Aspen Power Station

Initial Project Description

Submitted to:

The Impact Assessment Agency

Submitted by:

Saskatchewan Power Corporation (SaskPower)

April 2023

Stantec

SaskPower
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Abbreviations

AADT	average annual daily traffic
AAFC	Agriculture and Agri-foods Canada
ACC	Air Cooled Condenser
AGC	Automatic Generation Control
AHPP	aquatic habitat protection permit
AQMS	Air Quality Management System
AUC	Alberta Utilities Commission
ATRIS	Aboriginal and Treaty Rights Information System
BD6	Boundary Dam unit 6
BES	Battery Energy Storage
BMP	Beneficial Management Practice
BOP	balance of project
Burns and McDonnell	Burns & McDonnell Canada Ltd.
CAAQ	Canadian Ambient Air Quality Standard
CadnaA	Computer Aided Noise Abatement
CCGT	Combined Cycle Gas Turbine
CCME	Canadian Council of Ministers of the Environment
CCS	carbon capture and sequestration
CCUS	Carbon Capture Utilization Storage
CEGEP	Collège d'enseignement général et professionnel
°C	celsius
CEMS	continuous emissions monitoring system
CEPA	*Canadian Environmental Protection Act*
CER	Clean Electricity Regulations
CH_4	methane
CLI	Canada Land Inventory
CN	Canadian National
CO	carbon monoxide

CO_2	carbon dioxide
COSEWIC	Committee of the Status of Endangered Wildlife in Canada
CO_{2e}	carbon dioxide equivalent
CP	Canadian Pacific
CTG	combustion turbine generator
dB	decibel
dBA	A-weighted decibel
DFO	Department of Fisheries and Oceans Canada
D&RP	decommissioning and reclamation plan
EA	environmental assessment
EASB	Environmental Assessment and Stewardship Branch
ECCC	Environment and Climate Change Canada
EMP	environmental management plan
ENV-LB	Ministry of Environment-Lands Branch
EPA	Environmental Protection Agency
EPC	engineering, procurement, and construction
EPP	Environmental Protection Plan
ERP	emergency response plan
FHQ	File Hills Qu'Appelle
GBA+	Gender Based Analysis Plus
GDP	gross domestic product
GGFN	George Gordon First Nation
GHG	Greenhouse Gas
GOC	Government of Canada
GOS	Government of Saskatchewan
GSU	Generator Step-Up
GTG	gas turbine generator
Gwh	gigawatt hours
GWP	Global Warming Potentials
ha	hectares
HABISask	Hunting Angling and Biodiversity Information of Saskatchewan

HADD	harmful alteration, disruption or destruction
HCB	Heritage Conservation Branch
HDPE	high-density polyethylene
HP	High pressure
HRIA	Heritage Resource Impact Assessment
HRSG	heat recovery steam generator
IA	impact assessment
IAA	*Impact Assessment Act*
IAAC	Impact Assessment Agency of Canada
IPD	Initial Project Description
IPP	Independent Power Producer
ISO	International Organization of Standardization
kg CO_{2e}/MWh	kilograms per megawatt hour
km	kilometres
km^2	square kilometre
km/h	kilometre per hour
kV	kilovolt
kW	kilowatt
L	litre
LAA	Local Assessment Area
LIM-AT	Low-income measure, after tax
LGBTQ	Lesbian, Gay Bi-sexual, Transgender, Queer
LGBTQ2S+	Lesbian, Gay Bi-sexual, Transgender, Queer, Two-Spirited
LM	loam Ecosite
LP	low pressure
L/s	litres per second
LTSA	long-term service agreement
m	metre
m^2	square metre
m^3/h	cubic metres per hour
mg/m^3	milligram per cubic metre

MBCA	*Migratory Birds Convention Act*
MECL	minimum emissions compliance load
MNS	Métis Nation Saskatchewan
MOH	Ministry of Highways
MW	megawatt
MWh	megawatt hours
N_2O	nitrous oxide
NIA	Noise Impact Assessment
NIR	National Inventory Report
NMHC	non-methane hydrocarbon
No.	number
NO_x	nitrogen oxide
NO_2	nitrogen dioxide
NPRI	National Pollutant Release Inventory
OEM	original equipment manufacturer
PDA	Project Development Area
PEZ	prairie ecozone
ppm	parts per million
$PM_{2.5}$	particulate matter of 2.5 micron in diameter or smaller
PM_{10}	particulate matter of 10 micron in diameter or smaller
PRM	Planning Reserve Margin
PSL	permissible sound level
RAA	Regional Assessment Area
RCMP	Royal Canadian Mounted Police
Rec	receptor
RM	rural municipality
RO	reverse osmosis
ROW	right-of-way
SAAQ	Saskatchewan Ambient Air Quality Standard
SARA	*Species at Risk Act*
SaskEnergy	SaskEnergy Incorporated

SaskPower	Saskatchewan Power Corporation
SCGT	simple cycle gas turbine
SFCA	Southern Fur Conservation Area
SK	Saskatchewan
SK ENV	Saskatchewan Ministry of Environment
SK PCAP	Saskatchewan Prairie Conservation Action Plan
SKCDC	Saskatchewan Conservation Data Centre
SKSID	Saskatchewan Soil Information Database
SKSIS	Saskatchewan Soil Information System
SMR	small modular reactor
SO_2	sulphur dioxide
SOCC	species of conservation concern
SPP	Southwest Power Pool
SSP	SaskPower Supply Plan
Stantec	Stantec Consulting Ltd.
STC	sound transmission class
STEM	science, technology, engineering, and mathematics
STG	steam turbine generator
SWPPP	Storm Water Pollution Prevention Plan
the Project	Aspen Power Station
t	tonne
TK&P	Traditional Knowledge and Protocol
TLRU	traditional land and resource use
TPM	total particulate matter
TransGas	TransGas Limited
$\mu g/m^3$	microgram per cubic metre
ULN	Ultra Low NOx
UTM	Universal Transverse Mercator
VC	valued component
VOC	volatile organic compound
WDM	wet meadow

WLCS	Wicehtowak Limnos Consulting Services LP
WLSS	Wolverine Switching Station
WMZ	Wildlife Management Zone
WSA	Water Security Agency

PART A: GENERAL INFORMATION

1 Project Information

Saskatchewan Power Corporation (SaskPower) is pleased to submit this Initial Project Description (IPD) of the Aspen Power Station (the Project). The scope of this document is to describe the potential effects of the Project on environmental, sociocultural, and socio-economic components, as well as to outline mitigation measures associated with the construction, operation and maintenance, and decommissioning phases of the Project and activities incidental to the Project.

This document is intended to fulfill the requirements of an IPD under the *Impact Assessment Act (IAA)* and reflects the requirements of The Information and Time Limits Regulations, and the Impact Assessment Agency of Canada's (IAAC) Guide to Preparing an Initial Project Description and a Detailed Project Description (Government of Canada (GOC) 2019a, GOC 2019c, GOC 2022a).

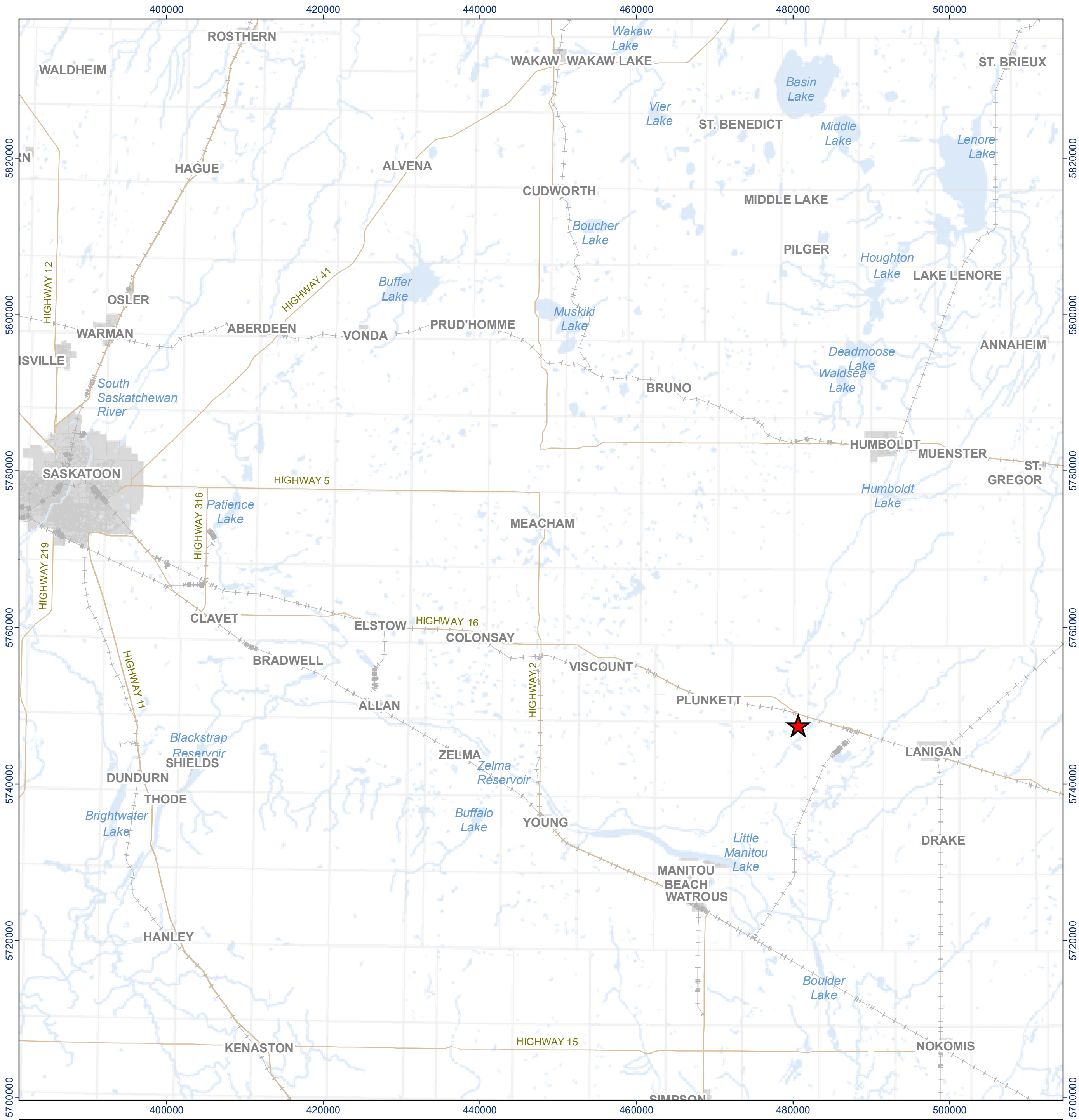
1.1 Type or Sector

The proposed Project is a 370 megawatt (MW) combined cycle gas turbine (CCGT) natural gas facility, with a targeted commercial operation date in early 2027. Additional information on the Project's production capacity and process are provided in Section 10.0.

Natural gas generation is a critical component in achieving both an increase in renewable capacity and a reduction in greenhouse gas (GHG) emissions, in accordance with SaskPower's GHG emissions reduction strategy. The Project is an ideal candidate for providing a back-up to intermittent renewable generation options such as solar and wind, as natural gas can quickly ramp up or down as the renewable generation output fluctuates. Therefore, once in service, the Project will play a key role in SaskPower's GHG emissions reduction strategy. Additional information on the Project's purpose is provided in Section 7.0.

1.2 Proposed Location

The Project is located approximately 104 kilometres (km) southeast of Saskatoon, Saskatchewan; and approximately 17 km west of Lanigan, Saskatchewan. The Project is located within one quarter section of land, NW 36-33-24 W2M, within the rural municipality (RM) of Usborne No. 310. The quarter section of land is owned by SaskPower. The general location of the Project is shown in Figure 1-1. The Project location is described in further detail in Section 13.0.



Legend

- ★ Project Site
- Major Road
- Railway
- Township
- Town/City

0 10 20 Kilometers

(At original document size of 8.5x11)
1:750,000

N

Stantec SaskPower

Project Location
NW-36-33-24 W2M
Near Guernsey, SK

Prepared by KL on 2023-01-25
TR by RM on 2023-01-25
IR by JH on 2023-01-25

Client/Project

111477076-001 REVD

SaskPower Aspen Power Station

Figure No.
1-1

Title
Project Overview

Notes
1. Coordinate System: NAD 1983 UTM Zone 13N
2. Data Sources: Base features produced under license with the Government of Canada, Government of Saskatchewan

2 Proponent Information

SaskPower is a Crown Corporation of the Province of Saskatchewan with its corporate head office in Regina. SaskPower is the principal supplier of electricity in the province with an obligation to deliver power to the province in a safe, reliable, cost-effective, and environmentally responsible manner. SaskPower operates under the legislated mandate and authority of the provincial Government of Saskatchewan (GOS) and its Board of Directors is accountable to the Minister responsible for SaskPower.

2.1 The Proponent's Name and Contact Information

Name of the Proponent:	Saskatchewan Power Corporation (SaskPower)
Address of the Proponent:	2025 Victoria Avenue, Regina, Saskatchewan S4P 0S1

2.2 Primary Representative

Primary Representative:	Riley Chesterton Project Manager, Power Production Project Delivery 306-566-6619 rchesterton@saskpower.com

2.3 Project Team

SaskPower plans to partner with an engineering, procurement, and construction (EPC) firm to build the Project. The EPC firm will have experience in executing projects with advanced F-class combined cycle facilities in Canada. The EPC firm will be required to support stakeholder engagement, comply with the commitments made within this Project Description, and investigate and commit to procurement opportunities for local and Indigenous vendors.

Burns & McDonnell Canada Ltd. (Burns and McDonnell) participated in the development of this Project Description to ensure the accuracy of the information provided, as this was the basis for emission and noise details. Burns and McDonnell has executed other combined cycle facilities throughout North America including projects in Saskatchewan and Ontario.

SaskPower contracted Stantec Consulting Ltd. (Stantec) to evaluate the environmental effects of the Project and prepare the regulatory submission. Stantec has extensive experience in evaluating the effects of power projects both locally and across Canada.

3 Public Engagement Summary

3.1 Siting Decision Engagement

3.1.1 PRELIMINARY ENGAGEMENT

In March 2020 SaskPower began broadly sharing information about the need for a future natural gas generation facility, the four geographical areas of interest under consideration, and the siting analysis process. The four potential regions were the Aberdeen area, Estevan area, Saskatoon area and the Lanigan area (i.e., Project site). By seeking community input at this early stage of the Project's development, SaskPower engaged the public to ensure interests, concerns and future community land use plans would be considered alongside technical factors to help determine the location of the Project.

SaskPower's engagement objectives at this stage of the Project development were to:

- Share meaningful Project information.
- Learn and integrate local interests, concerns, and future land use plans into the siting assessment process to the greatest extent possible.
- Share the findings of the site assessment and the ultimate preferred Project site location.

Table 3-1 summarizes the stakeholder outreach activity from March 2020 to July 2021.

Table 3-1 Stakeholder Outreach Activity from March 2020 to July 2021

Activity	Description	Date
Emails	Over 40 invitations were sent to local municipalities, special interest groups, and Indigenous groups initially identified in all three areas under consideration. The package contained information on the Project and the opportunities to exchange information with SaskPower via an in-person workshop. See Appendix A for a copy of the information.	March 11, 2020
Emails	Workshop invitation recipients were notified that due to COVID-19 the face-to-face workshops were cancelled while other meeting options were evaluated.	March 18, 2020
Emails	Local municipalities, special interest groups, and Indigenous groups were advised the Regina area was no longer under consideration and SaskPower is focusing on land owned in the Saskatoon, Lanigan and Estevan areas.	June to August 2020
Online and Paper Survey	Local municipalities, special interest groups, and Indigenous groups were sent a 5-minute electronic survey to understand preferences to provide input and receive project information.	June 25, 2020 to July 31, 2020
Phone calls	Follow up phone calls were made to ensure local municipalities and special interest groups were aware of the new siting information and SaskPower's desire to learn how groups wanted to exchange information in light of COVID-19. Paper copies were offered if electronic wasn't preferred.	June to August 2020

Activity	Description	Date
Electronic Newsletter	An electronic mailing list was set up so anyone could subscribe to receive project information and updates.	Launched June 2020
Webpage	A dedicated web page containing Project information and the opportunities to exchange information was updated here: www.saskpower.com/futuresite	Launched March 2020
Toll free phone number and Email	Both a dedicated toll-free phone line and email address were made available for members of the public and included in all information SaskPower shared regarding the Project.	March 2020 to Present
Virtual Meeting	Meeting with Saskatchewan Environmental Society representatives to hear their perspectives on when and how SaskPower achieves net-zero.	Dec 1, 2020
Letters/Email/ Newsletter	Provided project updates to over 140 Indigenous groups, landowners, business and special interest groups that the Saskatoon area sites (near Aberdeen and adjacent to the Queen Elizabeth Power Station) were less optimal due to higher costs. Study work to continue at the Lanigan and Estevan area sites. See Appendix A for a copy of the letter.	July 16, 2021

3.1.2 KEY COMMENTS AND CONCERNS

Key interests and concerns heard between March 2020 and July 2021 are summarized as follows:

- Managing COVID-19 mandates is a top priority.
- Why natural gas as the power source? There's interest on conventional coal, coal with carbon capture and sequestration (CCS) and solar power.
- Interest in understanding potential servicing needs and when siting decisions will be made.
- Concern about impacts to the local communities with the retirement of conventional coal.
- Keep those interested in the process informed via letters, phone calls and emails.

Local municipalities in each study area were generally interested in learning more about the Project and discussing potential opportunities to work together. SaskPower considered all feedback and evaluated all factors such as potential environmental effects, constructability and accessibility, performance, availability and cost of natural gas supply infrastructure, cost of transmission interconnection, water supply and wastewater management, and the overall cost of the Project.

3.2 Site Specific Engagement

3.2.1 PUBLIC ENGAGEMENT

In July 2022 SaskPower publicly announced the siting decision for the Project. SaskPower notified local municipalities, landowners, special interest groups and community members of the decision and invited groups to participate in the process as the Project was further evaluated.

SaskPower's engagement objectives at this stage of the Project development were to:

- Understand how the Project might affect stakeholders.
- How SaskPower could lessen effects.
- Anything else stakeholders wanted SaskPower to know as site studies were conducted.
- Understand who else SaskPower should be talking with.
- Maintain open communication throughout the Project.

Table 3-2 summarizes the stakeholder outreach activity from July 2022 to present.

Table 3-2 Stakeholder Outreach Activity from July 2022 to present

Activity	Description	Date
Letters	Provided project update to Indigenous groups, landowners, business and special interest groups that SaskPower had selected the Lanigan area as the preferred site for the Project. Invited to meetings and a Project office to learn more about the Project. (~90 communications). See Appendix A for a copy of the letter.	July 12, 2022
Meetings	SaskPower ensured nearby landowners had an opportunity to meet with the Project team to learn about the Project, exchange information and continue to learn about interests and concerns, especially regarding the proximity to the Project site. In person meetings and phone calls were held with 8 landowners. See Appendix A for a copy of the presentation and info sheet shared.	July 26, 2022
Project Office	A Project office was hosted in Lanigan at the Town Hall (~30 attendees). SaskPower offered a "come and go" style format for members of the public to learn about the Project, exchange information and continue to learn about interests and concerns. The Project office was advertised on the radio and promoted on the town's Facebook page. It ran from noon to 7:00 PM. See Appendix A for infographics shared at the Project office.	July 27, 2022
Feedback Survey	Paper and online survey was available to stakeholders to provide comments after the Project office regarding the Project. SaskPower received five submissions from the survey.	August 24, 2022
Letters/Email/ Newsletter	Provided a Project update to landowners, business and special interest groups with a summary of the information collected after the meetings and Project office. See Appendix A for a copy of the summary, letter and newsletter.	September 26, 2022
Project Office	A second Project office was hosted in Lanigan at the Merry Mixers Seniors Hall (12 attendees). SaskPower offered a "come and go" style format for members of the public to learn how the Project has progressed, exchange information and continue to learn about interests and concerns. The Project office was advertised by direct contact and on social media. It ran on October 25 from 1:00 PM to 6:00 PM and October 26 from 9:00 AM to noon. See Appendix A for a copy of the info sheet shared.	October 25 and 26, 2022
Newsletter	Interested parties were invited to sign up for Project updates. See Appendix A for updates provided through this subscription.	July 2022 to Ongoing

Activity	Description	Date
Webpage	A dedicated web page containing Project information and the opportunities to exchange information were updated here: https://www.saskpower.com/Our-Power-Future/Infrastructure-Projects/Construction-Projects/Planning-and-Construction-Projects/Potential-Lanigan-Natural-Gas-Power-Station	July 2022 to Present
Toll free phone number and Email	Both a dedicated toll-free phone line and email address were made available for members of the public and included in all information SaskPower shared regarding the Project.	March 2020 to Present

3.2.2 KEY COMMENTS AND CONCERNS BY STAKEHOLDERS

SaskPower began collecting feedback from local municipalities, landowners, special interest groups, and community members regarding the Project after the Project site announcement in July 2022. Key interests and concerns to date are summarized in Table 3-3.

Table 3-3 Key Interests and Concerns Raised by Stakeholders

Stakeholder Interest/Concern	SaskPower Response
How was the Project site chosen?	Site was purchased in 2013 and part of evaluation for natural gas power station sites. Further study in 2021 resulted in choosing the Project site based on opportunities for: • Road access • Potential groundwater availability • Proximity to natural gas and transmission infrastructure • Cost
What happens to unused portions of the Project site?	If there are unused potions of land after the build, the current renter may use the land. If the renter cancels the lease SaskPower will re-evaluate what is available at that time.
What is the plan regarding aesthetics, security and garbage?	Closest house is 0.5 km from the Project site. SaskPower has committed to work with the landowners to improve the line of sight and create visual buffers. The Project will be enclosed with a fence, monitored by closed-circuit television and access only by key passes. During construction, daily walks are conducted to address safety and housekeeping. Contractors are required to dispose of waste properly.
Why natural gas and what does the supply plan in the future look like?	As SaskPower phases out conventional coal it needs to replace it with another reliable source of power. In the near-term natural gas is the only baseload supply option available to meet that need. Natural gas is also required to enable the addition of variable renewables to reduce GHG emissions. SaskPower is on track to meet its target to reduce GHG emissions by 50% below 2005 levels by 2030 and to increase renewable capacity up to 50% by 2030. Additional renewables are planned following 2030 to continue to reduce GHG emissions. SaskPower continues to evaluate emerging supply options as it works towards net-zero GHG emissions.
What is the lifespan of a natural gas facility?	Typical life expectancy is 25 years. The actual life span depends on any new regulations and how SaskPower decides to balance the power supply.

Stakeholder Interest/Concern	SaskPower Response
Who does the Project serve?	Power from the Project would go to the provincial power grid serving all customers. The grid functions like a pool, so it's difficult to say who uses the electricity.
Where will the natural gas come from?	TransGas will be routing a natural gas line to the Project site from a location east of Saskatoon.
How does the Project connect to SaskPower's grid?	SaskPower needs to build a transmission power line. It will connect the Project to the Wolverine Switching Station (WLSS), two quarter sections to the west.
How loud will the Project be in operation? In construction?	During operation and maintenance, noise must stay below 50 decibels (dB) during the day and 40 dB during night. Noise studies are available to interested stakeholders. Some construction stages have unavoidable noisy activities – pile driving and steam blows. The noise will be intermittent. SaskPower will do its best to let nearby landowners know about pile driving and steam blows in advance.
Will there be impacts to water?	There are three wells on the Project site that were tested to determine how much water they supply. Water usage at the Project should not impact neighbouring landowner's water supply. A water treatment facility will be built on site to ensure the water used in the process is very clean. This allows the Project to operate efficiently.
How many people will be employed?	It is estimated that during construction there will be 375 people on site with a peak of around 450 people. SaskPower is looking into potential construction camps to accommodate these large numbers. In operation and maintenance, the power station will employ approximately 25 people.
Can local suppliers be part of the Project?	A partner will work with SaskPower to build the power station. Potential build partners will be assessed on how they plan to work with local and Indigenous suppliers and SaskPower will ensure they meet their commitments. When the build partner is selected SaskPower will hold supplier sessions in Regina, Saskatoon and in the community. This gives local and Indigenous suppliers the chance to meet the build partner.
Will this property pay taxes?	Power generation facilities are tax exempt through the Grants-in-Lieu of Property Tax Policy. The Project would be part of this policy.
Can the local health services handle the influx of workers?	This is something SaskPower will continue to consider with the large number of workers that can be on site at one time. SaskPower wants to be responsible in the community and will create plans for safety.
What is SaskPower's commitment to the environment?	SaskPower is committed to environmental stewardship and sustainability. A third-party environmental assessment (EA) program began this year. During construction, unavoidable noise may deter wildlife from the area. But once in operation and maintenance, the Project shouldn't continue to deter local wildlife.

Comments from local municipalities and stakeholders were mainly positive regarding the Project. The community sees the Project as an opportunity for growth and are familiar with industrial projects as there are large potash mines in development and expansion in the area. For the full response of how SaskPower has addressed comments from stakeholders, see the Summary of What We Heard, attached in Appendix A. SaskPower will continue to work with stakeholders to keep them informed about the Project and address questions and concerns.

3.3 Jurisdictional Engagement

The Project team began engaging with federal, provincial, and municipal agencies in March 2020 to discuss natural gas generation, introduce the Project, discuss technical requirements, any potential concerns, and the regulatory approval and permitting processes.

3.3.1 FEDERAL ENGAGEMENT

Table 3-4 Federal Engagement Activities from April 2020 to February 2023

Activity	Description	Date
Email	Information package sent to IAAC.	April 20, 2020
Conference Call	Initiate contact with IAAC to provide background information on the proposed CCGT project.	April 21, 2020
Email	Draft Summary of SaskPower-IAAC meeting notes from April 21, 2020 for IAAC's review and comments	April 29, 2020
Email	Confirmation that Draft Summary of SaskPower- IAAC meeting notes from April 21, 2020 were satisfactory	May 7, 2020
Email	Update on Project status.	September 10, 2021
Email	Re-initiate contact with IAAC and request an introductory meeting.	August 30, 2022
Virtual Meeting	Provide a Project introduction to IAAC.	September 20, 2022
Virtual Meeting	Discuss Indigenous engagement.	October 4, 2022
Email	Requested update from IAAC on the list of Indigenous groups to be engaged on the Project.	October 28, 2022
Email	Request for clarification on terminology in guidelines.	November 9, 2022
Virtual Meeting	Provide an overview of project and anticipated timelines to IAAC; discuss clarifications.	November 10, 2022
Email	PowerPoint presentation from September 20,2022 meeting sent to IAAC.	November 10, 2022
Email	Revised list of Indigenous groups to be engaged on the Project provided by IAAC.	November 28, 2022
Email	Submission of the draft IPD to IAAC for review.	December 22, 2022
Email	IPD review checklist provided by IAAC.	January 17, 2023
Virtual Meeting	Discuss IPD review checklist with IAAC.	January 19, 2023
Virtual Meeting	Discuss updated list of Indigenous groups to be engaged on the Project with IAAC.	February 3, 2023

3.3.2 PROVINCIAL ENGAGEMENT

SaskPower is in ongoing discussions with the provincial government regarding regulatory requirements. All regulatory requirements will be adhered to including submission of a Technical Proposal for examination through the provincial *The Environmental Assessment Act*.

Table 3-5 Provincial Engagement Activities from March 2020 to February 2023

Activity	Description	Date
Email	Workshop invitation sent to Ministry of Environment-Environmental Assessment and Stewardship Branch (EASB) and Ministry of Environment-Lands Branch (ENV-LB) regarding siting options.	March 12, 2020
Newsletter	Sent to the following provincial branches: 1. EASB 2. ENV-LB 3. Ministry of Parks, Culture and Sport 4. Heritage Conservation Branch (HCB) 5. Water Security Agency (WSA)	June 25, 2020
Email	Follow-up inquiry requesting whether EASB and ENV-LB would like to meet with SaskPower.	August 20, 2020
Email	Follow-up inquiry requesting whether Ministry of Parks, Culture and Sport would like to meet with SaskPower.	August 20, 2020
Virtual Meeting	Meeting with EASB and ENV-LB to discuss the role of natural gas generation and the Project site options under consideration.	September 14, 2020
Virtual Meeting	Meeting with Ministry of Parks, Culture and Sport to discuss the role of natural gas generation and the Project regions under consideration.	September 16, 2020
Mail	Letter sent to WSA regarding the selection of the Project site and invitation to public open house on July 27, 2022.	July 12, 2022
Email	Received from WSA indicating the operations and maintenance group that manages the Dellwood Brook Dam have no concerns with the Project and the water rights, approvals and compliance group will take the existing licensed surface and groundwater projects in the vicinity into account during the evaluation process.	August 8, 2022
Phone call	Re-initiate contact with EASB and provide overview of project and anticipated timelines and invite for virtual meeting.	October 26, 2022
Virtual Meeting	Provide a Project introduction to EASB and ENV-LB.	February 14, 2023

3.3.3 MUNICIPAL ENGAGEMENT

Multiple engagement activities were undertaken with the cities, towns and RMs in sync with the geographical areas under consideration during the siting of the Project. Once a decision was made, updates were provided on the siting decision and information on the Project and invitations to attend the Project office were sent to the local RMs and the town of Lanigan. SaskPower continually sought advice on how best to reach their constituents.

Table 3-6 Municipal Engagement Activities from March 2020 to November 2022

Activity	Description	Date
Conference Call	Call with city of Estevan to share results of gas quality studies.	Sept. 2, 2020
Conference Call	Call with city of Saskatoon to share information on site evaluation process, supply plan and forecasts and gather feedback on the city's plans.	Sept. 17, 2020
Conference Call	Saskatoon North Partnership for Growth 1. Share information about our evaluation of potential sites for natural gas power generation and how this work fits into the broader power future picture; 2. Learn about interests and concerns as we move through the Project site evaluation process; and 3. Address any questions or concerns	Nov. 12, 2020
Virtual Meeting	Presentation to RM of Corman Park	Nov. 12, 2020
Virtual Meeting	Presentation to RM of Aberdeen	Nov. 12, 2020
Email	Information sent to the following regarding further study of Shand and Lanigan areas: RM Usborne RM Aberdeen RM Estevan City of Saskatoon City of Estevan	July 16, 2021
Email	Information sent to the following regarding site selection: RM Usborne RM Aberdeen RM Estevan City of Estevan	July 12, 2022
Email	Invitation to Project office sent to RM Usborne	July 19, 2022
Email	Invitation to Project office and information sheet sent to RM Usborne office	July 25, 2022
Email	Summary of What We Heard at the Project Office Shared with: RM Usborne RM Wolverine Town of Lanigan SaskPower offered to meet separately with administration or council at their convenience.	September 26, 2022
Email	Invitation to Project office sent to: Town of Lanigan RM Usborne RM Wolverine SaskPower offered to meet separately with administration or council at their convenience.	October 20, 2022

3.4 Plan for Future Engagement

SaskPower is committed to ongoing discussions with stakeholders throughout Project development and the life of the Project. Moving forward SaskPower's engagement goals are to:

- share meaningful Project information
- continue to learn about local interests and concerns
- integrate Project mitigation measures that help address local interests and concerns to the greatest extent possible
- share how stakeholder interests and concerns influenced Project plans

Table 3-7 summarizes the planned stakeholder outreach activities to meet the above engagement goals.

Table 3-7 Planned Stakeholder Outreach Activity

Activity	Description	Proposed Date
Presentations	Provide Project information and updates to interested stakeholders.	As requested
Supplier Sessions	Sessions will be made available to interested contractors regarding opportunities and commitments in the procurement and construction of the Project.	To be determined
Commitment Registry	Project commitments will be logged and monitored to confirm stakeholders' expectations are met.	Ongoing
Newsletter	Project updates through newsletter will be continued to interested parties.	Ongoing
Webpage	A dedicated web page containing Project information and the opportunities to exchange information updated here: https://www.saskpower.com/Our-Power-Future/Infrastructure-Projects/Construction-Projects/Planning-and-Construction-Projects/Potential-Lanigan-Natural-Gas-Power-Station	Ongoing
Toll free phone number and Email	Both a dedicated toll-free phone line and email address made available for members of the public and included in all information SaskPower shared regarding the Project.	Ongoing
Site Tour	Facilitate tour(s) of other natural gas facilities such as Chinook Power Station at Swift Current. This offer has been made available during previous meetings, Project offices and updates.	As requested
Community contact	Provide a community contact dedicated to identifying, taking and resolving issues during the construction period.	To be determined

The remaining activities are to be determined with stakeholders as they engage with SaskPower in how they want to participate. SaskPower continues to collect input and host discussions with interested members of the public who want more information or to address specific concerns.

4 Indigenous Engagement Summary

Early engagement has occurred with Indigenous groups who may be affected by the Project. The Project site is located within Treaty Six territory, however there are several Treaty Four First Nations within 100 km of the Project site. Métis Nation Saskatchewan (MNS) is recognized as the official governing organization for Métis in Saskatchewan. Indigenous Peoples engaged to date included First Nations within Treaty Four and Treaty Six, as well as the MNS.

SaskPower's engagement objectives for the Project include:

- Share meaningful Project information and learn about Indigenous Traditional Knowledge, as well as stakeholder interests and concerns.
- Integrate Indigenous Traditional Knowledge as well as stakeholder interests and concerns into the Project plans to the greatest extent possible.
- Communicate how Indigenous Traditional Knowledge as well as stakeholder interests and concerns influence Project plans.
- Continue to exchange information on topics and issues.

SaskPower is committed to ongoing discussions with Indigenous groups and stakeholders throughout the development and life of the Project.

4.1 List of Potentially Affected and Interested Indigenous Groups

4.1.1 PRELIMINARY LIST OF INDIGENOUS GROUPS DURING SITING

In March 2020, SaskPower identified an initial list of 16 Indigenous groups who may potentially be affected by the siting of a new natural gas power station (Table 4-1). SaskPower used a proximity methodology in determining the initial list for engagement and contacted Indigenous groups within 100 km of the four geographical areas under consideration during siting (i.e., Aberdeen, Saskatoon, Estevan, Lanigan (which was ultimately selected as the preferred Project site)). Additionally, neighboring Indigenous groups outside the 100 km proximity were also contacted to ensure Project discussions with Indigenous peoples were inclusive of all associated groups and communities. This analysis included both home communities and other reserve lands in proximity. Other reserve lands are often land parcels acquired during the Treaty Land Entitlement implementation process and those home communities might be much further away than 100 km. An invitation to participate in a workshop in either Saskatoon or Regina to learn more about natural gas power generation and to provide input was sent via email to these Indigenous groups. However, due to the onset of the COVID-19 pandemic, these workshops were cancelled.

Table 4-1 Preliminary List of Indigenous Groups Identified by SaskPower during Siting

Indigenous Groups
Beardy’s and Okemasis First Nation
Carry the Kettle First Nation
Day Star First Nation
File Hills Qu’Appelle (FHQ) Development
George Gordon First Nation
Kawacatoose First Nation
Métis Nation of Saskatchewan
Mistawasis First Nation
Muskeg Lake First Nation
Muskowekwan First Nation
Okanese First Nation
Peepeekisis First Nation
Piapot First Nation
Saskatoon Tribal Council
Star Blanket First Nation
Whitecap Dakota First Nation
Zagime First Nation

4.1.2 LIST OF INDIGENOUS GROUPS FOR THE PROJECT

SaskPower contacted IAAC in April of 2020 to discuss and determine an initial list of the Indigenous groups that SaskPower was to engage with regarding the Project. IAAC provided a preliminary list to SaskPower on April 22, 2020 identifying the Indigenous groups within approximately 100 km of the Project. A list of 16 potentially affected and interested Indigenous groups was provided based on the Aboriginal and Treaty Rights Information System (ATRIS) search results (Table 4-2).

