feet being on each side of the centre line of the runway and 4,300 feet in length, 200 feet extending beyond the end of runway approach 08R and 600 feet extending beyond the end of runway approach 28L;
- (c)** the strip associated with runway 16L-34R is 500 feet in width, 250 feet being on each side of the centre line of the runway and 3,900 feet in length, 200 feet extending beyond each end of the runway; and
- (d)** the strip associated with runway 16R-34L is 500 feet in width, 250 feet being on each side of the centre line of the runway and 4,400 feet in length, 200 feet extending beyond each end of the runway.

PART VI

Description of Each Transitional Surface

Each transitional surface, shown on Department of Public Works Plan No. E1455 dated June 21, 1978, is a surface consisting of an inclined plane having a ratio of one foot measured vertically to seven feet measured horizontally at right angles to the centre line and centre line produced of each strip and extending upward from the lateral limits of each strip and its approach surface to an intersection with the outer surface or another transitional surface of an adjoining strip.

PARTIE V

Bandes

Voici la description des bandes qui figurent sur le plan n° E1455 du ministère des Travaux publics, daté du 21 juin 1978 :

- a)** la bande associée à la piste 08L-26R mesure 500 pieds de largeur, soit 250 pieds de chaque côté de l'axe de la piste, et 4 400 pieds de longueur, soit 200 pieds au-delà de chaque extrémité de la piste;
- b)** la bande associée à la piste 08R-26L mesure 500 pieds de largeur, soit 250 pieds de chaque côté de l'axe de la piste, et 4 300 pieds de longueur, soit 200 pieds au-delà de l'extrémité de l'approche de la piste 08R et 600 pieds au-delà de l'extrémité de l'approche de la piste 28L;
- c)** la bande associée à la piste 16L-34R mesure 500 pieds de largeur, soit 250 pieds de chaque côté de l'axe de la piste, et 3 900 pieds de longueur, soit 200 pieds au-delà de chaque extrémité de la piste; et
- d)** la bande associée à la piste 16R-34L mesure 500 pieds de largeur, soit 250 pieds de chaque côté de l'axe de la piste, et 4 400 pieds de longueur, soit 200 pieds au-delà de chaque extrémité de la piste.

PARTIE VI

Surfaces de transition

Chaque surface de transition, figurant sur le plan n° E1455 du ministère des Travaux publics, daté du 21 juin 1978, est une surface constituée d'un plan incliné à raison de un pied dans le sens vertical contre sept pieds dans le sens horizontal, suivant une direction horizontale perpendiculaire à l'axe et au prolongement de l'axe de chaque bande, qui s'élève vers l'extérieur à partir des limites latérales de chaque bande et de ses surfaces d'approche, jusqu'à son intersection avec la surface extérieure ou avec la surface de transition d'une bande adjacente.