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**VISION**

Our vision is to be Canada’s most valued airport experience. This Airport Master Plan reflects this vision of the Saskatoon Airport Authority (SKYXE) for the year up to 2040. This is achieved by respecting the project directives as defined through consultation with the public and key stakeholder groups.

This Master Plan recognizes the position of the Saskatoon Airport in its local, domestic and international context as a feeder airport to hubs in North America and beyond. It provides a strategy for growth without infrastructure constraints, while still remaining aligned with the objective of responsible sustainable growth.

**PURPOSE**

This Airport Master Plan provides a long-term strategy for the development of the airport as required by the Ground Lease. This Master Plan addresses the following topics:

- Socio-economic profiles
- Airport activity
- Airport environment and environmental impact
- Airfield infrastructure
- Airport terminal building
- Ground transportation
- Airport commercial services and facilities
- Airport operational support services
- Noise management
- Land use
MASTER PLAN PROCESS

The Master Plan has been organized to align with the sequence of work. Starting in early 2017, the project kicked-off with a discovery session involving two stages of consultation. The first phase involved initial contact with stakeholders through an online survey where all stakeholder groups including the public were given the opportunity to provide opinion on the future direction of the Saskatoon Airport. Information gathered was then offered to the public for further comment in the second stage of the discovery session. Information gathered in the discovery sessions defined the directives for the project and subsequently guided the tasks undertaken as part of this planning document.

Upon definition of the Master Plan Directives, the first task undertaken was to define the anticipated demand for the future. The Saskatoon Airport economic and aviation demand drivers were analyzed to determine the anticipated demand up until 2040.

The required capacity for the three primary areas of infrastructure (airfield, terminal, groundside) were subsequently assessed. An important part of this assessment was the consideration of environmental impact and land use definition.

The resultant development plans reflect not only the airport vision but also satisfy forecast demand, address environmental impact and comply with the existing land use definition.

The Airport Master Plan is therefore a long-term guidance document that contemplates conceptual development that may or may not materialize into actual projects. The development process is dynamic and continuously subject to changes in our business environment and ongoing consultations with our stakeholders. Subsequently the Airport Master Plan will be revised as necessary to achieve optimal airport operations over the horizon.
Airport History, Mission and Economic Impact
Introduction

Aviation has played a critical role in Canadian history since the beginning of the 1900s. The Saskatoon Airport, first sited in 1928 as an Aero Club, now provides the local community with a gateway to the rest of the country and the world. The changing role and development of the airport over the past 91 years has influenced the current situation. This chapter of the Master Plan provides an overview of the history and current economic impact of Saskatoon John G. Diefenbaker International Airport.
THE FIRST AIRPORT

In January 1927 the Department of National Defence (DND), Civil Aviation Branch, asked Saskatoon to consider establishing an airport. The City, with DND assistance, chose a site in May 1928 which was recommended for development.

EARLY DEVELOPMENT

Saskatoon Airport was first developed as the home of the Saskatoon Aero Club (later the Saskatoon Flying Club). By the end of 1929 the Saskatoon Aero Club was the second largest in the country with 60 members and 750 non-members. The air harbor covered a 65 hectare area. With a grant from the DND, the City installed airport lighting in June 1930. The following highlights some of the early developments at the airport:

- $20,000 grant under the one-third cost-sharing scheme was approved in April 1938. The City constructed three runways during the summer of 1938 and some further work done in 1939.

- In January 1940 the City agreed to lease the airport to the federal government for the duration of the war. It was taken over and operated by the RCAF until November 1945. Early in 1940 work started on five large hangars, barracks, classrooms, workshops, a hospital, and a control tower.

- In November 1945 the Department of Transport took over maintenance of the airport from the RCAF. In 1949 a control tower was opened and put into operation with electronic equipment borrowed from what was then the RCAF.

- In 1955 The Department of Transport carried out major improvements to the airport including a new air terminal building, maintenance garage, taxi strips and parking area.

- In December 1972, Justice Minister Otto Lang unveiled the plans for a new airport facility. Including a new terminal building twice the size of the existing terminal, aircraft parking areas to accommodate larger aircraft and increased flights. The grand opening of the facilities took place on November 29, 1975. The former terminal building was renovated in 1977 to serve as the operations building.

- In 1996 the airport undertook major renovations to the air terminal building, expanding to meet the growing needs of the airport carriers and users.
In the mid seventies, the Canadian Government began to review the management of major airports in Canada, a process that eventually led to the transformation of Canada’s airports to local airport authorities. In the February 1994 budget the Government announced the National Airports Policy which commenced 01 April 1995. In late 1998, a memorandum of understanding was signed between the Saskatoon Airport Authority and the Canadian Government and on 01 January 1999 the Saskatoon Airport Authority assumed responsibility for the Saskatoon John G. Diefenbaker International Airport.

**RECENT DEVELOPMENT PROGRAM**

The major developments that have been implemented since 1999 include the following:

- 1999 - The airport completed an Apron 1 restoration by replacing approximately 1/3 of the concrete pads on the apron.
- 2000 - Nav Canada opened a new state of the art Air Traffic Control Tower.
- 2002 - The airport completed renovation & expansion of the Air Terminal Building including the addition of a fourth Aircraft Loading Bridge.
- 2005 - The airport relocated and expanded the Airline Ticket Counters and baggage make up system in the main terminal concourse. A fifth Aircraft Loading Bridge was added to the Air Terminal Building.
- 2006 - The airport completed an expansion of the Public Parking Lot and realigned Airport Drive and the entrance to the parking lot.
- 2008 - Restoration of Runway 09 / 27 was completed
- 2009 - Apron 1 expansion completed to prepare for terminal expansion
- 2010 - D-ice Pad developed on Apron 1
- 2013 - Construction of Apron VI for GA aircraft
- 2016 - Construction of remote shuttle parking facility began
WHO WE ARE NOW?

On the heels of a newly expanded air terminal building and after being awarded the Most Improved Airport in North America under 2 million passengers from Airports Council International (ACI), we knew that it was the right time to rebrand ourselves. Like any name, ours has a lot of meaning behind it. We have so many first, middle and last names that sometimes it’s hard to know what to call us. Trust us, we know it can be confusing and we want to help clarify things.

SASKATOON JOHN G. DIEFENBAKER INTERNATIONAL AIRPORT - OUR OFFICIAL AIRPORT NAME

In 1993, the Saskatoon airport’s name was changed to Saskatoon John G. Diefenbaker Airport to recognize the home of and to honour our 13th Prime Minister. In 2006, “International” was officially added when the airport received International status. Saskatoon John G. Diefenbaker International Airport is the legal entity name for the physical location of the Saskatoon airport, representing the land, terminal and other physical assets. To honour this legacy, we prominently display ‘Saskatoon John G. Diefenbaker International Airport’ in two areas on the front of our air terminal building. We also celebrate Diefenbaker’s birthday each year on September 18 (1895-1979) by handing out treats to our guests and we proudly showcase information on this legacy in our public display case for several months around his birthday.

SASKATOON AIRPORT AUTHORITY - OUR CORPORATE NAME & LEGAL OPERATOR

Saskatoon Airport Authority (SAA) is the legal entity of the operator of the airport. SAA is responsible for managing and maintaining the airport.

SKYXE: OUR ALL-ENCOMPASSING BRAND NAME

Skyxe Saskatoon Airport is our brand name that encompasses both of the above entities. Our brand name represents the entire airport experience, embracing the pride we feel to be from Saskatchewan as well as our unique airport code. Through our brand name, we strive to exceed the expectations of our guests, partners, and community by providing service quality initiatives that meet our vision to be Canada’s Most Valued Airport Experience.

Our SKYXE brand comes on the heels of our newly expanded air terminal building that wrapped up construction in 2015. Following the success of our internationally recognized award from Airports Council International (ACI) for Most Improved Airport in North America in 2015, we knew that now was the time to redefine who we are and identify how to continually move forward to solidify the foundation on what we stand for.
WHAT DO WE STAND FOR?

Our vision is to be Canada’s most valued airport experience. Our mission outlines our commitment to provide excellence for our customers by:

- Ensuring excellence in safety and security;
- Surpassing expectations through a culture of superior customer service;
- Seamlessly connecting Saskatchewan communities to the world;
- Operating efficiently with care for the environment;
- Successfully partnering with our stakeholders; and
- Developing and empowering our people.

Our doors are open 24 hours a day, 7 days a week and we want to make our home-away-from-home yours too. Our driveway is more than 3.2 kilometres of runway and thousands of metres of apron. Our backyard is 2,000 acres. And our house is a 238,000 square foot terminal building that hosts over 1.4 million people annually.

With over 40 people helping to keep all of the moving parts of an Airport on track, our Airport facilities are shared by more than 40 businesses and government agencies that employ over 1,400 people and generates $1.05 billion in GDP for the City of Saskatoon.
ECONOMIC IMPACT STUDY

The Saskatoon International Airport is an economic engine for the community, generating over one billion dollars in economic activity while providing one of the largest employment generators in the region. The Saskatoon Airport Authority is a not-for-profit, non-government corporation whose vision is to operate this community asset to enhance economic growth and air access to Saskatoon and northern Saskatchewan residents.

The adjacent results summarize the 2016 economic impact activity generated by 67 on-airport firms and their subsidiaries. The impact is reported in terms of full-time equivalents (FTEs), labour income and economic output. Direct, indirect and induced forms of activity have been considered. The response rate to the interview process and survey questionnaire was exceptional: a 96 percent completion rate for the data sought.
In 2016, the Saskatoon International Airport supported a significant level of economic activity:

<table>
<thead>
<tr>
<th>Impact</th>
<th>FTEs</th>
<th>Labour Income</th>
<th>Other Expenditures</th>
<th>Economic Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct</td>
<td>4,283+</td>
<td>$169,304</td>
<td>$346,541</td>
<td>$515,845</td>
</tr>
<tr>
<td>Total</td>
<td>8,026</td>
<td>$356,202</td>
<td>$689,053</td>
<td>$1,048,255</td>
</tr>
</tbody>
</table>

Figure 02-1: Economic impact (in millions, except FTEs)
+ 1,460 jobs are located on the airport

The on-airport economic benefits are distributed as follows:

<table>
<thead>
<tr>
<th>Category</th>
<th>FTEs</th>
<th>Labour Income</th>
<th>Other Expenditures</th>
<th>Economic Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Carriers</td>
<td>22%</td>
<td>23%</td>
<td>27%</td>
<td>26%</td>
</tr>
<tr>
<td>ATB Concessionaires</td>
<td>13%</td>
<td>6%</td>
<td>7%</td>
<td>7%</td>
</tr>
<tr>
<td>General &amp; Corporate Aviation</td>
<td>30%</td>
<td>26%</td>
<td>45%</td>
<td>40%</td>
</tr>
<tr>
<td>Air Cargo</td>
<td>9%</td>
<td>9%</td>
<td>3%</td>
<td>4%</td>
</tr>
<tr>
<td>Airport &amp; Gov’t Services</td>
<td>25%</td>
<td>33%</td>
<td>13%</td>
<td>19%</td>
</tr>
<tr>
<td>On-Airport, Non-Aviation</td>
<td>4%</td>
<td>3%</td>
<td>5%</td>
<td>4%</td>
</tr>
</tbody>
</table>

Figure 02-2: Economic benefits
Engagement and Consultation Process
Introduction

The Master Plan sets a development path for the next 22 years that will have a lasting impact on a range of stakeholders and the community. As such, seeking input from all parties likely to have an interest in the airport was paramount to ensuring a sustainable airport development plan through community buy-in and the proactive assessment and mitigation of perceived and actual airport impacts. This chapter of the Master Plan provides an overview of the consultation process and defines the key directives for this project.
OVERVIEW

The process of engagement and consultation launched the master planning process with the public and stakeholders. All of the airport’s existing channels of communication were used to encourage stakeholder/public participation.

Stakeholders surveyed included the following groups:
- The public
- Airport board of directors
- GA tenants
- The Rural Municipality
- The City
- Nav Canada
- Transport Canada
- CBSA
- CATSA
- The Commissionaires (YXE security service provider)
- North Saskatoon Business Association
- Saskatchewan Aviation Council
- First Nations Groups
- Chamber of Commerce
- Airlines
- Ground support service providers
- Terminal tenants
- Terminal concessionaires.

DISCOVERY SESSIONS

Stakeholder and Public Engagement was the initial step of the master plan process to learn what a variety of key stakeholders, organizations and the public envision for their airport of the future. This discovery stage of the consultation process involved an online survey and was followed-up with multiple open forum consultation sessions.

An online survey was selected to ensure maximum participation from stakeholder groups. Over 1,400 responses to the survey were received from the public and the majority of other stakeholder groups also responded. Questions in the online survey focussed on the following primary topics:
- The main focus of the airport
- Future priorities and impediments over a 10 and 20 year horizon
- Infrastructure, sustainability, and market issues

Results from the survey were collated and presented at a series of consultations sessions along with information about the master planning process. Sessions were held between the 23rd and 25th of May, 2017.
Along with a Public open house, held at Marriott Courtyard (Saskatoon Airport), the following stakeholder group sessions were held to capture the aforementioned list of stakeholders:

- Airport staff
- Airport board of directors
- Community Consultative Committee (CCC)
- Airline Consultative Committee (ACC)
- Service Quality Group
- General Aviation Tenant Group

Holding a series of consultation sessions, over a number of months, enabled the project team to discuss the master plan with those in attendance while the survey and subsequent consultation sessions rounded out the input into the Master Plan Directives from the various stakeholders. The Master Plan Directives are defined in the following chapter.

The engagement and consultation process was concluded with a series of sessions that presented the Draft Master Plan on the 23rd and 24th of August, 2017. Identical to the Discovery Sessions, a public open house was combined with multiple stakeholder group sessions.

The following information was presented to all stakeholders:

- Aviation activity forecast
- Economic impact of airport results
- Airport development plans (airside, terminal and groundside)

Comments and questions were gathered at each consultation session. Responses gathered in those sessions have been provided in the Appendix A.
04

Project Directives
Introduction

A Master Plan provides a long-term infrastructure plan which should align with the mission, vision and values of the airport business and its stakeholders. This chapter of the Master Plan defines the key Directives for this project as a direct result of the Engagement and Consultation process.
OVERVIEW

SKYXE has well defined vision and mission as an airport operator (see Chapter 2). The airport Master Plan also considers the various stakeholders groups when developing a holistic plan that enables growth of all operations within the property of the airport. The Discovery Sessions, as part of the Engagement and Consultation process, were fundamental to developing the Master Plan Directives. These Directives directly influenced the entire Master Plan approach.

KEY STRATEGIC DIRECTIVES FOR THE MASTER PLAN

ONE STOP CONNECTION TO THE WORLD

SKYXE will prioritize growing air services as a feeder airport to North American hubs. The Master Plan will be guided by the growth projections for domestic, transborder and international markets, while also considering a range of airline products.

GROWING TRAFFIC WITHOUT INFRASTRUCTURE CONSTRAINTS

The Master Plan will assess capacity limitation of key pieces of infrastructure and identify a timeline for improvements within the Master Plan horizon to ensure traffic can grow without infrastructure constraints.