Table 4-2 Preliminary List of Potentially Affected and Interested Indigenous Groups for the Project Identified by IAAC, April 2020

Indigenous Group	Reserve Lands within Approximately 100 km of Project Location	Approximate Distance from Project (km)
Beardy's and Okemasis First Nation	Beardy’s & Okemasis Reserve No. 96 & 97-A	68
Day Star First Nation	Day Star No. 87	80
English River First Nation	Grasswoods Indian Reserve No. 192J	93
George Gordon First Nation	George Gordon First Nation Indian Reserve No. 86	99
Kawacatoose First Nation	Kawacatoose First Nation Indian Reserve No. 88	82
	Poorman Indian Reserve No. 88	76
Kinistin Saulteaux Nation	Kinistin No. 91A	99

Indigenous Group	Reserve Lands within Approximately 100 km of Project Location	Approximate Distance from Project (km)
Muskeg Lake Cree Nation	Asimakaniseekan Askiy Indian Reserve No. 102A	94
	Asimakaniseekan Askiy Indian Reserve No. 102B	102
Muskowekwan First Nation	Muskowekwan Indian Reserve No. 85-13	94
	Muskowekwan Indian Reserve No. 85-14	96
	Muskowekwan Indian Reserve No. 85-18	98
	Muskowekwan Indian Reserve No. 85-66	100
	Muskowekwan No. 85	103
	Muskowekwan No. 85A	87
One Arrow First Nation	One Arrow Indian Reserve No. 95	109
	One Arrow Indian Reserve No. 95-1C	89
	One Arrow Indian Reserve No. 95-1E	86
	One Arrow Indian Reserve No. 95-1H	89
	Sounding Sky Reserve	101
Red Pheasant Cree Nation	Red Pheasant No. 108	251
Thunderchild First Nation	Thunderchild First Nation Indian Reserve No. 115X	398
Whitecap Dakota First Nation	Whitecap Indian Reserve No. 94	99
Yellow Quill First Nation	Nakaway Ahkeeng Reserve	99
	Yellow Quill Indian Reserve 90-10	99

Source: https://sidait-atris.aadnc-aandc.gc.ca/atris_online/Content/Search.aspx
https://sidait-atris.aadnc-aandc.gc.ca/atris_online/Content/AboriginalCommunityView.aspx

In October 2022, SaskPower contacted IAAC to request an update on the list of Indigenous groups. On February 1, 2023, IAAC provided a list of eleven Indigenous groups (Table 4-3).

Table 4-3 Revised List of Potentially Affected and Interested Indigenous Groups for the Project Identified by IAAC, February 2023

Indigenous Group	Reserve Lands within Approximately 100 km of Project Location	Approximate Distance from Project (km)
Beardy’s and Okemasis First Nation	Beardy’s & Okemasis Reserve No. 96-97-A	68
Day Star First Nation	Day Star No. 87	80
Fishing Lake First Nation	Fishing Lake Indian Reserve No. 89	110
George Gordon First Nation	George Gordon First Nation Indian Reserve No. 86	99
Kawacatoose First Nation	Kawacatoose First Nation Indian Reserve No. 88	82
	Poorman Indian Reserve No. 88	76
Kinistin Saulteaux Nation	Kinistin No. 91A	99
Métis Nation of Saskatchewan	-	-

Indigenous Group	Reserve Lands within Approximately 100 km of Project Location	Approximate Distance from Project (km)
Muskowekwan First Nation	Muskowekwan Indian Reserve No. 85-13	94
	Muskowekwan Indian Reserve No. 85-14	96
	Muskowekwan Indian Reserve No. 85-18	98
	Muskowekwan Indian Reserve No. 85-66	100
	Muskowekwan No. 85	103
	Muskowekwan No. 85A	87
One Arrow First Nation	One Arrow Indian Reserve No. 95	109
	One Arrow Indian Reserve No. 95-1C	89
	One Arrow Indian Reserve No. 95-1E	86
	One Arrow Indian Reserve No. 95-1H	89
	Sounding Sky Indian Reserve	101
Whitecap Dakota First Nation	Whitecap Indian Reserve No. 94	99
Yellow Quill First Nation	Nakaway Ahkeeng Reserve	99
	Yellow Quill Indian Reserve 90-10	99

4.2 Summary of Engagement with Indigenous Peoples of Canada

SaskPower's engagement approach with Indigenous groups is an iterative model that evolves as the development of the Project progresses. It begins with sharing meaningful project information and learning from the Indigenous groups about their interests and concerns. In March of 2020 through the Project siting process, SaskPower contacted Indigenous groups with an invitation to participate in a workshop to provide input.

When the Project site was selected, SaskPower prepared Project notification letters for all identified Indigenous groups (Table 4-2). The letters contained a brief description of the Project, its location, and a request to meet face-to-face to discuss the Project. These letters were sent by email, followed by hardcopy in the mail on July 12, 2022. A follow-up letter reiterating the Project information and reminder of who to contact if there were any questions or concerns was sent out to the same Indigenous groups on October 31, 2022. See Appendix B for an example of the documentation.

Phone calls were made to each Indigenous group listed by IAAC in the updated February 2023 list on February 2 and 3, 2023 to:

- Confirm receipt of the notification letter.
- Confirm the Indigenous group's understanding of the engagement process.
- Determine the need for another conversation or a face-to-face meeting as well as future notification preference.

Table 4-4 Summary of Indigenous Engagement Activities

Indigenous Group	Date	Means of Engagement
Beardy's and Okemasis First Nation	March 11, 2020	Email extending an invitation to participate in a workshop to provide input on the need for a future natural gas generation facility, the two geographical study areas under consideration, site selection process, and SaskPower contact information.
	July 11, 2022	Letter sent explaining project and seeking input.
	October 31, 2022	Follow-up letter reiterating the Project information and reminder of who to contact if there were any questions concerns.
	February 3, 2023	Phone call to governance centre to invite for meeting in the near future. No answer no voice mail.
Carry the Kettle First Nation	March 11, 2020	Email extending an invitation to participate in a workshop to provide input on the need for a future natural gas generation facility, the two geographical study areas under consideration, site selection process, and SaskPower contact information.
Day Star First Nation	March 11, 2020	Email extending an invitation to participate in a workshop to provide input on the need for a future natural gas generation facility, the two geographical study areas under consideration, site selection process, and SaskPower contact information.
	July 11, 2022	Letter sent explaining project and seeking input.
	October 31, 2022	Follow-up letter reiterating the Project information and reminder of who to contact if there were any questions concerns.
	February 2, 2023	Phone call to governance centre and left voicemail referencing previous contact attempts (email and letters) and invited the First Nation for a discussion about the Project.
English River First Nation	July 11, 2022	Letter sent explaining project and seeking input.
	October 31, 2022	Follow-up letter reiterating the Project information and reminder of who to contact if there were any questions concerns.
File Hills Qu'Appelle Development	March 11, 2020	Email extending an invitation to participate in a workshop to provide input on the need for a future natural gas generation facility, the two geographical study areas under consideration, site selection process, and SaskPower contact information.
Fishing Lake First Nation	February 2, 2023	Phone call attempt to governance centre to invite for Project discussion. No voicemail.
George Gordon First Nation	March 11, 2020	Email extending an invitation to participate in a workshop to provide input on the need for a future natural gas generation facility, the two geographical study areas under consideration, site selection process, and SaskPower contact information.
	July 11, 2022	Letter sent explaining project and seeking input.
	October 31, 2022	Follow-up letter reiterating the Project information and reminder of who to contact if there were any questions concerns.
	February 2, 2023	Phone call to governance centre and left voicemail referencing previous contact attempts (email and letters) and invited the First Nation for a discussion about the Project.

Indigenous Group	Date	Means of Engagement
Kawacatoose First Nation	March 11, 2020	Email extending an invitation to participate in a workshop to provide input on the need for a future natural gas generation facility, the two geographical study areas under consideration, site selection process, and SaskPower contact information.
	July 11, 2022	Letter sent explaining project and seeking input.
	October 31, 2022	Follow-up letter reiterating the Project information and reminder of who to contact if there were any questions concerns.
	February 3, 2023	Phone call to governance centre and left voicemail referencing previous contact attempts (email and letters) and invited the First Nation for a discussion about the Project.
Kinistin Saulteaux Nation	July 11, 2022	Letter sent explaining project and seeking input.
	October 31, 2022	Follow-up letter reiterating the Project information and reminder of who to contact if there were any questions concerns.
	February 3, 2023	Phone call to governance centre and left voicemail referencing previous contact attempts (letters) and invited the First Nation for a discussion about the Project.
Métis Nation of Saskatchewan	March 11, 2020	Email extending an invitation to participate in a workshop to provide input on the need for a future natural gas generation facility, the two geographical study areas under consideration, site selection process, and SaskPower contact information.
	July 11, 2022	Letter sent explaining project and seeking input.
	October 31, 2022	Follow-up letter reiterating the Project information and reminder of who to contact if there were any questions concerns.
Mistawasis First Nation	March 11, 2020	Email extending an invitation to participate in a workshop to provide input on the need for a future natural gas generation facility, the two geographical study areas under consideration, site selection process, and SaskPower contact information.
Muskeg Lake Cree Nation	March 11, 2020	Email extending an invitation to participate in a workshop to provide input on the need for a future natural gas generation facility, the two geographical study areas under consideration, site selection process, and SaskPower contact information.
	July 11, 2022	Letter sent explaining project and seeking input.
	October 31, 2022	Follow-up letter reiterating the Project information and reminder of who to contact if there were any questions concerns.
Muskowekwan First Nation	March 11, 2020	Email extending an invitation to participate in a workshop to provide input on the need for a future natural gas generation facility, the two geographical study areas under consideration, site selection process, and SaskPower contact information.
	July 11, 2022	Letter sent explaining project and seeking input.
	October 31, 2022	Follow-up letter reiterating the Project information and reminder of who to contact if there were any questions concerns.
	February 3, 2023	Phone call attempt to governance centre to invite for Project discussion. Voicemail was full and therefore could not leave message.

Indigenous Group	Date	Means of Engagement
One Arrow First Nation	July 11, 2022	Letter sent explaining project and seeking input.
	October 31, 2022	Follow-up letter reiterating the Project information and reminder of who to contact if there were any questions concerns.
	February 3, 2023	Phone call attempt to governance centre to invite for Project discussion. No voicemail.
Okanese First Nation	March 11, 2020	Email extending an invitation to participate in a workshop to provide input on the need for a future natural gas generation facility, the two geographical study areas under consideration, site selection process, and SaskPower contact information.
Peepeekisis First Nation	March 11, 2020	Email extending an invitation to participate in a workshop to provide input on the need for a future natural gas generation facility, the two geographical study areas under consideration, site selection process, and SaskPower contact information.
Piapot First Nation	March 11, 2020	Email extending an invitation to participate in a workshop to provide input on the need for a future natural gas generation facility, the two geographical study areas under consideration, site selection process, and SaskPower contact information.
Red Pheasant Cree Nation	July 11, 2022	Letter sent explaining project and seeking input.
	October 31, 2022	Follow-up letter reiterating the Project information and reminder of who to contact if there were any questions concerns.
Saskatoon Tribal Council	March 11, 2020	Email extending an invitation to participate in a workshop to provide input on the need for a future natural gas generation facility, the two geographical study areas under consideration, site selection process, and SaskPower contact information.
Star Blanket First Nation	March 11, 2020	Email extending an invitation to participate in a workshop to provide input on the need for a future natural gas generation facility, the two geographical study areas under consideration, site selection process, and SaskPower contact information.
Thunderchild First Nation	July 11, 2022	Letter sent explaining project and seeking input.
	October 31, 2022	Follow-up letter reiterating the Project information and reminder of who to contact if there were any questions concerns.
Whitecap Dakota First Nation	March 11, 2020	Email extending an invitation to participate in a workshop to provide input on the need for a future natural gas generation facility, the two geographical study areas under consideration, site selection process, and SaskPower contact information.
	July 11, 2022	Letter sent explaining project and seeking input.
	October 31, 2022	Follow-up letter reiterating the Project information and reminder of who to contact if there were any questions concerns.
	February 3, 2023	Phone call to governance centre and left voicemail referencing previous contact attempts (email/letters) and invited the First Nation for a discussion about the Project.

Indigenous Group	Date	Means of Engagement
Yellow Quill First Nation	July 11, 2022	Letter sent explaining project and seeking input.
	October 31, 2022	Follow-up letter reiterating the Project information and reminder of who to contact if there were any questions concerns.
	February 3, 2023	Phone call attempt to governance centre to invite for Project discussion. Voicemail was full and therefore could not leave message.
Zagime First Nation	March 11, 2020	Email extending an invitation to participate in a workshop to provide input on the need for a future natural gas generation facility, the two geographical study areas under consideration, site selection process, and SaskPower contact information.

4.2.1 TRADITIONAL KNOWLEDGE AND PROTOCOL STUDY

SaskPower engaged the services of Wicehtowak Limnos Consulting Services LP (WLCS), a consulting firm wholly owned by George Gordon First Nation (GGFN), to undertake a Traditional Knowledge and Protocol (TK&P) study of the Project site that considered Traditional Knowledge and impacts relevant to the IAA regulatory process. WLCS has been appointed by GGFN leadership to conduct all stewardship work on behalf of the Nation for Projects that may impact Rights. In response to this request, WLCS undertook a TK&P study for the Project to:

- Provide regulatory context from the perspective of George Gordon First Nation.
- Undertake a desktop review of data generated by Stantec during baseline EAs to verify findings and identify gaps.
- Conduct a field assessment of the Project Development Area (PDA) to define landscape features of importance to Indigenous groups and Indigenous Peoples of Canada.

Refer to Section 21.0 and Appendix B for more information on the TK&P study.

4.3 Results of Indigenous Engagement to Date

To date, SaskPower has sent information via mail, email, and follow-up phone calls to Indigenous groups of potential interest/concern.

4.3.1 KEY ISSUES RAISED

No issues have been raised by Indigenous groups to date regarding the Project. In SaskPower's experience, Indigenous groups are often preoccupied with their own unique community interests, and some may be experiencing engagement and consultation fatigue or face capacity challenges which limit their ability to actively participate in project engagement. Engagement with Indigenous groups is ongoing, and SaskPower will continue to reach out and be available for discussion.

4.4 Plan for Future Indigenous Engagement

Engagement with the Project specific list of Indigenous groups and associated communities is ongoing, and SaskPower will continue to make contact and be available for discussion as the Project continues. If there is no response or feedback from the Indigenous peoples, SaskPower Indigenous Relations will reach out to the Chief of each First Nation and the leaders within the Métis Nation to arrange discussions if requested or desired by the Indigenous groups.

The Duty to Consult obligation rests with the GOC and GOS and these early discussions with Indigenous groups may help inform their decision-making process. As proponents of the Project, we will engage in any consultation process that the GOC and GOS deems necessary to properly move the Project forward.

Additionally, SaskPower has ongoing engagement with other Indigenous groups and communities (not specific to the Project) throughout Saskatchewan regarding the future of the power system in Saskatchewan. These engagement activities include conversations on SaskPower's future power supply options which includes the Project.

SaskPower is committed to ongoing discussions with Indigenous groups throughout the development and life of the Project. SaskPower will continue to notify Indigenous groups as required as the Project progresses or as requested by the Indigenous group.

All listed Indigenous groups will be invited to participate and provide feedback in stakeholder Project-related engagement activities such as:

- procurement information sessions
- site tours
- presentations and meetings

It is anticipated that Indigenous cultural ceremonies will likely occur for the Project. SaskPower will determine (through discussions with Indigenous groups) as to what cultural ceremonies or activities may be appropriate for the Project and which Indigenous groups will conduct and/or participate in each cultural activity.

SaskPower will continue our efforts to communicate with the Project specific list of Indigenous groups and communities by means of email, phone calls, letters, and open invitations to meet in their communities. If SaskPower is invited to participate in any community or ceremonial events, we will actively participate including considering requests for community-based sponsorships.

5 Regional Studies or Plans

The Project location has not been part of any regional assessments under Sections 92 or 93 of the IAA (GOC 2019a, GOC 2022b). Additionally, there are no known regional assessments of the area in which the Project is located at this time (GOC 2022b). Regional plans, development plans, and management frameworks that may be applicable to the Project are outlined in Section 18.4.

The Project is located within Treaty Six and the Métis Nation of Saskatchewan territory and is in close proximity to Treaty Four territory as shown in Figure 13-1. The desktop review of publicly available information did not identify any traditional land and resource use (TLRU) studies in the area. In addition, SaskPower contacted the Indigenous Consultation Unit of the Saskatchewan Ministry of Government Relations on January 20, 2023, for any information on TLRU or Traditional Knowledge studies that have been undertaken in the Project area. The response received was that there was no knowledge of any TLRU studies in the Project area.

6 Strategic Assessments

The Strategic Assessment of Climate Change conducted under Section 95(2) of the IAA is applicable to the Project (GOC 2019a, GOC 2020). The Project has the potential to have a negative effect on carbon sink capacity from the potential loss of wetland area during vegetation clearing and ground disturbance during the construction phase of the Project. The PDA covers 64.9 hectares (ha) and is comprised of 9.4 ha of wetland area. Additional information on the existing conditions and potential effects to wetlands are provided in Sections 14.2.4 and 19.1.4, respectively.

PART B: PROJECT INFORMATION

7 Purpose, Need and Benefits of Project

The proposed Clean Electricity Regulations (CER) indicate a requirement for all electric utilities in Canada to reach net-zero GHG emissions by 2035. Reaching net-zero GHG emissions is a huge challenge for SaskPower. To reduce our emissions even by one million tonnes, we need to expand, refurbish, and replace the equivalent of 150% of our current generating capacity. To get to net-zero, we have interim targets that include reducing our GHG emissions to 50% below 2005 levels by 2030 and increasing our non-emitting and renewable generation to up to 50% of our capacity by 2030.

SaskPower is on track to meet these targets. This will be achieved by retiring and replacing over 1400 MW (2021-2030) of baseload conventional coal generation. We are also aiming to add as much as 3000 MW of renewables (e.g., wind and solar) by 2035. However, we need to carefully manage the system as we add significant variable generation to ensure that the grid remains operable and stable. This means that additions cannot come faster than the grid modernization and back-up generation that is required to support the fluctuating supply.

SaskPower is currently evaluating what would be required to achieve net-zero by 2035 in anticipation of the forthcoming CER and commits that the Project will be compliant.

7.1 Project Purpose

The proposed Project is a nominal 370 MW combined cycle natural gas power station, with the capability to generate up to a maximum of 380 MW under optimum ambient conditions. The Project is required to serve increasing load, enable the retirement of conventional coal generation as well as the addition of new intermittent renewable generation projects (i.e., wind and solar). As such, once in service, the Project will play a crucial role in SaskPower’s GHG emissions reduction strategy and reaching net-zero.

7.2 Project Need

To integrate renewable supply options that are intermittent by nature, a back-up generation source is required to ensure there is enough electricity generation to meet demand. Natural gas generation is an ideal candidate as it can quickly ramp up or down as the renewable generation output fluctuates. For Saskatchewan, it is the only practical and economic option for integration of renewables to reach SaskPower’s 50% emission reduction target by 2030, as other intermittent support options such as sufficient energy storage are not currently available. To ensure power supply continuity and availability while integrating renewable power sources, the backstop must be in place beforehand.

Natural gas fired generation fills several system needs currently supplied by the coal-fired generation fleet. Natural gas can quickly ramp up or down to back up fluctuating renewable generation, it can also operate as a stable baseload supply to provide power any time of the day, any season of the year and the fuel can be stored to ensure a sustained fuel supply reliability. SaskPower currently only has two baseload supply options available to replace conventional coal and meet increasing demand in the next ten years. These are imports and natural gas generation. Imported energy can be a useful bridge between phasing out conventional coal and developing new low or non-emitting technologies but that amount of import potential is limited by both existing transmission capacity and the neighbouring area's availability of surplus capacity to supply. SaskPower has worked with our neighbours and now plans to build new transmission capacity with both North Dakota (Southwest Power Pool, SPP) and Manitoba Hydro. SaskPower has submitted transmission service requests to increase the ability to import from the SPP for up to 650 MW by 2027 and 100 MW from Manitoba by 2027. However, it is yet to be seen how much firm capacity will be realized as contracts are yet to be pursued that can offset the need to build more natural gas generation. This leaves new natural gas generation as the only near-term option for Saskatchewan to replace conventional coal and the only back-up option to support variable renewable generation.

However, the Project will also be the most expensive to run based on carbon tax. As we continue to add renewables, capacity factors for all of our peaking gas generation will decline, starting with the most expensive units. Therefore, predicted dispatch for the Project, based on current assumptions including current load forecast and electrification uptake, is for very low (<15%) capacity factors. We do still need the full output of the Project to provide capacity during peak demand (e.g., very cold winter days, very hot summer days, or when other units experience forced outages).

The Project is needed to provide capacity, back-up renewables, and act as a contingency if other options do not materialize, load grows, or aging units fail. This SaskPower-owned and operated Project is within our control whereas other projects, including imported power or Independent Power Producer (IPP) projects are not within our control to the same extent. If these projects are delayed, we will have increased reliance on operating this Project.

Looking ahead, we can anticipate that the use of the Project may increase up to 15% capacity factor if another unit fails, an Import project or IPP project are delayed or not realized. Capacity factor may also increase if we are able to negotiate an equivalency agreement with the federal government enabling the operation of this most efficient unit versus older, less efficient and higher GHG emitting units.

7.3 Potential Benefits of Project

SaskPower has traditionally designed large natural gas facilities to operate only in combined cycle mode, meaning the gas turbine operates in conjunction with the steam turbine, heat recovery steam generator (HRSG) and feedwater system. This design provides the most efficient and lowest cost for baseload natural gas generation but does limit the flexibility of the unit. This Project will be designed with the ability to operate in either flexible simple cycle or efficient combined cycle mode to maximize flexibility to support the addition of renewable generation. As more renewable generation is added to reduce GHG emissions, SaskPower requires the added system operational flexibility embedded in this Project design.

Natural gas generation is a key component to achieving both an increase in renewable capacity and GHG emissions reduction. Natural gas combined cycle power stations emit up to 60% less carbon dioxide (CO2) as compared to conventional coal-fired generation in Saskatchewan. The transition of conventional coal-fired generating units to renewables and natural gas represents a significant reduction in GHG and other air emissions and as more renewables are added to the system, more of the annual GHG emissions will be replaced by non-emitting renewable energy. As such, the proposed Aspen Power Station, is integral to SaskPower's plans to reach net-zero emissions.

7.4 Consequences of Project Delays

SaskPower is faced with challenges including aging infrastructure and additional power demand. The goal is to ensure SaskPower can meet these challenges with *reliable, sustainable, and cost-effective power* and the Project is well positioned to address these challenges. By 2027, an increase in demand for power of approximately 255 MW is expected compared to 2022 levels. After 2027, demand is expected to continue to grow at a rate of approximately 0.6% annually for the next ten years.

Based on SaskPower's reliability criteria of maintaining a 17% Planning Reserve Margin (PRM), if the Project is not in commercial operation on July 1, 2027, there is risk of a shortfall in July 2027 as the PRM is just met. The PRM falls to almost 13% in July 2028 and continues to fall below the PRM in the winter starting in 2028 and falling to 10% by 2035. System reliability could further deteriorate if other planned projects are delayed or existing aging generation fails. Whenever available capacity falls below the PRM the risk of unserved energy increases. This means residents and customers of SaskPower will not have the power they need when they need it; the risk is highest on the coldest winter days and the hottest summer days.

The Boundary Dam unit 6 (BD6) coal-fired power station is slated for retirement at the end of 2027 after the Project comes online. If the Project is delayed, continued operation of BD6 will be needed to cover the shortage and retirement will be delayed. In addition, the expansion of renewable generation capacity will also be compromised and GHG emissions will rise.

8 Physical Activities Regulations

The IAA, administered by IAAC, has two regulations that are most applicable to the Project, the *Physical Activities Regulations* and the *Information and Management of Time Limits Regulations* (GOC 2019a, GOC 2022a). The *Physical Activities Regulations* lists the activities and types of projects (designated projects) that require an impact assessment (IA) (GOC 2019b). Section 30 of the *Physical Activities Regulations* states:

> *30. The construction, operation, decommissioning and reclamation of a new fossil fuel-fired power generating facility with a production capacity of 200 MW or more.*

The Project will be 370 MW in size, and therefore, an IPD of the Project that includes the information outlined in the *Information and Management of Time Limits Regulations* must be provided to IAAC under Section 10 of the IAA (GOC 2019a).

The *Information and Management of Time Limits Regulations* outlines the information that must be included in the IPD under Section 3 and Schedule 1 (GOC 2019c). Section 3 of the *Information and Management of Time Limits Regulations* states:

> *3. For the purposes of subsection 10(1) of the Act, the information that is to be provided in the initial description of a designated project is set out in Schedule 1 and must*
>
> > *(a) be representative of the project at the time the information is provided; and*
> >
> > *(b) include the information related to any option that the proponent is considering in respect of any item in the description of the project.*

The Project is not a component of a larger project that is listed in the *Physical Activities Regulations* (GOC 2019b). This is a new project, and neither the Project nor any of its components are an expansion of an existing project (GOC 2019b).

9 Description of Project Activities

The Project will be a power generation facility that uses natural gas to generate a nominal 370 MW of electricity. Components will include the Project, as well as the following incidental activities necessary for Project construction and operation and maintenance (refer to Section 9.4 for further descriptions of incidental activities):

- distribution (25 kilovolt (kV)) power line
- overhead 230 kV transmission power line
- underground Fibre-optic line(s) for telecommunications
- road improvements
- underground water supply pipeline
- underground natural gas supply lines
- relocation of existing natural gas lines

Except for the incidental activities, all structures and equipment will be located within the PDA, currently owned by SaskPower (Section 14.1.1). This includes the powerhouse, with steam turbine and gas turbine building areas, multipurpose building with main control/administration areas, warehouse, workshop, and water treatment building, Air Cooled Condenser (ACC), switchyard, and miscellaneous auxiliary buildings and structures.

The land is currently undeveloped with the only existing infrastructure on the Project site being two underground high-pressure natural gas lines running diagonally across the middle of the quarter section that will need to be relocated and three water wells that SaskPower installed in the southeast part of the quarter section. The Project site layout illustrates the proposed locations of the physical structures to be erected on the Project site (Figure 9-1, Table 9-1).

Figure 9-1 Project Physical Works

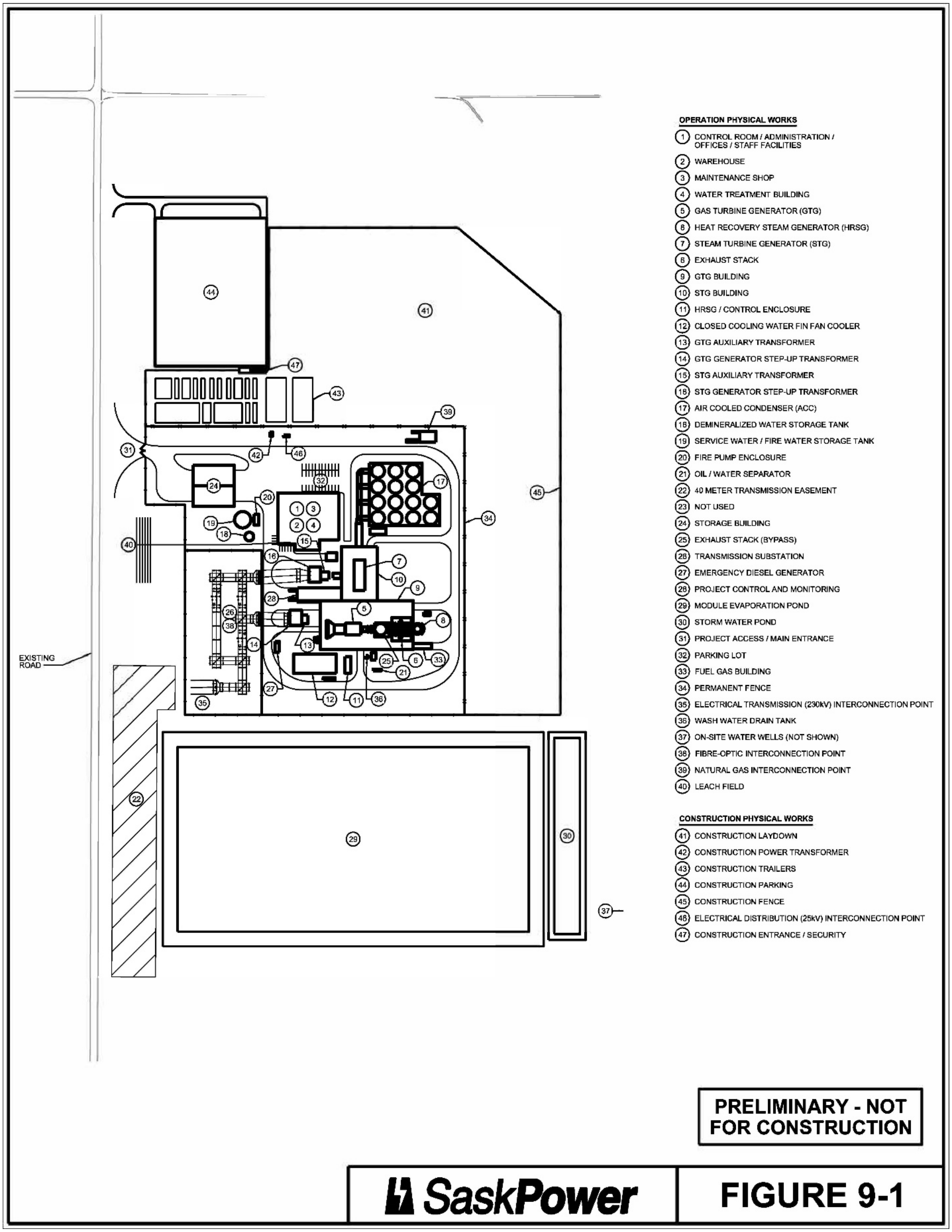


Table 9-1 Physical Works Associated with the Project

Number	Project Components	Key Dimensions	Area (ha)
1	CONTROL ROOM/ ADMINISTRATION/OFFICES/STAFF FACILITIES	42 m x 15 m	0.065
2	WAREHOUSE	16 m x 18 m	0.028
3	MAINTENANCE SHOP	13.5 m x 18 m	0.024
4	WATER TREATMENT BUILDING	38 m x 28 m	0.105
5	GAS TURBINE GENERATOR (GTG)	See item 9	See item 9
6	HRSG	See item 9	See item 9
7	STEAM TURBINE GENERATOR (STG)	See item 10	See item 10
8	EXHAUST STACK	52 m height	N/A
9	GTG BUILDING	85 m x 45 m	0.380
10	STG BUILDING	45 m x 35 m	0.158
11	HRSG CONTROL ENCLOSURE	3.5 m x 7.5 m	0.002
12	CLOSED COOLING WATER FIN FAN COOLER	10 m x 42 m	0.0416
13	GTG AUXILIARY TRANSFORMER	2.5 m x 4.5 m	0.001
14	GTG GENERATOR STEP-UP (GSU) TRANSFORMER	5 m x 10 m	0.004
15	STG AUXILIARY TRANSFORMER	2.5 m x 4.5 m	0.001
16	STG GSU TRANSFORMER	5 m x 10 m	0.004
17	AIR COOLED CONDENSER (ACC)	65 m x 56 m, 26 m tall	0.364
18	DEMINERALIZED WATER STORAGE TANK	567,811 litres (L)	N/A
19	SERVICE/FIRE WATER STORAGE TANK	1,892,706 L	N/A
20	FIRE PUMP ENCLOSURE	4 m x 10 m	0.004
21	OIL/WATER SEPARATOR	3785 L	N/A
22	40 METER TRANSMISSION EASEMENT	TBD	TBD
23	40 METER FUEL GAS EASEMENT	TBD	TBD
24	STORAGE BUILDING	37 m x 37 m	0.138
25	EXHAUST STACK (BYPASS)	52 m height	N/A
26	TRANSMISSION SUBSTATION	72 m x 72 m	0.518
27	EMERGENCY DIESEL GENERATOR	4 m x 7 m	0.003
28	PROJECT CONTROL AND MONITORING MODULE	12 m x 31 m	0.036
29	EVAPORATION POND (EXCLUDING SOIL BERM) EVAPORATION POND (INCLUDING SOIL BERM)	321m x 168 m 347 m x 189 m	5.395 6.556
30	STORM WATER POND	35 m x 200 m	0.700
31	PROJECT ACCESS / MAIN ENTRANCE	N/A	N/A
32	PARKING LOT	35 m x 100 m (Approximately 30 stalls)	0.348
33	FUEL GAS BUILDING	5 m x 14 m	0.008

Number	Project Components	Key Dimensions	Area (ha)
34	PERMANENT FENCE	N/A	N/A
35	ELECTRICAL TRANSMISSION (230 Kv) INTERCONNECTION POINT	N/A	N/A
36	WASH WATER DRAIN TANK	3 m x 5 m	0.002
37	ON-SITE WATER WELLS (NOT SHOWN)	N/A	N/A
38	FIBRE-OPTIC INTERCONNECTION POINT	N/A	N/A
39	NATURAL GAS INTERCONNECTION POINT	N/A	N/A
40	LEACH FIELD	N/A	N/A
41	CONSTRUCTION LAYDOWN	75,000 metres squared (m^2)	7.284
42	CONSTRUCTION POWER TRANSFORMER	5 m x 10 m	0.002
43	CONSTRUCTION TRAILERS	150 m x 48 m	0.728
44	CONSTRUCTION PARKING	105 m x 135 m	1.416
45	CONSTRUCTION FENCE	N/A	N/A
46	ELECTRICAL DISTRIBUTION (25 Kv) INTERCONNECTION POINT	N/A	N/A
47	CONSTRUCTION ENTRANCE / SECURITY	N/A	N/A

For a more detailed description of the physical works associated with the Project please refer to Section 9.2 and Section 9.3.

9.1 Anticipated Size

Conceptual renderings for the Project are provided in Figure 9-2 and Figure 9-3. The Project will be located within the western half of NW 36-33-24-W2M. The total anticipated disturbance footprint for the Project, including temporarily disturbed areas during construction, will be approximately 700 m x 450 m (31.5 ha). The total disturbed areas include approximately 9.7 ha for construction facilities and laydown, 8.1 ha for the storm and wastewater ponds, 8.1 ha for the main Project area, and the remainder for temporary excavation spoils and right-of-way (ROW) access for incidental activities such as transmission and gas piping.

The Project is a nominal 370 MW CCGT power plant with the capability to generate up to a maximum of 380 MW under optimum ambient conditions. Nominal output is used for convenience by manufacturers to compare generation associated with various technologies. Actual output from the Project will vary with seasonal ambient conditions. Further description on the electrical generating process can be found in Section 10.0, with estimated waste and emissions from the Project defined in Section 14.0.

Figure 9-2 Project Concept Rendering (Looking East)

Figure 9-3 Project Concept Rendering (Looking North)

9.2 Physical Works Associated with Construction

Construction physical works include temporary structures and facilities needed to manage the Project such as construction management trailers, laydown space, parking space, construction utilities, and temporary security measures.

9.2.1 ACTIVITIES

9.2.1.1 Pre-construction

Project pre-construction activities will include land and geotechnical surveys required for design and construction. Land surveys will identify site boundaries and topographic details required for site preparation and grading. Geotechnical surveys will be conducted to gather information on soil consistency and structure needed for piling and foundation design. During this time, SaskPower will also seek the appropriate regulatory approvals and permits, raise Project awareness through community outreach, and select the construction contractor(s) and technology provider(s) to deliver the Project.

Detailed project planning will occur during this phase. Prior to contractor mobilization a site procedures manual will be developed and will include a site emergency response plan (ERP), an environmental management plan (EMP), and site safety procedures.

9.2.1.2 Site Preparation and Grading

Site preparation activities will be performed prior to any other construction work. The developed portion of the Project site will be stripped of topsoil and organic matter. The topsoil will be stockpiled for later use in landscaping. The Project site will be excavated or filled, where required, to bring the Project site to the required elevations. Excavation spoils will likewise be temporarily stockpiled on site. Excavated materials, where possible, will be re-used as fill. The intent will be to balance excavation and fill quantities, to avoid importing or exporting material as much as possible.

The Project site will be graded to drain into main collection ditches. The Project site surface will be graded to a slope of one vertical to 100 horizontal, where site conditions and elevations allow, permitting rapid removal of surface water. Some locations within the power block will be drained by a catch basin and piping system. The main collection ditches will have a trapezoidal cross-section shape, with a minimum bottom width of 1.2 metres (m). The side slopes will be designed to the soil conditions present on site. Ditches shall be designed to be adequately protected from erosion after excavation to maintain slope stability using vegetation or other engineered means.

The general sequence of the Project site preparation construction will be to begin work in the main Project area and in the construction management trailer area/parking lot area. Following the initial work, the balance of the Project site preparation construction scope will be performed, which includes installing the Project site fence, preparing the switchyard area, excavating the wastewater and storm water ponds, installing the storm water collection system, and developing the main construction roads on the Project site.

9.2.1.3 Foundation Excavation and Construction

Foundation construction will begin as soon as site preparation work permits. There may be some overlap of site preparation and foundation work (for example, foundations may be installed in the main powerhouse area while pond excavation is ongoing to optimize Project schedule). Piling work will begin first, followed by installation of major equipment foundations and substructures. The Project will utilize either driven steel piles or auger-cast piles, depending on findings during the pre-construction phase. Dewatering activities are not expected during the foundation excavation. If the foundation excavation becomes saturated and dewatering activities need to take place, SaskPower will submit a dewatering plan to the WSA to ensure the proper permitting is in place.

Duct bank, grounding grid, and underground piping installation work will be completed in parallel to the foundation work in the same areas.

9.2.1.4 Building and Equipment Installation

Above grade construction activities will commence at completion of foundation work. It is during the building and equipment installation phase that craft labour force will peak at the Project site. To effectively manage the workforce, SaskPower expects that this phase will be broken up into the following scopes of work:

- above-ground mechanical erection (including the HRSG, above ground piping, and balance of project (BOP) equipment)
- powerhouse Building erection
- multipurpose Building and Storage Building erection
- field erected tanks (storage for demineralized water, and service / fire water)
- above-ground electrical construction
- erection of the ACC
- installation of fire protection and detection equipment
- switchyard construction, including above grade poles, line, and miscellaneous components for a complete generating station / transmission line interface

9.2.1.5 Commissioning and Testing

Start-up and commissioning of the Project involves a documented, safe, timely, and orderly transition from construction to operation and maintenance. It includes testing, start-up, and transfer of all packages, systems, and facilities. Planning for this transition will begin in the engineering stage, with the definition of Start-up Packages. EPC planning will strive for early commissioning of as many packages as practical. Early checkout and testing will help distribute the start-up workload more efficiently, reducing risk and uncertainty associated with Project start-up and commissioning.

The principal activities during this stage are as follows:

- start-up planning and preparation

- start-up and commissioning management
- start-up and commissioning of the Project, including the following major activities:
    - Cold commissioning (pressure testing of piping, continuity testing on wire and cable, etc.)
    - Hot commissioning:
        - Backfeed (energization of major equipment for the first time, using power from the grid)
        - Cleaning, inspections, and “button-up” of the HRSG and ACC
        - Flushing of the gas turbine generator (GTG) and steam turbine generator (STG) oil systems
        - GTG “first-fire” and rough tuning
        - HRSG “steam-blows” (generating steam through the HRSG and temporarily venting to atmosphere, to ensure proper steam cleanliness before introducing steam to the STG)
    - Facility testing, including operational testing in both simple and combined cycle
- operator training

Chemical cleaning will be utilized to remove grease and other contaminants in the HRSG, with all debris and cleaning agent contained and properly disposed. Once all systems have been properly cleaned and flushed, the GTG will be ready for first-fire. With the GTG running, steam generated in the HRSG from the GTG exhaust will be used to conduct steam blows. After steam blows are complete, the STG will be started to electrically synchronize to the grid. The Project team will then tune the unit to optimize performance. The final activities in the commissioning process will be facility testing. Facility testing for the Project will include performance tests, function and demonstration tests, noise and emission tests, and reliability tests.

9.2.2 PERMANENT STRUCTURES

Permanent structures will include only the Project infrastructure described below in Section 9.3.2. Construction fuel gas piping and the construction power feed will remain in place to support any future potential maintenance work throughout the operating life of the Project.

9.2.3 TEMPORARY STRUCTURES

At the conclusion of the construction phase of the Project, construction management facilities and temporary fencing will be removed from the Project site. Most of the developed construction management area, including laydown and temporary parking, will have rock surfacing removed and replaced with topsoil and grass seed. A rock surfaced area will remain for maintenance trailers and approximately 50-60 electrified parking stalls for future maintenance activities during operation and maintenance.

9.2.3.1 Security

Site security will be increased throughout the Project lifecycle. In the early construction phases, a permanent site security fence will be erected. A temporary fence surrounding the construction laydown area will also be constructed. Workers will be required to sign in and out of site. When trade staff levels require increased safety and monitoring on site, temporary site security services will be implemented. This will include a turnstile and a digital access control system to assist with tracking labour force onsite. After commissioning is complete, a permanent closed-circuit television system will be used to monitor and control site access.

9.2.3.2 Construction Parking

The construction parking lot will be located on the north side of the Project site as shown on the Project site layout drawing. The parking area will be constructed by the Project site preparation subcontractor and will be approximately 105 m by 135 m. In developing this area, existing topsoil will be stripped, and a layer of geotextile fabric plus crushed rock will be placed. It is expected that construction management personnel at the superintendent level and above will be allowed to park on-site near the construction office trailers. Upon Project completion, approximately 50-60 electrified stalls in the construction parking lot, will remain, to support future maintenance needs of the Project. The remainder will be stripped of crushed rock and geotextile, then replaced with topsoil and grass seed.

9.2.3.3 Construction Laydown

The construction laydown area will total approximately 6.5 ha along the north and east sides of the Project site. Like the parking lot, existing topsoil will be stripped, and a layer of geotextile fabric plus crushed rock will be placed. Most of the construction laydown space will be utilized for temporary storage and staging of deliveries. A smaller portion of this space will be reserved for on-site fabrication. Here, piping and some supplemental steel will be prefabricated and/or assembled at grade elevation prior to being lifted to the final locations. Upon Project completion all construction laydown areas will be stripped of crushed rock and geotextile, then replaced with topsoil and grass seed.

9.2.3.4 Construction Management Facilities

Construction management office trailers will be constructed early in the Project to house the EPC Contractor and SaskPower construction management personnel. Additional trailers will be provided to accommodate subcontractors as well as site representatives from major equipment suppliers. Prior to the installation of the permanent utilities, temporary facilities may be required such as a portable generator, portable toilets, and sanitary storage facilities.

The construction trailer area will be established near the construction parking lot. The construction trailer area will be approximately 40 m x 147 m (0.59 ha) and used by all the construction management personnel. The construction trailer area will include office space and restrooms for management staff, plus larger congregating areas for site-wide safety meetings, training, and break areas.

Contractor storage trailers and tool bins may also be located here with approval from the construction management team. Storage trailers and tool bin locations will change as construction progresses.

9.3 Physical Works Associated with Operation and Maintenance

Operation and maintenance physical works will include all structures and equipment to be located at NW 36-33-24-W2M. These include the powerhouse, multipurpose building, storage building, and BOP infrastructure described above. Additionally, operation and maintenance physical works will include the incidental activities required for operation and maintenance infrastructure mentioned above.

Figure 9-1 and Table 9-1 provide additional detail of physical works associated with the operation and maintenance of the Project.

9.3.1 ACTIVITIES

The Project will be owned and operated by SaskPower. Day-to-day operation and maintenance will be provided by a staff of operators, engineers, and support staff totaling approximately 25 people. Additional support staff will be available from the other natural gas generating facilities in the SaskPower fleet.

A detailed description of the generation process can be found in Section 10.0. The Project will have the capability to operate in simple cycle mode, using the GTG only (no HRSG or STG) for rapid load response to support intermittency associated with renewable generation. In addition, the Project will be able to operate in combined cycle mode, achieving higher overall thermal efficiency and output through utilization of the HRSG and STG. The Project will initially start in simple cycle mode and will transition over to combined cycle operation when increased load is required and will typically operate between 50% and 100% of GTG load. The Project site will be monitored and controlled in the local control room as well as SaskPower’s grid control centre and will be operated using Automatic Generation Control (AGC) for the purpose of load following variable renewable generation. The Project is anticipated to require up to 100 starts per year and operate up to 2200 hours per year.

9.3.2 PERMANENT STRUCTURES

9.3.2.1 Powerhouse

The Powerhouse is a T-shaped building which encloses the GTG, STG, HRSG, and other BOP electrical and mechanical equipment. The footprint of the building will be approximately 5,400 m^2 (0.54 ha). The GTG/HRSG portion of the building will be approximately 85 m x 45 m, whereas the STG portion of the building will be approximately 45 m x 35 m. The height of the powerhouse building will range from approximately 15 m to 40 m. There will be two exhaust stacks, each anticipated to be 52 m tall and constructed from steel:

- A bypass stack will be connected directly to the GTG exhaust and penetrate through the roof of the powerhouse building. When operating in simple cycle mode, a damper will divert GTG exhaust gas through this stack, “bypassing” the HRSG and steam cycle.
- When operating in combined cycle mode, the damper will divert GTG gas through the HRSG, where exhaust heat will be recovered to produce steam for the STG. The cooled exhaust gas will then exit the second stack connected to the back of the HRSG.

In addition to the GTG, STG, and associated auxiliary equipment, other BOP equipment will be in the powerhouse building. This includes the boiler feedwater pumps, HRSG blowdown tank, air compressors, dryers and receivers, sample panel, etc. The continuous emissions monitoring system (CEMS) will also be located indoors in its own enclosure, with monitoring probes connected to each of the two stacks.

9.3.2.2 Multipurpose Building

A multipurpose building will be constructed to house the operating and maintenance staff. The building is expected to be a pre-engineered steel frame structure with walls consisting of outboard cold-formed girts for the attachment of exterior metal panel and insulation system and roof consisting of cold-formed purlins to support the metal roof panel and insulation system. The preliminary dimensions of the areas within the multipurpose building are as follows:

- control room/administration rooms: 42 m x 15 m
- warehouse: 16 m x 18 m
- maintenance shop: 13.5 m x 18 m, and
- water treatment area: 38 m x 28 m

The administration/control room building will contain offices, a lunchroom, a distributed control system room, an operating control room, and washroom facilities. The building will be occupied 24 hours a day by operating and support staff. The warehouse will be used for storage of all critical spare parts and day to day consumables that are required for Project operation and maintenance. The maintenance shop will be used by trade staff to perform routine repair and maintenance for Project equipment.

The water treatment equipment will be located at the south end of the multipurpose building. The water treatment equipment will be used to treat either on-site well water or water sourced from SaskWater and to recycle process water for reuse. The equipment will include mixed bed ion exchangers, a reverse osmosis (RO) system, ultrafilters, chemical storage totes, and chemical feed pumps for cycle chemical control. The mixed bed ion exchangers will be rental units with regeneration taking place offsite by the supplier.

Secondary containment will be installed around all equipment, unloading pads, or storage tanks that contain oil or chemical in volume greater than or equal to 189 L. The secondary containment will be designed to meet the local, provincial, and federal requirements pertaining to hazardous substances, dangerous goods, and oil storage. If possible, the secondary containment areas will be sloped. Oil containments will include a manual drain valve piped to the oil water separator.

An enclosed breezeway will be constructed to connect the multipurpose building and the powerhouse.

9.3.2.3 Storage Building

A standalone storage building (37 m x 37 m) will be constructed to support outage maintenance and storage of equipment and materials during construction and future operation of the Project. One half of the building is for heated storage, typically used for storing materials or equipment that are emergent and need to be kept warm for reliability. The other half of the building is for cold storage, typically for storing materials or equipment that need to be secured for prevention of theft or weather damage.

The building is a pre-engineered framed structure with walls consisting of outboard cold-formed girts for the attachment of exterior metal panel and insulation system and roof consisting of cold-formed purlins to support the metal roof panel and insulation system.

9.3.2.4 Balance of Project Infrastructure

The ACC is a heat exchanger which condenses steam from the steam turbine to condensate. Fans, driven by electric motors, provide cooling air to the heat exchangers. The condensate collects in the condensate manifolds and gravity is used to drain the condensate to the main condensate tank. Condensate is then pumped from the condensate tank to the feedwater system to go through the steam cycle again. The ACC will be located near the northeast corner of the power station (roughly in the centre of NW 36-33-24-W2M) with an overall dimension of approximately 65 m x 56 m with a height of approximately 26 m.

A 5 m x 14 m pre-engineered fuel gas enclosure will be in the southeast corner of the Project. Inside this building will be a performance gas heater where feedwater is used to heat up fuel gas, a fuel gas filter/separator, and a knockout tank. This equipment will be used to prepare the natural gas for combustion in the gas turbine.

A water/glycol loop will be used in a closed-cycle cooling water system to cool various STG, GTG, and BOP equipment. The water/glycol loop is cooled by a fin-fan heat exchanger. Motor operated fans provide cooling air to the heat exchanger. The closed cooling water fin-fan heat exchanger measures approximately 10 m x 42 m and will be located outdoor adjacent to the powerhouse.

The electrical generator systems convert the mechanical rotating energy of the combustion and steam turbines into electrical energy to supply the power system load through the three-phase Generator Step-Up (GSU) Transformers to the high-voltage transmission system.

The high-voltage switchyard and transmission system provides the interconnection between the Project electrical system and the utility electrical grid for the transfer of power generated out of the Project, and supply of start-up and auxiliary power into the Project.

Two field erected water tanks, fire/service water and demineralized water, will also be located on site. The fire/service water tank will have a capacity of approximately 1,892,706 L whereas the demineralized tank is estimated to have a capacity of 567,811 L. The water storage tanks serve to improve operational reliability of the unit in the event of interruption of water supply from on-site wells, or equipment malfunction in producing demineralized water.

A 1,250-kilowatt (kW) emergency diesel generator will be installed to ensure the Project is in a ready-to run condition following a unit trip or loss of external power. The emergency diesel generator will be connected to an essential services electrical bus to supply power to critical Project components.

An oil/water separator located near the multipurpose building is used to separate oil from the water that will be collected from the Project drains. The oil/water separator will be designed to remove 20 micron and larger oil droplets to concentrations of less than 10 parts per million (ppm). It will be designed to store 3,785 L of oil. The oil/water separator will be constructed as a double walled buried tank and will have a leak monitor to detect a breach in the inner tank wall. Clean effluent will be recycled back to the fire/service water tank while the collected oil will be disposed offsite at an appropriate disposal facility periodically.

A septic tank and leach field will be installed on site to collect and dispose of sanitary waste streams. No wastewater infrastructure will be required to support the Project.

A storm water pond will also be constructed for the Project. The storm water pond will be designed to retain all site drainage water. The pond is estimated to be 35 m x 200 m (0.70 ha) in size.

Aside from stormwater runoff, the Project will not discharge any liquid waste off site. To achieve this, a new evaporation pond will be constructed on the Project property to receive process wastewater streams. The evaporation pond will be sized based on the necessary evaporation rate and site ambient conditions. It is expected that the pond will be approximately 321 m x 168 m (5.26 ha) in size (excluding the surrounding berm). With the soil berm, the pond is expected to be 347 m x 189 m (6.48 ha) in size. A high-density polyethylene (HDPE) or clay liner will be installed to ensure wastewater collected does not infiltrate native soil. SaskPower will be responsible for maintaining this liner and monitoring the pond for leakage as part of their operating procedures.

A permanent parking lot will be located on the north side of the multipurpose building and will have approximately 30 parking stalls to accommodate operation and maintenance staff and visitors. Additional parking spaces will be located along the west and south sides of the multipurpose building, next to the water treatment area. Parking surfaces will be paved.

A security fence will be constructed around the perimeter of the Project site to stop humans and animals from entering the Project site. The fence will be installed early in the construction period for added security and safety.

The Project will include several other permanent small buildings or enclosures including the fire water pump enclosure, emergency diesel generator, and three electrical equipment modules - the control and monitoring module, a gas turbine electrical building, and the CEMS and HRSG control enclosure. Enclosures will be designed for equipment protection as well as applicable noise mitigation.

An underground wash water drain tank will be located to the north of the GTG building. The 3 m x 5 m tank will collect water from the compressor wash and will be hauled off site periodically for disposal at an approved facility.

9.3.3 TEMPORARY STRUCTURES

No temporary structures associated with operation and maintenance are anticipated.

9.4 Incidental Activities

This section provides a description of the activities incidental to the designated project required during construction and operation and maintenance. In addition to the requirements stated in Schedule 2, Section 4 of the *Information and Management of Time Limit Regulations*, a separate application for the Project, including all incidental activities will be submitted to the EASB in mid-2023 for approval. The activities incidental to the Project during construction and operation and maintenance include:

- 25 kV Distribution power line
- 230 kV Overhead transmission power line
- underground Fibre-optic line(s) for telecommunications
- road improvements
- underground water supply pipeline
- underground natural gas supply lines
- relocation of existing natural gas lines

9.4.1 25 KV DISTRIBUTION POWER LINE

The Project will require connection to SaskPower’s existing power distribution system to support construction activities. SaskPower will be responsible for routing, constructing, and operating the construction power feed to the Project site. A step-down transformer will provide construction power at an estimated service capacity of 3,000 amps at 480 volts. It is expected that this supply will be tapped off a newly built overhead 25 kV line located directly south of the property. It is anticipated that the total length of these tap-off underground cables will be approximately 800 m within a 10 m-wide ROW.

The newly built 25 kV line will be built from the nearest Lanigan feeder approximately 12 km southeast of the Project. The new line will not be dedicated for the Project and may be used for future supply to rural customers in the area. Distribution line routing, stakeholder engagement, regulatory approvals/permits, construction, and operation and maintenance are the responsibility of SaskPower.

9.4.2 230 KV TRANSMISSION POWER LINE

The Project will require a dedicated 230 kV overhead transmission line to connect the Project to the electric grid. SaskPower is planning to route, construct, and operate an approximately 2.5 km-long new 230 kV transmission line within a 40 m-wide ROW to interconnect the Project with SaskPower's existing WLSS located directly west of the Project in NE 34-33-24 W2M.

A preliminary desktop study and ground reconnaissance of the area between the Project and the WLSS was performed in June 2022. Based on these assessments, a study area located within the RM of Usborne consisting of three-quarter sections was identified. The boundaries of the study area are presented in Figure 14-2.

The new 230 kV transmission line will use the last open position in the southwest corner of the WLSS and the point of interconnection is located on the west side of the Project site. The new line will require the crossing of six existing transmission lines. Due to these technical constraints, SaskPower will work directly with the three impacted landowners to address any concerns with structure placement during the line design process.

9.4.3 TELECOMMUNICATIONS

Telecommunications through a fibre-optic line will be required for operation and maintenance of the Project. Installation of this infrastructure is considered complementary and for the sole benefit of the Project. Existing fibre-optic cables are in place at the WLSS in support of SaskPower's existing switching station control systems. A new fiber optic line will be installed underground between the existing WLSS and the Project site, following the same 2.5 km route as the 230 kV transmission line (see Section 9.4.2 above). This fibre line may be installed earlier, schedule permitting, to provide service throughout the construction phase as well. SaskPower will be responsible for routing, constructing, and operating the fibre-optic line.

9.4.4 ROAD IMPROVEMENTS

New roads are not required for the Project; however, the primary site entrance will be located 1.65 km south of the TransCanada Yellowhead Highway (Highway 16) off of Range Road 2241. Tentatively, primary access to the Project is expected to be via Range Road 2241 which is currently a 6.25 m wide, gravel-surfaced rural road. This portion of road between Highway 16 and the Project entrance may require improvement to support construction traffic and loads. Likewise, turning lanes may need to be added to Highway 16 at this intersection to accommodate the expected increase in traffic. The final travel route to access the Project site will be finalized in consultation with the RM of Usborne and RM of Wolverine No. 340, as required. Any road modifications, improvements, maintenance, and dust control requirements would be under the care and control of the RM of Usborne and RM of Wolverine.

SaskPower will coordinate with the RM of Wolverine and the Saskatchewan Ministry of Highways (MOH) to meet compliance with applicable road restrictions and transportation requirements during the construction period.

Any road improvements made to support construction of the Project will remain for use during operation and maintenance, as well as for use by the local community.

9.4.5 WATER SUPPLY INFRASTRUCTURE

The overall estimate for construction water consumption is approximately 55 million L (55,000 m^3) as shown in Table 9-2. Construction water will be used for dust suppression and soil compaction during site preparation and foundation installation. The water consumption estimates provided below are estimates based on previous SaskPower projects of similar scope and size. It is estimated that one truck per day for four days per week will be required for dust suppression. Water consumption for soil compaction is based on expected earthwork quantities.

As construction progresses, additional water will be used to support hydrostatic pressure testing of piping systems, flushing, and first fills. For approximately 1-2 weeks during commissioning, a temporary increase in water demand beyond well capacity will be required to support steam blows (see Section 24.1 for additional detail). SaskPower will work with local RMs, if necessary, to source this temporary water need and deliver to site by truck.

Table 9-2 Estimated Volume of Water Required During the Construction Phase

Construction Activity	Volume (m^3)
Site Preparation / Foundations / Dust Suppression	17,034
Hydrostatic Testing	7,003
Commissioning[(a)]	46,182
Total	70,220
Note: (a) Peak water demand will be expected during steam blows	

SaskWater will provide a 15-centimetre water pipeline to supply water to the Project site and they are responsible for routing, constructing, and operating the waterline. Preliminary routing shows the pipeline will be routed within a 30-m wide ROW along the west side of SW 36-33-24-W2M approximately 800 m in length between the corner of the Project site and the proposed tie-in point to an existing waterline in the corner of NW 25-33-24-W2M. SaskWater has indicated it will either be located within private land or in the developed RM road allowance.

9.4.6 NATURAL GAS INFRASTRUCTURE

TransGas Limited (TransGas) is a wholly owned subsidiary of SaskEnergy Incorporated (SaskEnergy) and responsible for the transmission and storage of natural gas within the province of Saskatchewan. TransGas is in the process of determining the infrastructure requirements to provide natural gas to the Project and will be the proponent for the construction of a proposed compressor station, meter station and natural gas supply pipeline (up to the SaskPower property boundary). The natural gas infrastructure is outside the care and control of SaskPower with no ability to direct or influence the activities.

According to TransGas, the Project location is in an area with substantial industrial activity, with several nearby potash mines currently served by TransGas pipelines that are operating at or near capacity. The proposed pipeline and associated facilities, while being constructed primarily to serve the Project, will be designed and constructed to provide ancillary benefits and capacity to support other natural gas customers in the area. Some of the TransGas system benefits associated with this proposed pipeline could include:

- Incremental volume in the area to support future growth;
- Secondary source of supply to accommodate planned or unplanned outages on existing pipelines; and
- Renewal of certain affected facilities.

The natural gas infrastructure will be subject to the regulatory approval process under the Saskatchewan Ministry of Environment (SK ENV), Saskatchewan Ministry of Energy and Resources, and the Ministry of Parks, Culture and Sport. TransGas will make applications to these regulators to obtain approval to proceed with the natural gas infrastructure prior to beginning construction. Refer to Appendix C for more information.

9.5 Physical Works Associated with Decommissioning

In general, the overall duration of the decommissioning process, as well as the size of the crews involved, are expected to be substantially less than that required for construction of the Project. Physical works during the decommissioning phase will include temporary structures and facilities needed to manage the decommissioning scope such as construction management trailers, waste storage areas/containers, parking space and construction utilities. At the completion of the decommissioning phase these temporary provisions will be removed from the Project site. No new permanent structures will be constructed.

The Project is expected to operate until 2049. Precise timing for the decommissioning of the Project cannot be predicted at this time as it depends solely on the mode of operation. However, all relevant environmental regulations in existence at the time of decommissioning will be adhered to.

9.5.1 ACTIVITIES

In order for SaskPower to operate the Project, an Authorization to Operate must be obtained from SK ENV. As part of this Authorization, SaskPower is required to provide a comprehensive decommissioning and reclamation plan (D&RP). This plan is reviewed periodically for completeness and adherence to environmental laws/regulations as they may change periodically. This D&RP will guide SaskPower's activities and will outline the decommissioning and reclamation objectives, methodologies, and estimated costs to be submitted as a required part of the provincial Authorization to Operate application process.

The decommissioning will begin when SaskPower's Asset Management Group determines the station is at the end of life such that the decommissioning activities can ensue. SaskPower will review the Project D&RP, formally allocate funds, assign a project manager, and confirm the schedule of the decommissioning activities. When a project manager is assigned, he or she will be responsible for consulting with the environmental regulatory agency and will likely begin stakeholder consultation and complete an environmental decommissioning impact review.

Prior to demolition, the following measures will be taken:

- Floor drains, trenches, and sumps will be cleaned, and any materials removed will be tested and disposed of at approved facilities, as required.
- Oil and chemicals will be drained from the equipment and disposed of at approved facilities.
- Recycling of materials, rather than disposal in the landfill will be conducted, wherever practical.
- Charged Energy from electrical and mechanical systems will be removed.

During the first year of demolition activities, major equipment, piping, and electrical and mechanical infrastructure will be removed from site. As the year progresses it is expected that the Project and associated buildings (powerhouse, warehouse, administration/water treatment plant, etc.) will be removed from site.

The second year will see more underground work progress. Foundations and pilings will be removed to 1 m-below grade and the excavation backfilled and rubble will be crushed for use as base material. The gravel surface will be stockpiled on site for possible sale and metal will be sold for salvage. It is anticipated that small diameter underground piping may be left in the ground but any above or below ground storage tanks will be removed. After the decommissioning has been completed, only the foundations, pilings and HDPE pipe 1 m-below grade will remain on site. These will be identified in a caveat registered on the property title.

At the closure of the Project, the site will be reclaimed in accordance with industry standards and applicable environmental guidelines and regulations. It is expected that the site will be graded, contoured, and revegetated with an appropriate seed mix. Post-operation monitoring and an adaptive management approach will be taken to ensure reclamation success.

Below is the forecasted D&RP for incidental activities:

Electrical Power Infrastructure

The transmission and distribution incidental activities (Sections 9.4.1.1 and 9.4.1.2) specific to the Project will be removed when the CCGT facility is retired. Any reusable equipment, poles, conductors, or hardware will be salvaged. Unusable materials will be disposed in an approved manner and/or sold for scrap.

Fibre optic Line

The fibre optic communication line (Section 9.4.3) to the Project will run between the WLSS and the Project site. The line will terminate in a pedestal on the edge of the property. It is expected the fibre optic cable will be abandoned or repurposed by SaskTel or SaskPower following the retirement of the Project.

Road Upgrades

Road infrastructure (Section 9.4.4) to and from the Project, which are under the care and control of the RM of Usborne, will be maintained following the decommissioning of the Project.

Water Line

The water supply line to the Project is provided by and under the care and control of SaskWater (Section 9.4.6). At decommissioning, SaskWater will determine whether the pipeline will be removed or abandoned.

Natural Gas Infrastructure

The natural gas supply infrastructure for the Project is provided by and under the care and control of TransGas (Section 9.4.6). At decommissioning, TransGas will isolate, make safe and evaluate removal of their supporting infrastructure and pipeline based on other customer natural gas needs at that time.

10 Project Production Capacity and Process

10.1 Maximum Production Capacity

The Project will be a CCGT electric power generation facility which will use natural gas to produce a nominal 370 MW of electricity, with the capability to generate up to a maximum of 380 MW under optimum ambient conditions. These are the expected gross amounts of electricity generated by the Project. During operation and maintenance, the Project will draw power from itself to run equipment and other house services. The expected net export of electricity to the grid will vary with ambient conditions, operating mode, and grid load requirements, with a projected maximum of 374 MW. The remainder of this document will reference the generating capacity for this Project as a nominal 370 MW of electricity.

10.2 Production Process Description

The 370 MW capacity of the Project is derived from two primary electric generators. A GTG with a nominal capacity of 250 MW, plus a STG with a nominal capacity of 120 MW. In addition to the two generators, the Project will consist of one HRSG and one ACC. In the rare event of a generator trip or other power loss, a 1.25 MW diesel generator will provide emergency power to essential loads, such as turbine lube oil pumps to enable safe shut down of equipment and systems and prevent equipment damage.

The general process for the Project is to combust natural gas in a gas turbine, which is coupled to an electric generator to produce power. Gas turbine exhaust temperature can range from 590ºC to 630ºC at the outlet of the gas turbine. This heat from the exhaust gas is then “recovered” in the HRSG, which is a waste heat boiler that produces steam at three pressure levels (high, intermediate, and low). This steam is utilized in the steam turbine, which is also coupled to an electric generator for additional power output.

Exhaust steam exits the low-pressure section of the STG and is ducted into the ACC. The ACC is a heat exchanger where ambient air is drawn from the surroundings by the fans to condense the exhaust steam into condensate, which is collected in a tank. Condensate is then pumped into the deaerator, and then from the deaerator via the boiler feedwater pumps to the HRSG, and the steam cycle repeats.

This type of power plant is known as a CCGT electrical power generation facility. Due to the waste heat recovered, CCGT plants are one of the most efficient and reliable generation technologies available. Refer to Figure 10-1 for an overall process flow diagram.

The Project will be similar in size to SaskPower’s Chinook Power Station located near Swift Current, as well as the Great Plains Power Station currently under construction near Moose Jaw. There will be one key difference from these projects, which is the inclusion of a HRSG bypass stack. CCGT facilities are often utilized for baseload generation due to their high efficiencies. However, inefficiency can arise if full capacity is not utilized (for example, if the Project is run at partial load). As GTG exhaust gases flow into the HRSG, a constant flow of water must be supplied for steam production, which in-turn requires auxiliary power from pumps and other Project equipment. In start-up or part-load situations, steam may be produced but not sent to the STG, in which case auxiliary power is being consumed unnecessarily.

To support SaskPower's supply plan of increased production from renewable sources, SaskPower anticipates a higher need for part load and rapid response generation. By including a bypass stack with the Project, SaskPower will have the ability to start-up and operate the GTG independently (simple cycle gas turbine (SCGT)) mode if needed, independent of the steam cycle. Conversely, if demand is high, SaskPower can operate in CCGT mode to maximize output and efficiency. The ability to start and operate in simple cycle enables faster start and response times to support grid response to renewable generation and system disturbances.

GTG exhaust will be emitted to atmosphere either through the bypass stack or HRSG stack, depending on the mode of operation. For the Project, the emissions are controlled through utilization of Ultra Low NOx (ULN) burners within the GTG itself, which optimizes the ratio of combustion air to fuel as well as combustion temperature to control NOx emissions during the combustion process. This means that bypassing the HRSG and operating in SCGT mode does not change emissions produced by the combustion turbine generator (CTG). Emissions associated with the Project are discussed in detail in Section 24.0.

Electric power will be generated by the GTG and STG at an intermediate voltage (between 13.8 – 18 kV). Auxiliary transformers will siphon off some of the produced electricity and voltage to 4.16 kV to support facility loads. The remaining (net) electricity generated will pass through GSU transformers where voltage will be increased to 230 kV for transmission to the grid.

Natural gas will be utilized as the fuel source for the Project. Natural gas will be delivered to the Project site via a buried gas line, approximately 16" in diameter. Prior to entering the GTG, natural gas will be filtered to remove excess moisture and particulate. The incoming gas will also be heated via a water-bath type dewpoint heater, to prevent any moisture condensation as pressure is regulated.

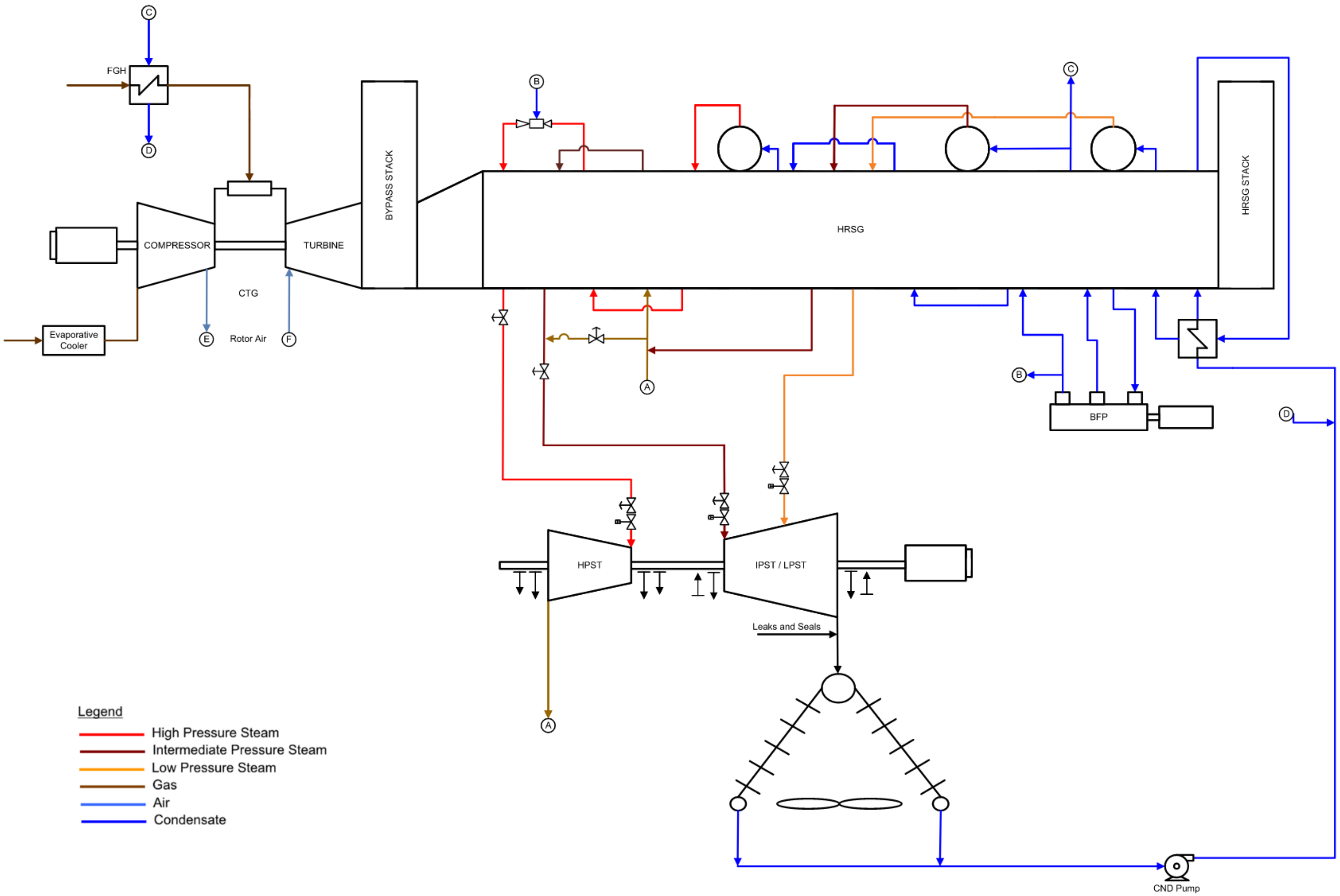
The Project will require raw water for makeup to the steam cycle, as well as the GTG evaporative cooler in warmer months. Water treatment equipment such as filters, RO units, and mixed bed ion-exchange vessels will be used to treat incoming raw water. Water chemistry in the steam cycle will be controlled through injection of chemicals including amine, phosphate, and ammonia to minimize corrosion and prevent scale formation.

Wastewater will be generated from the water treatment processes, steam cycle blowdown, and evaporative cooler blowdown. The estimated process wastewater that will be discharged during normal operation and maintenance, will range between 46 L/minute and 150 L/minute (67-216 cubic metres per day (m^3/day)) across various ambient conditions. Water that cannot be recycled to Project processes will be sent to the on-site evaporation pond.

Site water from rain, snowmelt, and runoff will be managed through a series of ditches and culverts. In the power block area, there will be on-grade duct banks that will make routing water to ditches difficult. As a result, the storm water in the power block area will be drained to inlets and routed via underground pipes to tie into the new site ditches. Rerouting of surface drainage will be confined to the Project site only. A Storm Water Pollution Prevention Plan (SWPPP) will be developed during site preparation design to implement and control storm water discharge.

A CEMS will be installed at the Project to measure and report emission data per the requirements of the annexed New Source Emission Guidelines for Thermal Electricity Generation (GOC 1999), published in the Canada Gazette, Part 1, and for controlling the unit. The CEMS information will be in accordance with Protocol and Performance Specifications EPS 1/PG/7 referenced in the guidelines.

Figure 10-1 Process Flow Diagram of a Combined Cycle Natural Gas Facility (with Bypass Stack)



11 Project Schedule

The Project schedule is outlined in Table 11-1. The schedule may be affected by SaskPower internal governance approvals and by regulating agency assessments and approvals. The schedule assumes that no federal IA or provincial EA will be required and there are no SaskPower internal governance approval delays.

Table 11-1 Project Schedule Assuming no IA Required

Activity	Project Schedule
Pre-Construction	
Land and Geotechnical Surveys	October 2022
Regulatory Applications and Approval	February 2023 – March 2024
Major Equipment Purchased	October 2023 – December 2025
Construction	
Site Clearing and Grubbing	April 2024 – May 2024
Site Preparation / Leveling	May 2024 – September 2024
Piling Installation	May 2024 – September 2024
Foundation and Underground Utility Installation	June 2024 – February 2025
Building Erection	September 2024 – June 2025
Equipment Installation	March 2025 – July 2026
Electrical Construction	June 2025 – Aug 2026
Commissioning and Start-up	March 2026 – February 2027
Operation and Maintenance	2027 – 2049 (estimated 23-year design life)
Decommissioning (after Project Life)	2049 - 2052

If an IA or EA is required, the Project milestones will need to be shifted accordingly based on the time required to conduct the assessments. Table 11-2 outlines the Project schedule taking into consideration approximately 2.5 years would be required to complete the IA. As mentioned previously in Section 7.4, if the Project is not in operation in 2027, continued operation of the existing coal facility would be needed to cover the supply shortage and the expansion of renewable generation capacity would be compromised resulting in an increase in GHG emissions.