RESPONSIBLE GROWTH

The Master Plan will continue the airport’s commitment to responsible management and a sound sustainability approach. Each infrastructure improvement will be assessed based on operational efficiency and the benefits to community, employee, and passenger well-being.
05
Aviation Activity
Introduction

The Master Plan Directives outline that demand shall grow without infrastructure constraints. In order to satisfy this directive it is critical to understand the demand profile going forward. This chapter of the Master Plan presents the demand forecast over the planning horizon.
HISTORICAL DEMAND AND FORECASTS

The passenger movements forecasts developed in the previous Airport Master Plan (2008-2028) are outlined on the adjacent graph.

It highlights how demand has generally exceeded the baseline forecasts and trended towards the high growth forecasts until recently. When comparing against other Canadian airports of similar size, similar trends were observed (Figure 5-2).

The growth patterns are typical of airports with mature demand which tend to be influenced by a range of growth drivers.

GROWTH DRIVERS

Saskatchewan has a diverse and growing economy driven by agriculture, minerals, oil & gas, relying heavily on exports. More specifically, it’s the world’s largest producer of potash, second largest producer of uranium and second largest oil producer in Canada. More than 40% of Canada’s cultivated farmland is located in the province as well. (Figure 5-3 and 5-4)

GROSS DOMESTIC PRODUCT (GDP)

While each sector contributes directly or indirectly to the growth of air travel, the Gross-Domestic Product (GDP), which captures the overall economic throughput of the province, will ultimately provide the best correlation for a mature market like Saskatoon Airport by aggregating the economic growth across all markets.

The real Gross Domestic Product (GDP) is a reliable indicator of air travel growth, whether due to business activities or leisure travel associated with higher disposable income. Figure 5-5 provides historical short-term (2016-18) forecasts from various banking and economics institutions for the Saskatchewan Provincial GDP (Expenditure-Based). These findings provide the basis for the short-term growth in GDP, and in turn in air traffic at the Saskatoon Airport.
Figure 5-1: Previous masterplan passenger movements forecasts
Aviation Activity

Figure 5-2: Annual passengers - comparable Canadian airports
Figure 5-3: Saskatchewan’s diverse growing economy - potash and uranium (Government of Saskatchewan)
Aviation Activity

Figure 5-4: Saskatchewan’s diverse growing economy - crop and oil (Government of Saskatchewan)
<table>
<thead>
<tr>
<th>Year</th>
<th>Historical</th>
<th>BMO</th>
<th>RBC</th>
<th>TD</th>
<th>Scotia</th>
<th>Global Insight</th>
<th>CBOC</th>
<th>MIN</th>
<th>AVG</th>
<th>MAX</th>
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</thead>
<tbody>
<tr>
<td>2007</td>
<td>3.6%</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>2008</td>
<td>5.3%</td>
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<td></td>
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<td></td>
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<td></td>
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<tr>
<td>2009</td>
<td>-5.3%</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2010</td>
<td>4.7%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>5.3%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2012</td>
<td>1.7%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2013</td>
<td>6.3%</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>2.4%</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>-1.3%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td>0.5%</td>
<td>-1.8%</td>
<td>-0.5%</td>
<td>-0.5%</td>
<td>-0.5%</td>
<td>-2.3%</td>
<td>-2.3%</td>
<td>-0.9%</td>
<td>0.5%</td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td>1.7%</td>
<td>1.8%</td>
<td>1.5%</td>
<td>1.7%</td>
<td>2.0%</td>
<td>0.9%</td>
<td>0.9%</td>
<td>1.6%</td>
<td>2.0%</td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>1.9%</td>
<td>2.3%</td>
<td>2.0%</td>
<td>2.0%</td>
<td>2.3%</td>
<td>1.5%</td>
<td>1.5%</td>
<td>2.0%</td>
<td>2.3%</td>
<td></td>
</tr>
</tbody>
</table>

Figure 5-5: Review of historical short-term GDP (2016-2018) forecasts from banks (Source: Statscan, BMO, RBC, TD, Scotia, IHS, Conference Board of Canada)
The forecasts from the Province of Saskatchewan in its most recent Provincial budget has been used for the years 2019 up to 2021 as a baseline. GDP growth was forecast to be 1.9%, 1.8% and 2.0% from 2019 to 2021.

Beyond 2022, the projections from the Organisation for Economic Co-operation and Development (OECD) were used as a baseline for growth, but will be indicative considering the various factors that may impact growth over the coming decades. Those ranged from 1.9% to 2.1%.

Using the Saskatchewan Real GDP, the following three growth scenarios were developed:

Combining the three scenarios short, medium and long-term forecasts, the resulting annualized compounded growth is 1.08% (Low), 2.06% (Base) and 3.03% (High) (figure 5-7).

Another growth factor that contributes to air travel is population growth. Projections for the Saskatoon Census Metropolitan Area (CMA), developed by the City of Saskatoon, were used for the period of 2015 to 2035. Growth was extrapolated up to 2040. This highlighted annualized compounded growth rates of 1.6% (Low), 2.1% (Base) and 2.6% (High) (Figure 5-8).

Using the population growth, GDP growth and other operational assumptions, the following passenger movement assumptions were developed (see Figure 5-9).

More specifically for the base growth case, demand has been broken down by sector (see Figure 5-10).

<table>
<thead>
<tr>
<th>Year</th>
<th>Low</th>
<th>Base</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016-18</td>
<td>Low Consensus</td>
<td>Average Consensus</td>
<td>High Consensus</td>
</tr>
<tr>
<td>2019-21</td>
<td>SK Gov. Projection -1%</td>
<td>SK Gov. Projection</td>
<td>SK Gov. Projection +1%</td>
</tr>
<tr>
<td>2022-40</td>
<td>OECD (Canada) -1%</td>
<td>OECD (Canada)</td>
<td>OECD (Canada) +1%</td>
</tr>
</tbody>
</table>

Figure 5-6: GDP growth scenarios
Figure 5-7: GDP compound annual growth
Aviation Activity

Figure 5-8: Population compound annual growth
Figure 5-9: Projected annual passengers
Aviation Activity

Figure 5-10: Base forecast passenger demand by sector
The resulting annual passenger movement growth rates are summarized in the Figure 5-11.

<table>
<thead>
<tr>
<th>CAGR</th>
<th>SECTOR</th>
<th>HISTORICAL</th>
<th>LOW FORECAST</th>
<th>BASE FORECAST</th>
<th>HIGH FORECAST</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998-2016</td>
<td>Domestic</td>
<td>3.5%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Transborder</td>
<td>2.7%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>International</td>
<td>17.6%</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Combined</td>
<td>3.7%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2017-2027</td>
<td>Domestic</td>
<td>2.2%</td>
<td>3.3%</td>
<td>4.3%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Transborder</td>
<td>2.2%</td>
<td>3.7%</td>
<td>5.2%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>International</td>
<td>2.2%</td>
<td>6.4%</td>
<td>10.1%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Combined</td>
<td>2.2%</td>
<td>3.5%</td>
<td>4.8%</td>
<td></td>
</tr>
<tr>
<td>2017-2040</td>
<td>Domestic</td>
<td>2.0%</td>
<td>3.0%</td>
<td>4.0%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Transborder</td>
<td>2.0%</td>
<td>3.5%</td>
<td>5.0%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>International</td>
<td>2.0%</td>
<td>5.8%</td>
<td>8.7%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Combined</td>
<td>2.0%</td>
<td>3.3%</td>
<td>4.6%</td>
<td></td>
</tr>
</tbody>
</table>

Figure 5-11: Resulting annual passenger movement growth rates
Projection of aircraft movements are driven by the level of commercial carriers and local flight training activity.

A review of the average number of passengers per movement for each sector highlights the growing trend as annual demand increases. While international services demonstrate more variability, domestic and transborder traffic has been trending upwards (Figure 5-12).

The natural growth in the Canadian aircraft fleet, including the introduction of the B737 Max and the CSeries, as well as the growth in Q400 operations, all support the fact that less aircraft movements will be required to carry the same number of passengers in the future.

A similar review of non-passenger aircraft movements was undertaken and highlighted downward pressure on movements although they are variable from one year to the next.

Figure 5-13 highlights projections in annual aircraft movements. Specifically looking at the base case, the commercial carriers movements drive the bulk of the demand although local movements will ultimately impact the extent of the variability from one year to the next (Figure 5-14).
Figure 5-12: Average passengers per aircraft movement for each sector.
Aviation Activity

Figure 5-13: Projected annual aircraft movements
Figure 5-14: Base forecast aircraft movements by sector
BUSY HOUR DEMAND

While annual traffic projections provide an insight into demand growth, a review of busy hour patterns is critical to understanding the extent of the facility requirements. The following chart presents the number of clock hour departure seats, ranked from the busiest hour to the quietest. It shows that peak demand only occur a few hours of the year and as such, capacity requirements should be developed pragmatically, ensuring that demand is generally met at a good level of service without significantly overbuilding. To do so, a typical methodology involves identifying the 95th percentile busy hour (Figure 5-15).
Figure 5-15: Busy hour seats (2017)

Peak Hour – 984 hourly seats

95th percentile – 582 hourly seats

+ 70%
Based on the selection of a 95th percentile busy hour in Winter (5 January 2017) and Summer (12 May 2016), the daily arrival and departure profiles for the 2017 baseline were reviewed (Figure 5-16).

Both days highlight a significant departure peak early in the morning that will drive the departure processing and holding capacity for the passenger terminal.

The arrival peak occurs mid-morning in winter and is driven by domestic traffic. International operations do not occur in the summer schedule and are assumed to occur mid-morning in winter with late night arrivals.

To project the busy hour requirements over the horizon of the Airport Master Plan, a combined Top-down and Bottom-up approach was used (Figure 5-17).

As shown in Figure 5-16, the rolling hour demand for selected busy days exhibits a significant departure peak early in the morning, which will drive the departure processing and holding capacity for the passenger terminal. The arrival peak occurs mid-morning in winter and is driven by domestic traffic. International operations do not occur in the summer schedule and are assumed to occur mid-morning in winter with late night arrivals. To project the busy hour requirements over the horizon of the Airport Master Plan, a combined Top-down and Bottom-up approach was used.
FLEET MODERNIZATION

In Canada, Air Canada recently acquired B737 Max that will replace its A320 fleet. The CSeries will also replace the Embraer and A319 fleet over time. Air Canada Rouge is in turn operating a high-seat configuration for the A319 (136 seats) and A321 (200 seats). WestJet also purchased B737max recently while Air Transat confirmed the lease of A321 Neo LR.

The main challenge with US Carriers is the scope clause with regional carriers which typically caps capacity at 76 seats per aircraft. As such, existing orders by regional US carriers involve a mix of Mitsubishi MRJs, Embraer E2 and Bombardier CRJs. However, a change to the scope clause could significantly impact the make-up of the transborder fleet.

Emerging carriers may include domestic ultra low cost carriers (ULCC) such as New Leaf or Jetlines who are hoping for increased investments following a recent lift in the foreign airline ownership cap.

A review of the average number of passengers per movement for each sector highlights the growing trend as annual demand increases. While international services are showing more variability, domestic and transborder traffic has been trending upwards.
The natural growth in the Canadian aircraft fleet, including the introduction of the B737 Max and the CSeries, as well as the growth in Q400 operations, all support the fact that less aircraft movements will be required to carry the same number of passengers in the future.

A similar review of non-passenger aircraft movements was undertaken and highlighted a downward pressure on movements although variability from one year to the next exists.

**FORECAST SCHEDULES**

Based on the selected busy days (Summer and Winter) and the top-down bottom-up approach, forecast schedules were created for the years 2022, 2027 and 2040.

The following table highlights the projected busy hour demand over the horizon of the Airport Master Plan (Figure 5-18). Busy hour demand is critical for determining capacity requirements for key pieces of infrastructure.

**PEAK STAND DEMAND**

Stand demand relates to the number of parking positions required for aircraft at the passenger terminal building.

Lika many Canadian airports, Saskatoon Airport has a high demand for overnight parking in order to allow for early departures connecting at domestic and United States hub airports. However, not all aircraft require a direct contact to the passenger terminal to board or disembark passengers.

Figure 5-19 highlights the peak stand demand for overnighting aircraft based on the forecast schedules (2022, 2027 and 2040), for the morning departure peak and for the daytime turnaround peak.

Aircraft operated by TransWest and WestWind are assumed to be towed back to their hangar when on the ground for extensive periods.
<table>
<thead>
<tr>
<th>Year</th>
<th>Season</th>
<th>Arrivals</th>
<th>Departures</th>
<th>Arrivals</th>
<th>Departures</th>
<th>Arrivals</th>
<th>Departures</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Total Passenger Movements</td>
<td>Domestic Passengers</td>
<td>International Passengers</td>
<td>Transborder Passengers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td>Summer</td>
<td>341</td>
<td>568</td>
<td>341</td>
<td>508</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td>Winter</td>
<td>330</td>
<td>669</td>
<td>326</td>
<td>608</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2022</td>
<td>Summer</td>
<td>462</td>
<td>586</td>
<td>462</td>
<td>526</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2022</td>
<td>Winter</td>
<td>408</td>
<td>755</td>
<td>392</td>
<td>694</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2027</td>
<td>Summer</td>
<td>496</td>
<td>708</td>
<td>496</td>
<td>647</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2027</td>
<td>Winter</td>
<td>518</td>
<td>854</td>
<td>496</td>
<td>733</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2040</td>
<td>Summer</td>
<td>673</td>
<td>781</td>
<td>568</td>
<td>647</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2040</td>
<td>Winter</td>
<td>722</td>
<td>971</td>
<td>496</td>
<td>850</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 5-18: Busy hour passenger demand
# Aviation Activity

<table>
<thead>
<tr>
<th>Year</th>
<th>Season</th>
<th>AGN II</th>
<th>AGN III</th>
<th>AGN IV/V</th>
<th>Buffer</th>
<th>Total</th>
<th>AGN II</th>
<th>AGN III</th>
<th>AGN IV/V</th>
<th>Buffer</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>Summer</td>
<td>0</td>
<td>9</td>
<td>0</td>
<td>1</td>
<td>10</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>2017</td>
<td>Winter</td>
<td>0</td>
<td>9</td>
<td>0</td>
<td>1</td>
<td>10</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>2022</td>
<td>Summer</td>
<td>0</td>
<td>9</td>
<td>0</td>
<td>1</td>
<td>10</td>
<td>0</td>
<td>5</td>
<td>0</td>
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<td>6</td>
</tr>
<tr>
<td>2022</td>
<td>Winter</td>
<td>0</td>
<td>12</td>
<td>0</td>
<td>1</td>
<td>13</td>
<td>1</td>
<td>5</td>
<td>0</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>2027</td>
<td>Summer</td>
<td>0</td>
<td>11</td>
<td>0</td>
<td>1</td>
<td>12</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>6</td>
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<tr>
<td>2027</td>
<td>Winter</td>
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<td>18</td>
<td>0</td>
<td>1</td>
<td>19</td>
<td>1</td>
<td>6</td>
<td>0</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>2040</td>
<td>Summer</td>
<td>0</td>
<td>11</td>
<td>1</td>
<td>2</td>
<td>14</td>
<td>1</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>2040</td>
<td>Winter</td>
<td>0</td>
<td>17</td>
<td>0</td>
<td>2</td>
<td>19</td>
<td>1</td>
<td>7</td>
<td>0</td>
<td>1</td>
<td>9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Season</th>
<th>AGN II</th>
<th>AGN III</th>
<th>AGN IV/V</th>
<th>Buffer</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>Summer</td>
<td>1</td>
<td>5</td>
<td>0</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>2017</td>
<td>Winter</td>
<td>3</td>
<td>6</td>
<td>0</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>2022</td>
<td>Summer</td>
<td>1</td>
<td>6</td>
<td>0</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>2022</td>
<td>Winter</td>
<td>3</td>
<td>7</td>
<td>0</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>2027</td>
<td>Summer</td>
<td>1</td>
<td>7</td>
<td>0</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>2027</td>
<td>Winter</td>
<td>3</td>
<td>8</td>
<td>0</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>2040</td>
<td>Summer</td>
<td>1</td>
<td>6</td>
<td>1</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>2040</td>
<td>Winter</td>
<td>2</td>
<td>9</td>
<td>0</td>
<td>2</td>
<td>13</td>
</tr>
</tbody>
</table>

Figure 5-19: Busy hour stand demand
06
Airfield Development
Introduction

The most important piece of infrastructure at the airport is the airfield and more specifically the aircraft movement areas (runways, taxiways and aprons). The airfield also includes many ancillary pieces of infrastructure that are critical to the operation of the aircraft movement areas, including, navigation systems and service roads. This chapter of the Master Plan provides an overview of the existing airfield facilities and the proposed improvement that will take SKYXE to 2040.
EXISTING AIRFIELD FACILITIES

RUNWAYS
The airfield at SKYXE includes two intersecting runways, the predominant runway being Runway 09/27 along with the cross-wind Runway 15/33. Traffic records indicate Runway 27 is most often favored based on prevailing wind conditions. The runways were originally constructed as 61m wide, but have since been painted to 45m operational widths, with the additional 16m width used as shoulders evenly split along either side. Each runway includes a 90m long graded (unpaved) Runway End Safety Area (RESA) beyond the 60m runway strip, as per new Transport Canada standards. The runway strips and clearances all meet current Transport Canada TP312 5th edition standards.