Table 11-2 Project Schedule Taking into Consideration the Anticipated Time Required for an IA

Activity	Anticipated Schedule
Pre-Construction	
Land and Geotechnical Surveys	October 2022
Regulatory Applications and Approval	February 2023 – October 2025
Major Equipment Purchased	October 2023 – December 2025

Activity	Anticipated Schedule
Construction	
Site Clearing & Grubbing	April 2026 – May 2026
Site Preparation / Leveling	May 2026 – September 2026
Piling Installation	May 2026 – September 2026
Foundation and Underground Utility Installation	June 2026 – February 2027
Building Erection	September 2026 – June 2027
Equipment Installation	March 2027 – July 2028
Electrical Construction	October 2027 – December 2028
Commissioning & Start-up	March 2028 – July 2029
Operation and Maintenance	2029 – 2049 (estimated 23-year design life)
Decommissioning (after Project Life)	2049 - 2052

11.1 Anticipated Construction Schedule

Pre-construction activities are anticipated to start in the fall of 2022 and continue throughout 2023, including planning, permitting, and site investigative work. Due to global market conditions and ongoing supply chain issues resulting from the COVID-19 pandemic, lead times for major equipment have increased significantly. To maintain the Project schedule outlined above, it is anticipated that major equipment will need to be purchased in fall 2023.

Construction is anticipated to begin in April 2024, after the spring thaw. Site preparation activities will be performed prior to any other construction work and are expected to take approximately 4-5 months to complete.

Piling work will begin in May 2024, followed shortly by installation of foundations and subsurface utilities. It is preferable that all subsurface work be completed during one construction season, and that all major equipment foundations be completed before freezing conditions occur the following winter.

Building construction will begin in late 2024 following completion of foundation construction. Erection of the Powerhouse Building will be scheduled based on major equipment deliveries, and the need to install the turbines before the building can be fully enclosed. Currently, major equipment is expected to arrive beginning spring 2025 and continue throughout that year. Mechanical construction will be scheduled to mobilize to site beginning with HRSG component deliveries that same year.

Above ground electrical construction including the transmission interconnection will begin in June 2025. Electrical equipment installation work will be completed first followed by raceways installation and then cable installation.

Switchyard construction will begin in 2025 and will be completed in time to support electrical backfeed targeted for May 2026.

The entire start-up and commissioning process is anticipated to take approximately 11 months to complete. First start-up of the GTG is expected to occur in fall of 2026. After steam blows are complete, there will be a period of approximately two to three months for tuning of the Project, as well as performance testing. The Project is currently estimated to be operational by February 2027.

11.2 Anticipated Operation and Maintenance Schedule

The Project is expected to operate for 23 years, between 2027 and 2049. Operation and maintenance of the Project will be the responsibility of SaskPower. Operation and maintenance personnel will either directly perform, or subcontract and oversee maintenance of all Project equipment.

Maintenance and refurbishment work on the STG and GTG will be provided by the original equipment manufacturer (OEM) to maintain reliability and efficiency. A comprehensive long-term service agreement will cover the gas and steam turbine and associated generators. Included in the Long-Term Service Agreement is remote monitoring of equipment health and performance to ensure long term equipment reliability and performance is achieved. Major maintenance intervals for the equipment are a function of run-time, with outages expected to occur every 33,200 hours (assuming base load operation). Depending on how the Project is operated (e.g., multiple starts or cycling load) the manufacturer may recommend more frequent maintenance intervals. A typical maintenance schedule is provided in Table 11-3.

Table 11-3 Turbine Manufacturer's Typical Maintenance Schedule

Equivalent Base Hours* (EBH)	Combustion Turbine Outage	Outage Durations (Days)	Steam Turbine Outage
33,200	Hot Gas Inspection	14	Limited Inspection
66,400	Major Inspection	21	Major Overhaul
99,600	Hot Gas Inspection	14	Limited Inspection
132,800	Major Inspection	28	Major Overhaul
150,000	End of Term		N/A

Note:
*Hours are approximate at time of outage

Operation and maintenance responsibility for incidental activities supporting the Project will be as follows:

- The overhead transmission line between the Project site and WLSS will be the responsibility of SaskPower.
- The water supply pipeline to the Project will be the responsibility of SaskWater.
- The fuel gas supply pipeline and associated infrastructure for the Project will be the responsibility of TransGas.

11.3 Anticipated Expansion Schedule of the Project

There are currently no anticipated plans to expand the generating capacity of the Project. Space is being left on the east side of the Project site to facilitate the future potential addition of Carbon Capture Utilization Storage (CCUS) technology. Studies are underway to assess potential steam cycle modifications, carbon capture footprint and integration, parasitic loads, water requirements and ability to sequester or sell CO_2.

11.4 Anticipated Decommissioning Schedule

The Project is expected to operate until at least 2049. Precise activities and timing for the decommissioning of the Project cannot be predicted at this time, however, all relevant environmental regulations in existence at the time of decommissioning will be adhered to. Decommissioning and reclamation will take approximately two years. An extra year may be required for post decommissioning and reclamation environmental monitoring activities.

12 Alternative Assessment

12.1 Alternative Means of the Project

12.1.1 SITE LOCATIONS

SaskPower conducted an extensive review and analysis of potential sites for development of a new natural gas power station between 2020 and 2022. The Project site selection process began with identifying potential geographical regions that were technically feasible for a new natural gas generation facility combined with an internal assessment of SaskPower's existing facilities and lands owned by SaskPower. Four geographical areas and sites of interest were identified (Aberdeen (an area centred around an existing switching station in the area), Estevan (existing land at the Shand Power Station), Saskatoon (land owned by SaskPower near the existing Queen Elizabeth Power Station) and the Project site (existing land owned by SaskPower within close proximity to SaskPower's WLSS)).

In early 2020, SaskPower began broadly sharing information about the need for a future natural gas generation facility, the four geographical areas of interest under consideration, and the siting analysis and process. Local municipalities in all four study areas were generally interested in learning more about the Project and discussing potential opportunities to work together.

SaskPower considered all feedback and evaluated the sites with consideration to all potential environmental effects, constructability and accessibility, land use, Project performance, availability and cost of natural gas supply infrastructure, cost of transmission interconnection, water supply and wastewater management, and the overall cost of the Project. SaskPower's existing lands near Estevan and the Project areas aligned best with the key interests and concerns raised during SaskPower's technical analysis and engagement**.** In July 2021 SaskPower narrowed its focus to these two areas.

The Project site was purchased in November 2013 as a result of a site selection study that was initially undertaken between 2011 and 2015. SaskPower's Chinook Power Station location near Swift Current was ultimately chosen over the Project area for development due to increased costs for gas infrastructure in the Project area at the time of the study. Reassessment of the Project site found that significant gas infrastructure investment has been implemented to reinforce the gas transmission capacity supplied into the Saskatoon and surrounding areas, making these areas attractive due to the increased redundancy, and low execution risk to support the Project. Additional benefits for the Project site are road access, proximity to existing transmission infrastructure and continued support from neighbouring municipalities.

The Project site was chosen over the Shand Power Station site as the Shand site has greater potential for future development. The Shand Power Station is an existing coal-fired facility under consideration for conversion to natural gas, which would utilize the existing local natural gas supply. Other potential generation and supply options in the Estevan area including the recently announced 100 MW solar facility and planned power purchase agreements with suppliers in the United States will fully utilize existing delivery capability in the area.

There are significant unknowns regarding the potential economic life of the Project and what additions, such as CCUS, may be required. Despite the uncertainty, proceeding with natural gas fired generation is still economically preferred as even with potential CCUS addition or a condensed life, the expected cost is below other future baseload options such as small modular reactors (SMRs), CCUS on Coal or biomass. Natural gas CCGT (with ability to operate as SCGT) is technology that can be installed now and provides greater flexibility to accommodate renewable energy.

It is not yet known if a CCUS retrofit on the Project will be feasible or economic. Space is being left on site to facilitate future potential addition of CCUS. Studies are underway to assess water requirements and ability to sequester or sell CO_2.

12.1.2 GAS TURBINE TECHNOLOGY

In order to increase system flexibility, a large SCGT facility composed of two 230 MW SCGTs was initially considered. SCGTs can start, stop, and ramp up and down more quickly than a CCGT. An SCGT facility requires minimal staff and minimal water. Two 230 MW SCGTs would have provided 460 MW of additional capacity to the system to meet peak demand without adding significant operating costs if the capacity factor remains as low as estimated with the planned addition of renewables. However, in consultation with TransGas, SaskPower determined that this region is not well suited to support the large fluctuation in natural gas volumes that would occur with 460 MW of fast acting generation ramping from 0 to full load in a variable manner. SCGTs require larger volumes of fuel per unit of electricity produced as the waste heat is not utilized. It was determined that a 370 MW CCGT was the largest unit this region could support.

The F-Class GTG will have the most up-to-date technology including several features intended to keep emissions low. NO_x will be controlled through use of ULN burners. Emissions of particulates will be low due to the combustion of clean-burning natural gas. In addition, carbon monoxide (CO) and volatile organic compounds (VOC) emissions will be minimized through effectively tuned combustion turbine controls. Further, the natural gas quality expected for the Project site has a very low sulfur content (less than 23 milligram per cubic metre (mg/m^3)) which will result in significantly lower sulphur dioxide (SO_2) emissions compared to other fuels. The Project is being designed to achieve ground level effects that will meet the Saskatchewan and Canadian Ambient Air Quality Standards (SAAQs and CAAQs).

An F-Class GTG was selected based on SaskPower’s grid design, forecasted need, and for commonality with other units in the SaskPower fleet. For SaskPower’s grid, the optimal combined cycle facility size is approximately 370 MW, with the operational flexibility to support SaskPower’s renewable energy plan. G-Class, H-Class, and J-Class turbines all have outputs larger than 370 MW when installed in a 1x1 CCGT configuration. An H-class 1x1 CCGT is estimated to have output of more than 400 MW under International Organization of Standardization (ISO) conditions, with an efficiency that is 1-2% better than a 1x1 F-class in an unfired facility. Using G, H, or J-class technology for the Project would require the unit to be derated to produce not more than 370 MW, require significant grid reinforcement, and renegotiation of interconnection agreements.

Although the G, H, J-Class gas turbines generally have better efficiency and produce less CO_2 than the F-class on a pounds-per-Megawatt hours (MWh) basis, derating the unit would adversely impact the efficiency advantage of larger gas turbines. Moreover, F-class gas turbines also have a lower NOx emission on a ppm basis compared to the H-class. The H-class turbine typically has 25 ppm NOx emission limit.

SaskPower is committed to meeting a NOx emission of 15 ppm emission limit at the stack exit. H-class gas turbines would not meet the NOx emission requirement in this case.

12.1.3 INCIDENTAL ACTIVITIES

12.1.3.1 25 kV Distribution Power Line

Final routing of the distribution line will occur once detailed engineering design begins in summer/fall 2023. The final route will be designed within the developed road allowances and will take into consideration technical constraints such as existing overhead and underground utilities, and RM road widening plans as well as environmental constraints such as treed areas and large waterbodies. Generally, the line is designed with poles placed every 90 m, except where wetland areas require the installation of longer spans.

12.1.3.2 230 kV Transmission Power Line

Final routing of the transmission line will occur once engineering begins in summer/fall 2023. The new line will require the crossing of six existing transmission lines so there are limited routing options. Due to these technical constraints, SaskPower will work directly with the three impacted landowners to address any concerns with structure placement during the line design process.

12.1.3.3 Water Supply Infrastructure

In 2013, three wells were drilled on the Project site: two 15-centimetre (cm) diameter wells, and a 5 cm observation well to evaluate groundwater resources. Recent yield tests conducted by SaskPower indicate that these existing wells are capable of sustaining a combined output of approximately 8.3 L per second (L/s) (29.9 cubic metres per hour (m^3/hr)), which is adequate to support most construction water demands, as well as operation and maintenance.

SaskPower is currently analyzing the water quality of the wells specifically regarding corrosion. The corrosion factor on the wells will greatly accelerate the wear on the system and treatment plant so the pipeline shall be considered the preferred option until an economical analysis can be completed.

12.1.3.4 Natural Gas Infrastructure

TransGas is in the process of determining the infrastructure requirements to provide natural gas to the Project. To address these requirements, TransGas has identified two options with several routing possibilities for a high-pressure natural gas line, a meter station located near the Project and the potential for a compressor station. Option A is proposed to be routed adjacent to TransGas' existing ROW beginning at SW16-36-3-W3M east of Saskatoon, Saskatchewan. Option B is proposed to begin at an existing TransGas facility at SW-12-38-28-W2M near Prud'homme, Saskatchewan. Both options end at the Project boundary in NW-36-33-24-W2M near Lanigan, Saskatchewan.

It is not known at this time what portion of the proposed pipeline will be dedicated solely to the Project given it is outside the care and control of SaskPower. Refer to Appendix C for more information.

12.2 Alternatives to the Project

SaskPower has recently more than doubled wind capacity from 244 MW in 2020 to 618 MW in 2022. Another 320 MW of wind and solar is in planning to be in-service by 2026 and the next 700 MW of wind and solar to be in-service by 2028 were announced in south-central Saskatchewan to support coal reliant communities. While our first Battery Energy Storage (BES) project, 20 MW/20MWh, will be in-service in Regina in 2023, this technology is still developing. SaskPower will continue to investigate further BES and other energy storage options but currently natural gas is the only option available to Saskatchewan to enable significant addition of variable renewables.

SaskPower has a limited number of generation supply options available to meet the growing demand for power, and transition from conventional coal, over the next 10 years. Natural gas is the only baseload supply option available that can be built at the scale required to serve our need to replace conventional coal, meet load growth, and enable renewables. There are no alternative options available before 2030 that are more technically or economically feasible to meet the need being filled by the Project.

Imported generation is the only other baseload option available in the near term. Imported energy can be a useful bridge between phasing out conventional coal and developing new low or non-emitting technologies but the amount of import potential is limited. SaskPower has worked with our neighbours and now plans to build new transmission tie-line capacity to North Dakota and Manitoba to increase the ability to import from the SPP to up to 650 MW and Manitoba Hydro by another 100 MW by 2027. It is yet to be seen how much firm import capacity will be realized as contracts have yet to be pursued that can offset the need to build more natural gas generation.

The ability to increase imports from Alberta and Manitoba are limited in the near term. Currently, firm import capacity from Alberta is limited to 75 MW. SaskPower has recently strengthened its interprovincial tie to Manitoba and secured 290 MW of import capacity. This purchase from Manitoba fully subscribes the current firm import capability from Manitoba and Manitoba Hydro has stated that they no longer have additional firm capacity and energy to sell to Saskatchewan. Another import limiting factor is that neighbouring jurisdictions are generally facing the same electric utility transitional issues as Saskatchewan.

SaskPower is taking advantage of all currently feasible low and non-GHG emitting supply options and mitigation measures within the province and is investing to enable the development of new options for the future. Table 12-1 provides a summary of the supply options that SaskPower is currently investing in.

Table 12-1 SaskPower Low and non-GHG Emitting Supply Options Available Before and After 2030

Supply Options and Mitigation Measures (Available Before 2030)	Supply Options (Potentially Available After 2030)
Natural Gas Generation	Additional Saskatchewan Hydro
Imported Power	Nuclear SMRs
Renewable Generation including wind, solar, and biomass	CCUS on Natural Gas Generation
Distributed Generation	Hydrogen
BES	
Demand Side Management	

PART C: LOCATION INFORMATION

13 Description of the Project Location

13.1 Geographic Location

13.1.1 GEOGRAPHIC COORDINATES OF THE PROJECT

The coordinates of the centre of the quarter section that the Project is located in are latitude 51°52'41.33"N (51.87815), longitude 105°16'50.64"W (-105.28073).

13.1.2 GEOGRAPHIC COORDINATES OF INCIDENTAL ACTIVITIES

The incidental activities associated with the Project (Figure 14-2), and the coordinates of their beginning and end points are presented below. The incidental activities study corridors have been defined to encompass the area in which they could be routed and sited. The corridors are described with respect to biophysical and human environment resources to aid in siting of routes and to provide context for the environmental setting, potential environmental effects, and likely mitigation measures (Section 14.0).

Table 13-1 Coordinates of Incidental Activities

Incidental Activity	Beginning Point	End Point
Overhead 230 kV transmission line	Latitude: 51.87674 Longitude: -105.31809	Latitude: 51.87747 Longitude: -105.28649
Underground fibre-optic line	Latitude: 51.87674 Longitude: -105.31809	Latitude: 51.87747 Longitude: -105.28649
Overhead 25 kV power distribution line	Latitude: 51.82353 Longitude: -105.22019	Latitude: 51.87443 Longitude: -105.28649
Underground potable water supply pipeline	Latitude: 51.86698 Longitude: -105.28634	Latitude: 51.87443 Longitude: -105.28634
Underground natural gas infrastructure	To be Determined	Latitude: 51.87806 Longitude: -105.28649
Road upgrades	Latitude: 51.89297 Longitude: -105.28668	Latitude: 51. 87455 Longitude: -105.28661

Incidental activities may use existing ROWs that have been previously used for a different type of linear project. For example, the power distribution line, underground potable water supply pipeline, and road upgrades are expected to occur in existing road allowances.

13.2 Site Maps

The Project's general location is shown in Figure 1-1. The spatial relationship of the Project's components is discussed in Section 9.0, including the Project layout in Figure 9-1, which illustrates the proposed arrangement and locations of the physical components to be constructed for the Project.

13.3 Legal Land Description

The Project is located in the northwest quarter of Section 36, Township 33, Range 24, West of the second meridian (W2M) (Figure 1-1). SaskPower is the registered owner of this quarter section. Refer to Appendix D for a copy of the land title. The incidental activities (distribution, transmission, fibre optic) under the care and control of SaskPower are located on either privately owned land or within developed road allowances owned by the Province of Saskatchewan and administered by the RM (Appendix D).

The waterline under the care and control of SaskWater will be located in either privately owned land or within the developed road allowance owned by the Province of Saskatchewan.

TransGas has indicated that although final routing and siting has not been completed, the Project will primarily be located on private, freehold lands with some portions intersecting lands owned by the Province of Saskatchewan.

13.4 Residences and Communities

13.4.1 PROXIMITY TO ANY PERMANENT, SEASONAL OR TEMPORARY RESIDENCES

The Project is located in a region where land is primarily utilized for agricultural purposes. The nearest permanent, seasonal, or temporary rural residence is located approximately 0.5 km northwest of the Project. There are seven rural residences within 1.5 km of the Project, and fifteen rural residences within 5.0 km of the Project. The locations of residences within 1.5 km of the Project are illustrated in Section 14.0, in Figure 14-3.

13.4.2 PROXIMITY TO NEAREST AFFECTED COMMUNITIES

The Project is located approximately 17 km west of the town of Lanigan, Saskatchewan, and 104 km southeast of the city of Saskatoon, Saskatchewan as shown in Figure 1-1. There are several other communities (e.g., hamlets, villages, towns, cities) in proximity to the Project, the closest community is the organized hamlet of Guernsey at approximately 6 km (Figure 1-1).

13.5 Proximity to Traditional Land Use

The Project is located within Treaty Six and the Métis Nation of Saskatchewan territory and is in close proximity to Treaty Four territory as shown in Figure 13-1. The Project is located on a quarter section that is owned by SaskPower. The incidental activities will be developed primarily within private agricultural land as well as developed road allowances owned by the Province of Saskatchewan to the extent feasible. Privately owned lands and leased provincial Crown land are typically not available for TLRU, and as such, the Project is not expected to affect the ability of Indigenous peoples to exercise Aboriginal and Treaty Rights, or use, access, or develop lands and resources currently used for traditional purposes.

While the Project is within the traditional territory of Indigenous groups, it is not specifically on land used for traditional purposes by Indigenous Peoples of Canada. To date, no concerns regarding potential effects on health and socio-economic conditions, physical and cultural heritage, any structure, site, or thing that is of historical, archaeological, palaeontological, or architectural significance have been raised during engagement with Indigenous groups (Section 4.3). Further information regarding engagement with Indigenous groups can be found in Section 4.0. Through ongoing engagement, SaskPower will seek affirmation from Indigenous groups whether lands proposed for the Project are currently used by Indigenous peoples for traditional purposes.

This assessment uses a conservative approach that recognizes that a lack of publicly available TLRU information does not necessarily represent a lack of current use by Indigenous Peoples of Canada. This assessment assumes that TLRU sites, areas, and activities have the potential to occur on unoccupied Crown land, even if Indigenous peoples did not identify specific activities, or sites in those same areas.

The Project and Incidental Activity Study Area boundaries are located within proximity to occupied provincial Crown land administered by the Saskatchewan Ministry of Agriculture. The nearest occupied provincial Crown land is 25 m northeast (SW-32-33-23 W2M) of the eastern part of Incidental Activity Study Area boundaries, 160 m north (SE-03-34-24 W2M) of the western part of the Incidental Activity Study Area, and 800 m north (NE02-34-24 W2M) of the Project site (Appendix D). No unoccupied Crown land was identified within proximity to the Incidental Activity Study Area.

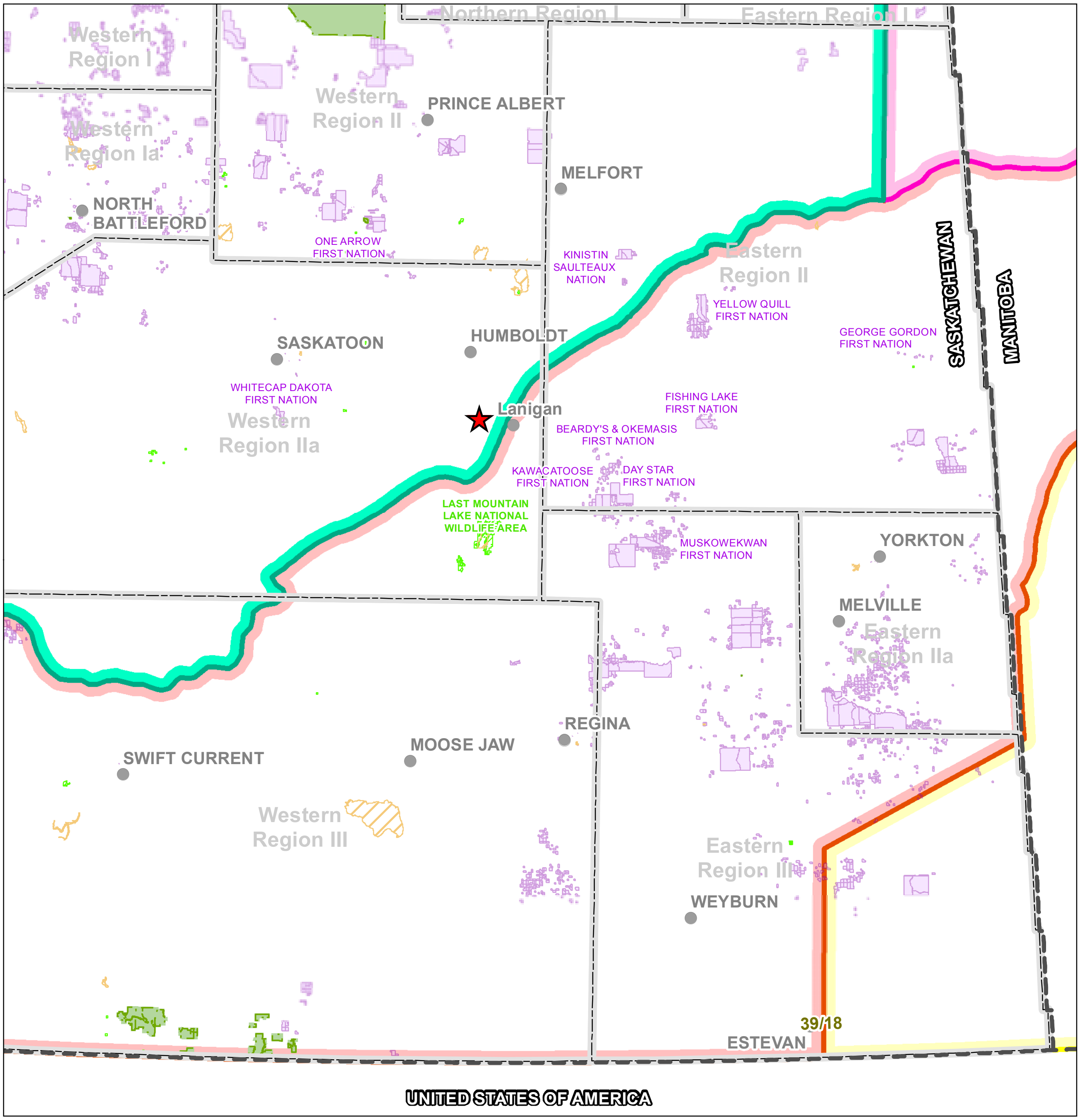
The Project and incidental activities under the care and control of SaskPower will not traverse land:

- In a reserve as defined in subsection 2(1) of the *Indian Act.*
- Designated as First Nation land as defined in subsection 2(1) of the *First Nations Land Management Act.*
- That is subject to a comprehensive land claim agreement or a self-government agreement.
- Set aside for the use and benefit of Indigenous Peoples of Canada.

Table 4-3 presents the approximate distances of Indigenous groups as identified by IAAC. The closest reserve lands belong to Beardy's and Okemasis First Nation, approximately 68 km east of the Project. Figure 13-1 shows the Project in relation to Indigenous groups, including the Indigenous groups identified by IAAC on February 1, 2023. There are no known First Nation lands as defined in subsection 2(1) of the *First Nations Land Management Act* in proximity of the Project at this time. Additionally, there are no known comprehensive land claim agreement or self-government agreements in proximity of the Project at this time.

13.6 Proximity to Federal Lands

The nearest federal lands to the Project are Last Mountain Lake National Wildlife Area (approximately 47 km) and Beardy's and Okemasis First Nation (approximately 68 km) (Figure 13-1). There are several other federal lands in proximity to the Project (i.e., within 100 km), including Indigenous groups, National Wildlife Areas, and Migratory Bird Sanctuaries.



Legend

- City/Town
- Project Site
- Migratory Bird Sanctuary
- National Wildlife Area
- National Park
- First Nations Reserve
- Political Boundary
- Métis Region Boundary

First Nations Treaties

- Treaty 2, 1871
- Treaty 4, 1874
- Treaty 5, 1875
- Treaty 6, 1876

0 25 50 Kilometers

(At original document size of 8.5x11)
1:3,000,000

N

Notes
1. Coordinate System: NAD 1983 UTM Zone 13N
2. Data Sources: Base features produced under license with the Government of Canada, Government of Saskatchewan, and Bing Imagery.
3. Background: Orthoimagery ©

Stantec SaskPower

Project Location
NW-36-33-24 W2M
Near Guernsey, SK

Prepared by KL on 2023-02-14
TR by RM on 2023-02-14
IR by JH on 2023-02-14

Client/Project
111477076-001 REVE

SaskPower Aspen Power Station

Figure No.
13-1

Title
Administrative Boundaries and Federal Lands

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14 Physical Environment

14.1 Overview

This physical environment overview has been developed using *Ecoregions of Saskatchewan* (Acton et al. 1998). The Project is located in the Quill Lake Plain landscape area within the Aspen Parkland ecoregion of the Prairie ecozone. The Prairie ecozone is characterized as a level to gently rolling plain with numerous subdued uplands dispersed throughout most of its extent. Most landforms in the Prairie ecozone are of glacial origin, where ground moraine, glaciolacustrine and glaciofluvial plains are contributors to the predominantly “flat prairie” landscape.

In the Aspen Parkland ecoregion, the prevalent soils are Black Chernozemic, in response to the additions of organic matter in the fescue grasslands, and the slower rates of decomposition due to the cooler climate. The vegetation in the Aspen Parkland, is a mosaic of patches of trembling aspen (*Populus tremuloides*), agricultural lands, woodlands, areas of native grassland, and wetlands. Patches of trembling aspen (*Populus tremuloides*) often include an understory of shrubs, herbs, and grasses. Shrublands also often appear on the margins of aspen stands, or in depressions of the hummocky landscape. The Aspen Parkland supports numerous species due to its grasslands, wooded groves, and numerous wetlands. Predominant species found within the Aspen Parkland include deer (*Odocoileus hemionus*), snowshoe hare (*Lepus americanus*), coyote (*Canis latrans*), red fox (*Vulpes vulpes*), and savannah sparrow (*Passerculus sandwichensis*).

Figure 14-3 presents biophysical considerations for the Project. The environmental setting for the Project is described in further detail in Section 14.2.

14.1.1 SPATIAL BOUNDARIES

The valued components (VCs) included in this document were reviewed to determine the spatial boundary (i.e., study area) over which an effect could be reasonably evaluated or to identify constraints in the routing and siting process. Spatial boundaries have been developed for the Project and are defined below.

14.1.1.1 Project Site

Project Development Area (PDA) – The Project will be located within the western half of NW 36-33-24-W2M. Although the total disturbance footprint for the Project, including temporarily disturbed areas during construction, is expected to be approximately 700 metres (m) x 450 m (31.5 hectares), the PDA has conservatively been defined as the entire NW 36-33-24-W2M to encompass any potential layout modifications.

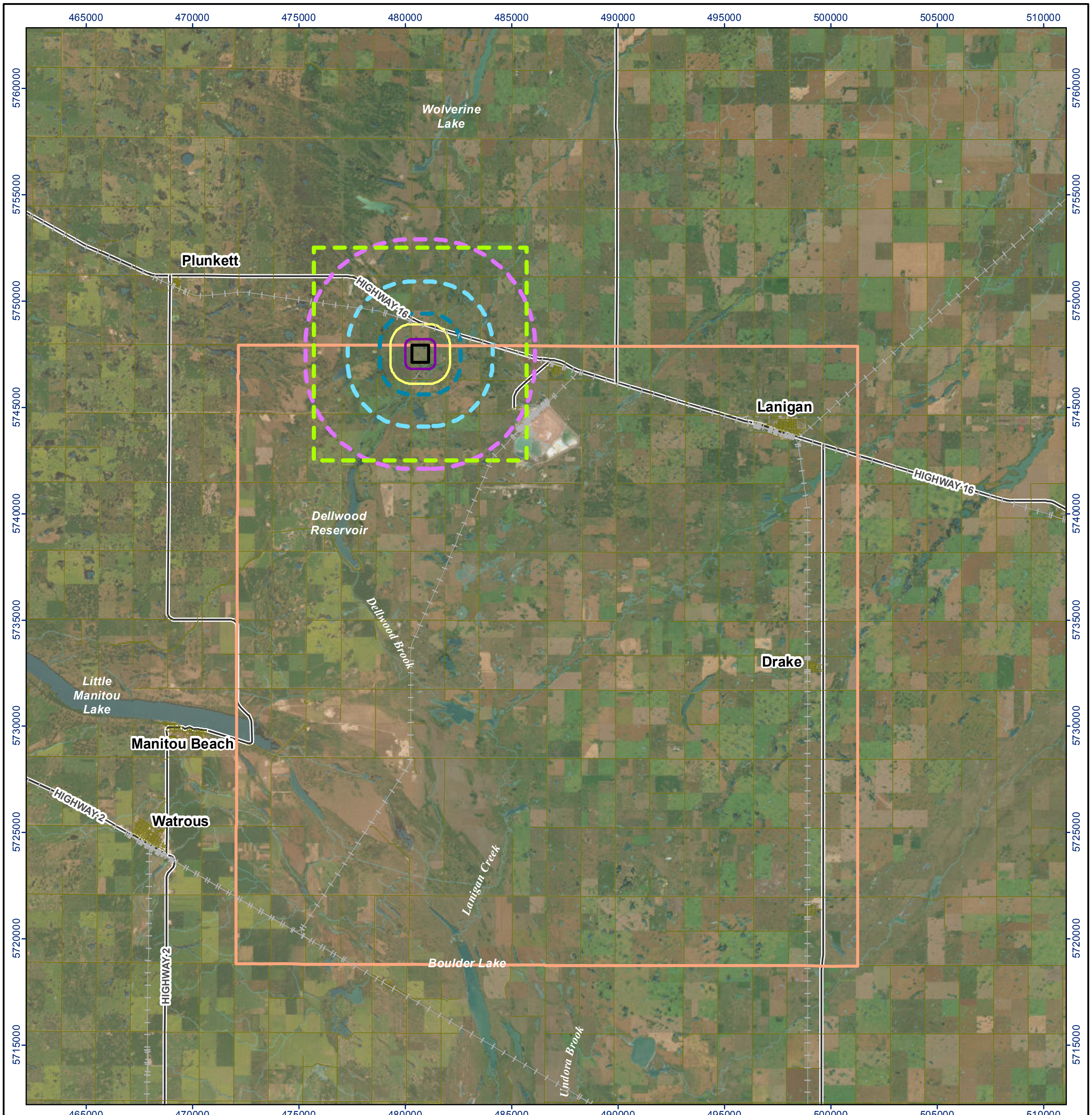
Local Assessment Area (LAA) – The LAA is a buffer of the PDA that represents the spatial extent within which the Project could have effects on VCs of the environment. Specific LAAs that have been developed for VCs are listed below. The spatial boundaries of the study areas are presented in Figure 14-1.

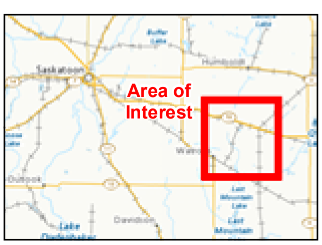
- Air Quality: The air quality LAA includes a 10 km x 10 km buffer of the PDA.

- Noise: The noise LAA includes a 1.5 km buffer of the PDA.
- Terrain and Soil: The LAA for terrain and soil capability are the same as the PDA because the potential effects of the Project site will be confined to the PDA.
- Vegetation and Wetlands: The vegetation and wetlands LAA includes a 300 m buffer of the PDA.
- Wildlife and Wildlife Habitat: The wildlife and wildlife habitat LAA includes a 1 km buffer of the PDA. The wildlife and wildlife habitat LAA was established based on maximum recommended avoidance setback for provincially and federal listed wildlife species of conservation concern (SOCC) that have the potential to occur near the Project (Section 14.2.5).
- Human Environment: The human environment LAA includes the RM of Usborne, the town of Lanigan, and the village of Drake.

Regional Assessment Area (RAA) – The RAA represents the regional context over which cumulative effects may occur and can be examined for biophysical, human, cultural, and economic VCs (Figure 14-1). A buffer of 5 km from the PDA was used as an area to describe potential regional issues for all VCs except for air quality, noise, and human environment, which are listed below.

- Air Quality: The air quality RAA is the same as the LAA for air quality and includes a 10 km x 10 km buffer of the PDA.
- Noise: The noise RAA includes a 3 km buffer of the PDA.
- Human Environment: The human environment RAA includes the Province of Saskatchewan.





Legend

- Railway
- Project Development Area (PDA)
- Local Assessment Area - Air Quality (10 x 10 km)
- Local Assessment Area - Noise (1.5 km)
- Local Assessment Area - Vegetation and Wetlands (300 m)
- Local Assessment Area - Wildlife (1 km)
- Local Assessment Area - Human Environment (RM of Usborne, Town of Lanigan, and Village of Drake)
- Regional Assessment Area - Noise (3 km)
- Regional Assessment Area - Vegetation and Wetlands, Wildlife (5 km)

0 2 4 Kilometers

(At original document size of 8.5x11) 1:275,000

N

Notes

1. Coordinate System: NAD 1983 UTM Zone 13N
2. Data Sources: Base features produced under license with the Government of Canada, Government of Saskatchewan, and Bing Imagery.
3. Background: Orthoimagery © Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Stantec SaskPower

Project Location
NW-36-33-24 W2M
Near Guernsey, SK

Prepared by KL on 2022-12-20
TR by RM on 2022-12-20
IR by JH on 2022-12-20

Client/Project
111477076-004 REVC

SaskPower Aspen Power Station

Figure No.
14-1

Title
Spatial Boundaries

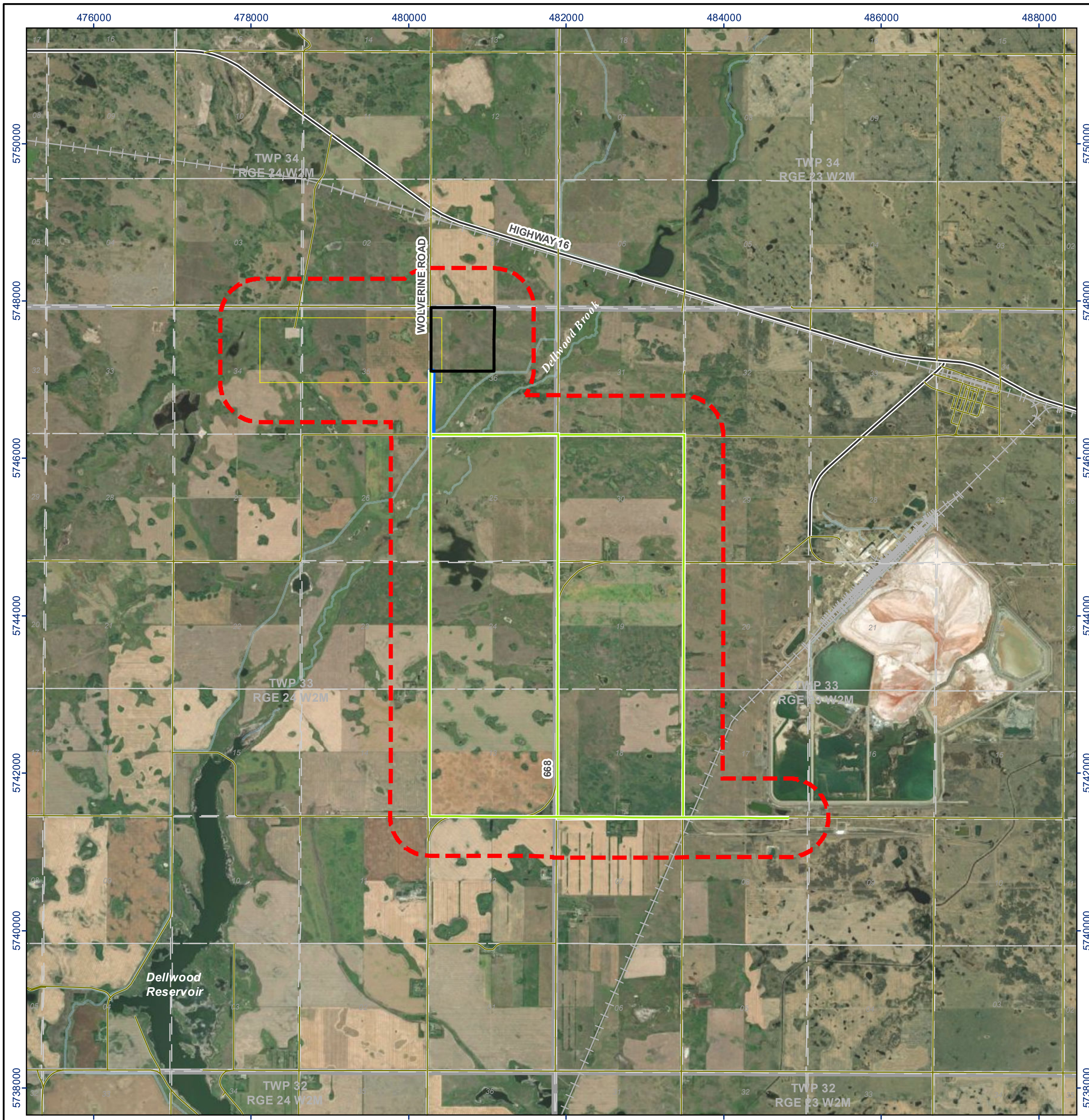
14.1.1.2 Incidental Activity Study Area

Incidental Activity Study Area – Routing and siting for incidental activities has not been finalized. As such, a study area (Figure 14-2) has been defined which encompasses the area in which incidental activities could be routed and sited.

The Incidental Activity Study Area is described with respect to biophysical and human environment resources to aid in siting of routes and to provide context for the environmental setting, potential environmental effects, and likely mitigation measures (Figure 14-2). The incidental activities to be routed and sited within this study area and their approximate footprint associated with construction and operation and maintenance are as follows:

- 25 kV distribution power line: 12 km-long x 10 m-wide ROW (12 ha)
- 230 kV transmission power line: 2.5 km-long x 40 m-wide ROW (100 ha)
- fibre optic line: 2.5 km-long x 10 m-wide ROW (2.5 ha)
- road upgrades: 2 km-long x 20 m-wide ROW (4 ha)
- water supply line: 800 m-long x 30-m wide ROW (2.4 ha)

Natural gas infrastructure has not been included. Its development and components (e.g., pipeline, compressor station, meter station) are, and will be, outside of the care and control of SaskPower. Natural gas infrastructure will be developed by a third-party proponent (TransGas) that will be subject to its own provincial and/or federal regulatory approval and permitting processes. The routing is still underway; however, TransGas has indicated that efforts will be made to parallel existing disturbances such as roads and other TransGas/SaskEnergy infrastructures. TransGas noted that issues, concerns, and knowledge identified during the engagement process will be considered in the planning, routing and development of the natural gas infrastructure. The line routing and facility siting, engagement and consultation, construction, and operation and maintenance are the responsibility of TransGas. Refer to Appendix C for more information from TransGas.



Legend

- Major Road
- Minor Road
- Railway
- Watercourse
- 25 kV Distribution Power Line
- Water Supply Pipeline
- Project Development Area (PDA)
- 230 kV Transmission Power Line Study Area
- Incidental Activity Study Area
- Section
- Township

0 0.5 1 Kilometers

(At original document size of 8.5x11)
1:75,000

N

Stantec SaskPower

Project Location
NW-36-33-24 W2M
Near Guernsey, SK

Prepared by KL on 2023-02-02
TR by RM on 2023-02-02
IR by JH on 2023-02-02

Client/Project
111477076-003 REVF

SaskPower Aspen Power Station

Figure No.
14-2

Title
Incidental Activity Study Area

Notes
1. Coordinate System: NAD 1983 UTM Zone 13N
2. Data Sources: Base features produced under license with the Government of Canada, Government of Saskatchewan, and Bing Imagery.
3. Background: Orthoimagery © Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

14.2 Project Environmental Setting

This section describes the physical and biological VCs that have the potential to interact with the Project. Specifically, detailed methods (including for desktop review and field surveys), existing conditions, effect pathways, mitigation strategies, and summary of residual effects are presented as they relate to potential Project-related environmental effects. Effect pathways for fish and fish habitat and aquatic species are not present and potential Project-related effects to these matters of federal jurisdiction are not expected. Additional information on fish and fish habitat and aquatic species are presented in Sections 19.6 and 19.7, respectively.

14.2.1 AIR QUALITY

This section addresses air quality in the context of the Project. This section outlines the methods and results of the desktop review in addition to identifying potential effect pathways, and mitigation strategies.

14.2.1.1 Methods

The focus of the air quality assessment is on Project operation and maintenance, because the operation and maintenance phase has the most potential to produce adverse air quality effects. Air emissions associated with Project construction are expected to be minor, occur only for short intervals, and their effects are expected to be limited to the immediate vicinity of the Project.

The effects of air emissions from Project operation and maintenance are evaluated using plume dispersion modelling, which accounts for physical characteristics of emission sources, topographic effects, and hourly variations in meteorological conditions. The dispersion modelling assessment is provided in Appendix E and predicts ground-level concentrations for each substance modelled. An air quality analysis was performed for CO, NOX, SO2, total particulate matter (TPM), particulate matter of 10 micron in diameter or smaller (PM_{10}), and particulate matter of 2.5 micron in diameter or smaller ($PM_{2.5}$).

A detailed description of the dispersion modelling methods is provided in Appendix E. The Saskatchewan Air Quality Modelling Guideline (SK ENV 2012) was used to conduct the air dispersion modelling analysis for the Project. Model results were compared to the SAAQS (SK ENV 2015a) shown in Table 14-1 and the CAAQS (CCME 2012)) shown in Table 14-2. It should be noted that the CAAQS were developed and are intended to be used for regional air quality management relative to air zone monitoring station measurements and not as regulatory standard for permitting or determining the acceptability of specific facilities. A comparison to the SAAQS is made at the maximum point of impingement in the air quality LAA, whereas a comparison to the CAAQS is made at nearby residential receptors.

Table 14-1 Saskatchewan Ambient Air Quality Standards (SAAQS)

Pollutant	Averaging Period	micrograms per cubic meter (μg/m3)
CO	1-hour	15,000
	8-hour	6,000
NO_2	1-hour	300
	24-hour	200
	Annual	45 [a]
SO_2	1-hour	450
	24-hour	125
	Annual	20 [a]
$PM_{2.5}$	24-hour	28 [b]
	Annual	10
PM_{10}	24-hour	50
TPM	24-hour	100
	Annual	60 [c]

Notes:
[a] Arithmetic mean
[b] The 3-year average of the annual 98th percentile of the daily 24-hour average concentrations
[c] Geometric mean

Table 14-2 Canadian Ambient Air Quality Standards

Pollutant	Averaging Period	CAAQS Effective 2020 μg/m³	CAAQS Effective 2025 μg/m³	Statistical Form
NO_2	1-hour	113	79	3-year average of the annual 98^{th} percentile of the daily maximum 1-hour average concentrations
	Annual	32	23	Average over a single calendar year of all 1-hour average concentrations
SO_2	1-hour	183	170	3-year average of the annual 99^{th} percentile of the daily maximum 1-hour average concentrations
	Annual	13	10	Average over a single calendar year of all 1-hour average SO_2 concentrations
$PM_{2.5}$	24-hour	27	--	3-year average of the annual 98^{th} percentile of the daily 24-hour average concentrations
	Annual	8.8	--	3-year average of the annual average of all 1-hour concentrations

14.2.1.2 Existing Conditions

The dispersion modelling assessment provided in Appendix E summarizes the existing air quality conditions for the Central Region of Saskatchewan, as established by the SK ENV (SK ENV 2012) through their regional background concentrations. These accepted background concentrations are based on data collected by a series of SK ENV air quality monitoring stations and are considered to be representative of the Project location. Table 14-3 shows the background concentrations for the substances of interest. The background concentrations for all substances and averaging periods are below the SAAQS.

Table 14-3 Central Region Ambient Background Concentrations

Pollutant	Averaging Period	Percentile	Background Concentration		SAAQS
			ppm	µg/m³	µg/m³
CO	1-hour	90	0.5	577.0	15,000
	8-hour	90	0.4	480.0	6,000
NO_2	1-hour	90	0.021	40.0	300
	24-hour	90	0.017	32.0	200
	Annual	50	0.008	15.0	45
SO_2	1-hour	90	0.001	2.6	450
	24-hour	90	0.001	2.6	125
	Annual	50	0.000	0.0	20
$PM_{2.5}$	24-hour	90	--	7.5	28
	Annual	50	--	3.3	10
PM_{10}	24-hour	90	--	36.3	50
TPM	24-hour	90	--	7.5	100
	Annual	50	--	3.3	60

Under the National Air Quality Management System (AQMS), the ambient monitoring data for air zones are assessed annually against the CAAQS. As part of AQMS, Saskatchewan is divided into six air zones. The Project site falls within the Northeast Air Zone. Compliance with the CAAQS for the Northeast Air Zone is determined based on three years of measurement data collected by the monitoring stations within the air zone. Based on the Saskatchewan air zones report for 2017-2019 published by GOS (GOS 2021a), the Northeast air zone $PM_{2.5}$ CAAQS metric values for 24-hour and annual $PM_{2.5}$ are 17.0 and 7.3 µg/m³, respectively. These measured $PM_{2.5}$ concentrations are less than the $PM_{2.5}$ CAAQS of 27 and 8.8 µg/m³, respectively. The Northeast air zone falls under the orange category management level of AQMS for $PM_{2.5}$ and is under the management level with objective to improve air quality using early and ongoing actions for continuous improvement.

14.2.2 NOISE

Noise emission equipment from a power generation facility can potentially affect the acoustic environment at identified residential noise sensitive receptors within the LAA. The assessment of this noise effect is guided by provincial noise guidelines. The Province of Saskatchewan does not have a numerical noise limit applicable to the Project. For consistency with other power-generation applications, the Project's sound level design goal is to meet the permissible sound level (PSL) and low frequency noise thresholds as determined by AUC Rule 012 (AUC Rule 012; Rule 012).

14.2.2.1 Methods

The noise assessment approach is based on methods prescribed in Rule 012. Rule 012 prescribes the PSL noise threshold for residential dwellings during normal operation and maintenance of a project; however, there are no quantitative noise thresholds for Project-related construction activities therefore the Project construction noise effect was assessed qualitatively.

The approach used to assess the potential noise effects during normal operation and maintenance is summarized as follows:

- determine the assessment area and receptor location(s) within the LAA/RAA
- establish the PSL noise thresholds for noise sensitive receptors
- quantify the ambient sound levels at the noise sensitive receptors in accordance with AUC Rule 012
- predict the Project's noise effects for the two operation scenarios (i.e., combined-cycle and simple-cycle)
- assess compliance by comparing the cumulative noise level at the receptors to the PSL

Seven noise sensitive receptors (i.e., Rec 01 to Rec 07) have been identified within 1.5 km of the Project property line. The daytime and nighttime PSLs for the dwellings near the Project are 50 decibels A-weighted (dBA) and 40 dBA, respectively. The more restrictive nighttime PSL was used as the noise design goal for the Project, as the Project is designed to operate continuously during both daytime and nighttime hours.

To quantify the noise emitted by the Project, a noise model was developed based on historical and vendor-supplied sound level data. The noise model predicted noise level at the seven receptors, as well as area in the surrounding community. Sound modelling was performed using industry-accepted sound modelling software Computer Aided Noise Abatement (CadnaA), version 2022. The software is a scaled, three-dimensional program, which accounts for air absorption, terrain, ground absorption, and reflections and shielding for each piece of noise emitting equipment and predicts sound pressure levels. The model calculates sound propagation based on ISO 9613-2:1996, General Method of Calculation. ISO 9613-2 assesses the sound level propagation based on the octave band center frequency range from 31.5 to 8,000 Hz.

As prescribed in AUC Rule 012, noise effects from the ambient sound level, an existing regulated facility, and the Project are combined to determine the cumulative sound level. The cumulative sound level is compared to the nighttime PSL noise threshold of 40 dBA at all seven receptors. There is an existing substation (WLSS) within 2 km west of the Project. Noise effect from this substation is considered in the cumulative sound level. In addition to the PSL, the low-frequency noise analysis was conducted for all the receptors.

A detailed Noise Impact Assessment (NIA) report for the Project is presented in Appendix F. The NIA report summarizes the methods, noise emission sources, prediction results, and assumptions associated with the noise assessment for the Project.

14.2.2.2 Existing Conditions

The acoustic environment near the Project is characterized by a low population rural environment with a mix of agricultural and industrial activities. The existing daytime ambient sound level of 45 dBA and nighttime sound level of 35 dBA were assumed in the NIA, as recommended by AUC for rural environments in Alberta. The acoustic environment in a rural area in Saskatchewan is similar to Alberta; therefore, the ambient sound level recommended by Rule 012 are considered representative for the Project.

14.2.3 TERRAIN AND SOIL

This section addresses terrain and soil in the context of the Project, as the Project has the potential to affect the terrain integrity, and the soil quality and quantity. This section outlines the methods and results of the desktop review and field surveys.

14.2.3.1 Methods

14.2.3.1.1 Desktop

Existing data was used to conduct a desktop analysis of baseline terrain and soil conditions within the PDA and the Incidental Activity Study Area. Baseline terrain and soil conditions were obtained from the Saskatchewan Soil Information System (SKSIS) (SKSIS Working Group 2018) and the Hunting Angling and Biodiversity Information of Saskatchewan (HABISask) (SK ENV 2022) to determine soil classification, surface texture, surface expression and slope class. The databases provide a regional overview of terrain and soil resources for most of Saskatchewan. The desktop review focused on a general classification and identification of terrain and soil characteristics. These characteristics included slope, topsoil texture, erosion potential, and soil agricultural capability ratings. Existing slope classes associated with published soils spatial data were based on the slope classes defined in the Saskatchewan Soil Information Database (SKSID) 4.0 user manual (Agriculture and Agri-foods Canada (AAFC) 2009). Soil agricultural capability ratings were based on published values in HABISask and as defined in SKSID 4.0 (AAFC 2009). The SKSID 4.0 soil agricultural capability class ratings follow the Canada Land Inventory (CLI) rating system (CLI 1972) of soil capability classification for agriculture. The CLI system rates climate, terrain, and soil factors independently, as each factor can control the suitability of a tract of land for crop production.

14.2.3.1.2 Field Surveys

Stantec documented site-specific observations related to topography, slopes, and general drainage within the PDA in August 2022. The field survey was completed at a survey intensity level 1, which means that there is at least one inspection in every soil delineation (ACRB 1981). A total of four inspection points were selected using satellite imagery on Google Earth based off two different soil polygons that represent different soil textures, topography, and soil drainage (SKSIS Working Group 2018). At each inspection site, topographic data such as slope, and surface expression were collected. Areas of bare soil, erosion, and drastic changes in topography were documented.

14.2.3.2 Existing Conditions

14.2.3.2.1 Desktop

The soils consist of a mix of Orthic and Calcareous Black Chernozems with poorly drained Gleysols found in depressions (SKSIS Working Group 2018). Most of the soils in the PDA were formed on sandy fluvial parent material overlaying till. The dominant surface texture is sandy loam, which can be susceptible to wind erosion. These surface textures are not as susceptible to water erosion as finer textured soils with higher clay content. Agricultural capability ranges from class 3 to class 4 indicating that there is moderate to severe crop limitations that restrict the range of crops or that require special conservation practices (SKSIS Working Group 2018).

14.2.3.2.2 Field Surveys

The topography is mostly undulating; however, areas in the northwest portion of the PDA are nearly level. Slopes within the PDA range from 0.5% to 5% and generally converge into depressions on the east side. The topography becomes more pronounced outside the eastern boundary of the PDA where it becomes gently rolling. The overall slope of the PDA is southward towards Dellbrook Creek and Dellbrook Reservoir. Two small areas (i.e., less than 10 m x 10 m) of bare soil were observed in the field where wind erosion is suspected to have occurred.

14.2.3.2.3 Incidental Activity Study Area

The terrain in the Incidental Activity Study Area includes surface expressions that range from level to hummocky topography with undulating topography being prevalent. Most of the Incidental Activity Study Area has gentle to very gentle slopes and to a lesser extent, nearly level to moderate slopes. The presence of nearly level slopes is generally associated with wetland depressions. Parent material of which the soils has formed on include glacial till, fluvial, and lacustrine deposits.

The soils in the Incidental Activity Study Area consist of Black Chernozems with Gleysolic soils in poorly drained depressional areas. The dominant surface soil textures include loam, sandy loam, and loamy sand. Coarser textured surface soils such as sandy loam and loamy sand can be more susceptible to wind erosion than finer textures. High water erosion potential is associated with finer textured soils with high clay content. In addition to soil texture, water erosion potential considers the typical rainfall for the area, soil type, infiltration rate, slope length, land use, and farming practices. The soils in the Incidental Activity Study Area have a low potential for water erosion. Soil agricultural capability ratings in the Incidental Activity Study Area ranges from Class 2 to Class 6. Classes 2, 3, and 4 are considered capable of sustaining field crop cultivation. Class 2 soils have moderate limitations and can be cropped with little difficulty. Class 3 to Class 4 soils have moderately severe to severe limitations, respectively, that restrict the range of crops that can be grown. Classes 5 and 6 soils have the limited capability to support sustained perennial forage crop cultivation.

14.2.4 VEGETATION AND WETLANDS

The Project is expected to result in environmental effects on vegetation and wetlands, which may include changes to plant species of conservation concern (SOCC). Therefore, vegetation and wetlands is carried forward as a VC in this assessment. SOCC are defined as federally and provincially legislated species at risk and species identified in federal and provincial tracking lists and activity restriction guidelines, including species:

- Listed under Schedule 1, Schedule 2, or Schedule 3 of the federal *Species at Risk Act* (SARA) (GOC 2002) as endangered, threatened, or special concern (GOC 2022c).
- Listed under *The Wildlife Act* (GOS 1998) and *Wild Species at Risk Regulations* (GOS 1999) of Saskatchewan as endangered, threatened, or vulnerable.
- Listed by the Committee of the Status of Endangered Wildlife in Canada (COSEWIC) as endangered, threatened, or special concern (GOC 2022c).
- Assigned a rank of S1, S2, or S3 (or a combination of these ranks) by the Saskatchewan Conservation Data Centre (SKCDC) (SKCDC 2022).
- Included in the Saskatchewan Activity Restriction Guidelines for Sensitive Species (GOS 2017a).

14.2.4.1 Methods

14.2.4.1.1 Desktop

Provincial databases, aerial photography, and literature sources were reviewed for existing data on vegetation and wetlands. The desktop review determined land cover and wetlands, as well as historical records of plant SOCC within the vegetation and wetlands LAA and the Incidental Activity Study Area. Prior to field surveys, a desktop HABISask search was used to determine the ecoregion and ecosite within the vegetation and wetlands LAA and Incidental Activity Study Area.

Prior to field surveys, land cover and wetlands in the PDA, vegetation and wetlands LAA, and wildlife and wildlife habitat LAA were delineated and classified in ArcGIS with aerial imagery from various years using SaskPower's standard land cover classification definitions (Table 14-4). Wetland boundaries were mapped, and wetlands classified according to the *Classification of Natural Ponds and Lakes in the Glaciated Prairie Region* (Stewart and Kantrud 1971) (Table 14-5). The land cover and wetlands were mapped at a scale of 1:3,000.

Table 14-4 SaskPower's Standard Land Cover Classification

Land Cover Class	Land Cover Subclass	Definition
Cleared	Populated area	Land that includes buildings in urban and rural areas and farmsteads.
	Industrial	Land that is predominantly developed including commercial and industrial plants, gravel pits and mine structures.
	Cultivated	Land that has been converted to cultivated annual crops, which is annually tilled, seeded or cut.
	Hay/Forage	Land that has been converted to cultivated crops used for livestock, which is cut annually.
	Road	Human-constructed routes for vehicles including surface/paved highways and non-surfaced trails.
Low Vegetation	High Shrub (>2 m)	Land dominated by woody, multi-stemmed plants or trees larger than 2 m in height.
	Low Shrub (<2 m)	Land dominated by woody, multi-stemmed plants or trees less than 2 m in height including wolf willow (Eleagnus comutata) and snowberry (Symphoricarpos occidentalis).
	Tame Pasture	Pastureland sown to perennial grasses and/or legumes and used for livestock grazing (not cut annually for hay). Over time native species may be incorporated in the Project community.
	Native Grassland	Land where the sod layer has never been converted to agricultural production and is dominated by native plant species or an area of unbroken grasslands or parkland dominated (≥ 51 per cent) by perennial native vegetation and wildlife species and/ or an area of previously broken grassland that has reverted to native vegetation (i.e., has remained unbroken for at least 30 years).
Waterway	River	A large watercourse of natural flowing water.
	Lake	Non-flowing water, wetland larger than 20.2 ha in size.
	Stream	A small watercourse of natural flowing water.
Forested	Forested	Land dominated by tree species including deciduous, mixed wood, and coniferous dominated forest.
(SaskPower 2021)		

Table 14-5 Wetland Classification

Land Cover Class	Land Cover Subclass	Wetland Class	Definition
Wetland	Temporary	Class II	Characterized by standing or slow moving water for a few weeks after snowmelt or several days after a heavy storm. Typically dominated by foxtail barley (Hordeum jubatum), dock spp (Rumex spp), wild mint (Mentha arvensis) and other wet meadow (WDM) vegetation.
	Seasonal	Class III	Characterized by a shallow marsh zone that dominates the deepest part of the wetland area. Example species include awned sedge (Carex antherodes), water smartweed (Persicaria amphibia var. emersa) and slough grass (Beckmannia syzigachne).
	Semi-Permanent	Class IV	Characterized by marsh vegetation which dominates the central zone of the wetland as well as submerged aquatic plants including cattail (Typha latifolia), hard-stemmed bullrush (Schoenoplectus acutus var acutus) and Siberian water-milfoil (Myriophyllum sibiricum).
	Open Water	Class V	Characterized by a permanent-open-water zone that dominates the deepest part of the wetland area. Generally, have very little to no vegetation in the central zone. Plants commonly present is cattail (Typha latifolia) and spiral ditch grass (Ruppia cirrhosa).
	Alkali Ponds	Class VI	Dominated by an intermittent-alkali zone in the deepest part of the wetland area. They have a pH above 7 and a high concentration of salts. Dominant plants include red samphire (Salicornia rubra) and beaked ditch-grass (Ruppia maritima).
(Stewart & Kantrud 1971)			

14.2.4.1.2 Field Surveys

Habitat Assessment

A habitat assessment was completed in the PDA to validate the land cover classification in conjunction with the vegetation assessment. For the vegetation and wetlands LAA and wildlife and wildlife habitat LAA, the habitat assessment was completed roadside. The results of the habitat assessment were used to update the land cover and wetland mapping.

Listed Plant Species Survey

An early listed plant survey was conducted on June 14, 2022, and a late listed plant survey was conducted on August 19, 2022. The listed plant surveys were conducted in accordance with *The Wildlife Act* (GOS 1998) and standard research permit conditions as a research permit had not been received by the time the surveys were completed. These surveys were completed following the SK ENV Species Detection Survey

Protocol 20.0 Rare Vascular Plant June 2021 Update (SK ENV 2021). The objective of this survey was to confirm the presence of plant SOCC. Surveys targeted areas of suitable habitat within the PDA.

The listed plant species survey consisted of two visits to capture early blooming and late-blooming species. The survey effort was determined based on estimates of land cover classification within the PDA using the results of desktop land cover mapping. Three transects were selected in ArcGIS prior to field surveys based on the suitable habitat for plant SOCC including native grasslands, tame pasture, forest, shrubland, and wetlands. The transects ranged between 380 to 680 m in length and 5 m wide. All transects were placed a minimum of 10 m apart. Transect search speed was no faster than 4 kilometres/hour. Data was collected using FieldMaps for ArcGIS (© 2018-2021 Esri Inc. version 22.3.1) and Survey123 for ArcGIS (© 2022 Esri Inc version 3.15.156) applications on an Apple device. Data collected include Universal Transverse Mercator (UTM) coordinates at the start and end of the transect, the legal subdivision, environmental conditions, and a complete vascular plant species inventory including weeds listed under *The Weed Control Act* (GOS 2010a). If a plant SOCC was encountered, data was collected.

Detailed Vegetation Survey

A detailed vegetation survey was completed at the start of each transect. The detailed vegetation survey included vegetation community classification according to Saskatchewan Prairie Conservation Action Plan's Saskatchewan Rangeland Ecosystems: Ecosite Guide Publications (Thorpe 2014a).

To acquire additional data and detail on the abundance of dominant vascular plant species within the PDA, three one metre-square quadrats were assessed at the start of each transect during the listed plant species surveys. The percent cover of each vascular plant species, bryophytes, lichens, litter, water, and bare ground was recorded for each quadrat. Any incidental plant SOCC observations were recorded. Data was collected using FieldMaps and Survey123 applications on an Apple device.

Weed Survey

Weed surveys were conducted to determine the presence of weed species listed as prohibited, noxious or nuisance under *The Weed Control Act* and documented opportunistically while conducting the listed plant species surveys, detailed vegetation surveys, and the wetland/waterbody assessment (Table 14-6). The density distribution was determined for all prohibited and noxious weeds following a density distribution guide for rating invasive species infestation (Saskatchewan Prairie Conservation Action Plan [SK PCAP] 2008). Data were collected using FieldMaps and Survey123 applications on an Apple device.

Table 14-6 Weed Designation Definitions as Defined Under *The Weed Control Act*

Provincial Designation	Definition
Prohibited	Prohibited weeds pose a significant economic and/or environmental threat and are absent or very rare. The regulatory objective for these weeds is early detection and eradication upon discovery in consultation with the weed inspector and the Saskatchewan Ministry of Agriculture.
Noxious	Noxious weeds are locally established within a limited area. The regulatory objective is to prevent invasion to uninfected areas.

Provincial Designation	Definition
Nuisance	Nuisance weeds are widely established, but may spread easily from one area to the next. The regulatory objective for these species is to address the underlying reason for their occurrences and to take measures to reduce their long-term effect.
(Brenzil 2010)	

Wetland/Waterbody Assessment

A wetland/waterbody assessment was completed in conjunction with the listed plant species and detailed vegetation surveys. The wetland/waterbody assessment was conducted to confirm the wetland boundaries and classes according to Stewart and Kantrud (1971) (Table 14-5). Data was collected using FieldMaps application on an Apple device. Results of the wetland/waterbody assessment were used to update the wetland mapping within the PDA.

14.2.4.2 Existing Conditions

14.2.4.2.1 Desktop

The PDA and LAA is located in the Quill Lake Plain in the Aspen Parkland ecoregion. The Quill Lake Plain mostly consists of agricultural cropland with remnant native grassland and tame pasture located in areas of sandy soils including the former federal pasture north of Highway 16 near Plunkett (Acton et al. 1998).

A search of the HABISask database revealed no historical occurrences of plant SOCC (Appendix G) within the vegetation and wetlands LAA. There is no critical habitat for federally listed species at risk (i.e., species listed under SARA) within the vegetation and wetlands LAA. There are 31 potential plant SOCC within the Quill Lake Plain landscape area (Appendix G).

The PDA is located approximately 350 m northwest of Dellwood Brook and approximately 30 m northwest of an unnamed agricultural drain. The agricultural drain is connected to Wolverine Lake approximately 11 km upstream from the PDA, however the drain is unlikely to provide fish habitat because it is largely ephemeral (i.e., only containing water seasonally or after precipitation events). Dellwood Brook is the closest potential fish bearing water feature to the Project and flows southwest through the Incidental Activity Study Area before entering the Dellwood Reservoir approximately 5.3 km downstream, eventually reaching its confluence with Lanigan Creek approximately 21.5 km south of the Incidental Activity Study Area. Given the distance to Dellwood Brook from the PDA, no interactions with fish or fish habitat are expected to occur.

The PDA covers 64.9 ha and consists of predominantly low vegetation (55.4%) with the remainder comprised of cleared (29.4%), wetland (14.5%), and forested (0.8%). It should be noted that during the field surveys, native grassland in the PDA was observed to be invaded by non-native species with an understory of native species. The vegetation and wetlands LAA covers 189.8 ha and consists of predominately low vegetation (41.9%) with the remainder comprised of cleared (37.4%), wetland (13.7%), forested (6.5%), and waterway (0.5%). The wildlife and wildlife habitat LAA covers 701.0 ha and consists predominately of cleared (41.1%) with the remainder comprised of low vegetation (40.4%), wetland (13.4%), forested (4.0%), and waterway (1.0%). A summary of land cover is presented in Table 14-7.

Table 14-7 Land Cover Summary

Land Cover Class	Land Cover Subclass	PDA		Vegetation and Wetlands LAA		Wildlife and Wildlife Habitat LAA	
		Area (ha)	Proportion (%)	Area (ha)	Proportion (%)	Area (ha)	Proportion (%)
Cleared	Populated Area	-	-	-	-	2.5	0.4
	Industrial	-	-	-	-	4.2	0.6
	Cultivated	18.9	29.1	68.4	36.0	263.5	37.6
	Hay/forage	-	-	-	-	5.3	0.8
	Road	-	-	2.2	1.2	11.8	1.7
	Dugout	0.2	0.3	0.3	0.2	1.2	0.2
Subtotal*		**19.1**	**29.4**	**70.9**	**37.4**	**288.4**	**41.1**
Forested	Forested	0.5	0.8	12.4	6.5	28.4	4.0
Subtotal*		**0.5**	**0.8**	**12.4**	**6.5**	**28.4**	**4.0**
Low Vegetation	Low Shrub (<2 m)	-	-	-	-	0.7	0.1
	Tame Pasture	14.9	23.0	46.1	24.3	229.7	32.8
	Native Grassland	21.0	32.3	33.4	17.6	53.0	7.6
Subtotal*		**35.9**	**55.4**	**79.5**	**41.9**	**283.4**	**40.4**
Waterway	Stream	-	-	1.0	0.5	6.8	1.0
Subtotal*		-	-	1.0	0.5	6.8	1.0
Wetland	Seasonal	4.8	7.3	11.7	6.2	60.7	8.7
	Semi-permanent	-	-	0.4	0.2	0.4	0.1
	Temporary	4.6	7.1	13.9	7.3	33.1	4.7
Subtotal*		**9.4**	**14.5**	**26.0**	**13.7**	**94.1**	**13.4**
Grand Total*		**64.8**	**100.0**	**189.8**	**100.0**	**701.1**	**100.0**

Note:
Potential for variances in sums due to rounding.

Incidental Activity Study Area

The Incidental Activity Study Area encompasses the Quill Lake Plain in the Aspen Parkland ecoregion. A search of the HABISask database revealed two records of plant SOCC within the Incidental Activity Study Area including two occurrences of large yellow lady's-slipper (*Cypripedium parviflorum* var. *pubescens*) S2, and two occurrences of pale bulrush (*Scirpus pallidus*) S3 (Appendix G). There is no critical habitat for federally listed species at risk (i.e., species listed under SARA) within the Incidental Activity Study Area. Large yellow lady's slipper is a perennial forb that is commonly found in wet meadows, forested wetlands, bogs, and swamps (NatureServe 2022). Pale bulrush is a perennial graminoid found in ditches, canals, and streams (NatureServe 2022). There are 30 potential plant SOCC within the Elstow Plain (Appendix G).

Dellwood Brook flows southwest through the Incidental Activity Study Area before entering the Dellwood Reservoir, approximately 5.3 km downstream, eventually reaching its confluence with Lanigan Creek approximately 21.5 km south of the Incidental Activity Study Area. Wetlands are scattered throughout the Incidental Activity Study Area.

Appendix C provides information on the TransGas study area for the proposed natural gas infrastructure.

14.2.4.2.2 Field Surveys

Habitat Assessment

The land cover classification provided in Table 14-7 was validated based on the results of the habitat assessment (Figure 14-3). The native grassland observed in the field was dominated by slender wheatgrass (*Elymus trachycaulus ssp. Trachycaulus*) and invaded by non-native species including smooth brome (*Bromus inermis*) and Kentucky bluegrass (*Poa pratensis*).

Listed Plant Species Vegetation Survey

A total of three transects were surveyed in the PDA during the listed plant surveys. A total of 68 vascular plant species were observed (Appendix G) and no plant SOCC were found.

Detailed Vegetation Survey

The Project is located within the Aspen Parkland ecoregion of the Prairie ecozone on a sandy loam ecosite. The reference plant community (i.e., typical for ungrazed or slightly grazed communities with no invasion of non-native species) for this ecosite is Aspen Parkland (AP) – sand and sandy loam (SD) – community type A (AP-SD-A). Community type A means that there is no alteration from the original reference community (Thorpe 2014a). The expected dominant plant species found in this community is western porcupine-grass (*Hesperostipa curtiseta*), sedge (*Carex spp*) and needle-and-thread (*Hespersostipa comuta*) (Thorpe 2014b).

A total of three quadrats were surveyed during the early and late vegetation assessment. One of the quadrats was a meadow and marsh ecosite and the other two were loam ecosites. Meadow and marsh ecosites are characterized as being moist to wet ecosites with gleysolic soils (Thorpe 2014a). Loam ecosites are described as well-drained soils with medium to moderately fine textured soils (Thorpe 2014a).

The plant community for quadrat one is the prairie ecozone (PEZ), WDM ecosite, community type C (PEZ-WDM-C). Community type C has alterations from the reference plant community (Thorpe 2014b). The dominant species observed in quadrat one were silverweed (*Potentilla anserina ssp. Anserina*) and smooth brome. Alterations to the expected plant community (AP-SD-A) are due to increased grazing decreasing the dominance of sedges and increasing Kentucky blue grass, Canada thistle and other non-native species.

The plant community for quadrats two and three are both Aspen Parkland, loam (LM), community type E (AP-LM-E). Community type E has moderate alteration from the reference community (Thorpe 2014a). This plant community is dominated by mid grasses, with significant amounts of short grasses and forbs and lesser amounts of half shrubs (Thorpe, 2014b). The dominant plant species observed in these two quadrats was slender wheat grass and Kentucky bluegrass.

Appendix G presents the cover of vascular plant species, bryophytes, lichens, litter, water, and bare ground recorded for each quadrat.

Weed Survey

Four noxious weed species were observed in the PDA including Canada thistle (*Cirsium arvense*), common tansy (*Tanacetum vulgare*), perennial sow thistle (*Sonchus arvensis*), and annual hawksbeard (*Crepis tectorum*) (Figure 14-3; Table 14-8).