The following table provides a summary of the runway system at SKYXE:

<table>
<thead>
<tr>
<th>NAME</th>
<th>LENGTH (M)</th>
<th>WIDTH (M)</th>
<th>SURFACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Runway 09/27</td>
<td>2,530</td>
<td>45</td>
<td>Asphalt, with concrete thresholds</td>
</tr>
<tr>
<td>Runway 15/33</td>
<td>1,890</td>
<td>45</td>
<td>Asphalt, with concrete thresholds</td>
</tr>
</tbody>
</table>

The runway pavement structure and geometry meet current aircraft operational requirements, and have an ongoing maintenance program aligned with previously performed pavement condition assessments. Both runways have a reported Pavement Load Rating (PLR) of 11.

Runway 15/33, with exception of the concrete threshold areas, will undergo a surface rehabilitation by 2018, including a major improvement at the intersection with Runway 09/27. The Runway 09/27 pavement surface is expected to be rehabilitated in 2021. The declared distances (in feet) for the runways are summarized as follows:

<table>
<thead>
<tr>
<th>DECLARED DISTANCE (FT)</th>
<th>RWY 09</th>
<th>RWY 27</th>
<th>RWY 15</th>
<th>RWY 33</th>
</tr>
</thead>
<tbody>
<tr>
<td>Take-off Run Available (TORA)</td>
<td>8,300</td>
<td>8,300</td>
<td>6,200</td>
<td>6,200</td>
</tr>
<tr>
<td>Take-off Distance Available (TODA)</td>
<td>9,284</td>
<td>9,284</td>
<td>7,184</td>
<td>7,184</td>
</tr>
<tr>
<td>Accelerate-stop Distance Available (ASDA)</td>
<td>8,300</td>
<td>8,300</td>
<td>6,200</td>
<td>6,200</td>
</tr>
<tr>
<td>Landing Distance Available (LDA)</td>
<td>8,300</td>
<td>8,300</td>
<td>6,200</td>
<td>6,200</td>
</tr>
</tbody>
</table>
TAXIWAYS
The airfield at SKYXE consists of four major taxiways, including two taxiways that parallel the runways: Taxiway Alpha (A) parallel to Runway 09/27, and Taxiway Bravo (B) parallel to Runway 15/33. Taxiway A spans the length of the runway providing access to both thresholds, whereas Taxiway B parallels a large portion of Runway 15/33, providing access to only the Runway 33 threshold. The existing separation distances between the runways and Taxiways A and B is almost 350m, which exceeds the Transport Canada minimum requirement of 153m for Aircraft Group Number (AGN) V category aircraft. Taxiway Charlie (C) provides access to the cargo and maintenance facilities at the east end of the airport, and Taxiway Foxtrot (F) is a connector taxiway and holding bay at the Runway 27 threshold, at the east end of Taxiway A. All the existing taxiways are at least 23m wide, allowing operations for up to AGN V category aircraft, but are certified in the Airport Operations Manual as AGN IIIIB taxiways based on confirmed clearances.

Taxiway F is rated to PLR 12, and most of the remaining taxiways are rated to PLR 11, with the exception of Taxiway C around the General Aviation and Cargo operations area, which is PLR 8. The taxiways are generally in fair condition for current operations, but will require rehabilitation as per the pavement management program and forecast included in recent pavement condition assessments.

Taxiways A, B, and F are controlled by the air traffic control tower (ATCT), but Taxiway C is not, due to line of sight constraints.

There are just a few areas of the existing taxiway system that limit the operations on the airfield. One area includes the apex of Taxiways A and B, where the pavement fillet along the inside corner is not large enough to allow larger aircraft movements turning from one taxiway to the other.

B737 and Q400 aircraft are required to over-steer when making this turn. Another limitation is the extent of Taxiway B, which does not extend north of Runway 09/27, forcing the aircraft that depart Runway 15 to taxi on the runways before departure. Finally, the overall pavement structure strength along Taxiway C could limit the operations of larger cargo aircraft, or result in overstressing the pavement.

APRONS AND AIRSIDE COMMERCIAL
The airport currently has eight designated aprons used for commercial passenger operations, de-icing, general aviation, FBO operators, and cargo facilities.

Apron 1 is the primary apron and services the passenger terminal building and provides up to nine aircraft stands that can accommodate AGN III aircraft, two of which are compatible with AGN V aircraft. Of these nine stands, eight are contact stands connected to the terminal building via passenger boarding bridge (PBB), and one is a remote stand where passengers are transferred to the building via bus or by walking. When needed, overnight parking of aircraft is done either on-stand, and during peak periods, along Taxiway B.
Airfield Development

SKYXE currently has a central de-icing apron which can accommodate a maximum of three AGN III, or a combination of one AGN III and one AGN IV aircraft simultaneously. In addition to this apron, the airport recently completed the construction of a fourth AGN III de-icing stand within the footprint of Apron IV.

Apron III is multi-use and includes space for cargo operations near Purolator’s facility. Apron III is large enough for Group III aircraft, but when larger aircraft occasionally arrive, they manoeuvre and park at the end of Taxiway C. Apron II is also used for cargo, in addition to other Fixed Base Operators (FBO’s). Apron VI has been more recently extended south, and is limited to smaller aircraft partly due to varying building development offsets from the apron taxi lane centerline. General aviation and FBO related operations share much of the non-commercial apron (Apron II) areas, and are currently constrained for future expansion by landside facilities and roads. There is also a dedicated general aviation facility, with T-Hangars, located along the east perimeter of the airport, at the end of Taxiway C. All the general aviation and FBO aprons and facilities have separate and direct landside access.

VISUAL AIDS AND NAVIGATION SYSTEMS

Both runways have edge, end, and threshold lighting, with installations and spacing to meet Transport Canada standards. The edge/end/threshold lighting for Runway 09/27 is high-intensity. The edge/end/threshold lighting for Runway 15/33 is medium-intensity. Runway 09 is equipped with a SSALR approach lighting system, while Runways 15, 27, and 33 have ODALS approach lighting. Precision Approach Path Indicators (PAPI’s) are installed for Runways 27, 15, and 33, and lighted windsocks are installed at each end of Runway 09/27.

The taxiways and aprons have edge lighting and guidance signage installed to meet Transport Canada standards. All lighting is medium intensity.

The field electrical centre (FEC) currently sits north of Runway 09/27, and is in good condition. However, the existing constant current regulators (CCR’s) and airfield lighting control and monitoring system will require upgrading. The existing building provides adequate space to house the new equipment, which generally takes a smaller footprint than the older equipment.

In addition to Visual Aids, Navigational Aids are key to the safe and efficient operations of the airfield, including aircraft approach procedures, as well as the dynamic operations of aircraft and vehicles on the airfield. SKYXE’s runways are supported by a mix of navigational aids on and off airport property. Runway 09 is supported by an Instrument Landing System (ILS), installed in 2015, which consists of a glidepath and localizer and allows for precision approach procedures of aircraft. The ILS does not allow for a back-course approach, which has not been problematic based on demand.
Other Navigational Aids include off-site Non-Directional Beacons (NDB) to facilitate various instrument flight procedures. There are three NDB’s in total. On-site electronic navigational aids include VHF Omnidirectional Range /Tactical Air Navigation (VORTAC) equipment, which is co-located with Distance Measuring Equipment (DME).

AIRFIELD OPERATIONS

Runway 09/27 provides runway length sufficient for all aircraft operating at SKYXE and is generally preferred by commercial airlines when weather permits. Runway 15/33 is used by aircraft ranging up to Group III. The following table outlines the runway usage for 2016:

<table>
<thead>
<tr>
<th>RUNWAY END</th>
<th>USAGE (2016)</th>
</tr>
</thead>
<tbody>
<tr>
<td>09</td>
<td>27%</td>
</tr>
<tr>
<td>15</td>
<td>8%</td>
</tr>
<tr>
<td>27</td>
<td>55%</td>
</tr>
<tr>
<td>33</td>
<td>10%</td>
</tr>
</tbody>
</table>

Figure 6-3: Runway usage

RUNWAY CAPACITY

The runway capacity is a major determinant of an airport’s capacity. Generally, runway capacity will be outlined as a maximum amount of movements in an hour which is influenced by many factors.

The main runway capacity determinants include:
- Airfield layout: runway, taxiway and apron physical features
- Operational situation: operating hours, air traffic control availability, curfews etc.
- Demand: fleet mix and movement type (arrivals and departures)
- Other factors: weather, available navigation equipment

The existing maximum hourly practical capacity of the SKYXE runway system was determined based on the current airfield layout and operational situation. In 2016 the maximum hourly runway demand was 23 movements. Based on the forecasting exercise completed, there would NOT be a need to increase the existing runway capacity with the horizon of this Master Plan.
**EXISTING RUNWAY CAPACITY**

**SINGLE RUNWAY OPERATIONS**
(RWY 09/27)
Capacity: 43 movements/hour

**INTERSECTING RUNWAY OPERATIONS**
(RWY 09 + RWY 15)
Capacity: 55 movements/hour

**INTERSECTING RUNWAY OPERATIONS**
(RWY 27 + RWY 33)
Capacity: 44 movements/hour

Figure 6-4: Existing runway capacity
Figure 6-5: Existing airfield facilities
AIRFIELD DEVELOPMENT

RUNWAYS
The length of Runway 09/27 is sufficient for the current and forecasted flights within Canada and the rest of North America. With the longer-term potential of direct international flights to Europe, with heavier aircraft or wide-body aircraft, there could be resulting flight weight restrictions depending on aircraft size and destinations. Aircraft such as Boeing B757 and B787 were considered for the master plan horizon. Results of this study demonstrated that the current length of Runway 09/27 is sufficient for flights to Europe using larger B757 or B787 aircraft.

The aircraft traffic forecast along with estimated capacity of the runway configuration and runway length assessment show that the current runway lengths and configuration will be sufficient to comfortably and efficiently handle forecasted commercial flights over the master plan horizon. Regardless, it would be prudent to continue protecting airport zoning regulations for already protected areas to accommodate a northern close spaced parallel runway and a western extension to Runway 09/27.

TAXIWAYS
To facilitate the expansion of the passenger terminal building, apron, and remote-overnight stands, the northern relocation of Taxiway A is needed to accommodate additional aircraft parking space, as well as a reconfigured flow-through central de-icing apron.

A new taxiway parallel to Taxiway A will be introduced, and extend between Taxiways B and F to better facilitate aircraft movements to/from the runways without being impacted by push-back operations. The geometry is based on minimum taxiway separation standards from Runway 09/27 (153m), and between the two taxiway centerlines (76m).

A connector taxiway is included between the new parallel taxiways, and a transition to existing Taxiway A will be introduced at the intersection with Taxiway B.

To optimize runway usage and minimize runway occupancy times, Taxiway B will be extended to the north to service the threshold of Runway 15. Taxiway C will also be extended a short distance to the east, allowing for improved cargo aircraft operations in an area that will likely become known as Cargo Village.

Finally, an additional AGN IIIB taxiway will be introduced west of the Runway 33 threshold, to connect to a future Western Development Area. This taxiway would be configured to accommodate a potential future parallel runway system for the south airfield. Although the typical design aircraft are AGN III or IV, all taxiway geometry and separation standards will accommodate AGN V spacing criteria, as per TP312 5th edition.
APRON 1
As part of the increased passenger and commercial traffic forecasted over the master plan horizon, apron area for additional aircraft stands is needed as well as additional apron space for other uses such as FBO’s and cargo operations.

Apron 1 will be expanded to the north-east of the existing Gate 1 to include area for five new commercial aircraft stands. Although the master plan indicates a net increase of four commercial gates, one of the existing gates will be impacted by the anticipated terminal expansion and requires relocation. Initially the five new stands will have the flexibility of being used as either passenger terminal gates or remain overnight (RON) stands, and over the course of the master plan horizon, the apron will extend further east allowing for dedicated terminal stands and dedicated RON stands to be developed. The apron will also introduce a new Multi Aircraft Ramp System (MARS) stand that can accommodate either one AGN V or two AGN III aircraft. An additional AGN III apron area will adjoin the eastern limits of Taxiway F.

The increased passenger and aircraft traffic over the next 22 years will also increase the demand for aircraft de-icing operations during the winter months. The following preferences were applied when planning the de-icing apron expansion:

- Increased wing tip separation and GSE staging areas for the large de-icing equipment;
- Allowance of taxi-through operations to optimize de-icing operations and schedules, and minimize delays.

The deicing apron will be expanded over the short-term, ultimately providing the airport with up to four AGN IIIB de-icing stands as required by forecast schedule. Phase 1 will include, after the relocation of Taxiway A, a new MARS de-icing stand that will accommodate either one AGN V or two AGN III aircraft, and adjoin the eastern side of the existing de-icing apron. A new taxiway connection will also be introduced along the north side of the de-icing apron, allowing for taxi-through operations. A GSE staging area and ice-house building/facility will be positioned at the head of the de-icing stands, to the north. The centralized de-icing apron will be complete with the reconfiguration and expansion of the two existing AGN III stands at the existing de-icing apron.

CARGO VILLAGE
To support the expected increase in cargo operations, a cargo apron will be developed along existing Taxiway C and Apron III.
AIRFIELD DEVELOPMENT

OTHER AIRSIDE COMMERCIAL
The more recently expanded Apron VI has already extended far enough south that any further extension may limit in/out operations to the facilities there. However, due to the increased demand in passenger and expanded cargo apron operations over the master plan horizon, further infrastructure planning may be required. With the areas around Aprons II through VI already relatively constrained, it is recommended that the new GA facility be positioned away from this area and along the south end of Taxiway B.

To support the expected growth of both general aviation and airside commercial operations, a new Western Development area will be introduced west of the Runway 33 threshold. This area will facilitate fixed based operators (FBO) and GA operations, with direct groundside access to Claypool Drive. This will reduce the airside and groundside congestion at the north-east end of the airport from the increased demand in passenger and cargo traffic. The new FBO apron area and taxiway link will be able to accommodate up to AGN III aircraft, whereas the GA apron is planned for smaller AGN I aircraft.

A new AGN III parallel taxiway to the west of Runway 15/33 could be added to segregate general aviation and aircraft related to the new commercial developments from passenger and cargo operations at the eastern side of airport. The taxiway would entail civil and infrastructure development, and unlikely to be justified based on demand.

VISUAL AIDS AND NAVIGATION SYSTEMS
The runway lighting systems are critical for safe and efficient aircraft operations during all weather and seasons. Runway 09/27 will benefit from an upgraded approach lighting system for the 27 approach, replacing the existing ODALS and making it consistent with the 09 approach. The runway edge/end/threshold lights along Runway 15/33 will be upgraded to high intensity, to match those found on Runway 09/27 today.

The equipment in the FEC will be modernized, specifically the CCR’s, Airfield Lighting Control and Monitoring System (ALCMS), and back-up generator (including fuel tank). The upgrade will improve the reliability of the airfield’s critical lighting systems, and improve connectivity to the Air Traffic Control Tower as well as improved maintenance diagnostics.

There are no anticipated improvements, relocations, or additions to nav aids serving the airports instrument approach procedure needs. The nav aids are reported to be functioning well and expected to meet the needs of aircraft flight procedures over the planning horizon. Modern technological advancements allow for Performance Based Navigation by use of Global Navigations Satellite System (GNSS), an internationally recognized and accepted method for achieving Area Navigation (RNAV) instrument flight procedures without the investment of costly ground-based infrastructure or equipment. It is expected that the airlines serving SKYXE will invest more attention to RNAV approach procedures, as they can also improve flight paths and overall efficiency.
AIRFIELD DEVELOPMENT OVERVIEW

- Additional 4 contact gates
- Additional 6 remote overnight stands
- Centralized de-icing facility
- Supporting taxiway system
- Cargo apron
- Airside commercial growth
- General aviation hangers
- Western airfield development
Terminal Development
The terminal building is the main interface for passengers at an airport. It provides the link between the aircraft operating areas and the groundside elements of an airport. The terminal is a very important piece of infrastructure at the airport as it consists of many processors that enable conventional air travel. This chapter of the Master Plan provides an overview of the existing terminal facilities/processors and the proposed improvement that will take SKYXE to 2040.
EXISTING TERMINAL FACILITIES

The terminal building recently completed a significant upgrade increasing the total number of contact gates to nine. The expansion updated many of the terminal functional areas including pre-board screening, holdrooms, boarding gates, retail and food and beverage offerings and international arrival functions. The terminal can now accommodate up to a Group V aircraft (Airbus A330). All but one gate is serviced by boarding bridges, although ground loading is still possible on multiple gates. Currently all gates have the capability of accommodating domestic arrivals and departures. Gates 7, 8, and 9 can accommodate international arrivals, while Gate 1 is capable of accommodating non-screened arrival flights.

Figure 7-1: Existing terminal facilities
CHECK-IN
The check-in area provides 34 conventional counters with some operators providing kiosks for self-service check-in functions. The all-season operators include WestJet, Air Canada, Delta Airlines and Transwest/Westwind. Seasonal operators include Air Transat and Sunwing. The check-in hall also includes office space for airline operations.

BAG MAKE-UP
A bag conveyor system runs the length of the back wall of the check-in hall (behind the conventional counters) and oversize baggage induction is located in the middle of the check-in counters. Screening of baggage occurs back of house and feeds a single bag make-up belt which is shared by all service providers. The bag make-up area includes office space for service providers.

PRE-BOARD SCREENING
Pre-board Screening (PBS) was relocated and expanded as part of the recent terminal upgrades. The area currently has four CATSA screening lanes, associated queuing space and offices for staff. The area is capable of accommodating one additional conventional screening lane. CATSA Plus has not been reviewed as part of the Master Plan process.
CONCESSIONS
The concession program at SKYXE was a major part of the recent terminal upgrades. It includes various retail and food and beverage offerings both pre- and post-security for arriving/departing passengers and meeters and greeters to enjoy while in the terminal building.

BAG CLAIM
The terminal building has five flatbed bag reclaim units, three for domestic flights and two for international flights. The effective presentation length of the reclaim units range from 26-31m. Each bag belt has an associated back of house presentation length that is enclosed and only accessible to service providers. There are three oversize baggage collection points.

INTERNATIONAL FACILITIES
The Canada Border Services Agency (CBSA) is located on the ground floor of the terminal building and is accessed via a sterile corridor from Gates 7, 8, and 9. The facility includes a primary inspection lane (PIL), bag reclaim and secondary screening facilities. The PIL area currently has 4 service counters and associated queuing space with the capability of expanding to 6 counters.

OTHER FUNCTIONS
The terminal includes office space for various operators and includes airport authority offices (on the second floor). Six car rental operators service SKYXE which are conveniently located in the arrivals hall of the terminal.

FORECAST DEMAND
The forecast scheduled for the planning years were used to determine the required contact and remote aircraft stands. Figure 7-4 summarizes the stand demand requirements.
Each processor in the terminal needs to be capable of handling the relevant busy hour passenger demand. The following busy hour passengers were derived from the forecast schedules:

### BUSY HOUR STAND DEMAND

<table>
<thead>
<tr>
<th></th>
<th>Existing</th>
<th>2017</th>
<th>2022</th>
<th>2027</th>
<th>2040</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminal Contact</td>
<td>9</td>
<td>9</td>
<td>11</td>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td>Remain Overnight (RON)</td>
<td>0</td>
<td>4</td>
<td>4</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

Figure 7-4: Busy hour stand demand

### BUSY HOUR PASSENGERS

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2022</th>
<th>2027</th>
<th>2040</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic Arrivals</td>
<td>341</td>
<td>462</td>
<td>496</td>
<td>568</td>
</tr>
<tr>
<td>Domestic Departures</td>
<td>608</td>
<td>694</td>
<td>733</td>
<td>850</td>
</tr>
<tr>
<td>Transborder Arrivals</td>
<td>134</td>
<td>134</td>
<td>134</td>
<td>134</td>
</tr>
<tr>
<td>Transborder Departures</td>
<td>134</td>
<td>134</td>
<td>134</td>
<td>169</td>
</tr>
<tr>
<td>International Arrivals</td>
<td>95</td>
<td>220</td>
<td>286</td>
<td>381</td>
</tr>
<tr>
<td>International Departures</td>
<td>284</td>
<td>284</td>
<td>284</td>
<td>409</td>
</tr>
<tr>
<td>TB/Intl Combined Arrivals</td>
<td>134</td>
<td>220</td>
<td>284</td>
<td>381</td>
</tr>
<tr>
<td>Combined Arrivals</td>
<td>341</td>
<td>462</td>
<td>518</td>
<td>722</td>
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<tr>
<td>Combined Departures</td>
<td>669</td>
<td>755</td>
<td>854</td>
<td>971</td>
</tr>
</tbody>
</table>

Figure 7-5: Busy hour passenger demand
Terminal Development

TERMINAL REQUIREMENTS

Busy hour demand, international standards and information gathered from the airport and airlines were used to assess each critical processor in the terminal building. The following table outlines the processor capacity requirements, assuming unconstrained demand for each of the planning years:

<table>
<thead>
<tr>
<th>Processor</th>
<th>Existing</th>
<th>2017</th>
<th>2022</th>
<th>2027</th>
<th>2040</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check-In Counters</td>
<td>34</td>
<td>9</td>
<td>13</td>
<td>13</td>
<td>15</td>
</tr>
<tr>
<td>Automated Bag Drop</td>
<td>0</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>Kiosk</td>
<td>14</td>
<td>22</td>
<td>25</td>
<td>28</td>
<td>32</td>
</tr>
<tr>
<td>Pre-Board Screening Lanes</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Baggage Make-Up</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Dom Baggage Claim</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>CBSA Primary Units</td>
<td>4</td>
<td>4</td>
<td>7</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>International Baggage Claim</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

Figure 7-6: Processor requirements chart
Based on the processor requirements, each terminal area was assessed and sized to suit the forecast demand. Note: these requirements outline a minimum area which does not account for local constraints caused by the existing building geometry.

<table>
<thead>
<tr>
<th>Functional Area (m²)</th>
<th>Existing</th>
<th>2017</th>
<th>2022</th>
<th>2027</th>
<th>2040</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check-In</td>
<td>993</td>
<td>1,000</td>
<td>1,260</td>
<td>1,320</td>
<td>1,530</td>
</tr>
<tr>
<td>Pre-Board Screening</td>
<td>856</td>
<td>920</td>
<td>1,110</td>
<td>1,290</td>
<td>1,290</td>
</tr>
<tr>
<td>Departure Holdroom</td>
<td>2,337</td>
<td>2,059</td>
<td>2,357</td>
<td>2,572</td>
<td>2,785</td>
</tr>
<tr>
<td>Baggage Make-Up</td>
<td>590</td>
<td>1,045</td>
<td>1,168</td>
<td>1,310</td>
<td>1,478</td>
</tr>
<tr>
<td>CBSA Facility</td>
<td>330</td>
<td>325</td>
<td>421</td>
<td>538</td>
<td>714</td>
</tr>
<tr>
<td>Baggage Offload</td>
<td>647</td>
<td>518</td>
<td>518</td>
<td>776</td>
<td>776</td>
</tr>
<tr>
<td>Domestic Baggage Claim</td>
<td>754</td>
<td>451</td>
<td>528</td>
<td>624</td>
<td>670</td>
</tr>
<tr>
<td>International Baggage Claim</td>
<td>567</td>
<td>224</td>
<td>314</td>
<td>455</td>
<td>556</td>
</tr>
<tr>
<td>Arrivals Hall</td>
<td>885</td>
<td>250</td>
<td>339</td>
<td>380</td>
<td>530</td>
</tr>
<tr>
<td>Concessions</td>
<td>1,615</td>
<td>1,031</td>
<td>1,230</td>
<td>1,456</td>
<td>2,168</td>
</tr>
<tr>
<td>Offices</td>
<td>1,475</td>
<td>1,205</td>
<td>1,424</td>
<td>1,652</td>
<td>1,925</td>
</tr>
<tr>
<td>Public Toilets</td>
<td>919</td>
<td>751</td>
<td>887</td>
<td>1,029</td>
<td>1,200</td>
</tr>
<tr>
<td>Circulation</td>
<td>3,962</td>
<td>3,237</td>
<td>3,826</td>
<td>4,437</td>
<td>5,172</td>
</tr>
<tr>
<td>Mechanical and Electrical Systems</td>
<td>1,108</td>
<td>905</td>
<td>1,070</td>
<td>1,241</td>
<td>1,446</td>
</tr>
<tr>
<td><strong>Functional Program</strong></td>
<td><strong>17,038</strong></td>
<td><strong>13,922</strong></td>
<td><strong>16,452</strong></td>
<td><strong>19,079</strong></td>
<td><strong>22,240</strong></td>
</tr>
</tbody>
</table>

Figure 7-7: Terminal Area Requirements

Exceeds Existing
Terminal Development

**TERMINAL DEVELOPMENT**

The priority for the expansion of the terminal building is driven by the Master Plan directives – Growing without Infrastructure Constraints and Responsible Growth. This is achieved by prioritizing the retention of the functional baseline of the terminal building. Arrivals and departures passenger flows and the sector allocation of gates will continue in their current layout. The terminal functional areas will grow incrementally from their current location as needed to 2040.

To meet forecast demand the terminal will require the following upgrades within the life of this Master Plan:

**TERMINAL CONTACT GATES**

Four additional domestic gates will need to be added to the existing terminal to accommodate the forecast stand demand. The growth of the terminal will match the proposed growth of the apron to the north, which ensures incremental and flexible growth is achievable. One additional international arrival capable gate is required within the Master Plan horizon and is achieved by extending the existing sterile corridor to enable international arrivals at Gate 6.

**CHECK-IN HALL**

It is anticipated that new self-service technologies such as Automated Bag Drop (ABD) units and kiosks will be used in the future at SKYXE to help improve efficiency of the check-in processes. However even with efficiency improvements, the existing check-in hall is still lacking the area required to accommodate the proposed growth to 2040. The check-in hall also requires improvement to conventional counter layout with the introduction of bag belts to the check-in counters. This will improve the access to the bag belt for staff and passengers as the current layout requires staff to lift and place all checked bags on the conveyor which runs along the back wall of the check-in hall.

**BAG MAKE-UP**

The bag make-up area will require future expansion to meet departure peak demand. This will include increased bag screening capacity and bag make-up belt effective presentation length.

**PRE-BOARD SCREENING**

Within the horizon of the Master Plan it is anticipated that the screening area will need to expand beyond existing area. The current location offers optimum passenger flow and should be retained.

**CONCESSIONS**

It is expected as passenger numbers grow to 3.1 million by 2040, there will be a requirement to expand the concession offering in pre- and post-security areas. This growth will occur incrementally to ensure commercial success of operators.
BAG CLAIM
The arrival passenger peak is anticipated to grow over the life of the Master Plan requiring additional bag claim belt capacity. The existing bag claim area will be maintained and expanded incrementally at the south-west end of the terminal.

INTERNATIONAL FACILITIES
As new international destinations are offered from SKYXE it is anticipated that the processing capacity of the CBSA hall will need to increase to meet demand. Opportunities for improving processing capacity through new technology, such as Primary Inspection Kiosks (PIK), will be a possibility in the future. However, it is still anticipated that as the busy hour international arrival demand increases there will be a requirement for additional primary and secondary inspection areas. Similar to the bag claim area, growth will occur at the south-west end of the terminal.

OFFICES
As the airport passenger numbers grow there will be a correlated growth in the amount of staff working in the terminal building. This will include the growth of existing tenant staffing and the introduction of new tenants. This will require incremental growth in the office space available at the airport. It is anticipated that currently vacant areas within the terminal will provide some of this additional office space capacity. It is also anticipated that the First Floor of the terminal office space will be required to grow to meet demand.
TERMINAL DEVELOPMENT OVERVIEW

- Additional 4 domestic gates
- Additional 1 international gate
- Expanded Check-in and Bag Make-up areas
- Additional Bag Reclaim Belt
- Expanded CBSA facility
- Additional 3 pre-board screening lanes

Figure 7-8: 2040 terminal layout
Groundside Development
Introduction

The groundside of an airport includes all areas accessible by the public. The primary pieces of infrastructure of the groundside include ground access infrastructure (roads and pathways), parking facilities, groundside commercial infrastructure and greenspace accessible by the public. Utilities servicing all airport facilities also fall under the category of groundside infrastructure. This chapter of the Master Plan provides an overview of the existing groundside infrastructure and the proposed improvements that will take SKYXE to 2040.
SKYXE is currently undertaking a large groundside infrastructure project that will improve ground access to the terminal building and increase public parking capacity. This project due for completion in 2018 is NOT included within the Master Plan; all updates included within this project are considered complete for the purpose of this plan.