Table 14-8 Noxious Weed Occurrences in the PDA

Common Name	Scientific Name	Density Distribution[1]	UTM Coordinates
Canada thistle	*Cirsium arvense*	10	13U 580384 5747173
Canada thistle	*Cirsium arvense*	10	13U 480678 5747202
Canada thistle	*Cirsium arvense*	10	13U 480972 5747832
common tansy	*Tanacetum vulgare*	2	13U 480810 5747212
common tansy	*Tanacetum vulgare*	2	13U 480957 5747204
common tansy	*Tanacetum vulgare*	8	13U 480901 5747288
common tansy	*Tanacetum vulgare*	6	13U 480576 5747941
perennial sow thistle	*Sonchus arvensis*	10	13U 580384 5747173
perennial sow thistle	*Sonchus arvensis*	12	13U 480555 5747143
perennial sow thistle	*Sonchus arvensis*	10	13U 480678 5747202
perennial sow thistle	*Sonchus arvensis*	10	13U 480972 5747832
perennial sow thistle	*Sonchus arvensis*	12	13U 480645 5747728
annual hawksbeard	*Crepis tectorum*	1	13U 480676 5747461

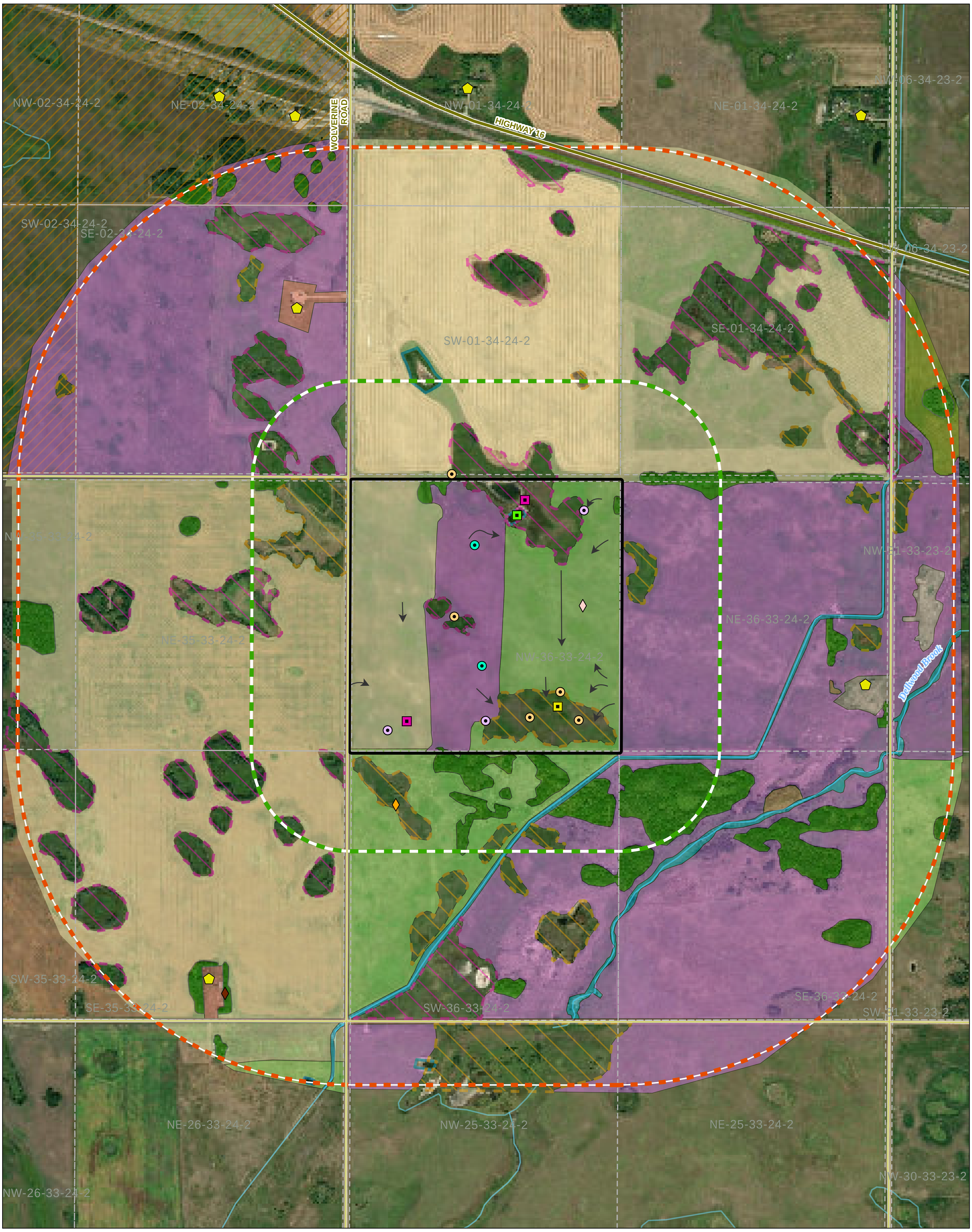
Note:
[1] Density Distribution Class Definitions:
1= Rare, 2= few sporadically occurring individual plants, 6= A single patch plus a few sporadically occurring plants, 8 = A few patches plus several sporadically occurring plants, 10= Continuous uniform occurrences of well spaced plants, 12= Continuous dense occurrences of plants
(SK PCAP 2008)

Wetland/Waterbody Assessment

Based on the field verified wetland mapping, there are four wetlands within the PDA. Three wetlands classified as Class III (seasonal pond) and one wetland is Class II (temporary) (Figure 14-3; Table 14-9).

Table 14-9 Wetlands in the PDA

Wetland	UTM Coordinates	Wetland Class	Potential for Interactions with Fish or Fish Habitat
1	13U 480939 5747197	Class II	No interactions are expected to occur
2	13U 480892 5747814	Class III	No interactions are expected to occur
3	13U 480611 5747490	Class III	No interactions are expected to occur
4	13U 480540 5747547	Class III	No interactions are expected to occur



Notes
1. Coordinate System:
Name: NAD 1983 CSRS UTM Zone 13N
2. Data Sources: Base features produced under license with the Government of Saskatchewan and the Government of Canada.

Legend
- Rural Residence
- Railway
- Surface Flow
- Watercourse
- Major Road
- Minor Road
- Project Development Area (PDA)
- Vegetation Local Assessment Area (LAA) (300 m)
- Wildlife LAA (1 km)
- Agricultural Crown Land
- Quarter Section

Field Observations of Species of Conservation Concern
- Spague's Pipit and Baird's Sparrow
- Sprague's Pipit
- Western Tiger Salamander

Wildlife Incidental Feature
- Coyote Den
- Active Songbird Nest
- Stick Nest

Noxious Weed Observation
- Common Tansy
- Perennial Sow Thistle
- Perennial Sow Thistle, Canada Thistle

Land Cover Classification
Land Cover, Land Cover Subclass
- Cleared, Cultivated
- Cleared,Hay/Forage
- Cleared, Industrial
- Cleared, Populated Area
- Cleared, Road
- Forested, Forested
- Low Vegetation, Low Shrub (<2m)
- Low Vegetation, Native Grassland
- Low Vegetation, Tame Pasture
- Waterway, Stream
- Dugout,Dugout
- Wetland, Seasonal
- Wetland, Temporary

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Stantec

Project Location
NW-36-33-24 W2M
Near Guernsey, SK

Prepared by KL on 2/24/2023
TR by NK on 2/24/2023
IR by JH on 2/24/2023

Client/Project
111477076-005-REVD

SaskPower Aspen Power Station

Figure No.
14-3

Title
Biophysical Considerations

14.2.5 WILDLIFE AND WILDLIFE HABITAT

This section addresses terrestrial wildlife and wildlife habitat resources in the context of the Project. While all wildlife species and their habitats are considered as part of the assessment, there is an added focus placed on wildlife SOCC and migratory birds that are known, or have the potential, to occur in the wildlife and wildlife habitat LAA and RAA. SOCC are defined in Section 14.2.4.1.1. This section outlines the methods and results of the desktop review and field surveys.

14.2.5.1 Methods

14.2.5.1.1 Desktop

Existing information from provincial and federal databases, satellite imagery, literature sources, and field surveys were used to characterize wildlife and wildlife habitat relative to the PDA and the Incidental Activity Study Area. A focus was placed on determining known occurrences of wildlife SOCC, migratory birds, and availability of their habitat within the Project. Habitat suitability was evaluated to determine the wildlife SOCC and migratory birds that have potential to occur in the Project. Migratory birds are those protected under the *Migratory Birds Convention Act* (GOC 1994).

The following sources of information were reviewed:

- the HABISask Application database search for historical records of SOCC and protected and designated lands (SK ENV 2022)
- SKCDC taxa lists (SKCDC 2022)
- SARA public registry database for SARA- and COSEWIC-listed species (GOC 2022c)
- Birds of the World Online database (Cornell Lab of Ornithology and the American Ornithologists' Union 2022)
- Saskatchewan Breeding Bird Atlas (Birds Canada 2022a, 2022b)
- satellite imagery such as ESRI World Imagery (Digital Globe 2016) and FlySask (SGIC 2008-2013)

These data sources provided information about potential and historical wildlife SOCC occurrences, sensitive wildlife habitat features (e.g., migratory bird concentration sites), and habitat types present within the Project (i.e., land cover classes). In addition to the historical occurrences of wildlife SOCC, the availability of wildlife habitat within the Project, in combination with a species' range, was used to determine wildlife SOCC and migratory birds with the potential to occur in the Project. Wildlife habitat availability was evaluated based on land cover data, as well as a review of satellite imagery. Because land cover classes represent broad habitat types (i.e., are at a coarse scale), a habitat association approach was used to estimate habitat availability. Specifically, each land cover class was evaluated to determine whether it provided suitable habitat using knowledge of seasonal habitat requirements for wildlife, including wildlife SOCC and migratory birds. Land cover mapping methods are presented in Section 14.2.4.1.

14.2.5.1.2 Field Surveys

As part of the wildlife and wildlife habitat assessment, wildlife surveys were conducted to identify the presence or sign of wildlife species within the wildlife and wildlife habitat LAA with an emphasis on SOCC as well as their associated habitat types and landscape features (e.g., targeting all wetland classes for the presence of yellow rails). The survey types and the associated methods are presented in the following sections.

General Wildlife Survey

All wildlife and wildlife signs (e.g., migratory bird nest, mammal den, scat, tracks) that would not otherwise be recorded in the wildlife surveys listed below were documented through incidental observations within the wildlife and wildlife habitat LAA. Incidental observations were collected using FieldMaps for ArcGIS (© 2018-2022 Esri Inc. version 22.3.1) applications on an Apple device. Data collected include the species, abundance, behaviour, UTM coordinates, the legal subdivision, and any other pertinent information.

Grassland Breeding Bird Survey

Breeding bird surveys were completed in the PDA on June 10 and 28, 2022. Survey locations were selected to cover representative land cover classes (i.e., low vegetation, forested, and wetland) within the wildlife and wildlife habitat LAA while avoiding any overlap in-between survey radii of 100 m.

The surveys followed methods outlined in the standardized SK ENV survey protocol for grassland breeding birds (SK ENV 2020c). Two survey visits were completed at five locations between sunrise and no more than four hours after sunrise and under appropriate environmental conditions (i.e., temperature >0 degrees Celsius (°C), wind <20 kilometres per hour (km/h), precipitation not exceeding a light intermittent drizzle; SK ENV 2020c). At each survey location, the observer waited for two minutes to allow disturbances associated with site access to subside before beginning a five-minute passive observation period. All birds observed were recorded but detection efforts were focused on a 100 m radius from the survey location's centre (i.e., observer). Birds observed outside the 100 m radius were recorded as incidental observations and the habitat composition and environmental conditions were recorded for every survey location.

Amphibian Auditory/Visual Survey

Amphibian surveys were completed at potential amphibian breeding habitats located within and up to 500 m from the PDA. A 500 m buffer of the PDA accounts for the provincial maximum activity restriction setback for amphibian species (GOS 2017a). Amphibian habitat sites were selected during desktop analysis and confirmed in the field before surveys were initiated. Sites surveyed supported potential breeding habitat for northern leopard frog (*Lithobates pipiens*), wood frog (*Lithobates sylvaticus*), boreal chorus frog (*Pseudacris maculata*), Canadian toad (*Anaxyrus hemiophrys*), and/or western tiger salamander (*Ambystoma mavortium*).

Amphibian surveys included auditory and visual components that were completed on June 10, 15, and 19, 2022. Three survey visits were completed at one location, two surveys rounds were completed at four locations, and one survey round was completed at seven locations (12 locations total). Surveys were only completed on subsequent visits if habitat was still suitable for breeding (i.e., water present in wetlands). Roadside auditory surveys were completed outside of the PDA due to access constraints. Auditory surveys were completed from 30 minutes after sunset to 01:00, under appropriate environmental conditions (i.e., temperature >6°C, wind <20 km/h, and no precipitation; SK ENV 2020a). At each wetland, surveys began following a two-minute waiting period to allow disturbance associated with site access to subside. This was followed by a three-minute passive observation period during which all frog and toad calls heard were recorded using an abundance index outlined in the survey protocol (SK ENV 2020a) and species identified.

Visual surveys were completed in the PDA during day-light hours and under appropriate environmental conditions (i.e., temperature >6°C, wind <13 km/h, and no precipitation; SK ENV 2020b). At each wetland, the entire wetland edge was surveyed for amphibian eggs, larvae, and adults. Survey durations varied with wetland size and all species identified, including calls heard, were recorded.

Yellow Rail Survey

Yellow rail surveys were completed at potential yellow rail breeding habitats (e.g., wetlands dominated by sedges/emergent vegetation, wet meadows, bogs) located within and up to 350 m from the PDA. A 350 m buffer of the PDA accounts for the provincial maximum activity restriction setback for Yellow rail (GOS 2017a). Yellow rail habitat sites were selected during desktop analysis and confirmed in the field before surveys were initiated. Yellow rail surveys were completed on June 10 and 19, 2022. The surveys followed methods outlined in the standardized SK ENV survey protocol for yellow rails (SK ENV 2014). Two survey visits were completed at eleven locations between 23:00 and 03:00 and under appropriate environmental conditions (i.e., temperature >0°C, wind <20 km/h, no precipitation; SK ENV 2014). At each survey location, the observer waited for two minutes to allow disturbances associated with site access to subside before beginning a five-minute passive observation period, followed by three-minutes of call playback, and another two-minute passive observation period. The habitat composition and environmental conditions were recorded for every survey location.

Prairie Raptors Survey

A raptor stick nest survey was completed on June 9, 2022. The survey targeted all suitable habitat (e.g., tree bluffs, isolated trees) within the wildlife and wildlife habitat LAA, which represents the maximum activity restriction setback (1 km) for ferruginous hawk (*Buteo regalis*) nests (GOS 2017a).

A ground-based survey for stick nests was conducted using roadside methods during daylight hours when visibility was good (i.e., no precipitation or fog). The observer assessed suitable habitat and scanned trees and shrub patches looking for stick nests. If a stick nest was observed, activity was recorded, the presence of adults and/or young, behaviour (i.e., defensive display, incubating), size of the nest, location, and surrounding habitat were documented (GOA 2013).

14.2.5.2 Existing Conditions

The Project is within in the Aspen Parkland ecoregion of the Prairie ecozone that supports a wide variety of wildlife species, including 55 species of mammals, 320 species of birds, and 11 species of amphibians and reptiles (Acton et al. 1998). Habitat for wildlife in the ecoregion is comprised predominantly of grasslands, wooded groves, and wetlands that provide important breeding and staging habitats for waterfowl and a diverse number of wildlife species.

14.2.5.2.1 Desktop

There is a total of 46 SOCC (2 mammal, 42 bird, and 2 amphibian) that have the potential to occur in the wildlife and wildlife habitat LAA based on species range overlap (Cornell Lab of Ornithology and the American Ornithologists' Union 2022) and habitat availability. The HABISask project screening report revealed six known historical occurrences of wildlife SOCC with no critical habitat for federally listed species at risk (i.e., species listed under SARA) within the wildlife and wildlife habitat LAA (Appendix G, SK ENV 2022).

Table 14-10 Known Historical Occurrences of Wildlife SOCC in the Wildlife and Wildlife Habitat LAA

Common Name	Scientific Name	Provincial Rank[1]	SARA Status[1]
Sprague's pipit	*Anthus spragueii*	S3B	Threatened
rusty blackbird	*Euphagus carolinus*	S3B, SUN	Special Concern
bobolink	*Dolichonyx oryzivorus*	S5B	Threatened
barn swallow	*Hirundo rustica*	S4B	Threatened
horned grebe	*Podiceps auritus*	S5B	Special Concern
American badger	*Taxidea taxus taxus*	S3	Special Concern
Notes: [1] SK ENV 2022 S3: vulnerable S4: apparently secure S5: secure B: breeding population U: status is uncertain N: non-breeding population			

Land cover and habitat information is presented in Section 14.2.4.1.1 and 14.2.4.2.2.

Incidental Activity Study Area

The Incidental Activity Study Area is comprised primarily of cultivated farmland, which provides limited habitat for most wildlife species. There is some native grassland along the Dellwood Brook as well as scattered remnant patches of native grassland within the Incidental Activity Study Area. There are some portions of quarter sections that are permanently managed as provincial *Wildlife Habitat Protection Act* lands that are native grassland (SK ENV 2023).

Overall, potential wildlife and wildlife habitat associated with the Incidental Activity Study Area is limited due to anthropogenic disturbances (e.g., cultivation, residential development, and infrastructure), however, the native grassland provides a higher habitat value for some wildlife species. Wetlands and forested patches can provide breeding habitat (e.g., raptor and migratory breeding bird nests), forage (e.g., migratory waterfowl), and shelter for small and large mammals (e.g., north American beaver, deer, moose). Cultivated fields can also attract large numbers of migratory waterfowl in the spring and fall for foraging opportunities. The Incidental Activity Study Area contains historical records of 11 known SOCC with some overlap in species found in the wildlife and wildlife habitat LAA (SK ENV 2023; Table 14-11).

Appendix C provides information on the TransGas study area for the proposed natural gas infrastructure.

Table 14-11 Known Historical Occurrences of Wildlife SOCC in the Incidental Activity Study Area

Common Name	Scientific Name	Provincial Rank[1]	SARA Status[1]
Sprague's pipit	*Anthus spragueii*	S3B	Threatened
Baird's sparrow	*Centronyx bairdii*	S4B	Special Concern
rusty blackbird	*Euphagus carolinus*	S3B, SUN	Special Concern
bobolink	*Dolichonyx oryzivorus*	S5B	Threatened
barn swallow	*Hirundo rustica*	S4B	Threatened
whooping crane	*Grus americana*	SXB, S1M	Endangered
loggerhead shrike	*Lanius ludovicianus excubitorides*	S3B	Threatened
red-necked phalarope	*Phalaropus lobatus*	S4B, S3M	Special Concern
horned grebe	*Podiceps auritus*	S5B	Special Concern
bank swallow	*Riparia riparia*	S4B, S5M	Threatened
American badger	*Taxidea taxus taxus*	S3	Special Concern
Note: [1] SK ENV 2023			

14.2.5.2.2 Field Surveys

Wildlife and wildlife signs (e.g., migratory bird nest, mammal den) incidentally observed within the wildlife and wildlife habitat LAA are listed below in Table 14-12. A complete list of wildlife observed in the wildlife and wildlife habitat LAA during field surveys is presented in Appendix G. Only one SOCC, western tiger salamander (*Ambystoma mavortium*), was incidentally recorded during field surveys (Figure 14-3).

Table 14-12 Incidental Wildlife Observations

Common Name	Scientific Name	Abundance	Observation	UTM Coordinates
western tiger salamander*	Ambystoma mavortium*	1 adult (unknown gender)	Ring-billed gull observed feeding on salamander carcass on June 10, 2022	13U 480772 5747818
red-tailed hawk	Buteo jamaicensis	1 female adult and 1 male adult	Perched on June 9, 2022	13U 480108 5747115
coyote	Canis latrans	1 adult (unknown gender)	Adult exiting active den on August 19, 2022	13U 480970 5747547
northern harrier	Circus hudsonius	1 adult (unknown gender)	Flying on June 9, 2022	13U 479730 5747879
mule deer	Odocoileus hemionus	2 adults (unknown gender)	2 adults foraging	13U 480822 5746385
clay-colored sparrow	Spizella pallida	1 female adult	Female flushed from nest while incubating 3 eggs on June 9, 2022	13U 480409 5746951
Note: *SOCC				

Grassland Bird Survey

A total of 27 species of grassland birds were recorded during the surveys with two identified as SOCC. Five observations of Sprague's pipit (*Anthus spragueii*) were recorded during the surveys with one observation recorded outside of the PDA. Sprague's pipit are listed under the SARA (GOC 2022c) as threatened, and vulnerable under the SKCDC (2022). Two Baird's sparrow (*Ammodramus bairdii*) were recorded during the surveys in the PDA. Baird's sparrow is listed as special concern under the SARA (GOC 2022c) and apparently secure by the SKCDC (2022).

Amphibian Auditory/Visual Survey

No amphibians were detected during the auditory and visual surveys.

Yellow Rail Survey

No yellow rails were detected during the surveys.

Prairie Raptors Survey

One stick nest was observed outside of the PDA but within the wildlife and wildlife habitat LAA on June 9, 2022, at 13U 479898 5746386. No activity was observed at the nest.

14.2.6 HUMAN ENVIRONMENT

Human environment is considered a VC for this assessment as the Project has the potential to affect current land and resource use, employment and the economy, and infrastructure and services. Potential challenges pertaining to the health and social setting of the region are discussed in Section 15.0. This section provides a summary of methods and results of the desktop studies completed for the Project.

The primary focus for this assessment is on:

- Current Land and Resource Use: The Project may have the potential to affect current or future land and resource use, which is important to neighbouring communities (e.g., recreation and tourism), property owners, resource users (e.g., hunters, farmers, commercial operations, general public), and other stakeholders.
- Employment and Economy: The Project is expected to create employment and business opportunities and generate revenue.
- Infrastructure and Services: Project activities, traffic, and the workforce may place increased demands on local services and infrastructure (e.g., accommodations, community and emergency services, transportation).

14.2.6.1 Methods

A desktop review of existing conditions for the human environment were obtained primarily through secondary research. The following sources and types of information were used to characterize baseline conditions:

- existing literature, such as government publications, land use surveys, regional studies, resource management plans, and land use plans
- websites for government and non-government agencies and organizations (e.g., Saskatchewan Hunters and Trappers Guide 2021/22 (GOS 2021b))
- provincial and federal databases, historical data, and relevant literature sources
- planning documents from the RM of Usborne
- vegetation dataset for land cover mapping (Section 14.2.4)
- Statistics Canada 2016 and 2021 census data, including population and community profiles (Statistics Canada 2017a, Statistics Canada 2022a)
- websites for infrastructure and service providers including health care facilities, fire, and police services
- other VC sections (e.g., Section 14.2.5 Wildlife and Wildlife Habitat)

14.2.6.2 Existing Conditions

14.2.6.2.1 Current Land and Resource Use

Land use has been defined based on the land cover types described in Section 14.2.4. The PDA is 64.9 ha and is located on predominantly low vegetation (55.4%), in addition to cleared (29.4%), wetland (14.5%), and forested (0.8%). The LAA, beyond the PDA, is dominated by low vegetation, with some cleared, wetland, and forested land cover areas.

The PDA is located within the RM of Usborne. From their Official Community Plan (RM of Usborne 2012) they state that their vision for the future identifies the region's richness in agriculture, potash, and manufacturing that creates a strong economy for the region and the province; the area supports a variety and abundance of wildlife and numerous tourist sites and opportunities; and that the region contains cooperative and ambitious community spirits that create a unique quality of life for everyone. The RM's resources are described as being largely based in the agricultural land base, where the CLI's land capability for agriculture survey classified a significant portion of the RM as having the highest rated capability grouping for agriculture use. Potash resources are also dominant in the RM. The primary land uses within the RM include agricultural activities pertaining to field crops, pasture lands, and livestock operations. One of the goals of the Official Community Plan is sustainability and environment. The RM has a number of important wildlife habitats and lands that are highly productive from an agricultural point of view, including land that is set aside for community pasture.

The PDA is privately owned and is not accessible for public use. Several waterbodies exist within the LAA, including multiple wetlands, the Dellwood Reservoir, Little Manitou Lake, and Boulder Lake. The PDA is located within Wildlife Management Zone (WMZ) No. 21, and the Southern Fur Conservation Area (SFCA), which governs and places restrictions in terms of hunting and trapping activities (GOS 2021b, GOS 2022f). The seasons for harvesting activities of big game in WMZ No. 21 are primarily within September to December, with specific ranges dependent upon the species (GOS 2021b). The trapping seasons in the SFCA can be year-round for species such as skunk, raccoon and coyote but trapping for the remainder of the species can range from September to June (GOS 2021b). WMZ No. 21 is a part of Game Bird Management Unit 4, as part of the South Game Bird District. The seasons for hunting game birds is also primarily from September to December, with specific ranges dependent upon the species (GOS 2021b).

14.2.6.2.2 Employment and Economy

Population

Statistics Canada population data from 2021 for the RM of Usborne, the town of Lanigan, the village of Drake and the Province of Saskatchewan are presented in Table 14-13. In 2021, the RM of Usborne had a population of 511, a 3.4% decrease since 2016. Whereas the village of Drake had a population of 197 in 2021 and 2016. The town of Lanigan had a population of 1,433 in 2021, a 4.1% increase since 2016. Therefore, in 2021, the LAA, comprised of the RM of Usborne, the town of Lanigan and the village of Drake had a population of 2,141, a 0.2% increase since 2016. This represents the same rate of growth in comparison to the RAA, or the province overall.

Table 14-13 Population and Population Change in the LAA and RAA

Population	RM of Usborne	Town of Lanigan	Village of Drake	LAA	Saskatchewan RAA
2016	529	1,377	197	2,103	1,098,352
2021	511	1,433	197	2,141	1,132,505
2021-2016 Variation %	-3.4%	4.1%	0.0%	0.2%	0.2%
(Statistics Canada 2022a)					

In 2021, of a 25.0% sample of the LAA, 2.2% of the population identified as Indigenous and 8.6% identified as a visible minority (i.e., non-Indigenous, non-Caucasian). Whereas in the RAA, 17.0% of the population identified as Indigenous and 14.4% identified as a visible minority. Of the LAA, the entire population that identified as Indigenous was located within the town of Lanigan. The primary proportion (85.7%) of the population that identified as visible minority within the LAA was also located within the town of Lanigan (Statistics Canada 2022a).

In 2021, the median age of the residents in the LAA was 43.3 (Table 14-14), which is older than the provincial median age of 38.8. The median age in the RM of Usborne was 43.6. The town of Lanigan had a younger median age, of 42.0; whereas the median age of the village of Drake was older than the LAA and the RAA, with a value of 44.4. In the LAA, 57.5% of the population was between 15-64 years of age, whereas in the RAA, 62.8% of the population fell in the same age bracket. The primary proportion (67.1%) of the percentage of the population in the 15-64 years of age bracket within the LAA was located within the town of Lanigan.

Table 14-14 Population Demographics in the LAA and RAA

Age Characteristics		RM of Usborne	Town of Lanigan	Village of Drake	LAA	Saskatchewan RAA
Age 0-14	Men +	50	150	20	220	114,360
	Women +	55	135	10	200	108,755
	Total	105	290	35	430	223,115
Age 15-64	Men +	145	440	65	650	357,000
	Women +	145	385	60	590	354,410
	Total	285	825	120	1,230	711,405
Age 65 and over	Men +	65	150	15	230	91,765
	Women +	55	170	25	250	106,215
	Total	120	320	40	480	197,980
Total All Persons	Men +	265	740	105	1,110	563,120
	Women +	250	690	90	1,030	569,385
	Total	510	1,430	195	2,135	1,132,505
Median Age	Men +	44	39.6	41.2	41.6	38.0
	Women +	43.2	44.0	52.4	46.5	39.6
	Total	43.6	42.0	44.4	43.3	38.8
Note: Values include Men+ (includes men (and/or boys), as well as some non-binary persons) and Women+ (includes women (and/or girls), as well as some non-binary persons). (Statistics Canada 2022a)						

Education

Several education institutions operate within the LAA including Drake Elementary School, Lanigan Elementary School and Lanigan Central High School. Within the RAA, there are multiple education institutions at the elementary, secondary, and post-secondary levels. Within the RAA, in proximity to the Project, Carlton Trail College operates out of the city of Humboldt (GOS 2022a). Additionally, in proximity to the Project, the University of Saskatchewan, University of Regina (Saskatoon Campus), St. Thomas More College, The First Nations University of Canada, College of Emmanuel and St. Chad, Horizon College & Seminary, Lutheran Theological Seminary, St. Andrew's College, Saskatchewan Polytechnic, Gabriel Dumont Institute of Native Studies and Applied Research, Saskatchewan Indian Institute of Technologies, and Collège Mathieu are all located in Saskatoon (GOS 2022a).

In 2016, of a 25.0% sample of data, 31.3% of the population of the LAA aged 15 years or older in private households, held a high school diploma or equivalency as their highest level of education completed, compared with 30.5% in the RAA (Table 14-15). Of the same sample, 14.3% of the population of the LAA held an apprenticeship or trades certificate or diploma, compared to 10.4% of the RAA. Whereas 26.6% of the population of the LAA in comparison to 17.1% of the RAA held a college, CEGEP (Collège d'enseignement général et professionnel), or non-university certificate or diploma.

Table 14-15 Education Attainment (15 Years and Older) in the LAA and RAA

Education Characteristics		RM of Usborne	Town of Lanigan	Village of Drake	LAA	Saskatchewan RAA
No certificate, diploma, or degree	**Total**	60	150	35	245	177,210
	%	13.8%	14.5%	30.4%	19.6%	20.7%
Secondary (high) school diploma or equivalency certificate	**Total**	175	285	30	490	261,210
	%	40.2%	27.5%	26.1%	31.3%	30.5%
Apprenticeship or trades certificate or diploma	**Total**	50	190	15	255	89,440
	%	11.5%	18.4%	13.0%	14.3%	10.4%
College, CEGEP or non-university certificate or diploma	**Total**	110	230	35	375	146,770
	%	25.3%	22.2%	30.4%	26.0%	17.1%
University certificate or diploma below bachelor level	**Total**	15	35	0	50	28,195
	%	3.4%	3.4%	0.0%	2.3%	3.3%
University certificate, diploma or degree at bachelor level or above	**Total**	25	145	10	180	154,480
	%	5.7%	14.0%	8.7%	9.5%	18.0%

Notes:
Total values may not sum due to rounding.
25% sample data.
Percentage values are representative of the percentage of the population aged 15 years or older.
CEGEP is a post-secondary education exclusive to Quebec.
(Statistics Canada 2017a)

Employment

Of the current population in the working age group between the ages of 15 to 64 years old, the participation rate (i.e., percentage of people who are either employed or are actively looking for work) for the LAA in 2016 was 67.1% (Table 14-16). This compared to the RAA participation rate of 68.3%. Of the LAA, the greatest participation rate was within the RM of Usborne. The employment rates within the LAA and RAA were 64.0% and 63.5%, respectively. Within the LAA, the greatest employment rate was within the RM of Usborne (Table 14-16). Additional information about the regional economic description is presented in Section 15.3.

Table 14-16 Labour Force in the LAA and RAA

Labour Force Characteristics	RM of Usborne	Town of Lanigan	Village of Drake	LAA	Saskatchewan RAA
Adult Population	435	1,035	120	1,590	857,295
Labour Force	315	645	80	1,040	585,540
Participation Rate	72.4%	62.3%	66.7%	67.1%	68.3%
Employed	300	625	75	1,000	544,095
Unemployed	15	15	10	40	41,445
Employment Rate	69.0%	60.4%	62.5%	64.0%	63.5%
Unemployment Rate	4.8%	2.3%	12.5%	6.5%	7.1%

Notes:
Total values may not sum due to rounding.
Percentage values are representative of the percentage of the population aged 15 years or older.
Adult population is the population aged 15 years and over by Labour force status.
The employment rate shows the percentage of people in the working age group who have been employed for the previous three census years.
25% sample data.
(Statistics Canada 2017a)

14.2.6.2.3 Infrastructure and Services

This section provides an overview of existing conditions for the LAA and RAA with respect to community services such as health, emergency, and social services, and transportation and utility interactions. The LAA is part of the Saskatoon Health Region. Medical services in the LAA include the Lanigan Hospital and the Lanigan & District Medical Clinic. The Lanigan Hospital was built in 1968, and supports acute, palliative, respited, and long-term care, with four acute care beds and six long term care beds. Laboratory and X-Ray services are available Monday to Friday from 8:30 am to 3:30 pm while the hospital's outpatient and emergency departments operate 24 hours a day, seven days a week (Saskatoon Health Region 2020, Town of Lanigan 2022).

Within the RAA, there are multiple additional health and emergency services in proximity to the Project. Watrous District Health Complex operates out of Watrous as part of the Saskatoon Health Region. The city of Saskatoon is also a part of the Saskatoon Health Region, and includes St. Paul's Hospital, Royal University Hospital, Jim Pattison Children's Hospital, and Saskatoon City Hospital. Additional health services within the RAA in Saskatoon include nineteen minor emergency and walk-in clinics (Saskatoon Health Region 2017). The ongoing COVID-19 pandemic has increased pressure on the provincial healthcare system and has resulted in staff shortages and longer wait times across the province.

Ground ambulance services within the LAA are the responsibility of the Lanigan & District Ambulance, based in Lanigan and connected to the Lanigan Fire Hall. There is a satellite location in LeRoy, Saskatchewan. Lanigan & District Ambulance has a staff of ten paramedics, with a fleet of seven vehicles. Aerial ambulance services are available through Saskatchewan Air Ambulance and STARS (Shock Trauma Air Rescue Service) for Saskatchewan residents. Saskatchewan Air Ambulance is based in Saskatoon, and STARS is based in both Saskatoon and Regina, within the RAA (GOS 2022c).

Additional emergency services within the LAA include the Royal Canadian Mounted Police (RCMP), which have a detachment located in Lanigan, comprised of four members, and a two-member highway patrol. Within the LAA, fire services include the Lanigan Volunteer Fire Department which is based out of the Lanigan Fire Hall.

The primary weight highway in the LAA that will provide access to the Project is the TransCanada Yellowhead Highway 16. Highway 20 is a secondary highway in the LAA, that runs south of the town of Lanigan and passes the village of Drake. The Project is adjacent to Range Road 2241 south of the TransCanada Yellowhead Highway 16. In 2022, the GOS committed more than $50 million to create 28 passing lanes on the TransCanada Yellowhead Highway 16 between Clavet and Dafoe, Range Road 2241 and the Project falls within this range (GOS 2022g). Average annual daily traffic (AADT), as published by the GOS for 2020 was: 2,160 west of the Range Road 2241 intersection; 2,620 east of the Range Road 2241 intersection; 2,680 west of the town of Lanigan. At the north end of Highway 20 just south of the town of Lanigan, the AADT in 2020 was 530, decreasing to 330 near the village of Drake (GOS 2020a).

Rail lines are also present in the LAA, including the Canadian Pacific (CP) main track that runs alongside the TransCanada Yellowhead Highway 16, and the CP main track that runs south from the TransCanada Yellowhead Highway 16 alongside Highway 20 and passes through the village of Drake. In addition to the CP main lines, CP has a spur which runs south from the organized hamlet of Guernsey to the Nutrien Lanigan Potash mine where there are several siding tracks. In addition to the CP siding tracks, Canadian National (CN) has several siding tracks at the Nutrien Lanigan Potash mine. South of the mine, CN has several spurs, which ultimately connects to the CN main track that runs southeast through the town of Watrous (Railway Association of Canada 2022).

14.2.6.2.4 Incidental Activity Study Area

The Incidental Activity Study Area is inclusive of the LAA, and RM of Wolverine. Land and resource use within the Incidental Activity Study Area is primarily based around the agriculture industry, as in the LAA. Land and resource use within the RM of Wolverine consists of a mix of dry land cultivation of grains and oilseeds and livestock production, and a community pasture (RM of Wolverine 2022). The Incidental Activity Study Area is located within WMZ No. 21 and No. 41, and the SFCA (GOS 2021b, GOS 2022f). The seasons for harvesting activities of big game and trapping seasons for the Incidental Activity Study Area are the same as those for the LAA (GOS 2021b). WMZ No. 41 and No. 21 are part of Game Bird Management Unit 4, and therefore, a part of the South Game Bird District (GOS 2021b).