Groundside Existing Facilities

A high-level review of the transportation network in and around the airport was based on background studies including the 2008 Airport Master Plan, and assessments of the access and circulation needs of the airport. The existing conditions of the airport's local road network and the wider-area transportation network surrounding the airport were examined. Two major thoroughfares, Circle Drive and Idylwyld Drive, are located near the airport and can be used to reach the Airport Business Area. Within the local road network of the Airport Business Area, primary access to the airport is provided via Circle Drive and Airport Drive. Other accesses are provided via 45th Street, Avenue C and 51st Street.

The following summarizes key findings of the review:

- Congestion has been identified along Circle Drive at various locations to the east of Airport Drive including the Idylwyld Drive – Circle Drive interchange and Circle Drive and Avenue C intersection. The operational constraints on Circle Drive may be causing cut-through traffic on Airport Drive and 45th Street to reach the North Industrial Area on the east side of Idylwyld Drive. The intersection of Airport Drive and 45th Street requires further investigation to improve traffic flow to the airport, and identify alternate access options in the event of a full closure of the intersection.

- There are potential access and safety improvements along the Avenue C corridor in the Airport Business Area, especially at the intersection of Avenue C with Hangar Road.

- Access improvements to and from the terminal building loading dock will be necessary to better facilitate heavy vehicle turning movements prior to docking, especially as the terminal building expands to the south.

Detailed traffic studies will be needed at the above locations to better understand current vehicle operations, identify potential improvements, and inform the design and configuration of such improvements during conceptual and detailed design.
PARKING
SKYE introduced a new remote parking product in 2017 with the construction of 900 stalls at the intersection of 45th Street W and Airport Drive. The airport now offers a range of parking products with just under 2,000 stalls available to the public.

Existing Parking Product Mix
- Long Term (main lot) = 840
- Short term (main lot) = 180
- Car Rental lot = 220
- Remote Shuttle lot = 900 (500 paved, 400 gravel)
- Valet = 20
- Staff = 186

WATER SUPPLY AND DISTRIBUTION
Water is provided to the Saskatoon Airport by a 300 mm diameter City of Saskatoon (COS) watermain at locations along 45th St W. The eastern-most airside support and commercial lots are serviced by a 150 mm diameter water line from Wheaton Avenue. The remainder of the airport is serviced by a 250 mm diameter feed at Koyle Av, which loops through to the air terminal and operations buildings, then reconnects to the COS watermain at Berney Av. SKYE has indicated that water demand is currently met but nearing the limits of supply. Low water pressure occurs in the airport distribution system when tenants test fire pumps.

SANITARY SEWER SYSTEM
The airport drains to a 300 mm COS sanitary sewer along 45th St W, and ultimately to 450 mm diameter sewer at the intersection with Idylwyld Drive. The airport sanitary collection system includes a 250 mm diameter sanitary sewer from Airport Road which extends to the terminal building, a 250 mm diameter sewers from Thayer Av which extends to the terminal parking and services the deicing facility, and a 150 mm diameter sewer at Wheaton Av draining the eastern aviation support and airside commercial areas.

The existing sanitary sewer collectors on the airport have adequate capacity for existing and future developments. However, COS has indicated that there is limited capacity in its 300 mm diameter sanitary sewer along 45th St W and that an upgrade would be needed up to the intersection with Avenue C for any significant developments.
STORMWATER DRAINAGE SYSTEM
The airport land area consists of three separate watersheds that drain to respective sloughs with outfalls on COS property. The largest of the three watersheds drains 600-ha from the western, central, and northern sections to the north slough, northeast of the Runway 15 threshold, and overflows offsite in the northeast. The eastern section drains 200-ha offsite to the Idylwyld slough to the east of the airport along Idylwyld Dr then into COS storm sewer system. The remainder, a 30-ha area in the southeast corner of the airport drains south to a storm pond at the intersection of Airport Dr and Circle Dr, then into the COS storm sewer system.

Deicing runoff is managed by SKYXE depending on glycol concentration. Runoff from deicing pads is collected and directed either to the airport sanitary sewer system or, with high glycol volume, to the storm sewer system for containment and treatment in the north slough where glycol concentrations are monitored prior to discharge to the COS storm sewer system.

POWER / GAS / COMMUNICATIONS
The airport electrical power is fed with 25 kV overhead power lines from Airport Dr and 45th St W, and along 47 St W. Communication services are carried into the airport along the power distribution system. Natural gas is supplied from a MP150 main along Wheaton Ave which branches into three segments to serve the airport.

FOOTPATHS AND GREENSPACE
There are limited designated footpaths and greenspace within the airport property. Footpaths currently provide access for passengers between the terminal building and the main parking lot. No footpath access currently exists between the terminal building and the remote parking lot. Existing greenspace includes landscaping along the terminal access corridors on Airport Drive and Airport Road.
Figure 8-1: Existing groundside facilities
FORECAST PARKING DEMAND

It is anticipated that parking demand will grow as more passengers fly through SKYXE. The following table outlines the anticipated parking stall demand based on the forecast passenger growth:

<table>
<thead>
<tr>
<th>PARKING DEMAND</th>
<th>2022</th>
<th>2027</th>
<th>2040</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Stalls</td>
<td>1,900</td>
<td>2,200</td>
<td>3,300</td>
</tr>
</tbody>
</table>

Figure 8-2: Parking demand

GROUNDSIDE DEVELOPMENT

GROUND ACCESS/ROADS
A review of the transportation network indicated there are opportunities to improve traffic operations and safety at key locations within the airport and in its immediate surrounding areas. As part of the Master Plan, a number of potential solutions were developed for these locations. However, detailed traffic analysis at each location is recommended in Phase 1 to identify the most appropriate solution(s) for the existing and future expected traffic demands on the road network. The following concepts are proposed for further detailed investigation:

• AIRPORT DRIVE AND 45TH STREET
A two-lane roundabout to improve traffic flow through the intersection, designed to accommodate all heavy vehicles expected to access the airport.

Additional storage for the westbound right turn lane on 45th Street and an acceleration lane on Airport Drive to increase road capacity for airport-bound traffic from 45th Street.

A restricted/gated road connecting 45th Street to Airport Drive to be used as a secondary access in the event of a full blockage of the intersection of Airport Drive and 45th Street.

• AVENUE C AND HANGAR ROAD
Closure of Hangar Road at Avenue C with provisions for a new internal road connecting Hangar Road to 47th Street, and signalization of Avenue C and 47th Street intersection. A backroad connection between Hangar Road and 47th Street is proposed to better facilitate heavy vehicles accessing Hangar Road at a further distance from the intersection of Avenue C and 47th Street; this also presents the opportunity to eliminate the existing jog at Hangar Road and 47th Street.

There is also potential to improve north-south connections through the area by extending Wheaton Avenue to the south and aligning with the access to Hangar Road to the north. However, such improvements to the City’s road network require further evaluation and discussions with the appropriate stakeholders.
• TERMINAL BUILDING LOADING DOCK
Protection for additional property of the existing parking Lot 2 to facilitate heavy vehicle turning manoeuvres and access to the loading dock, especially as SKYXE expands airport operations to the 2040 horizon year.

PARKING
The parking products currently offered will continue to feature in the future at SKYXE. The recently constructed remote parking lot has provision for growth of up to 3,300 stalls. As part of the initial build phase in 2017, groundwork was completed for future parking expansion at this site. Demand requirements to 2040 can be met with the available growth capability of the remote parking lot with incremental expansion. Future expansion of the remote parking lot will include the introduction of a shuttle pick-up building to provide shelter for passengers and staff and to potentially offer remote check-in facilities.

UTILITIES
With increased development comes increased demand of utility services. It is recommended that a utility servicing study be conducted for a detailed assessment of the on-site utility systems servicing the airport properties. The site servicing study would develop actual usage quantities, address existing utility conditions, perform modelling to further evaluate the system capacities, and to confirm the recommendations for the proposed expansion. This would allow for future engineering of an efficient system that makes best use of existing infrastructure capacities.

• WATER SUPPLY AND DISTRIBUTION
To meet future water demand from the projected increase in airport passengers and to carry present fire flows, additional capacity is needed in the ring main serving the airport. The existing 250 mm diameter loop could be replaced with a larger diameter line along the same corridor. Increasing the ring main size will be dependent on upgrade of the 300 mm diameter COS watermain serving the airport along 45th St W.

The airside commercial developments and the relocated hangars can both be serviced from the existing water and sewer lines on Airport Crescent and Airport Road respectively. Commercial Lands Sites No. 1 - 3 each front existing streets with COS watermain for service.

The proposed Western Airfield Development and Commercial Lands Site No. 4 in the southwest corner of the airport property will require new utility services. A 2016 AECOM servicing study for the Hampton Village Business Park (HVBP), a proposed development located south of the airport property along Claypool Drive, addressed potential servicing connections for the adjacent airport developments. Water service could be extended from a 300 mm diameter watermain at the intersection of McClocklin Road with Claypool Drive.
Groundside Development

- **SANITARY SEWER SYSTEM**
  Additional flow from long-term increase in airport passengers and from development of Commercial Lands Sites No. 1 and 2 will likely necessitate upgrade of the 300 mm diameter COS sanitary sewer in 45th St W.

  A 2014 Airport Business Area Sanitary Servicing Plan developed by the COS addresses the servicing needs of the proposed airport developments near the intersection of Airport Drive and Claypool Drive. The area includes the Western Airfield and Commercial Lands Site No. 4 in addition to the HVBP and Aerogreen Business Park. A sanitary pump station is needed to drain this area and convey flows to the sanitary system at the intersection of 43 Street W and Warman Road. Service connection for the airport developments to the proposed pump station, located on the HVBP property, has been allotted to a 425 mm diameter sanitary sewer on Claypool Drive, southwest of the Jet Set parking lot. Given the flat topography of this area, a lift station may be needed to transfer sanitary flows from these two developments to the proposed HVBP pump station to avoid prohibitive gravity sewer depth. It is recommended this option is evaluated in further detail in a site servicing study.

- **STORMWATER DRAINAGE SYSTEM**
  The proposed airside areas consisting of aprons, taxiway, overnight stands, deicing, and cargo, as well as the relocated hangars and Western Airfield will generally require new storm sewer and catch basins fronting the new paved surfaces. A 150 to 250 mm diameter storm sewer, as needed to convey flows through the flat slopes, will collect the runoff and drain to existing storm collectors then discharge to respective sloughs.

  Stormwater modelling is needed to confirm suitability of existing collectors to receive additional flows. Specifically, a closer look is needed at the west-most 760 mm diameter storm outfall at the north slough and the 640 mm diameter storm outfall at the east slough.

  It is expected that the deicing runoff from the expanded deicing areas will continue to be handled as per existing operations.

  The COS will require that Commercial Land Sites and the Jet Set shuttle parking limit storm discharge to predevelopment flows. These developments will include onsite storage upstream of connection to respective COS storm sewer collectors. For the Commercial Lands Site No. 4, storm sewer connection at the intersection of Airport Drive and Claypool Drive will require a slow release orifice to limit discharge to an acceptable rate determined by COS. A 900 mm diameter storm sewer connection has been allotted at HVBP storm sewer system but would also be limited for lack of capacity.

- **POWER / GAS / COMMUNICATIONS**
  It is expected that power, natural gas, and communications supply and distribution improvements for new airport developments can be readily accomplished by extending existing networks.
GROUND SIDE COMMERCIAL
The Commercial Lands Master Plan identifies four sites for potential development of commercial infrastructure. As part of the Master Plan, these areas were assessed in terms of alignment with other infrastructure functions and requirements.

Sites, 2, 3 and 4 would be the most optimal areas of commercial development with the following considerations:

- Available utilities
- Impact on ground access to the terminal building (e.g. the addition of a dedicated airport access lane on 45th Street W proposed in this Master Plan may impact the Site 2)
- Impact on ground access to the remote parking lot and facilities located along Airport Road.
- The provision for footpaths between the terminal building and the remote parking lot and hotels

This Master Plan proposes expansion and improvement of cargo facilities in the vicinity of Hanger Road and Avenue C N. Therefore, the development of commercial facilities at Site 1 is NOT recommended to ensure growth opportunity is available for cargo facilities.

FOOTPATHS AND GREENSPACE
SKYXE is committed to making infrastructure improvements that benefits community, employee and passenger well-being. As such, the Master Plan proposes an expansion and improvement to existing footpaths and greenspaces in highly used areas on airport property. A notional concept has been proposed to link the terminal building with the remote parking lot and the existing hotels (just outside of airport property). This footpath link would provide an option for people to walk between these facilities. As part of the introduction of this footpath there would be an opportunity to improve the landscaping along Airport Drive which is exposed to all those accessing the terminal building. An opportunity for greenspace has also been proposed as part of the terminal growth to the north-west. An area has been identified to the north-east of the check-in hall for greenspace that could be used by passengers and staff.
Figure 8-3: Commercial lands master plan
Figure 8-4: 2040 groundside layout

GROUNDSIDE DEVELOPMENT OVERVIEW

- Footpath and greenspace connecting hotels, remote parking and terminal
- Greenspace adjacent to terminal building
- Remote parking expansion
- Utility upgrades
- Ground access improvements
Land Use Plan
Introduction

A Land Use Plan divides the airport site as a whole into sections with particular land uses. This chapter provides an overview of the Land Use Plan which incorporates all proposed improvements outlined in the Airfield, Terminal and Groundside Development sections of this report.
OVERVIEW

The existing Land Use Plan was referenced throughout the Master Plan process while assessing each area of development (airfield, terminal and groundside infrastructure). It was concluded that the existing Land Use Plan adequately protects the airport subsystems for the defined planning horizon.

The following graphic overlays the existing Land Use Plan on the 2040 airport layout:
Figure 9-1: Land use plan with 2040 layout

Air Terminal District
Airside District
Airside Commercial District
Groundside Commercial District
Airport Reserve District
Operational Services District
10

Environment
The sustainability of Saskatoon Airport relies on a holistic approach driving exemplary levels of environmental performance through collaboration with our staff, customers, business partners, tenants, contractors, suppliers and the community. This chapter outlines the environmental objectives and goals which are aligned with the Master Plan Directives and the existing Sustainability Plan.
OVERVIEW

SKYXE recognizes the importance of balancing the key strategic directives of the Master Plan with its duty of care for the environment and the commercial realities of operating the airport. Ambitious plans define the journey ahead and push for improvement in Saskatoon Airport’s environmental performance. One of the keystones of the Master Plan is for SKYXE to establish itself as one of ‘World’s Most Environmentally Responsible Airports’ and in doing so placing environmental stewardship and sustainable development at the forefront of future growth plans.

A series of environmental objectives and goals underpin the delivery of our strategic vision. These are:

- To be energy and resource efficient across the entire airport property and operationally
- To use alternative, clean energy sources to minimise the airport’s carbon footprint
- To make the airport and its operations resilient to future changes in the climate
- To manage the use of land across and immediately surrounding the airport sustainably, enhancing its ecological diversity, and increasing its economic and social value where possible
- To protect land, air and water from pollution and other negative impacts associated with airport development and operations
- To be a good neighbour and positively contribute to the local communities served by the airport

ENVIRONMENTAL MANAGEMENT FRAMEWORK

SKYXE is committed to protecting the environment as it looks to develop and grow the airport in a safe and responsible manner.

An environmental management framework (EMF) has been established for Saskatoon Airport, premised on a system of continuous learning and improvement. The primary intent is that individual components of the EMF will evolve during its implementation. Where appropriate, the EMF will be regularly updated to reflect new and emerging policy and regulations, scientific research, best available practices, technological advancements, company policy and stakeholder feedback. To that end, the EMF provides the overarching blueprint to environmental management at Saskatoon Airport. It forms the core building blocks in which SKYXE will plan, implement, monitor, review and report environmental management across all airport development, property and operational domains.

A cornerstone of the EMF is to adopt a risk-based approach to environmental management in line with the ‘Plan-Do-Check-Act’ principles of ISO14001 to minimise reasonably foreseeable disruption to operations, constraints to future development and expansion, harm to people, damage to the surrounding environment or airport property, and fiscal impacts. The principal environmental risks taking centre stage and forming the basis of future management priorities at the airport include:
• Alteration to surface hydrology affecting nearby waterways
• Air pollution from aircraft operations, ground handling, vehicles, building plant and equipment, tenants and construction activities
• Aircraft noise exposure to communities living near the airport or underneath flight paths
• Resource use and waste generation
• Pollution of surface and ground water resources, and soil
• Flood water inundation of operational areas and built assets
• De-icing and glycol management during the winter season
• Wildlife control.

Once key environmental risks have been identified, a bespoke set of controls will be established and implemented to manage and reduce associated impacts to acceptable levels. Importantly, environmental management at Saskatoon Airport is the responsibility of all staff, airline operators, business partners, tenants and contractors.

The broad responsibilities for environmental management are illustrated below.
CANADIAN ENVIRONMENTAL AUTHORITIES

PLANNING, DEVELOPMENT & ENVIRONMENTAL REGULATIONS

ENVIRONMENTAL PERMIT(S) & LICENCES

SKYXE Environment Manager

LEGAL COMPLIANCE

CONTRACTUAL

Contractors

ALL PARTIES APPOINTED BY SAA TO CONSTRUCT VARIOUS AIRPORT MASTER PLAN ITEMS

LEGAL COMPLIANCE

ASSURANCE

Contractor(s) Environmental Management Representative (EMR)

REPORTING

YXE Tenants & Concessionaires

AIRLINES, RETAILERS, F&B OPERATORS, UTILITY PROVIDERS ETC.

SKYXE Operational & Support Divisions

Contractual Performance & Level of Service

Safety & Operational Compliance

SKYXE Management

SKYXE Board

YXE Development & Administration

Environment Officers

Safety & Operational Compliance

SKYXE Wildlife Control Team

SKYXE Standards & Quality Management

Figure 10-1: Environmental management
CLIMATE CHANGE

At the global level, aviation is a growing contributor to emissions of greenhouse gases, which cause climate change. Currently, around 2% of global man-made CO2 emissions are attributed to aviation and this figure is on the rise. Climate change along with more extreme weather is now recognised as real and present threat faced by airports around the world, though a degree of uncertainty surrounds the likely extent of change and the magnitude of the effects predicted.

SKYXE’s approach to adapting to a changing climate and strengthening the airport’s operational resilience is to:

- Design all new airport buildings to be climatically responsive, smart and healthy
- Continue to explore feasible ways in which to increase the use of renewable energy through the onsite sourcing of solar and geothermal
- Procure and use low impact, responsibly sourced materials
- Conserve resources and use energy and water responsibly
- Optimize the airport vehicle fleet, including GSE by increasing the number of electric or alternative fuel vehicles
- Install low energy lights, hand dryers, baggage handling system motors and vertical transport throughout all existing and any new or refurbished areas of the terminal and other airport buildings
- Equip airport buildings with intelligent controls (demand/occupancy linked) and automatic monitoring
- and targeting systems to deliver significant reductions on the base energy load and potable water use
- Consider the feasibility of installing 400Hz fixed electrical ground power (FEGP) and pre-conditioned air (PCA) on all contact stands to enable aircraft to switch-off their auxiliary power units (APUs) during turnarounds
- Upgrade airfield ground lighting with ultra-low energy LED fixtures
- Promote the use of sustainable, healthy transport to staff and passengers
- Work with airline partners and fuel companies to encourage the uptake of alternative, sustainable biofuels and to implement carbon reduction measures for their operations.

Alongside this, SKYXE, in association with the broader aviation industry, continues to work towards reducing the airport’s carbon footprint, monitoring relevant research and actions by governments and industry bodies, and ensuring any relevant climate adaptation and resilience strategies are, where appropriate, factored into future planning.

In 2015, SKYXE mapped the airport’s carbon footprint to account for a range of stationary and non-stationary emission sources under its direct control. This is being done to allow the airport to participate in and seek certification under the Airports Council International (ACI) Airport Carbon Accreditation (ACA) scheme. This would enable Saskatoon Airport to join an elite band of North American airports already certified under the scheme, eight of which are from Canada.
Nonetheless, the management of carbon emissions is a key challenge, not just for Saskatoon Airport but for all airports. Technological innovation will play a vital role in driving reduction efforts at the airport. The same can be said for airlines as the global fleet of commercial aircraft undergoes a significant technological transformation as airlines renew their fleets with new, more fuel efficient cleaner aircraft.

**AIR QUALITY**

Air quality is a key concern for people living near airports. Good air quality at Saskatoon Airport is important for the well-being of all airport users and workers as well as the local community. Typically, the concentrations of air pollutants such as nitrogen dioxide (NO2), nitric oxide (NO) and fine particulate matter (PM10 and PM2.5) in the immediate vicinity of the airport are high relative to surrounding areas. High concentrations of such pollutants can be harmful to human health, particularly for people with pre-existing cardio-vascular and pulmonary conditions. Changes in deposition rates and pollutant concentrations can also potentially affect local ecology.

The main sources of air pollutants at the airport generally include:
- Combustion of aviation fuel on the ground and in the air during the landing-take-off (LTO) cycle which extends up to 3,000ft in the skies above the airport
- Use of aircraft APUs whilst parked on stand
- Aircraft engine ground running tests following ‘maintenance-repair-overhaul’ checks
- Fixed mechanical plant and building management systems to keep interior spaces lit, ventilated and operational
- Local road and airside vehicle traffic exhausts
- Operations of GSE when handling stationary aircraft during turnarounds
- Fire training exercises
- Fugitive dust from airport construction works.

Managing and where possible improving air quality is a long-standing commitment within SKYXE’s corporate responsibility agenda. We recognise the need to manage the emissions that we have direct responsibility for and to work in partnership with other airport users, tenants and business partners to manage air quality impacts. Central to this approach is a clean air strategy which sets out how SKYXE plans to manage air quality ensuring that the airport continues to comply with the air quality limits under Canadian standards.
Figure 10-2: Air quality

Clean Air Strategy

1. Energy Efficient Technologies
2. Smart (Green) Airport Buildings
3. Electric GSE & Vehicle Fleets
4. 400Hz FEGP & PCA Systems
5. Reduced Engine Taxiing
6. Sustainable Biofuels
7. Mass Transit Connectivity
8. Renewable Energy Sourcing
WATER MANAGEMENT

Saskatoon Airport lies within the South Saskatchewan River Basin. The western boundary of the airport is framed by prairie pothole wetlands and large tracts of farmland. The upstream and downstream catchment areas of the River Basin have been extensively modified by the intensification of agricultural activities, especially livestock and crops. Development of new airport infrastructure or the modernization of existing built assets will potentially alter natural drainage regimes through changing local topography and introducing large areas of hard, impervious pavements. Such changes will bring about reductions in the groundwater recharge potential and the water holding capacity of soils and floodplain of the airport and its environs, possibly lowering the water table and increasing the risk of erosion, scouring and downstream flooding.

A range of contamination sources at an airport have the potential to affect local water quality. These include localised fuel and oil spills on aprons during aircraft re-fuelling and servicing, wash-out of chemical agents from aircraft and vehicle maintenance and fire training, ‘wing-tip’ spillages from aircraft hydraulic lines during taxiing, brake and tyre wear debris from pavements, sediment-laden runoff from construction areas, influx of spent fluids during the de-icing of aircraft and airfield pavements in the winter season and other point sources across the airport (i.e. both airside and landside).

The adequate provision and control of airport drainage is critical to maintaining local water quality and minimising the influx of particulate or dissolved contaminants from entering the natural water environment, which could significantly affect aquatic biota.

Key water quality and drainage issues, typically include:

• Water balancing and groundwater recharge
• Integrated water cycle management (rainwater harvesting, grey water reuse)
• Glycol recovery and reuse during winter operations for certain airports
• Use of primary and secondary pollution prevention systems
• Sustainable drainage systems (bio-swales, constructed wetlands)

Water quality control measures are in place at the airport. These measures are designed to reduce the velocity of stormwater flow, allowing for the natural filtration of sediment and nutrients. The reduced flow also controls erosion and is designed to facilitate infiltration and groundwater recharge.

Frost or ice build-up on aircraft surfaces can influence the aerodynamic properties required for flight resulting in reduced lift forces (i.e. airflow over the wing surfaces). Airfield pavements are treated with anti-icing and skid agents to keep runways, taxiways and aprons snow and ice free for safety purposes.
The chemicals contained in aircraft de-icing and pavement anti-icing products include propylene glycol and potassium acetate. Both products are low in toxicity and easily biodegradable although have high levels of Biological Oxygen Demand. Large volumes of untreated de-icing fluids entering local waterways or groundwater could lead to oxygen deficiency affecting water quality and aquatic biota.

The average aircraft de-icing time varies according to the aircraft type. After an aircraft has been de-iced it taxis to the departure threshold for clearance from ATC to take-off. The maximum holdover time between de-icing and departure is approximately 15 minutes depending on the severity of the prevailing weather conditions. This is to prevent new ice forming on the control surfaces of the aircraft. Exceedance of this holdover time could require the reapplication of de-icing giving rise to delays, taxiway congestion, increased fuel burn and emissions.

For the winter season, Saskatoon Airport has a dedicated glycol collection and management system. This includes a de-icing pad with under pad drainage lines to collect glycol laden runoff and store it in holding ponds. These ponds contain plants to separate the glycol from the water and break it down naturally to minimise any potential harm to the environment. SKYXE continually monitors glycol levels from de-icing activities to ensure that concentrations are compliant with Canadian standards.
NOISE MANAGEMENT PLAN

Aircraft noise is the most significant cause of adverse community reaction related to the operation and expansion of airports. It is therefore critical to identify problems as they arise and identify various measures to reduce noise in collaboration with stakeholders and the community. The Plan documents the existing program and identifies areas of focus and supporting initiatives over the horizon of the Airport Master Plan. Noise management initiatives can take many forms as described below.

REDUCTION OF NOISE AT THE SOURCE

By far the most effective means of reducing aircraft noise is at the source - the aircraft engine. As aircraft technology has improved over the years, so has the improvement in noise performance of aircraft. International noise certification standards have reflected this trend, ensuring that new aircraft entering the market are increasingly quiet. The following chart highlights how the B737 aircraft family has progressively become quieter over time. Communication of the impact of new technology can be an important part of a noise management plan.
Figure 10-4: Noise exposure forecast (NEF)
LAND-USE PLANNING AND MANAGEMENT
While SKYXE has little control over the aircraft operating to its airport, it has a more proactive role in ensuring that appropriate land-use buffers are implemented in the municipal town plan. Sound land use planning within the City of Saskatoon has ensured that aircraft noise is not a major issue. The municipality has followed Transport Canada’s noise exposure forecast (Figure 10-4) and restricted incompatible residential and other development in high impact areas.

In the future, SKYXE management will continue to work closely with City planning officials to ensure that noise exposure is used to guide surrounding development and to see that municipal plans, policies and bylaws continue to promote compatible development.

OPERATIONAL MITIGATION
Operational considerations can also mitigate the impact of aircraft noise. These may include the use of preferential runways, training circuits guidance or restrictions on engine run-ups at night-time. However, the implementation of such measures would need to be the result of careful consideration of the causes of noise events and the likely social, economic and environmental impacts of the operational mitigation measures.

COMMUNITY CONSULTATIVE COMMITTEE
The identification of community issues and potential initiatives for consideration in the Plan is undertaken consultatively and actively seeks community and industry input to ensure buy-in. Initiatives in the Plan set broad objectives and deliverables; however, actions and results are often subject to further work and assessments to ensure decisions can be made with all available input, information, and data available. While issues can be raised by community consultative committee members, any person in the community can submit a query or complaint to the airport for further assessment.
Appendix A

Economic Impact Study
The Saskatoon International Airport is an economic engine for the community, generating over one billion dollars in economic activity while providing one of the largest employment generators in the region. The Saskatoon Airport Authority is a not-for-profit, non-government corporation whose vision is to operate this community asset to enhance economic growth and air access to Saskatoon and northern Saskatchewan residents.

This report documents the 2016 economic impact activity generated by 67 on-airport firms and their subsidiaries. The impact is reported in terms of full-time equivalents (FTEs), labour income and economic output. Direct, indirect and induced forms of activity have been considered. The response rate to the interview process and survey questionnaire was exceptional: a 96 percent completion rate for the data sought.

<table>
<thead>
<tr>
<th></th>
<th>Direct Impact</th>
<th>Total Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FTEs</td>
<td>Labour</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Income</td>
</tr>
<tr>
<td>Direct Impact</td>
<td></td>
<td>$169.304</td>
</tr>
<tr>
<td>Total Impact</td>
<td></td>
<td>$359.202</td>
</tr>
</tbody>
</table>

( in millions, except FTEs )

† 1460 jobs are located on the airport.
The on-airport economic benefits are distributed:

<table>
<thead>
<tr>
<th></th>
<th>FTEs</th>
<th>Labour Income</th>
<th>Other Expenditures</th>
<th>Economic Output</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Air Carriers</strong></td>
<td>22%</td>
<td>23%</td>
<td>27%</td>
<td>26%</td>
</tr>
<tr>
<td><strong>ATB Concessionaires</strong></td>
<td>13%</td>
<td>6%</td>
<td>7%</td>
<td>7%</td>
</tr>
<tr>
<td><strong>General &amp; Corporate Av</strong></td>
<td>30%</td>
<td>26%</td>
<td>45%</td>
<td>40%</td>
</tr>
<tr>
<td><strong>Air Cargo</strong></td>
<td>9%</td>
<td>9%</td>
<td>3%</td>
<td>4%</td>
</tr>
<tr>
<td><strong>Airport &amp; Gov't Services</strong></td>
<td>25%</td>
<td>33%</td>
<td>13%</td>
<td>19%</td>
</tr>
<tr>
<td><strong>On-Airport, Non-Aviation</strong></td>
<td>4%</td>
<td>3%</td>
<td>5%</td>
<td>4%</td>
</tr>
</tbody>
</table>

Each 1000 E&D passengers creates 5.5 full time jobs.