The RM of Wolverine had a 6.5% population increase from 2016 to 2021 (Statistics Canada 2022a). Therefore, overall, the Incidental Activity Study Area, experienced a population change similar to that of the LAA and RAA. In 2021, the median age of the residents was 41.6 for the RM of Wolverine (Statistics Canada 2022a). As in the LAA, the median ages was greater than the RAA. Of the current population in the working age group between the ages of 15 to 64 years old, the participation rate (i.e., percentage of people who are either employed or are actively looking for work) was 77.8% for the RM of Wolverine (Statistics Canada 2017a). This value was significantly greater than the participation rate of the LAA.

Health services provided in the LAA are also those available within the Incidental Activity Study Area. The RCMP detachment within the Incidental Activity Study Area is the detachment in Lanigan. Additional emergency services in the Incidental Activity Study Area beyond those included in the LAA, include the Viscount & District Fire Association which serves the RM of Wolverine (RM of Viscount 2022). The primary weight highway in the Incidental Activity Study Area is the TransCanada Yellowhead Highway 16. Highway 20 is a secondary highway in the Incidental Activity Study Area.

15 Regional Health, Social and Economic Description

15.1 Regional Health Description

The Project is located within an area that is administered by the Saskatoon Regional Health Authority, which is part of the provincial Saskatchewan Health Authority (Saskatoon Health Region 2022, Statistics Canada 2017b). Medical services within the Saskatoon Regional Health Authority in the vicinity of the Project include the Lanigan Hospital and the Watrous District Health Complex, as outlined in Section 14.2.6.2 (Saskatoon Health Region 2017). A summary of the health profile for the Saskatoon Health Region is presented in Table 15-1. For the majority of the health-related indicators outlined in Table 15-1, the Saskatoon Regional Health Authority had values that were comparable to the values of the Province of Saskatchewan as a whole.

Table 15-1 Health Related Indicators

Health Characteristics	Saskatoon Regional Health Authority	Saskatchewan
Life Expectancy[1] (2015-2017)	81.3	80.2
Infant Mortality[2] (2015, per 1000 live births, under 1 year of age)	4.1	5.8
Proportion of Adults (aged 18 years or older) in the Household Population with Underlying Health Conditions (2017/2018)		
At Least 1 Underlying Health Condition[3]	41.1%	42.8%
At least 2 Underlying Health Conditons[3]	12.8%	14.9%
Health Indicators (2019/2020)		
Obese Adults[4]	34.4%	35.8%
Physically Active Adults (150 minutes/week)[4]	54.2%	52.2%
Very Good or Excellent Perceived Mental Health in Adults[4]	63.0%	61.6%
Fair or Poor Perceived Mental Health in Adults[4]	10.2%	9.0%
Social Determinants of Health Indicators (2020)		
Proportion of Children Aged 0-17 in Low Income[5]	12.0%	12.8%
Proportion of Lone Parent Households[5]	14.8%	16.4%
Proportion of Food Insecure Households with Children Aged 4-17[5]	13.6%	15.1%
Proportion of Population Aged 15 and over with no Certificate, Diploma, or Degree[5]	16.3%	20.7%
Proportion of Households with 5 or more People[5]	9.4%	9.6%

Notes:
Total values may not equal the sum due to rounding.
[1]: (Statistics Canada 2019)
[2]: (Statistics Canada 2018)
[3]: (Statistics Canada 2020)
[4]: (Statistics Canada 2022b)
[5]: (Statistics Canada 2021)

15.2 Regional Social Description

The Project is located within the RM of Usborne, which includes the town of Lanigan, the village of Drake, and the organized hamlets of Guernsey and Lockwood (RM of Usborne 2022). The RM of Usborne, town of Lanigan, and the village of Drake are all respective census subdivisions (Statistics Canada 2022c). The total population of the RM, town, and village in 2021 was 2,141, which was an average increase of 0.23% since 2016 (Table 14-13). There is a higher proportion of individuals in the RM, town, and village that live in single detached homes, as compared to the Province of Saskatchewan (Table 15-2). The average household size in the RM of Usborne is the same as Saskatchewan (2.5), whereas in the town of Lanigan and the village of Drake, the average household size is less (2.4 and 2.2, respectively) (Table 15-2). The age composition of the RM of Usborne, town of Lanigan, and village of Drake shows the predominant age group is 15-64 (Table 14-14). There are approximately 430 people under the age of 14, and 480 people aged 65 and older within three census divisions, cumulatively (Table 14-14).

The proportion of one-parent family households in the RM of Usborne and the village of Drake is significantly less than the provincial average; additionally, the proportion of one-parent family households in which the parent is a woman+ is significantly less than the provincial average (Table 15-2). In the RM of Usborne, 6.5% of census families were one-parent households where the parent is a woman+. In the Province of Saskatchewan, 17.0% of the population identified as Indigenous, whereas 0.0% of the population in the RM of Usborne and the village of Drake identify as Indigenous and only 3.2% in the town of Lanigan. Additional social indicators of the Project region are outlined in Table 15-2.

Table 15-2 Social Related Indicators

Social Indicators	RM of Usborne	Town of Lanigan	Village of Drake	Saskatchewan
Population Density per square kilometre (km^2)	0.6	176.1	307.3	2.0
Total Occupied Private Dwellings	205	578	91	449,581
Proportion of Occupied Private Dwellings that are Single Detached Houses	97.6%	77.6%	94.4%	71.6%
Average Household Size	2.5	2.4	2.2	2.5
Proportion of the Population in Census Families	87.4%	83.9%	82.1%	81.9%
Proportion of One Parent Family Households	9.7%	12.7%	9.1%	17.1%
Proportion of One-Parent Family Households in Which the Parent is a Women+	6.5%	10.1%	9.1%	12.9%
Proportion of Indigenous People	0.0%	3.2%	0.0%	17.0%
Most Common Non-Official Language Spoken at Home	German	Tagalog (Pilipino, Filipino)	Tagalog (Pilipino, Filipino)	Tagalog (Pilipino, Filipino)
Note: Values include Men+ (includes men (and/or boys), as well as some non-binary persons) and Women+ (includes women (and/or girls), as well as some non-binary persons). (Statistics Canada 2022a)				

15.2.1 GENDER BASED ANALYSIS PLUS

Gender Based Analysis Plus (GBA+) is an analytical framework that analyses how projects may affect diverse or potential vulnerable population groups. As shown in Table 14-14, the proportion of the total population who identified as Women+ or as Men+ within the RM of Usborne, town of Lanigan, and the village of Drake were similar. Women+ includes women (and/or girls), as well as some non-binary persons; Men+ includes men (and/or boys), as well as some non-binary persons (Statistics Canada 2022a). When looking at those aged 0-14 within the RM of Usborne, town of Lanigan, and the village of Drake, 52% of the population identified as Men+ (220), and 48% of the population identified as Women+ (200) (Statistics Canada 2022a). Of those aged 15-64 52% of the population identified as Men+ (650), and 48% of the population identified as Women+ (590) (Statistics Canada 2022a), 48% of those aged 65 and over identified as Men+ (230), and 52% identified as Women+ (250) (Statistics Canada 2022a).

The Project is in the vicinity of the Humboldt and Area Pride Network, which celebrates gender and sexual diversity in Humboldt, Saskatchewan and surrounding area. The Humboldt and Area Pride Network was founded in 2014. The Humboldt and Area Pride Network also runs Parents of the Rainbow, a peer-led support group for parents of Lesbian, Gay Bi-sexual, Transgender, Queer (LGBTQ) children; and the Youth Rainbow Coffee Group, a peer-led support group for LGBTQ youth (CBC Radio-Canada 2019, Humboldt and Area Pride Network 2022).

The Project is also in the vicinity of Out Saskatoon, Saskatoon and area's LGBTQ2S community centre and service provider. Out Saskatoon began as Gay & Lesbian Health Services in 1991. Out Saskatoon provides support services, youth housing, and education and research services through a harm reduction, culturally informed, equity-seeking, and community-based approach. The mission of Out Saskatoon is to uplift 2SLGBTQ people by leading, serving, and supporting in a dynamic community. Out Saskatoon fosters physical, emotional, mental, and spiritual health through intentional services and meaningful engagement (Out Saskatoon 2022a, 2022b, 2022c).

SaskPower, who is recognized as one of Canada's top 100 employers, is committed to having a culture of diversity and inclusion (Canada's Top 100 Employers 2022). The company is partnered with the Saskatchewan Human Rights Commission for the purpose of recruiting and retaining employees from a variety of backgrounds (SaskPower 2022c). SaskPower has a diversity department with a full-time diversity specialist who is responsible for the development and implementation of a corporate diversity strategy. The company maintains an inclusive design committee and has been recognized as one of Canada's Best Diversity Employers for 14 consecutive years (Canada's Top 100 Employers 2022, SaskPower 2022b).

SaskPower has been a long term partner of the University of Regina, for the purpose of providing students and recent graduates with opportunities for entering the workforce. In correlation, SaskPower has been recognized as one of Canada's Top Employer's for Young People for 10 consecutive years, as it offers extensive internship and work placement programs.

SaskPower has been recognized as one of Saskatchewan's Top Employers for 15 consecutive years, as it has numerous strategies to assist employees in balancing their work and personal lives and offers an extensive benefits program including maternity leave top-up payments to new mothers. The company has multiple Employee Resource Groups which focus on creating a culture of growth and inclusion, including:

- Indigenous Employees Network: provides a collective voice and a supportive environment for Indigenous employees, promotes opportunities for Indigenous peoples within the company, and plays a key role in building a progressive community.
- Lesbian, Gay Bi-sexual, Transgender, Queer, Two-Spirited (LGBTQ2S+) Network: raises awareness for the LGBTQ2S+ community within the company and provides support for employees.
- Network of Employees with Disabilities: advises on ways to improve the recruitment and retention of those with disabilities, improves experiences for those with accessibility issues and promotes career development opportunities.
- Cultural Diversity Group: advocates on cultural diversity concerns, supports the needs of diverse employees, and educates employees on the benefits and rewards of diverse cultures and backgrounds in employment.
- Women's Resource Group: encourages equitable participation in under-represented occupations and leadership roles and works to assist women in achieving their full career potential.
- Power Gen: aims to shape the next generation of leaders by creating opportunities, connecting employees, and promoting person and professional development.

The construction industry, and the science, technology, engineering, and mathematics (STEM) industries have historically been male dominated, however the construction and STEM industries are now much more inclusive of all genders. As shown in Section 3.0 and Section 4.0, gender gap issues and other disparities were not identified in any of the consultation with the public or Indigenous groups. This was not unexpected, given the rural location of the Project. As presented in Sections 3.0 and 4.0, public and Indigenous engagement was open to all individuals, including Indigenous groups, women+, low income, under or unemployed, disabled, seniors, and systemically marginalized groups.

15.3 Regional Economic Description

In 2020, the median household income in the RM of Usborne was $89,000, which is greater than the median household income in the town of Lanigan and the provincial median household income (Table 15-3). In 2016, 69.0% of the population of the RM was employed, whereas 60.4% of the town of Lanigan was employed (Table 14-16). The unemployment rate was highest in the village of Drake (12.5%), and lowest in the town of Lanigan (2.3%) (Table 14-16). Approximately 40.3% of the RM's workforce and 31.3% of the village of Drake's workforce are employed in the agriculture, forestry, fishing, and hunting industries. Additional key employers in the RM are mining, quarrying, and oil and gas extraction (12.9%), construction (11.3%), and health care and social assistance (9.7%) (Statistics Canada 2017a). In the town of Lanigan, approximately 19.4% of the workforce are employed in the mining, quarrying, and oil and gas extraction industry, and 11.6% of the workforce are employed in the health care and social assistance industry

(Statistics Canada 2017a). Approximately 36.7% of the workforce in the RM work from home, in comparison to 3.2% of the town of Lanigan. Additionally, approximately 35.5% of the workforce in the RM are self-employed, in comparison to 7.8% of the town of Lanigan. Additional economic indicators of the Project region are outlined in Table 15-3.

Table 15-3 Regional Economic Indicators

Economic Indicators	RM of Usborne	Town of Lanigan	Village of Drake	Saskatchewan
Median Total Income of Individuals in 2020[1]	$ 40,400	$44,400	-	$ 42,400
Median Total Income of Households in 2020[1]	$ 89,000	$87,000	-	$ 82,000
Proportion of Individuals who are COVID-19 Emergency and Recovery Benefits Recipients in 2020[1]	9.9%	9.8%	-	24.3%
Median COVID-19 emergency and recovery benefits among recipients in 2020[1]	$ 8,000	$8,000	-	$ 8,000
Prevalence of Low Income[1]	12.4%	9.2%	-	13.4%
Predominant Industry[2]	Agriculture, Forestry, Fishing and Hunting	Mining, quarrying, and oil and gas extraction	Agriculture, Forestry, Fishing and Hunting	Health Care and Social Assistance
Proportion of Workforce who Worked at Home[2]	36.7%	3.2%	18.8%	10.9%
Proportion of Workforce who are Self-Employed[2]	35.5%	7.8%	12.5%	14.8%

Notes:
Total values may not equal the sum due to rounding.
Individuals include those 15 years and over.
Prevalence of low income is based on the Low-income measure, after tax (LIM-AT).
[1]: (Statistics Canada 2021)
[2]: (Statistics Canada 2017a)

As discussed in Section 14.2.6, the peak construction workforce for the Project is estimated to be 450 employees. Labour peaks are anticipated between 2025-2026. During construction, it is anticipated that the Project will create extensive temporary employment opportunities in a broad range of positions including labourers, trades professions, operators, supervisors, and professionals. The Project will not have a temporary labour camp, instead a stipend will be provided to employees for commuting or accommodations. The Project's construction workforce and Project activities will contribute to the local and regional economy through labour income and provision of local good and services. Project expenditures will also generate benefits and opportunities for local businesses related to increased revenue from Project associated spending.

A third-party study done of Saskatoon and surrounding area, including the Project location, forecasted that the risk of a labour shortage during construction is high. There are several competing projects in the region whose labour peaks are also anticipated between 2025-2026. Competing projects are primarily in the industries of metals and minerals, oil and gas production, power, and food and beverage. There are forecasted deficits for the majority of craft trades in the region. Consequently, the Project may require employees to travel from other provinces throughout the Project activities. Potential impacts and mitigation measures pertaining to Project employment and the economy include those discussed in Section 14.0 and Section 19.0.

15.4 Health, Social or Economic Derived from Engagement

SaskPower through its commitment to diversity and inclusion, is committed to increasing the diversity of the workforce, advancing women in trades and leadership, increasing the percentage of underrepresented groups, focusing on building strong internal and external partnerships, promoting the value of diversity and ensuring practices are inclusive, creating an environment for people to excel and live up to their full potential, and consistently demonstrating inclusive behaviours and language (SaskPower 2022c). SaskPower has no barriers to equality with respect to decision-making, participation, access, or control over the Project. Engagement and consultation activities to date have been inclusive of women and diverse groups (Section 3.0).

From engagement activities conducted so far, SaskPower has not heard any concerns about potential effects to vulnerable populations. The community has hosted and is hosting construction camps. We recognize that there may be impact if a construction camp is required and are committed to ensuring it is implemented in a safe and responsible way.

Like other considerations, SaskPower will continue to work with stakeholders to identify and address any concerns that may arise during the Project. SaskPower is committed to giving consideration for employment and contracting opportunities that remove barriers to participation. SaskPower has existing policies to ensure safe working conditions for all.

PART D: FEDERAL, PROVINCIAL, TERRITORIAL, INDIGENOUS AND MUNICIPAL INVOLVEMENT

16 Federal Financial Support

The Project does not include any proposed or anticipated federal financial support.

17 Use of Federal Lands

The Project will not be constructed or operated on federal lands.

18 Project's Environmental Effects Assessment Jurisdictions

18.1 Federal Regulatory Requirements

As discussed in Section 8.0, the Project will be subject to review by IAAC under the IAA. The Project is considered a designated project under Section 30 of The Physical Activities Regulations (GOC 2019b). In addition to the IAAC review process under the IAA, the Project will be subject to the following federal regulatory requirements:

- *Aeronautics Act*
- *Canadian Environmental Protection Act* (CEPA)
- *Fisheries Act*
- *Migratory Birds Convention Act* (MBCA) and its regulations
- Proposed CER
- Regulations Limiting Carbon Dioxide Emissions from Natural Gas-fired Generation of Electricity
- *Species at Risk Act* (SARA)
- Standards Respecting Pipeline Crossings Under Railways

Table 18-1 Summary of Potential Federal Legislative and Regulatory Requirements for the Project

Legislation/ Regulations	Overseeing Agency	Description
Aeronautics Act (GOC 1985b)	NAV Canada Transport Canada	SaskPower may be required to submit a Land Use Submission Form to NAV Canada prior to construction (NAV Canada 2022). In accordance with the Canadian Aviation Regulations Standard 621, SaskPower may also be required to submit an Aeronautical Assessment Form for Obstruction Marking and Lighting to Transport Canada, to determine the need for the application of marking and lighting of objects that may pose a hazard to aviation (GOC 2021b, GOC 2021c).
CEPA (GOC 1999)	Environment and Climate Change Canada (ECCC)	In accordance with Sections 48 and 50 of CEPA, the National Pollutant Release Inventory (NPRI) is the public inventory of releases, disposals and transfers which tracks over 320 pollutants from over 7,000 facilities across Canada (GOC 2022d). NPRI collects information on reporting facilities, including: • Releases from facilities to air, water or land • Disposals at facilities or other locations • Transfers to other locations from treatment and recycling • Facilities' activities, location and contacts • Pollution prevention plans and activities The Project is anticipated to be required to be registered as a reporting facility.

Legislation/ Regulations	Overseeing Agency	Description
Fisheries Act (GOC 1985a)	Department of Fisheries and Oceans Canada (DFO)	A non-compliance with the *Fisheries Act* could occur if the Project results in any of the following: • The death of any life stage of fish • The harmful alteration, disruption, or destruction (HADD) of fish habitat • The introduction of a deleterious substances or listed substances • The obstruction of free passage of fish DFO outlines measures to protect fish and fish habitat, where if the Project cannot follow the measures, then the Project must submit a Request for Review through the Fish and Fish Habitat Protection Program to determine if the Project will require authorization. If it is determined that the Project requires authorization, then an application for authorization must be submitted to DFO (GOC 2021a). Effects to fish and fish habitat, as defined in subsection 2(1) of the *Fisheries Act* are not expected to be caused by the Project or its incidental activities as outlined in Section 19.6.
MBCA (GOC 1994)	ECCC	The MBCA protects and conserves migratory bird populations and individuals and their nests, through the Migratory Birds Regulations and the Migratory Birds Sanctuary Regulations (GOC 2018a). The Project may interact with migratory birds and this document describes appropriate mitigation to avoid potential effects.
Proposed CER (GOC 2022e)	ECCC	The CER are currently being developed for the purpose of driving progress towards a net-zero electricity grid in 2035. The CER are being developed around three principles: • Maximize GHG reductions to achieve net-zero emissions from the electricity grid by 2035. • Ensure grid reliability to support a strong economy and ensure Canadians are safe by having energy to support their cooling needs in the summer and warmth in the winter. • Maintain electricity affordability for homeowners and businesses. The Electrification and Energy Efficiency Overview outlines that as part of a clean energy supply and generation, natural gas projects will be phased down as part of the effort to decrease emitting electricity. Therefore, it is anticipated that the Project will be subject to the CER once they come into effect.
Regulations Limiting Carbon Dioxide Emissions from Natural Gas-fired Generation of Electricity (GOC 2018c)	ECCC	Under Section 3, the Regulations apply to any boiler unit or combustion engine unit that has a capacity of 25 MW or more. Under Section 4, any project with a capacity greater than 150 MW must not emit greater than 420 tonnes (t) of CO_2 emissions/ gigawatt hours (GWh) of energy produced in a given calendar year. Therefore, the Project will be required to comply with the Regulations.
SARA (GOC 2002)	ECCC	The SARA applies to listed species and prohibits the killing, harming, harassing, capturing, or taking of species listed as extirpated, endangered or threatened. The SARA also prohibits the damage or destruction of residences of listed species. The status of species is assessed and designated by the COSEWIC. Part of the mandate of the SARA is to identify and protect critical habitat for a listed species through recovery strategies or action plans. Federally listed species at risk may occur near the Project and have the potential to interact with the Project, therefore, this document describes appropriate mitigation to avoid potential effects.

Legislation/ Regulations	Overseeing Agency	Description
Standards Respecting Pipeline Crossings Under Railways (Transport Canada 2000)	Transport Canada	All pipelines (including utilities) that cross under railways must be installed, repaired, maintained, and removed in a safe manner, and must conform with the requirements stated within the Standards Respecting Pipeline Crossings Under Railways. Therefore, the Project will be required to comply with the Standards should any railway crossings occur.

18.2 Provincial Regulatory Requirements

Provincial regulatory requirements that may affect the Project are those associated with:

- *The Environmental Assessment Act*
- *The Environmental Management and Protection Act*
- *The Heritage Property Act*
- *The Highways and Transportation Act*
- *The Management and Reductions of Greenhouse Gases Act*
- *The Saskatchewan Employment Act*
- *The Water Security Agency Act*
- *The Weed Control Act*
- *The Wildlife Act*

Table 18-2 Summary of Potential Provincial Legislative and Regulatory Requirements for the Project

Legislation/ Regulations	Overseeing Agency	Description
The Environmental Assessment Act (GOS 1980a)	EASB	*The Environmental Assessment Act* legislates eAs in Saskatchewan, to provide a coordinated review of environmental issues associated with projects and developments by ensuring economic developments proceed with adequate environmental safeguards and opportunities for public consultation (GOS 2014a). Projects that are likely to have significant environmental effects require approval from the EASB prior to proceeding. SaskPower will submit a Technical Proposal to the EASB to inform their decision regarding the acceptability of potential environmental effects from the Project. Following the review, the EASB will determine if the Project is deemed a development, in which case an EA will be required.

Legislation/ Regulations	Overseeing Agency	Description
The Environmental Management and Protection Act (GOS 2010b)	SK ENV	Under Section 8 and 9, no substances from the Project may be discharged, and the discharge or discovery of substances must be reported. Under Section 24, a permit is required for the operation of waterworks and sewage works, the construction of water treatment works, water distribution works, sewage treatment works, and sewage collection works. Under Section 38, an aquatic habitat protection permit (AHPP) is required for work in the bed, bank, or boundary of a water body or watercourse, or for any discharge with an adverse effect on water. The Project is anticipated to require an AHPP. The Project will also require approval and an Environmental Protection Plan (EPP) to construct and operate an industrial source facility. Air quality is regulated under the requirements of Chapter E.1.2, of the Saskatchewan Environmental Code, which SaskPower will be requirement to adhere to (GOS 2014b). The Hazardous Substances and Waste Dangerous Goods Regulations outline the requirements and approvals required for storing hazardous substances, transporting hazardous substances and waste dangerous goods, constructing a storage facility, and operating a storage facility for the storage of hazardous substances and waste dangerous goods (GOS 1989). Should the Project include any of the listed hazardous substances and waste dangerous goods, approval will be required for the transportation, storage, and construction and operation of a storage facility.
The Heritage Property Act (GOS 1980b)	HCB	The HCB has designated each quarter section parcel within the southern half of Saskatchewan as either "sensitive" or "non-sensitive" for heritage resources. Developments occurring within a "non-sensitive" land parcel may proceed to development without needing to be submitted to the HCB for evaluation. The Project location, NW 36-33-24 W2M is not heritage sensitive, and can proceed to development without further evaluation by the HCB (GOS 2022c). A heritage resource impact assessment (HRIA) was conducted on the PDA under archaeological resource investigation permit # 22-149. An HRIA may be required for the incidental activities, once routes are finalized.
The Highways and Transportation Act (GOS 1997)	MOH	The Project may require roadside development permits for any approaches, pipelines and utilities, roadside development, or use of the highway or its ROW. A permit is required for any work within 90 metres (m) of the property line or ROW edge of a provincial highway. Permits may also be required for the movement of oversized and overweight vehicles on provincial highways; and for on premise and off-premise identification signs (GOS 2022d).
The Management and Reductions of GHGs Act (GOS 2010c)	SK ENV	A regulated emitter is a prescribed person, or a person who is a member of a class of prescribed persons, who emits a GHG, and meets the prescribed requirements. Regulated emitters must reduce their GHG emissions in the prescribed manner, through the prescribed means, and by the prescribed date in accordance with the prescribed programs. The Management and Reduction of GHG (Reporting) Standard outline that a reporting facility is a facility that is owned or operated by a specified emitter that has GHG emissions of at least 10,000 t carbon dioxide equivalent (CO_2e) in a given reporting period. A reporting facility must submit a report pertaining to the release of GHGs from the reporting facility by June 1st of the year following the reporting period, which is the previous calendar year (SK ENV 2020d). Should the Project be determined to be a reporting facility, it will be required to adhere to the prescribed programs.

Legislation/ Regulations	Overseeing Agency	Description
The Saskatchewan Employment Act (GOS 2013)	Ministry of Labour Relations and Workplace Safety	Under The Occupational Health and Safety Regulations, the Project is responsible for ensuring the health, safety, and welfare of all workers through the provision and maintenance of the Project, systems of work and working environments; arrangements for the use, handling, storage and transportation of articles and substances; the provision of any information, instruction, training and supervision that is necessary; and the provision and maintenance of a safe means of entrance to and exit from the place of employment and all worksites and work-related areas in or on the place of employment (GOS 2020b). The Project will be required to comply with *The Saskatchewan Employment Act* and The Occupational Health and Safety Regulations.
The Water Security Agency Act (GOS 2005)	SK ENV – Fish, Wildlife and Lands Branch WSA	Under *The Water Security Agency Act*, every person wishing to obtain a water rights licence and approval to construction and operate works must apply for a permit. Under Section 59, approval is required prior to the construction, extension, alteration, or operation of any works. Additionally, approval is required to conduct a groundwater investigation program, to drill a water well and to use groundwater. The Project is anticipated to require a Water Rights Licence and Approval to Construct and Operate Works. SaskPower has obtained a Permit to Conduct a Groundwater Investigation for the Project (File: ES/5713, ES/4795). SaskPower will be required to pay an industrial usage fee as required by WSA.
The Weed Control Act (GOS 2010a)	Ministry of Agriculture RM of Usborne	Under *The Weed Control Act*, the RM of Usborne is able to enforce the control of prohibited, noxious, and nuisance weeds within the RM of Usborne. Early detection and eradication measures are to be taken against prohibited weeds and isolated populations of noxious weeds (less than five ha per quarter section). Containment and integrated control measures are to be taken against established noxious weeds (greater than five ha per quarter section), and integrated control measures may be implemented to bring infestations of nuisance weeds under reasonable control (GOS 2022b). The Project must comply with *The Weed Control Act*.
The Wildlife Act (GOS 1998)	SK ENV – Fish, Wildlife and Lands Branch	Under Section 45 of *The Wildlife Act*, designated plant and animal species include those listed as extirpated, endangered, or threatened (GOS 1998). Under Section 51, designated species are protected from being killed, injured, possessed, disturbed, taken, captured, harvested, genetically manipulated, interfered with, exported, or trafficked without a permit (GOS 1998). SaskPower has obtained a Permit for the field surveys that occurred in 2022 (22SD144). The Project may interact with protected species; therefore, this document describes appropriate mitigation to avoid potential effects.

18.3 Municipal Regulatory Requirements

Regulatory requirements from the RM of Usborne that may affect the Project are described in Table 18-3.

Table 18-3 Municipal Regulatory Requirements

Bylaw or Policy	Overseeing Agency	Description
The Planning and Development Act	RM of Usborne Ministry of Government Relations	SaskPower will be required to submit a development permit application for a municipal development permit to the RM of Usborne (GOS 2007).
Building Bylaw	RM of Usborne	All buildings developed for the Project will be required to comply with the Building Bylaw. SaskPower will obtain the necessary building permits for the Project prior to development (RM of Usborne 2011).
Zoning Bylaw	RM of Usborne Ministry of Government Relations	Under *The Planning and Development Act*, SaskPower will be required to submit a development permit application for a municipal development permit to the RM of Usborne (GOS 2007, RM of Usborne 2014).
Dust Control Policy	RM of Usborne	Addresses dust control procedures within the RM of Usborne, including practices for haul routes and private yard sites (RM of Usborne 2020).

18.4 Regional Plans and Management Frameworks

Regional plans, development plans, and management frameworks applicable to the Project are described in Table 18-4.

Table 18-4 Regional Plans and Management Frameworks Applicable to the Project

Plan	Description
RM of Usborne Official Community Plan	Provides guidance for the management and use of land, and future development within the RM of Usborne (RM of Usborne 2012).
Upper Qu'Appelle River and Wascana Creek Watersheds Source Water Protection Plan	The Project is located within the Lanigan-Manitou Sub-basin of Upper Qu'Appelle River and Wascana Creek Watersheds. The Plan provides guidance for source water management and protection (Saskatchewan Watershed Authority 2008).
Saskatchewan's Growth Plan	Outlines 20 Actions for the 2020s and 30 goals for 2030 to build a strong economy, strong communities, and strong families, to build a stronger Saskatchewan (GOS 2019).
25 Year Saskatchewan Water Security Plan	Provides a comprehensive and integrated approach to water management that includes all of government's core water management responsibilities and technical expertise (WSA 2012)
Prairie Resilience: A Made-in-Saskatchewan Climate Change Strategy	Provides a strategy that takes a system-wide approach and includes commitments designed to make Saskatchewan more resilient to the effects of a changing climate (GOS 2017b).
Saskatchewan's Climate Resilience Measurement Framework	Monitors resilience-related progress across 25 indicators. SK ENV reports annually on the indicators to enhance understanding of how Saskatchewan is responding to the effects of climate change (GOS 2018, GOS 2022e).

PART E: POTENTIAL EFFECTS OF THE PROJECT

19 Potential Effects on Air Quality, Noise, Terrain and Soil, Vegetation and Wetlands, Wildlife and Wildlife Habitat, and Human Environment

19.1 Overview of Environmental Effects and Pathways

The assessment of each environmental component begins with a description of the pathways whereby specific Project activities could result in an environmental effect (i.e., the effects pathways). For each environmental component, the Project's potential effects are identified and assessed in the context of the environmental component's existing conditions, as well as its biophysical or socio-economic characteristics, regulatory context, and any input received from the engagement process.

19.1.1 AIR QUALITY

The Project will result in the release of substances of interest that will change ambient air quality. As previously noted, the focus of the air quality assessment is on Project operation and maintenance because the operation and maintenance phase has the most potential to produce adverse air quality effects. Air emissions associated with Project construction are expected to be minor, occur only for short intervals, and their effects are expected to be limited to the immediate vicinity of the Project area.

The air quality assessment is limited to the consideration of substances for which there are applicable air quality objectives and standards adopted by either or both of the Saskatchewan or federal regulatory agencies (i.e., SAAQS and CAAQS). The predicted effects are assessed relative to these criteria. For this assessment, CO, nitrogen dioxide (NO_2), SO_2, $PM_{2.5}$, PM_{10}, and TPM are the primary substances of interest. These substances of interest are combustion by-products emitted by the Project sources. Table 19-1 shows the maximum potential air emissions associated with the Project including start-up and shutdown emissions for the turbine and auxiliary equipment. The maximum emissions from any operating load and including start-up and shutdown emissions for the combustion turbine were used to demonstrate the maximum potential emissions for each pollutant. Combined-cycle air emissions are based on 8,760 hours per year of operation (100% capacity factor) and simple-cycle air emissions are based on 2,891 hours per year of operation (33% capacity factor). Appendix E provides more detailed description of Project sources and emissions. Additional information on the Project's emissions during the construction and operation and maintenance phases are provided in Sections 24.4 and 24.5, respectively.

Table 19-1 Total Emissions Associated with the Project Operation and Maintenance

Pollutant	Combined-Cycle Project Potential Emissions (tonnes per year)	Simple-Cycle Project Potential Emissions (tonnes per year)
NO_x	469.4	163.5
CO	326.0	201.7
$TPM/PM_{10}/PM_{2.5}$	38.7	13.0
SO_2	29.6	9.8

Plume dispersion modelling, as described in Appendix E, shows that maximum predicted concentrations of the substances of interest are less than the SAAQS for all averaging periods. Maximum predicted concentrations are expected to occur near the Project and decrease with increasing distance from the fence line. Concentrations of the substances of interest at nearby residential receptors are predicted to be less than the 2025 CAAQS. The largest spatial extent within which the Project is expected to have effects on air quality, or the regional context over which cumulative effects may occur, is a 10 km x 10 km buffer of the PDA (i.e., the LAA and RAA for air quality). As presented in Section 13.6, the nearest federal lands to the Project are approximately 47 km away (Last Mountain Lake National Wildlife Area). Therefore, no changes to air quality are expected to occur on federal lands as a result of carrying out the Project. Construction and operation and maintenance mitigation measures are outlined in Sections 19.2.1 and 19.3.1. SaskPower will adhere to federal emission standards and guidelines for new turbine emissions (ECCC 2017).

19.1.2 NOISE

A detailed NIA report for the Project is presented in Appendix F. The NIA report summarizes the method, noise emission sources, prediction results, and assumptions associated with the noise assessment for the Project. Major noise emitting equipment in a combined-cycle power plant consists of one CTG, one HRSG, one STG and an ACC. The NIA quantifies the Project noise effect during normal combined-cycle and simple-cycle steady state operations at the seven nearest residential dwelling receptors (i.e., Rec01 to Rec07) within 1.5 km from the Project property boundary. Incidental activities include distribution power line, transmission power line, and water supply infrastructure. Based on past experience with these activities, the noise effects are expected to be negligible during the operation and maintenance phase. Therefore, these activities are not included in the NIA.

The NIA results indicate that cumulative sound levels (logarithmic sum of Project emitted noise, existing energy-related facility noises, and ambient sound level), are expected to be at or below the PSL at all seven residential dwelling receptors. In addition, low frequency noise analysis indicated that Project related low frequency noise effects are not expected to be an issue. The NIA assumed that operation and maintenance mitigation measures will be implemented during detailed design of the Project. These mitigation measures are presented in Section 19.3.2.

Noise effects associated with construction and upset conditions (e.g., start-up, shutdown, and bypass operations) were assessed qualitatively in the NIA. Noise levels resulting from construction equipment are dependent on several factors, including the number and type of equipment operating, the level of operation, and the distance between sources and receptors. The effects that various construction-related activities might have will vary considerably based on the proximity to the Project fence line. During a typical day, equipment would not be operated continuously at peak levels. While the average noise levels would represent a noticeable temporary increase over the ambient noise levels near the construction sites, the noise would attenuate with increasing distance, fading into ambient noise background levels at distances over approximately one kilometre (km) from the loudest equipment. During Project commissioning, steam blows will be utilized to remove any debris which may be left inside the system during construction. Steam blowing is a critical activity during the commissioning of the Project. Estimated noise levels from steam blows vary, but the use of silencers can reduce noise emissions down to a level similar to typical construction activities. The number of steam blow vents, pipe diameter, pressure, and mass flow all factor into the noise generated by the steam blow operation. Construction mitigation measures are presented in Section 19.2.2.

The largest spatial extent within which the Project is expected to have effects on noise and the regional context over which cumulative effects may occur is a 1.5 km and 3 km buffer of the PDA (i.e., the LAA and RAA for noise). As presented in Section 13.6, the nearest federal lands to the Project are approximately 47 km away (Last Mountain Lake National Wildlife Area). Therefore, no changes to noise are expected to occur on federal lands as a result of carrying out the Project. Construction and operation and maintenance mitigation measures are outlined in Sections 19.2.2 and 19.3.2. As described in Section 19.8, increased sensory disturbances associated with construction and decommissioning activities (e.g., noise from increased vehicle traffic, heavy equipment, lights) has the potential to result in localized indirect migratory bird habitat loss due to reduced habitat effectiveness in areas adjacent to the work. Construction and operation and maintenance mitigation measures are outlined in Sections 19.2.5 and 19.3.5.

19.1.3 TERRAIN AND SOIL

The Project has the potential to affect terrain and soil through changes in terrain integrity and soil quality and quantity. Terrain integrity includes surface expressions that are influenced by changes in slopes. Soil quality and quantity can be measured as agricultural capability because it is based on several features including soil classification, texture, topsoil depth, erosion, salinity, and stoniness. The effect pathways and mitigation strategies for potential effects are described below. Changes to terrain and soil have the potential to occur within the PDA and Incidental Activity Study Area. As presented in Section 13.6, the nearest federal lands to the Project are approximately 47 km away (Last Mountain Lake National Wildlife Area). Therefore, no changes to terrain and soil are expected to occur on federal lands as a result of carrying out the Project.