Each 1000 E&D passengers creates $247,000 of annual labour income.

Each 1000 E&D passengers creates $721,000 of economic output activity.

Each time a B737 lands and takes off, it generates 0.8 FTEs; $35,000 of annual labour income; and $102,000 of economic output activity.

Each time a Bombardier Q400 lands and takes off, it supports 0.4 FTEs; $19,000 of annual labour income; and $56,000 of economic output activity.

A new daily Bombardier C-Series service between Saskatoon and Ottawa would create 175 FTEs of employment; $7,880,000 of labour income; and $23,000,000 of economic output annually largely of benefit to Saskatoon and northern Saskatchewan.

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**Definition of Terms**

**ATB** – airport terminal building.

**FTEs** – Full time equivalent workers, based upon a 40 hr work week.

**E&D passengers** – enplaned and deplaned passengers.

**GDP** – Gross domestic product; the value of all goods and services required to produce a given service or product.

**Economic Output** – an aggregate of the labour income plus other expenditures totals which can be considered as the contribution to GDP.

**Jobs** – the number of workers gainfully employed, either full-time (FTE) or part-time.

**Labour Income** – the annual salaries plus benefits of a given workforce, which are generally circulated within the community where that workforce resides.

**On-Airport, Non-Aviation** – refers to those businesses physically located on airport property but do not have or produce an aviation-related product or service.

**One-Time, New Construction** – consists of on-airport, new capital construction (ie. new bricks and mortar facilities and/or the refurbishment of existing infrastructure.

**Other Expenditures** – other annual, non-labour expenditures, by firms for goods and services, excluding labour costs. These monies generally circulate within the community where those purchases are made.

**Non-Resident Visitors** – passengers arriving at the airport from jurisdictions outside the greater Saskatoon area (ie. other parts of Saskatchewan, other provinces, transborder or international passengers.

**Trans-Border** – US originating or departing passengers.

**ULD** – Unit Load Device, a container used in the large-scale movement of air cargo, typically in support of dedicated freighter aircraft.
About this report

This report was undertaken by RP Erickson & Associates of Calgary in conjunction with AirBiz of Vancouver for a Master Plan which was completed for the Saskatoon Airport Authority. The purpose of the study is to document the economic impact of the Saskatoon International Airport during the 2016 calendar year.

Impact assessments are valuable in that they serve to heighten business, community and political awareness as to the economic importance of an airport within a local economy. This study can also be viewed as a base-line against which future developments may be measured.
Methodology

The economic impact of the Saskatoon International Airport has been measured in terms of employment [full-time equivalents or FTEs], labour income, other expenditures and economic output. These leading indicators are expressed in dollar values and person-years of employment. Direct, indirect and induced forms of activity have been considered for employment and economic output. Data was obtained for the 2016 calendar year.

The data compiled in the 2016 study was obtained via a questionnaire circulated amongst 67 firms that operate on the airport. It is noted that a number of companies, particularly the airport terminal building (ATB) concessionaires, often include subsidiary businesses operating separate venues, as do a number of other on-site firms. In all cases, data was sought for an entire operation even though a business entity may have more than one on-airport company or outlet presence.

The survey population was separated into 8 sub-categories; the impacts associated with:

- the air carriers & their support services;
- the airport terminal building concessionaires;
- the general and corporate aviation communities;
- the air cargo sector;
- airport support & government agencies;
- on-airport, non-aviation firms;
- the impact associated with the spending activities of non-resident air passengers visiting the Saskatoon area; and,
- the ‘one-time’ economic impacts of new construction projects on the Saskatoon International Airport.
Each of the above categories is described in more detail in Chapter II (Sections 2.1 through 2.8). Section 2.9 displays the aggregate economic impact of the Saskatoon International Airport for 2016.

In conducting the interview/questionnaire process, key principals at each targeted firm were visited by the consultants, where: the underlying rationale for undertaking the study was explained; the objectives of the study could be examined; the value of their participation fully explored; and, the confidentiality of their data could be assured.

This approach resulted in an exceptional 96 percent response rate. Of the 67 firms surveyed, 64 completed the questionnaire with all firms providing employment data. Incomplete returns were estimated comparing completed results of similar-sized firms involved in like commercial pursuits.

The impact of off-airport passenger spending was undertaken by utilizing the Conference Board of Canada’s TEAM econometric model, as explained in Section 2.7.
One last important consideration is worth imparting: this report represents a ‘snap-shot’ of economic activity in time. The data herein represents the economic activity for the Saskatoon International Airport for calendar year 2016.

The economic impact modelling process

Economic impact analysis is based on the premise that operations within various industries in an economy are closely related or linked to each other; that is, an increase in the activity levels in one industry will produce a positive ‘domino’ or rippling effect on other industries. Economists discuss the impact that one sector has on another in terms of indirect and induced effects. The total economic impact is the sum of the direct, indirect and induced effects.

The most common economic measures used in economic impact surveys are: employment in terms of jobs and labour come alongside economic output – essentially, the contribution made to gross domestic product. For this study, the consultants have chosen to display labour income as a separate category of economic output.

In this report:

- Direct economic effects are the benefits attached to labour and expenditure activities within Saskatchewan;

- Indirect economic effects are the result of the increase in goods and services produced largely within the Saskatchewan economy in support of direct activities;

- Induced economic effects arise from the spending power of direct and indirect employees and largely benefiting local businesses;

- Employment is measured in terms of full-time equivalents (FTEs). FTEs are expressed in person-years and labour income by dollar value. Employment multipliers have been used to generate the associated indirect and induced impacts;

- Labour Income is the total payroll expense including wages, salaries and employee benefits. Labour income multipliers have been used to generate the associated indirect and induced impacts;
Other Expenditures is defined as the amount of dollar value to the local economy created through expenditure activity. A multiplier has been used to generate the indirect and induced impacts; and,

Economic Output is an aggregate of labour income and other expenditure totals, and can be considered as a contribution to gross domestic product (GDP). No multiplier effort has been applied to this category.

The aviation industry is a good example of a highly integrated sectoral activity which has significant linkages throughout a domestic economy. The multipliers associated with aviation are higher than most primary sectors and, as such, the potential impact to an economy linked to an increase or expansion in aviation activity is significant.

A word about the multipliers used in this report

Multipliers are used to infer indirect and induced economic activity from a measure of direct economic activity. Multipliers are not directly observed; they are inferred from an economic model. By far the direct measure is the most accurate. Readers are advised that multiplier analysis remains an imprecise econometric technique and that caution be used in interpreting the indirect and induced impacts contained in this report. However, multipliers are virtually the only cost-effective tool available to identify the overall impact of a sectoral activity within an economy.

The consultants note that the Saskatchewan Bureau of Statistics does not create provincial economic multipliers. The consultants have chosen the latest available set of Saskatchewan-specific multipliers produced by Statistics Canada, National Input-Output Multipliers. Multipliers have been selected for three categories ‘Air Transportation’ (used for aviation activities); ‘Retail Trade’ (used for ATB Concessionaires); and ‘Professional Services’ (used for Non-Aviation, On-airport Firms).
The closed Statistics Canada model utilized accounts for economic activity occurring within the province. As such, it is fair to note that some ‘leakage’ of benefits is likely occurring outside the Saskatoon area as well as Saskatchewan as a whole which may not be accounted for in this report. This reinforces our earlier premise of undertaking a conservative approach in assessing the overall impact of the Saskatoon International Airport.

Thus, the findings displayed in this report can be viewed as the minimum economic impact created by the presence of YXE in 2016.
Economic Impact of the Air Carrier & Support Services Sector at the Saskatoon International Airport: 2016

As could be expected, the air carrier sector is a dominant contributor to the economic activity generated by the Saskatoon International airport. The major firms operating within this category include scheduled and charter airlines, ground and passenger handling firms, food catering, aircraft grooming, line maintenance and re-fuelling companies. Noted is a seasonal variation with regard to the substantial sunspot charter activity which occurs at YXE throughout the winter months.

Table 1 depicts the economic impact activity undertaken by the Air Carrier & Support Services sector in 2016.

Table 1.

Air Carrier & Support Services Sector:
2016 Economic Impact
(in millions, except FTEs)

<table>
<thead>
<tr>
<th></th>
<th>Direct Impact</th>
<th>Total Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>FTEs</td>
<td>Labour Income</td>
<td>Other Expenditures</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>257</td>
<td>$16.806</td>
<td>$54.458</td>
</tr>
<tr>
<td>717</td>
<td>$38.318</td>
<td>$141.591</td>
</tr>
</tbody>
</table>
For calendar year 2016, a total of 257 full-time equivalent employees can be attributed to the Air Carrier & Support sector operating at YXE – within this category 298 direct jobs are located on the airport. Their aggregate labour income was identified at $16.806 million. Other Expenditures for this sector were $54.458 million. The direct Economic Output was $71.264 million.

When the indirect and induced multipliers are applied to the above direct economic activity, the considerable impact of Saskatoon’s air carrier sector can be realized. Within the Saskatoon area 717 full-time jobs are dependent upon it, generating an annual labour income of $38.318 million. Other Expenditures in this sector were $141.591 million. In 2016, the total Economic Output benefit created by air carriers and their support activities at the Saskatoon International airport was $179.909 million.

**Economic Impact of the Airport Terminal Building Concessionaire Sector : 2016**

Within the Saskatoon Airport Terminal Building (ATB), 11 firms were identified as providing services to passengers and non-resident visitors arriving by air, alongside the meeters & greeters of arriving passengers and employees of the airport. The number of firms canvassed in this grouping does not correlate with the actual number of outlets offering on-site services since a number of firms operate subsidiary or satellite venues in the terminal. The totals of this sector are dominated by the car rental firms; important too, are the ground transportation and food & beverage providers.

Table 2 depicts the economic impact activity undertaken by the ATB concessionaire sector in 2016.
Table 2.

Airport Terminal Building Concessionaire Sector:
2016 Economic Impact
( in millions, except FTEs )

<table>
<thead>
<tr>
<th></th>
<th>Direct Impact</th>
<th>Total Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FTEs</strong></td>
<td><strong>Labour Income</strong></td>
<td><strong>Other Expenditures</strong></td>
</tr>
<tr>
<td>161</td>
<td>$4.644</td>
<td>$13.511</td>
</tr>
<tr>
<td><strong>FTEs</strong></td>
<td><strong>Labour Income</strong></td>
<td><strong>Other Expenditures</strong></td>
</tr>
</tbody>
</table>

For calendar year 2016, a total of 161 full-time equivalent employees can be attributed to the concessionaires operating within the Saskatoon ATB – within this category 276 direct jobs are located on the airport. Their aggregate labour income was identified at $4.644 million, lower on average than most other airport workers and reflecting the lower earnings bracket of many workers in this sector. Other Expenditure activities were $13.511 million. The direct Economic Output was $18.155 million.

When the indirect and induced multipliers are applied to the above direct economic activity, the overall economic impact of the ATB concessionaires can be realized. Within the Saskatoon area 203 full-time jobs are dependent upon this sector, generating an annual labour income of $6.362 million. Other Expenditure activities were $19.321 million. In 2016, the total Economic Output activity created by ATB activities was $25.683 million.
Economic Impact of the General & Corporate Aviation Sectors at the Saskatoon International Airport : 2016

The Saskatoon International Airport supports a diverse, on-site general aviation (GA) community alongside a growing corporate aviation presence. By a wide measure, YXE is Saskatchewan’s leading general aviation airport in large measure due to its extensive supporting role in servicing northern Saskatchewan communities and their residents.

Saskatoon’s GA firms undertake a variety of aviation-related activities, including: flight training; aircraft sales and leasing; maintenance/overhaul/repair; alongside a range of specialized support services, where a significant northern workforce transportation presence is apparent. The airport is home to several government flight departments and Fix Base Operators (FBOs) which handle itinerant corporate air traffic and refuelling activities.

Table 3 depicts the economic impact activity undertaken by the GA and Corporate sector in 2016.

Table 3.

General & Corporate Aviation Sector : 2016 Economic Impact
( in millions, except FTEs )

<table>
<thead>
<tr>
<th></th>
<th>FTEs</th>
<th>Direct Impact</th>
<th>Total Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Labour Income</td>
<td>Other Expenditures</td>
</tr>
<tr>
<td>Direct Impact</td>
<td>354</td>
<td>$18.455</td>
<td>$91.128</td>
</tr>
<tr>
<td>Total Impact</td>
<td>988</td>
<td>$42.077</td>
<td>$236.933</td>
</tr>
</tbody>
</table>
For calendar year 2016, a total of 354 full-time equivalent employees can be attributed to the general and corporate aviation sector operating at YXE – within this category 387 direct jobs are located on the airport. Their aggregate labour income was identified at $18.455 million. Other Expenditure activities were $91.128 million. The direct Economic Output was $109.583 million.

When the indirect and induced multipliers are applied to the above direct economic activity, the significant impact of Saskatoon’s GA and corporate sectors can be realized. Within the Saskatoon area 988 full-time jobs are dependent upon it, generating an annual labour income of $42.077 million. Other Expenditures activity was $236.933 million. In 2016, the total Economic Output activity created by general and corporate aviation at the Saskatoon International airport was $279.010 million.

**Economic Impact of the Air Cargo Sector at the Saskatoon International Airport : 2016**

Saskatoon’s current air freight industry is dominated by the express courier & mail segment largely due to the limited air cargo capacity available on the narrow-bodied jet or regional passenger aircraft in service at YXE. In fact, YXE’s air cargo requirements are largely being met at Calgary and Edmonton due to a lack of unit load devices (ULD) capacity. As such, most of Saskatchewan’s regular air freight shipments are transported by road feeder services.

One bright light has been the recent introduction of a weeknight B727 main deck freighter service linking YXE with the country’s overnight hard freight network. However, this welcomed ULD capacity is currently subscribed to mainly courier express products; so much so, that the current service provider reports a strong likelihood that a larger B757-200F will come on-line in the fall.
Table 4 depicts the economic impact activity undertaken by the Air Cargo sector in 2016.

Table 4.

**Air Cargo Sector : 2016 Economic Impact**

( in millions, except FTEs )

<table>
<thead>
<tr>
<th></th>
<th>FTEs</th>
<th>Labour Income</th>
<th>Other Expenditures</th>
<th>Economic Output</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Direct Impact</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>105</td>
<td>$6.655</td>
<td>$5.536</td>
<td>$12.191</td>
</tr>
<tr>
<td><strong>Total Impact</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>293</td>
<td>$15.173</td>
<td>$14.394</td>
<td>$29.567</td>
</tr>
</tbody>
</table>

For calendar year 2016, a total of 105 full-time equivalent employees work in the air cargo sector – within this category 115 direct jobs are located on the airport. Their aggregate labour income was identified at $6.655 million. Other Expenditure activities were $5.536 million. The direct Economic Output was $12.191 million.

When the indirect and induced multipliers are applied to the above direct economic activity, the overall impact of YXE’s air freight sector can be realized. Within the Saskatoon area 293 full-time jobs are dependent upon the movement of air cargo, courier and mail products, generating an annual labour income of $15.173 million. Other Expenditures activity was $14.394 million. In 2016, the total Economic Output benefit created by YXE’s air freight sector was $29.567 million.
Economic Impact of the Airport Support & Government Services Sector at the Saskatoon International Airport: 2016

This sector includes the Saskatoon Airport Authority and its third-party contractors, as well as, a range of government agencies operating on the airport. Included in this later group are the Canada Border Services Agency, the Canadian Air Transport Security Authority, Transport Canada, the Commissionaires and two air ambulance agencies: the Saskatchewan Air Ambulance, providing northern Saskatchewan residents with fixed wing service in accessing Saskatoon’s health care facilities; and STARS Air Ambulance – the not-for-profit helicopter service provider. NavCanada, the country’s air navigation service provider, is included in this category although it is not a government agency. NavCanada operates the Saskatoon Air Traffic Control Tower, the Saskatoon Flight Service Station and provides an on-airport Tech Services branch.

Table 5 depicts the economic impact activity undertaken by the Airport Support and Government Services sector in 2016.

Table 5.

<table>
<thead>
<tr>
<th></th>
<th>Airport Support &amp; Government Services Sector: 2016 Economic Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( in millions, except FTEs )</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Direct Impact</th>
<th>Labour Income</th>
<th>Other Expenditures</th>
<th>Economic Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>FTEs</td>
<td>$23.520</td>
<td>$27.091</td>
<td>$50.611</td>
</tr>
<tr>
<td>292</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total Impact</th>
<th>Labour Income</th>
<th>Other Expenditures</th>
<th>Economic Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>FTEs</td>
<td>$53.626</td>
<td>$70.437</td>
<td>$124.063</td>
</tr>
<tr>
<td>815</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
For calendar year 2016, a total of 292 full-time equivalent employees can be attributed to this sector – within this category 328 direct jobs are located on the airport. Their aggregate labour income was identified at $22.520 million. Other Expenditure activities were $27.091 million. The direct Economic Output was $50.611 million.

When the indirect and induced multipliers are applied to the above direct economic activity, the significant impact of the airport & government support sector can be realized. Within the Saskatoon area 815 full-time jobs are dependent upon it, generating an annual labour income of $53.626 million. Other Expenditure activity was $70.437 million. In 2016, the total Economic Output activity created by the airport support and government services sector was $124.063 million.

**Economic Impact of the On-Airport, Non-Aviation Sector at the Saskatoon International Airport : 2016**

The attractiveness of the industrial lands located on the Saskatoon airport is reflected in its On-Airport, Non-Aviation sector. Currently, 7 firms are included in this sub-group.

Table 6 depicts the economic impact activity identified in the On-Airport, Non-Aviation sector in 2016.
Table 6.

On-Airport, Non-Aviation Sector : 2016 Economic Impact
( in millions, except FTEs )

<table>
<thead>
<tr>
<th>Direct Impact</th>
<th>Labour FTEs</th>
<th>Income</th>
<th>Other Expenditures</th>
<th>Economic Output</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>53</td>
<td>$1.960</td>
<td>$9.906</td>
<td>$11.866</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total Impact</th>
<th>Labour FTEs</th>
<th>Income</th>
<th>Other Expenditures</th>
<th>Economic Output</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>110</td>
<td>$4.724</td>
<td>$22.784</td>
<td>$27.508</td>
</tr>
</tbody>
</table>

In 2016, a total of 53 full-time equivalent employees are attributed to the On-Airport, Non-Aviation sector – within this category 56 direct jobs are located on the airport. Their aggregate labour income was identified at $1.960 million. Other Expenditure activities were $9.906 million. The direct Economic Output was $11.866 million.

When the indirect and induced multipliers are applied to the above direct economic activity, the significant impact of the On-Airport, Non-Aviation sector can be realized. Within the Saskatoon area 110 full-time jobs are dependent upon it, generating an annual labour income of $4.724 million. Other GDP activity was $22.784 million. In 2016, the total Economic Output activity created by the sector at the Saskatoon International airport was $27.508 million.
### 2.7 Economic Impact generated by Airport Visitor Spending: 2016

Spending by visitors travelling by air to the Saskatoon area is an important contribution to the overall economic impact of the airport. Visitors by air are divided into domestic, transborder or international passengers depending upon point of origin. A smaller subset of visitor spending are the expenditures made by cockpit and cabin crews of air carriers who overnight at hotels in the Saskatoon area for operational or crew rest reasons. Another source of local hospitality spending can be attributed to non-resident aviation students undertaking flight or job training syllabuses available at YXE on-site aviation education institutes.

In attempting to capture the impact attributable to this sector, the consultants have chosen the Conference Board of Canada’s Tourism Economic Assessment Model [TEAM]. The TEAM model is a sophisticated, computer-based econometric tool designed to assess the impact of non-resident spending upon a local or provincial economy. A Saskatchewan-specific TEAM model was utilized and its impacts output is presented below and integrated into the overall study results.

From Table 7 an input total of $325.521 million of non-resident visitor/overnight aircrew spending was entered into the TEAM model utilizing Canadian Tourism Committee and Tourism Saskatoon data sources. The model produced the results shown in Table 8.
Table 7.

**Spending by Non-Resident Visitors**
**Arriving by Air : 2016**

<table>
<thead>
<tr>
<th>Non-resident Visitors</th>
<th>2016 Visitor Totals †</th>
<th>Total Spending ††</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic</td>
<td>457,700</td>
<td>$221,080,000</td>
</tr>
<tr>
<td>Transborder</td>
<td>74,800</td>
<td>$49,250,000</td>
</tr>
<tr>
<td>International</td>
<td>50,300</td>
<td>$48,941,000</td>
</tr>
<tr>
<td>Flightcrew/Non-resident student expenditures †††</td>
<td></td>
<td>$6,250,000</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>$325,521,000</td>
</tr>
</tbody>
</table>

† Saskatoon Airport Authority.
†† Canadian Tourism Commission/Tourism Saskatoon.
††† RP Erickson & Associates.

**Note:** This spending is attributable to passengers arriving at the Saskatoon International airport in 2016; an unknown number of these visitors continue beyond the immediate Saskatoon market, possibly to Regina or other regional centres, northern parts of the province and/or beyond. It is safe to assume that a significant proportion of this spending finds its way into the Saskatchewan economy but that exact figure is unknown.
Table 8 depicts the economic impact attributable to non-resident, airport visitor spending in the Saskatoon area in 2016.

Table 8.

**Spending by Non-Resident Visitors arriving by Air:**

2016 Economic Impact

( in millions, except FTEs )

<table>
<thead>
<tr>
<th></th>
<th>Direct Impact</th>
<th>Total Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FTEs</td>
<td>Labour Income</td>
</tr>
<tr>
<td></td>
<td>3061</td>
<td>$97.264</td>
</tr>
<tr>
<td></td>
<td>4818</td>
<td>$192.630</td>
</tr>
</tbody>
</table>

For calendar year 2016 within the province, a total of 3061 full-time equivalent employees can be attributed to non-resident, airport visitor spending. The aggregate labour income was identified at $97.264 million. Other Expenditure activities were $144.933 million. The direct Economic Output was $242.197 million.

When the TEAM-generated multipliers are applied to the above direct economic activity, the significant impact of non-resident, airport visitor spending upon the province can be realized. This spending generated 4818 full-time jobs, generating an annual labour income of $192.630 million. Other Expenditure activity was $174.499 million. In 2016, the total Economic Output activity created by this sector on the provincial economy was $367.129 million.
2.8 The ‘One-Time’ Economic Impact of New Construction at the Saskatoon International Airport : 2016

The ‘one-time’ impact of the economic contribution accompanying capital spending on the airport is consequential. Capital spending arises from the Saskatoon Airport Authority’s capital construction program alongside a range of tenant facility new construction and/or expansion projects. This capital investment has provided work for the local construction industry and Saskatchewan’s construction materials sector.

In 2016, an appreciable $14.385 million of capital construction was undertaken at YXE. Leading the investment was an $11 million SAA capital program. The SAA’s on-going maintenance and expansion programs accounted for 76 percent of the 2016 capital expenditures on the airfield.

Table 9 depicts the ‘one-time’ economic impact activity associated with capital spending on the Saskatoon airport in 2016.

Table 9.

One-Time, New Construction at the Saskatoon International Airport : 2016 Economic Impact
( in millions, except FTEs )

<table>
<thead>
<tr>
<th>Total Impact</th>
<th>FTEs</th>
<th>Labour Income</th>
<th>Other Expenditures</th>
<th>Economic Output</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>82</td>
<td>$6.292</td>
<td>$9.094</td>
<td>$15.386</td>
</tr>
</tbody>
</table>

For calendar year 2016, a total of 82 annual full-time equivalent construction and support service jobs can be attributed to capital construction spending at YXE. The aggregate labour income was identified at $6.292 million. Other Expenditure activities were $9.094 million. The direct Economic Output was $15.386 million.
The Aggregate Economic Impact of the Saskatoon International Airport: 2016

At the Saskatoon International Airport, 67 commercial firms or government agencies were interviewed and their 2016 economic activities assessed. Additionally, the impact of non-resident visitor spending in the Saskatoon area and the economic benefits associated with ‘one-time’ capital construction expenditures for 2016 have been combined with the data in Sections 2.1 through 2.8 to produce Table 10.

Table 10 depicts the aggregate economic impact of the Saskatoon International Airport for 2016.

Table 10.

| Aggregate Economic Impact of the Saskatoon International Airport: 2016 |
|-------------------------|--------|-----------|-----------------|------------------|
|                         |        |           |                 |                  |
|                         |        | FTEs      | Labour Income   | Other Expenditures|
| Direct Impact           |        | 4,283     | $169.304        | $346.541          |
|                         |        |           |                 | Economic Output   |
|                         |        |           |                 | $515.845          |
| Total Impact            |        | 8,026     | $359.202        | $689.053          |
|                         |        |           |                 | Economic Output   |
|                         |        |           |                 | $1,048.255        |

For calendar year 2016, a total of 4,283 annual full-time equivalent employees can be attributed to the Saskatoon International Airport; it is noted that within this total – 1460 jobs are located on the airport. The aggregate labour income of this workforce was identified at $169.304 million. Other Expenditure activity was $346.541 million. The
direct Economic Output created by the Saskatoon International airport was $515.845 million.

When the indirect and induced multipliers are applied to the above direct economic activity, the consequential impact of the airport can be realized. The airport creates some 8,026 full-time jobs, generating an annual labour income of $359.202 million. Other Expenditures activity was $689.053 million. In 2016, the total Economic Output benefit created by the Saskatoon airport was $1,048.255 million.

2.10 Discussion

In addition to providing over 8000 full-time jobs, the Saskatoon International Airport’s contribution to the GDP of the Saskatoon area was over $1 billion.

The distribution of the Economic Impact by sub-category is presented in Table 11. This distribution has been calculated on the basis of on-airport activities and does not include the totals created by non-resident visitor spending and the one-time impact associated with new construction.
Table 11.

**Distribution of Economic Impacts**

The economic benefits of the on-airport firms are distributed:

<table>
<thead>
<tr>
<th></th>
<th>FTEs</th>
<th>Labour Income</th>
<th>Other Expenditures</th>
<th>Economic Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Carriers</td>
<td>22%</td>
<td>23%</td>
<td>27%</td>
<td>26%</td>
</tr>
<tr>
<td>ATB Concessionaires</td>
<td>13%</td>
<td>6%</td>
<td>7%</td>
<td>7%</td>
</tr>
<tr>
<td>General &amp; Corporate</td>
<td>30%</td>
<td>26%</td>
<td>45%</td>
<td>40%</td>
</tr>
<tr>
<td>Air Cargo</td>
<td>9%</td>
<td>9%</td>
<td>3%</td>
<td>4%</td>
</tr>
<tr>
<td>Airport &amp; Gov’t</td>
<td>25%</td>
<td>33%</td>
<td>13%</td>
<td>19%</td>
</tr>
<tr>
<td>On-Airport, Non-Aviation</td>
<td>4%</td>
<td>3%</td>
<td>5%</td>
<td>4%</td>
</tr>
</tbody>
</table>

**Data Generalities – 2016**

When the economic impact totals are compared against Saskatoon's 2016 enplaned and deplaned [E&D] passenger movement data (1,453,000), the results provide some interesting generalities.

Within the Saskatoon area:

Each 1000 E&D passengers creates 5.5 full time jobs.

Each 1000 E&D passengers creates $247,000 of annual labour income.

Each 1000 E&D passengers creates $721,000 of economic output activity.

* * * * * * * * * * * * * *
Each time a B737 lands and takes off at YXE, it generates 0.8 FTEs; $35,000 of annual labour income; and $102,000 of economic output activity.

* * * * * * * * * * * * * *

Each time a Bombardier Q400 lands and takes off at YXE, it supports 0.4 FTEs; $19,000 of annual labour income; and $56,000 of economic output activity.

* * * * * * * * * * * * * *

A new daily Bombardier C-Series service between Saskatoon and Ottawa would create 175 FTEs of employment; $7.9 million of labour income; and $23 million of economic output annually largely of benefit to Saskatoon and northern Saskatchewan.

* * * * * * * * * * * * * *

In addition to the quantifiable economic benefits displayed in this report, the Saskatoon International Airport provides a wide range of ancillary, qualitative benefits to residents of the Saskatoon area and the province as a whole. These range from societal advantages attached to the travel, tourism and transportation functions of the airport, through expansive career and hobby development possibilities to opportunities for volunteerism.

The Saskatoon airport also provides critical access for air-related environmental and emergency response services; none more importantly than in providing all Saskatchewan residents with access to Saskatoon’s extensive health care resources by both fixed wing aircraft alongside the STARS helicopter capability.

**Volunteerism - 2016**

Airports provide local residents with a number of volunteer opportunities, where local residents can pursue their recreational interests in like company at no cost to any level government. By example, the Saskatoon Aviation Museum Society estimate some 4600 hours of volunteerism by their membership in 2016. The Club’s activities are
diverse but include support for local air cadet groups, aviation historical research and the restoration of historical aircraft.

A number of airport firms and agencies host school visits throughout the year. These services are undertaken on a ‘no-charge, volunteer basis’ and have the significant ancillary benefit of passing Saskatoon and the province’s rich aviation heritage on to future generations - not to mention those student visitors who may be attracted to a career in aviation.

2.11 Conclusions

In 2016, the Saskatoon International Airport supported a considerable level of economic activity, primarily in the Saskatoon area but also throughout the province and, to a lesser extent, the national economy.

In direct terms, the airport:

• contributed 4300 full-time jobs;
• generated $170 million in labour income; and,
• created in excess of $500 million in economic output.

When indirect and induced forms of economic activity are included, the airport generates:

• over 8000 full-time jobs;
• over $350 million in annual labour income; and,
• over 1 billion dollars of GDP activity.

Clearly – the Saskatoon International Airport is an important economic and social contributor to the City of Saskatoon and northern Saskatchewan.