19.1.3.1 Change in Terrain Integrity

Construction

Change in terrain integrity has the potential to occur during the construction phase of the Project and incidental activities. During construction, slopes within the PDA and Incidental Activity Study Area will be disturbed during grading activities. Grading can change the terrain, creating new surface expressions on the landscape. Potential interactions of the Project with terrain integrity are not expected to occur within the PDA or Incidental Activity Study Area due to the absence of areas with steep slopes (i.e., greater than a 15% slope gradient). Soil exposure from grading can lead to changes in soil quality and quantity through increased soil erosion, mass movement, and changes in natural drainage patterns. The disturbance of the soil structure could possibly initiate or accelerate erosional processes.

Operation and Maintenance

Soil disturbance activities are not expected to occur during the operation and maintenance phase of the Project and no additional changes to terrain integrity will occur.

19.1.3.2 Change in Soil Quality and Quantity

Construction

Change in soil quality and quantity will occur predominantly during the construction of the Project and incidental activities and can be measured as change in soil agricultural capability. Soil agricultural capability influences land use, as lower soil quality can restrict the productivity of land. Changes in soil quality and quantity can be caused by loss of topsoil, admixing, erosion, compaction, and rutting. The construction activities that have the potential to affect soil quality include soil stripping, excavation, trenching, grading, piling installation, and heavy equipment and vehicle traffic.

Topsoil loss can be caused by improper soil handling techniques during soil stripping and grading activities. Soil stripping will remove organic materials and topsoil at locations where excavation and/or grading activities are required. Excavation would be necessary with the installation of Project related infrastructure and building foundations. Grading will be required to level the PDA for proper drainage purposes and to facilitate construction activities. Topsoil may be lost during soil stripping activities if topsoil becomes incorporated into the subsoil layer.

Admixing could occur if the topsoil and subsoil are not stripped and/or stored separately. The admixing of subsoil with topsoil can decrease the quality of the topsoil through the loss of organic matter, changing soil chemistry (e.g., increasing soil salinity levels), and increasing stoniness.

The PDA and Incidental Activity Study Area are characterized as having high potential for wind erosion and low potential for water erosion. The potential for erosion will be further increased through the exposure of soil. Soil will be exposed during the construction of the Project and incidental activities during soil stripping, grading, and stockpiling. The combination of exposed soil with strong wind and/or precipitation weather events may further increase erosion potential.

During construction of the Project and incidental activities, repetitive heavy equipment and vehicle traffic can create the risk for admixing, erosion, and topsoil loss through compaction and rutting. Compaction can result in admixing of the topsoil with subsoil and cause changes to infiltration capacity, water-holding capacity, and bulk density of the soil. Reduced water-holding capacity can increase the surface runoff that could lead to water erosion. Rutting creates exposed soil that provides the opportunity for erosion and soil loss. Rutting increases when the soil is saturated, especially during high precipitation events and spring-melt conditions.

Operation and Maintenance

Soil disturbance activities can increase the risk of soil erosion during the operation and maintenance phase of the Project on areas where stockpiled soils are exposed. Like in the construction phase, vehicle traffic on exposed soils (e.g., within the overhead transmission line ROW) during the operation and maintenance phase can create the risk for admixing, erosion, and topsoil loss through compaction and rutting and additional changes to soil quality and quantity can occur.

19.1.4 VEGETATION AND WETLANDS

19.1.4.1 Change in Vegetation and Wetlands

Construction

Project construction has the potential to cause a change in vegetation and wetlands. The PDA covers 64.9 ha and consists of predominantly low vegetation (55.4%) with the remainder comprised of cleared (29.4%), wetland (14.5%), and forested (0.8%) (Table 14-7). The Incidental Activity Study Area is comprised of mostly agricultural lands and hayland with patches of native grassland, forested land, and wetlands (SK ENV 2023). Vegetation removal (e.g., brushing, mulching), equipment travel, and introduction or spread of weed species may cause a loss or change in native vegetation communities. Construction of the Project and incidental activities will affect both native vegetation communities (e.g., native grassland, tame pasture, and wetlands) and previously disturbed cleared land cover (e.g., cultivated land and road allowances).

Wetlands of various sizes and classes are distributed throughout the PDA and Incidental Activity Study Area. A loss of wetland area or change in wetland class could occur during vegetation clearing and ground disturbance.

The Project (including incidental activities) will not interact with water features that provide fish habitat. Routing and siting of incidental activities (e.g., 25 kV overhead distribution line) will avoid fish habitat and therefore, no change in fish habitat or change in fish mortality risk is anticipated as result of the construction.

As described in Section 19.8, the removal of vegetation associated with construction activities has the potential to result in direct habitat loss for nesting migratory birds. Construction activities (e.g., vegetation clearing, vehicle traffic, trenching) occurring during the migratory bird nesting period can result in the destruction of migratory bird nests. The Incidental Activity Study Area is primarily comprised of cropland that can support foraging opportunities for migrating waterfowl, including some wildlife SOCC. Mitigation measures that will be implemented during to reduce potential effects on migratory birds are outlined in Sections 19.2.5 and 19.3.5.

The largest spatial extent within which the Project is expected to have effects on vegetation and wetlands and the regional context over which cumulative effects may occur is a 300 m and 5 km buffer of the PDA (i.e., the LAA and RAA for vegetation and wetlands). As presented in Section 13.6, the nearest federal lands to the Project are approximately 47 km away (Last Mountain Lake National Wildlife Area). Therefore, no changes to vegetation and wetlands are expected to occur on federal lands as a result of carrying out the Project.

Operation and Maintenance

Project operation and maintenance activities including vehicle traffic could cause the introduction or spread of weed species within the PDA, ROWs associated with incidental activities, or vegetation and wetlands LAA. No change in fish habitat or change in fish mortality risk is anticipated because the Project is not expected to interact with fish and fish habitat.

19.1.4.2 Change in Plant SOCC

Construction

A change in plant SOCC has the potential to occur during the construction phase of the Project. Vegetation removal and ground disturbance activities (e.g., topsoil stripping, grading) may cause a loss or change in plant SOCC. Although no plant SOCC were observed in the PDA, there is potential habitat for plant SOCC within native plant communities including native grassland, tame pasture, shrubland, forested land, and wetlands associated with the incidental activities. Construction activities may result in the loss of plant SOCC during vegetation removal activities or through increased competition due to the introduction or spread of weed species due to vehicle and equipment movement.

Operation and Maintenance

Project operation and maintenance including vehicle traffic within the ROWs associated with incidental activities may increase competition due to the introduction or spread of weed species.

19.1.5 WILDLIFE AND WILDLIFE HABITAT

19.1.5.1 Change in Wildlife Habitat

This section discusses the direct and indirect pathways for a change in wildlife habitat, including for SOCC, during the construction, operation and maintenance, and decommissioning phases of the Project. An assessment on migratory birds is included in Section 19.8. Construction and operation and maintenance mitigation measures, including those pertaining to migratory birds are outlined in Sections 19.2.5 and 19.3.5.

The largest spatial extent within which the Project is expected to have effects on wildlife and wildlife habitat and the regional context over which cumulative effects may occur is a 1 km and 5 km buffer of the PDA (i.e., the LAA and RAA for wildlife and wildlife habitat). As presented in Section 13.6, the nearest federal lands to the Project are approximately 47 km away (Last Mountain Lake National Wildlife Area). Therefore, no changes to wildlife and wildlife habitat are expected to occur on federal lands as a result of carrying out the Project.

Construction

A change in wildlife habitat has the potential to occur during the construction phase of the Project. Vegetation clearing of the PDA and incidental activities is the primary pathway for habitat loss during site preparation and infrastructure installation activities. Direct habitat loss is expected within the PDA as 70.6% of the area comprises low vegetation, forested, and wetlands supporting migratory birds, including some SOCC, while the remaining 29.4% is cultivated land with dugouts (see Table 14-7 for more details on land cover). The majority of the Incidental Activity Study Area is comprised of cropland that can support foraging opportunities for migrating waterfowl, including some SOCC like whooping crane, and transient ungulates (e.g., moose, white-tailed deer [*Odocoileus virginianus*], mule deer [*Odocoileus hemionus*]). The remainder of lands suitable for wildlife habitat in the Incidental Activity Study Area is limited to low vegetation, shrubland, tame pasture, and wetlands. Vegetation loss associated with construction activities (e.g., vehicle and equipment use, development of access roads, etc.) has the potential to result in direct habitat loss and alteration for wildlife.

Sensory disturbances associated with construction activities (e.g., noise from increased vehicle traffic, heavy equipment, lights) have the potential to result in indirect habitat loss outside of the PDA due to reduced habitat effectiveness (i.e., wildlife avoidance of otherwise suitable habitat). The average noise levels would create a noticeable temporary increase over ambient noise but would attenuate with increasing distance, fading into ambient noise background levels at distances of approximately one km (see Section 19.1.2 for more details on noise effects). Wildlife species that reside near the Project may be deterred from using nearby habitats during the construction of all Project components. Construction disturbance may also affect breeding and rearing success for some wildlife species (Bayne et al. 2008; Francis and Barber 2013) if construction occurs during the nesting season. Responses vary by species, but it is expected that wildlife will avoid the Project during construction because of noise, vibrations, and increased human activity (Habib et al. 2007).

Operation and Maintenance

The primary pathways of potential effects on wildlife, during operation and maintenance are associated with the creation of wildlife habitat. The evaporation and storm water ponds will create potential habitat for wildlife, particularly amphibians, waterbirds, and waterfowl (including SOCC and migratory birds). The evaporation pond will receive process wastewater streams (i.e., water that cannot be recycled to Project processes). The storm water ponds will have storage, secondary containment, and handling procedures employed on-site, therefore; it is unlikely surface water runoff will encounter contaminants. Water quality in the evaporation and storm water ponds are expected to be similar to other natural habitats and therefore ecological health risks to wildlife are not anticipated.

Sensory disturbance during operation and maintenance may result in indirect habitat loss by altering wildlife habitat availability in the wildlife and wildlife habitat LAA. The increase in noise levels near the PDA during operation and maintenance may result in the displacement of wildlife, however, potentially affected species may return after a period of acclimatization. The operation and maintenance of all incidental activities will include minimal activity and is not expected to impose indirect effects on wildlife and wildlife habitat.

Decommissioning

Direct habitat loss is not expected to occur during the decommissioning phase of the Project. Decommissioning of the Project and transmission line will include removal of the above-ground Project infrastructure while the remaining Project components will be maintained by the RM of Usborne (e.g., road infrastructure) or abandoned or repurposed (e.g., fibre-optic line; Section 9.4.6).

Increased sensory disturbances associated with decommissioning activities (e.g., noise from increased vehicle traffic, heavy equipment, lights) has the potential to result in localized indirect habitat loss due to reduced habitat effectiveness in areas adjacent to the Project. Removal of noise associated with the Project upon decommissioning has the potential to improve habitat effectiveness in the wildlife and wildlife habitat LAA as compared to the construction and operation and maintenance phases.

19.1.5.2 Change in Wildlife Mortality Risk

Construction

Project construction has the potential to result in an increased direct mortality risk for wildlife, including SOCC. Construction activities (e.g., vegetation clearing, vehicle traffic, trenching) during the breeding season can result in the disturbance to, or destruction of, migratory bird nests, as well as den sites and burrows. Ground nesting SOCC (e.g., Sprague's pipit, Baird's sparrow, bobolink) are particularly vulnerable during construction throughout the breeding season. Wildlife mortality of young may also occur if active nests and burrows have been abandoned due to sensory disturbance and the young may not be able to escape the area. Wildlife with decreased mobility (i.e., amphibians, nesting birds, and small mammals) are also more susceptible to direct mortality if individuals are unable to escape construction activities.

There is also an increased mortality risk for wildlife, including SOCC, due to potential vehicle collisions at the Project with increased vehicle traffic along existing access roads in the wildlife and wildlife habitat LAA.

Increased activity and noise during construction may cause an indirect increase in mortality risk from disturbance to wildlife resulting in behavioural changes and increased predation efficiency. Some wildlife species (e.g., amphibians) might move from cover (i.e., behavioural change) because of disturbance from noise and vibration, putting them at greater risk of predation and mortality from exposure.

Operation and Maintenance

Project operation and maintenance has the potential to result in an increased mortality risk to wildlife, including SOCC. Presence of overhead wires, in particular shield wires, pose a collision risk to birds because they are difficult to see during low light conditions. Birds perched on distribution structures are at risk of electrocution due to the potential to touch two energized points at once.

Artificial night lighting has the potential to attract or disorient nocturnally migrating birds that may result in an increased risk of injury or mortality from exhaustion or collisions with Project infrastructure. Any birds attracted to the Project by artificial night lighting could also be exposed to other threats such as predation or collisions with Project vehicles or equipment (e.g., transmission lines). Project lighting may also attract bats and increase bat mortality due to collisions with lit infrastructure. Alternatively, some bat species may avoid lit areas, resulting in increased mortality as a result of increased energy expenditure to fly longer alternative routes between foraging and roosting habitat.

Human-wildlife conflict is a mortality risk during construction and operation and maintenance. Poor management of wastes (e.g., garbage, grey water, food wastes) and other attractants (e.g., food, petroleum products, toothpaste) may result in wildlife-human conflict and the destruction of wildlife deemed to be a safety risk. Human-wildlife conflict is mostly likely to effect canids, but may also affect other mammals (e.g., American badger [*Taxidea taxus*]).

There is also an increased mortality risk for wildlife, including migratory birds, due to potential vehicle collisions at the Project, along the access road and roads in the wildlife and wildlife habitat LAA that will be used to bring in equipment and materials to the Project. In addition, there is mortality risk for amphibians moving between the stormwater and evaporation ponds within the PDA.

Decommissioning

Similar Project effects during the construction phase have the potential to occur during onset of the decommissioning phase. The removal of above-ground Project infrastructure during the breeding season can result in the destruction of migratory bird nests, as well as den sites and burrows. However, once infrastructure is removed, this can reduce mortality risks to migratory birds (e.g., overhead power lines). The risk is greatest for wildlife with decreased mobility (e.g., amphibians, nesting birds, and small mammals). Movement of Project vehicles and equipment within the Project and along roads accessing incidental activities may also increase mortality risk for wildlife.

19.1.6 HUMAN ENVIRONMENT

19.1.6.1 Change in Current Land and Resource Use

Current land and resource use within the PDA is not expected to change with construction of the Project. The PDA is owned by SaskPower (Appendix D). Within the LAA, there is the potential for the Project to affect current land and resource use through access disruption due to construction traffic, and a loss of available wildlife species due to sensory disturbance (e.g., noise from increased vehicle traffic, heavy equipment, lights, increased human presence) that may deter recreational and resource use activities (e.g., hunting and trapping). Availability of hunted wildlife species may be affected by an increase in mortality due to vehicle-wildlife collisions from increased traffic.

Change to current land and resource use within the PDA is not expected to occur during the operation and maintenance phase of the Project. Continued sensory disturbance and vehicle-wildlife collisions during operation and maintenance may continue to deter wildlife close to the PDA (thereby deterring recreational activities in the LAA) or reduce availability of hunted wildlife species within the LAA. Temporary disturbance to recreational land use in the LAA is possible during decommissioning activities, but once reclamation is complete, it is assumed the reduction in sensory disturbance will no longer deter use of the LAA for recreational purposes. Changes in current land and resource use are not anticipated to cause adverse effects within federal jurisdiction.

19.1.6.2 Change in Employment and Economy

It is expected that over its lifetime, the Project will contribute to an increase in employment and economy in the RAA. The Project will provide an economic benefit to the LAA through employment opportunities and will have economic benefits from the purchasing of supplies and services from vendors across central Saskatchewan. As discussed in Section 15.3, it is estimated that during the peak of construction the Project will provide approximately 450 fulltime employment opportunities including a broad spectrum of operators, trades, supervisors, and professionals. During operation and maintenance, the Project will provide employment opportunities for approximately 25 full time staff at the Project.

The Project's construction workforce and Project activities will increase the demand for goods and services, including temporary accommodation, food services, and construction materials. These expenditures on goods and services will generate benefits and opportunities for local businesses but may result in a reduction in available capacity or quality of services for residents and visitors to the area. As discussed in Section 15.3, there are forecasted deficits for most craft trades in the Project region. Consequently, the Project may require employees to travel from other provinces throughout the Project phases. Given the relative population of the LAA, the addition of full-time employees are not expected to have a substantial effect on the availability of goods and services for residents.

Effect pathways for change in employment and economy during all Project phases (i.e., construction, operation and maintenance, and decommissioning) will include Project expenditures on local goods and services which will contribute to the local economy of the LAA; Project expenditures on labour will contribute to federal and provincial gross domestic product (GDP) and government revenues; Project purchases of goods and services from local and regional businesses will contribute to federal and provincial GDP and government revenues; and the purchase of consumer goods and services by individuals who are employed directly or indirectly by the Project will contribute to GDP and government revenue. Changes in employment and economy are not anticipated to cause adverse effects within federal jurisdiction.

19.1.6.3 Change in Infrastructure and Services

The Project's construction workforce and Project activities may increase the demand for existing infrastructure and services, such as the road network, rail network, local landfills, health care services, and businesses. The Project is likely to increase traffic on the TransCanada Yellowhead Highway 16, Highway 20, and local roads through the transportation of workers, equipment and materials and will likely also generate solid waste and sewage requiring disposal. The potential increase of traffic on the TransCanada Yellowhead Highway 16, Highway 20, and local roads is expected to be minimal considering the existing capacity and traffic levels of the primary and secondary highway, but may include increased wear and tear, traffic wait-times, and collision risk.

The Project's construction workforce has the potential to result in an increased demand for health, emergency, and protection services, which may increase response times. There is also the potential that the presence of a construction workforce may result in a reduction in available capacity or quality of infrastructure and services for residents and visitors to the area. However, the emphasis on developing a local labour force, and the stipend that will be provided for employees commuting or for their respective accommodations (Section 15.3), may alleviate some pressure on infrastructure and services. The need for emergency services will continue during operation and maintenance, however it is anticipated to be at a reduced level in comparison to the construction phase.

During operation and maintenance, the expected workforce of approximately 25 full time employees will shift the demand from temporary accommodations to more permanent accommodations. There may be an increased workforce during the decommissioning phase that would again increase pressure on existing infrastructure, particularly temporary accommodation. Changes in infrastructure and services are not anticipated to cause adverse effects within federal jurisdiction.

19.2 Construction Mitigation Measures

19.2.1 AIR QUALITY

Air emissions associated with Project construction are expected to be minor and occur only for short intervals. Multiple control measures will be implemented during construction to reduce air emissions and potential effects. After grading, the untraveled or lightly travelled locations will be watered, mulched, overlain with a crushed stone layer, or vegetated to reduce fugitive particulate matter ($PM_{2.5}$, PM_{10}, and TPM) emissions. Activities that potentially generate fugitive emissions will be monitored visually by construction personnel. If fugitive emissions become visible, water will be sprayed on the affected areas. The idling of construction equipment and vehicles will be reduced.

Potential air quality effects from construction activities will vary depending on the level of activity, the specific operations, site conditions, control measures, and prevailing weather conditions. Most effects due to construction are expected to occur in areas within the immediate vicinity of the Project. Many of the Project site preparation and construction activities such as land clearing, filling, and grading, will be intermittent and of short duration. These aspects of the construction activities as well as control measures, will serve to reduce potential effects. Additional information on the Project's emissions during the construction phase is provided in Section 24.4.

19.2.2 NOISE

Project construction will generate noise levels that have the potential to be periodically audible offsite. Construction of the proposed Project is expected to involve site clearing, excavation, placement of concrete, and the use of typical utility construction equipment. The primary sources of construction noise will be associated with equipment operation, use of heavy-duty vehicles, grading, and foundation work activities. Project construction is typically completed in stages, but various construction activities may overlap and with multiple construction crews operating simultaneously. Construction noise mitigation measures that could be implemented include the following actions:

- Maximize the distance between stationary equipment and noise sensitive receptors to the extent practicable.
- Limit pile driving and impact activities to daytime hours.
- Route construction equipment away from noise sensitive receptors to the extent practicable.

- Turn off idling equipment when not in use.
- Use construction equipment with proper mufflers.

For a full listing of SaskPower's standard mitigation measures for noise please refer to SaskPower's Environmental Beneficial Management Practices (BMPs) (SaskPower 2022a).

19.2.3 TERRAIN AND SOIL

Implementing mitigation measures to reduce Project effects to changes in terrain integrity, soil quality, and soil quantity during construction include, but are not limited to, the following:

- Proper soil handling techniques will be implemented including stripping and storing topsoil and subsoil separately and maintain adequate distance between stockpiles to avoid admixing.
- Topsoil stripping will be monitored to reduce soil quality loss through admixing.
- Erosion control measures will be installed where required to reduce potential for loss of soil quantity. Erosion control measures will include the use of silt fencing around soil stockpiles.
- Soil stockpiles that may be stored for longer durations may be stabilized with temporary seeding.
- Refuelling of equipment will not be completed on topsoil and topsoil/subsoil stockpiles.
- Heavy equipment and vehicle use will be restricted to dry or frozen soil conditions to reduce the potential for compaction and rutting, where feasible.
- When saturated soil conditions are observed during construction, mitigation measures will be implemented including installing matting, avoidance, and/or temporary shutdowns of construction activities.

For a full listing of SaskPower's standard mitigation measures for terrain and soil please refer to SaskPower's Environmental BMPs (SaskPower 2022a).

19.2.4 VEGETATION AND WETLANDS

There are several mitigation measures that have already been and/or will be implemented to avoid or reduce Project effects to vegetation and wetlands including, but not limited to:

- The Project team designed the Project to be sited within cultivated lands where possible, avoiding suitable habitat for plant SOCC. Incidental activities will be routed and sited to avoid sensitive land types or features (e.g., native grassland, wetlands) to the extent feasible.
- Approvals from the appropriate provincial regulatory agencies (e.g., SK ENV, Water Security Agency) will be obtained prior to the commencement of work in wetlands and work will be completed in accordance with regulatory permit conditions.
- Clearing will be limited to the marked limits of the PDA and reduced to the extent feasible.

- Pre-construction vascular plant surveys will be completed in areas of potential habitat in the Incidental Activity Study Area in accordance with SK ENV Species Detection Survey Protocol 20.0 Vascular Plant Surveys to identify SOCC and weed species locations.
- Known SOCC locations will be avoided, where possible, and applicable SK ENV Saskatchewan Activity Restriction Guidelines for Sensitive Species (2017) setbacks will be applied by staking features (e.g., plant SOCC, if observed, and weed infestations) within the Project prior to construction.
- Vehicles and equipment will be inspected before entering the Project or its incidental activities to make sure they are clean and free of weeds.
- SaskPower's Environmental BMPs (SaskPower 2022a) including BMP01 Surface Water and BMP04 Native Grassland, Agricultural Land, and Sandhills Environments, will be followed during all Project activities. The BMPs includes measures to reduce or avoid changes to the distribution and abundance of native vegetation, plant SOCC, and weeds.
- Disturbed areas will be reclaimed after construction is complete, including topsoil replacement and seeding, when ground conditions and moisture levels permit.
- Reseeding will be completed, in areas where native vegetation has been removed or damaged, using a native seed mix. Seeding will be completed following construction during the optimal seasonal time frame to maximize germination (i.e., spring or fall).
- Native seed mixes that are consistent and compatible with the baseline vegetation community will be used for reclamation. Seed mixes will be certified weed free (i.e., analyzed for species and percentage of prohibited and noxious weeds).
- Appropriate weed control measures will be applied, as necessary.
- Monitoring the success of native vegetation reclamation will be conducted the year after seeding is completed, if applicable.

For a full listing of SaskPower's standard mitigation measures for vegetation and wetlands please refer to SaskPower's Environmental BMPs (SaskPower 2022a).

19.2.5 WILDLIFE AND WILDLIFE HABITAT

This section includes a discussion of potential effects and mitigation strategies for wildlife and wildlife habitat. Effects to fish and fish habitat and aquatic species are discussed in Section 19.6 and 19.7. Effects to migratory birds are primarily discussed here and are also summarized in Section 19.8.

Project-specific mitigation measures, along with standard industry practices and avoidance measures will be implemented during construction, operation and maintenance to reduce potential effects on wildlife and wildlife habitat. There are several mitigation measures that have already been and/or will be implemented to avoid or reduce Project effects to wildlife and wildlife habitat including, but not limited to:

- The Project team designed the Project to be sited within cultivated lands where possible, avoiding suitable habitat for wildlife SOCC. Incidental activities will be routed and sited to avoid sensitive land types or features (e.g., native grassland, wetlands) to the extent feasible.

- Vegetation removal (e.g., brushing, mulching) will be completed outside of the migratory bird nesting period to the extent feasible, outlined by ECCC (April 22 to August 24; GOC 2018b).
- Sensory disturbances will be reduced by using standard noise abatement equipment on machinery (i.e., mufflers) to control noise levels and avoid unnecessary idling.
- If a SOCC, active nest, or other sensitive wildlife feature is encountered, a species appropriate setback will be applied by staking features within the Project prior to or during construction in accordance with the SK ENV Saskatchewan Activity Restriction Guidelines for Sensitive Species (2017). In addition, construction activities in an area may be temporarily shut down until an acceptable mitigation plan is implemented in consultation with SK ENV, if necessary.
- Pre-construction nest surveys will be completed in areas that contain nesting habitat for any work occurring within the migratory bird nesting period.
- Overhead transmission line routing will avoid high risk mortality locations (e.g., wetlands) where possible. In instances where this is not feasible, mitigation measures will be implemented to increase line visibility to migratory birds (i.e., line markers) and reduce the potential for wildlife mortality following SaskPower's BMPs for line marking (SaskPower 2022a).
- Speed limits will be maintained below 40 km/h on and off the Project and reduced in areas where wildlife SOCC or movement corridors have been identified.
- Vehicle operators will yield the ROW to wildlife and take all reasonable measures to avoid wildlife-vehicle collisions. Any collisions with wildlife will be reported to provincial regulators, as appropriate.
- Personnel will not be permitted to harass or feed wildlife. Nuisance wildlife will be reported to the appropriate authorities.

For a full listing of SaskPower's standard mitigation measures for wildlife and wildlife habitat please refer to SaskPower's Environmental BMPs (SaskPower 2022a).

19.2.6 HUMAN ENVIRONMENT

Standard industry practices and avoidance measures, in addition to Project-specific mitigation measures will be implemented during construction to reduce effects to the human environment. Mitigation measures to reduce Project effects to changes in current land and resource use, employment and economy, and infrastructure and services during construction include, but are not limited to, the following:

- Property owners, resource users, and stakeholders will be provided with information and updates on ongoing and planned construction activities.
- Appropriate signage indicating access restrictions and the duration of the restrictions will be posted in advance of construction.
- There will be no entry of personnel or equipment, or work conducted on private property without proper agreements in place.
- A security fence will be installed around the active construction zone. Any fences inadvertently damaged adjacent to or within the PDA will be immediately repaired.

- Temporary gates to bypass construction will be installed if neighboring fence sections need to be moved.
- All buried and overhead lines will be marked with appropriate warning signage.
- Vehicles and equipment will be inspected before entering the Project or its incidental activities to make sure they are clean and free of weeds.
- Project labour agreements for construction work will be developed that respect provincial labour laws and established practices for labour training and supply.
- The hiring of local construction workers, subject to labour availability, cost, and quality considerations will be prioritized, followed by workers from within the province, then from the rest of Canada, then North America, and then overseas countries.
- The local labour force will be supplemented with mobile workers when needed to avoid displacing currently employed individuals in the area.
- Employment and procurement programs will be developed that actively promote local opportunity, including for Indigenous workers and businesses, taking into consideration the competitiveness and relative capacity of local suppliers.
- An ERP will be developed for the Project that will be shared with Project personnel. The ERP will include measures to address emergency response communications, a 24-hour emergency transport to the hospital for occupational and non-occupational injuries, and a plan for fire response and evacuation. Contractors will also be required to have ERPs in place.
- The MOH and RM of Usborne will be coordinated with regarding compliance with applicable road restrictions and transportation requirements during the construction period.
- Potable water will be provisioned in accordance with local regulations.
- During the construction phase, sanitary waste generated onsite will be stored in a septic tank and will be pumped and removed from site by licensed contractors and disposed of in accordance with applicable regulations
- Solid waste, including construction waste, recyclable material, and some hazardous waste, will be disposed of in accordance with local regulations.
- Project construction-related traffic will be restricted to the PDA to the extent practical and required.
- Roadways used or damaged through construction activities will be maintained and repaired.
- Roads, local highways and rail lines will not be blocked, and crossings will adhere to safety and legal requirements.
- Additional resource requirements for power, heating, traffic, policing, fire protection and snow clearance will be accounted for.

For a full listing of SaskPower’s standard mitigation measures for the human environment please refer to SaskPower’s Environmental BMPs (SaskPower 2022a).

19.3 Operation and Maintenance Mitigation Measures

19.3.1 AIR QUALITY

SaskPower will adhere to federal emission standards and guidelines for new turbine emissions (ECCC 2017). In addition, SaskPower commits to meeting ambient air quality objectives, and industry standard best practices for operational emissions. To achieve this, and to reduce potential adverse effects of the Project operation and maintenance on ambient air quality, mitigation measures will include the following:

- Installing the most up-to-date technology including several features intended to reduce overall emissions including ULN burners.
- Increasing the temperature of fuel gas in combine cycle mode using feedwater to improve cycle efficiency, reducing emissions.
- Regular inspection and maintenance of the gas turbines will be completed to support optimum performance and emission reduction.

With the application of the mitigation measures and the fact that predicted ambient concentrations are anticipated to be below the SAAQS and 2025 CAAQS, the effects of the Project on ambient air quality are assessed as being not substantial. Additional information on the Project's emissions during the operation and maintenance phase is provided in Section 24.5.

19.3.2 NOISE

To meet the noise thresholds (i.e., AUC Rule 012 PSL) at nearby dwellings, some of the equipment will require noise mitigation measures in their design. Actual mitigation will be selected during detailed design of the Project. Typical mitigation measures may include silencer, barriers, enclosures, acoustic shrouding, low noise equipment, acoustic louvers, or building with high sound transmission class rating. A summary of the major equipment noise emission level targets (i.e., sound power level or sound pressure level) are provided in the detailed NIA for the Project in Appendix F. The required sound transmission class (STC) of the combustion- and steam-turbine buildings are also provided in the NIA.

During Project commissioning, steam blows will be utilized to remove any debris which may be left inside the system during construction. Steam blowing is a critical activity during the commissioning of the Project. The steam system feeding the steam turbine must be steam blown to remove debris that could potentially damage the steam turbine blades during operation and maintenance. The steam blow piping will be routed outside the building and the noise generated from the steam exiting the discharge piping will be routed through a silencer to reduce noise emissions.

19.3.3 TERRAIN AND SOIL

Implementing mitigation measures to reduce Project effects to changes in terrain stability, soil quality, and soil quantity during operation and maintenance include, but are not limited to, the following:

- Heavy equipment and vehicle use will be restricted to dry or frozen soil conditions to reduce the potential for compaction and rutting, where feasible.
- When saturated soil conditions are observed during operation and maintenance, mitigation measures will be implemented including installing matting, avoidance, and/or temporary shutdowns of operation and maintenance activities.

For a full listing of SaskPower's standard mitigation measures for terrain and soil please refer to SaskPower's Environmental BMPs (SaskPower 2022a).

19.3.4 VEGETATION AND WETLANDS

Vegetation and wetland mitigation measures during Project operation and maintenance will focus on maintenance of protective measures and on-going application of control measures including the following:

- Operation and maintenance activity will be restricted to the PDA and incidental activities ROWs.
- Vehicles will be clean and free of weeds before entering the Project or its incidental activities.
- Sediment fencing will be maintained as required.
- The PDA will be regularly inspected for weed occurrences and corrective measures applied (e.g., spraying, mowing, hand-pulling), as needed.

For a full listing of SaskPower's standard mitigation measures for vegetation and wetlands please refer to SaskPower's Environmental BMPs (SaskPower 2022a).

19.3.5 WILDLIFE AND WILDLIFE HABITAT

Wildlife and wildlife habitat mitigation measures during Project operation and maintenance includes protective measures and on-going application of control measures including the following:

- Water quality in the evaporation and storm water ponds are expected to be similar to other natural habitats; as such, mitigation measures to discourage use of the stormwater pond by wildlife, including migratory birds, is not deemed necessary.
- Personnel will not be permitted to harass or feed wildlife. Nuisance wildlife will be reported to the appropriate authorities.

For a full listing of SaskPower's standard mitigation measures for wildlife and wildlife habitat please refer to SaskPower's Environmental BMPs (SaskPower 2022a).

19.3.6 HUMAN ENVIRONMENT

Standard industry practices and avoidance measures, in addition to Project-specific mitigation measures will be implemented during operation and maintenance to reduce effects to the human environment. Mitigation measures to reduce Project effects to changes in current land and resource use, employment and economy, and infrastructure and services during operation and maintenance include, but are not limited to, the following:

- Property owners, resource users, and stakeholders will be provided with information and updates on planned operation and maintenance activities.
- Vehicle operators will yield the ROW to wildlife and take all reasonable measures to avoid wildlife-vehicle collisions.
- Any fences inadvertently damaged adjacent to or within the PDA will be immediately repaired.
- All buried and overhead lines will be marked with appropriate warning signage.
- The local labour force will be supplemented with mobile workers when needed to avoid displacing currently employed individuals in the area.
- Employment and procurement programs will be adhered to.
- The ERP will be adhered to.
- Ensure roads, local highways and rail lines are not blocked, and crossings adhere to safety and legal requirements.

For a full listing of SaskPower's standard mitigation measures for the human environment please refer to SaskPower's Environmental BMPs (SaskPower 2022a).

19.4 Decommissioning Mitigation Measures

The Project is expected to operate until 2049. Precise timing for the decommissioning of the Project cannot be predicted at this time as it depends solely on the mode of operation. However, all relevant environmental regulations in existence at the time of decommissioning will be adhered to. A (D&RP), as required by the SK ENV, will be developed for the Project outlining the decommissioning and reclamation objectives, methodologies, and estimated costs. This plan is reviewed periodically for completeness and adherence to environmental laws/regulations as they may change periodically. This D&RP will guide SaskPower's activities.

19.5 Accidents and Malfunctions

Accidents and malfunctions are unplanned events that have a reasonable chance of occurring, or those that could result in significant environmental effects. Accidents and malfunctions have the potential to occur because of acts of nature, human error, equipment failure, or other possible causes. Potential accidents and malfunctions that may occur during Project construction, operation and maintenance include hazardous materials spills, fires, vehicle accidents, and accidental damage to utilities.

19.5.1 HAZARDOUS MATERIALS SPILLS

Hazardous materials will be stored and used on site during Project construction and operation and maintenance. Improper handling, use, or storage of these materials could result in a release. In addition, the release of hazardous materials could occur through several scenarios including vehicle collisions, refueling, and equipment or machinery breakdowns. Small spills (spills not deemed as reportable to SK ENV under the Environmental Spill Control Regulations) of hazardous materials can usually be contained and cleaned up by onsite staff using standard equipment. Larger spills could result from a vehicle, or mobile equipment collision that ruptures a tank used to store hazardous materials. A Project-specific EMP, which will include a Spill Contingency Plan, will be developed to support a response and actions to reduce potential effects to the environment. The Spill Contingency Plan will be consistent with those in place at SaskPower generating facilities.

The Spill Contingency Plan will identify protection and emergency response measures to use if there is a release of hazardous materials. Additional mitigation measures available to reduce potential effects for accidental hazardous material releases include:

- Materials will be available at all physical work locations to contain and recover spills.
- Contractors will be responsible for having spill response equipment and materials onsite and readily available.
- Staff and contractors that handle hazardous materials, including fuel truck drivers, will have valid and appropriate training and/or certification.
- All equipment will arrive to the Project free of leaks and in good working condition. Any equipment which does not arrive free of leaks and in good working condition shall not be allowed on site.
- Equipment used in the construction and operation and maintenance of the Project will be maintained in proper working condition to reduce the potential for leaks.
- All hazardous materials will be stored using adequate secondary containment.
- No fuel, oil or other hazardous material will be stored within 100 m of any water feature.
- Equipment maintenance and servicing will not occur within 100 m of any water feature.
- All reportable spills (those identified in SK ENV Environmental Spill Control Regulations) will be reported to SK ENV. Soil and water quality tests will be undertaken as needed to assess the damage and to develop a remediation plan if required. Remediation efforts, where required, will be in accordance with SK ENV guidelines and reporting requirements.

19.5.2 FIRES

Fire may be caused by natural events such as lightning strikes, electrically powered Project component malfunction, equipment malfunction, or anthropogenic activities. In the unlikely event of an accidental fire, effects could include the damage or destruction of Project buildings, equipment, and infrastructure. Fires also have the potential to cause loss of life, air quality degradation, vegetation loss, wildlife and wildlife habitat loss, agricultural loss, and infrastructure loss.

An ERP will be developed for the Project and will identify protection and emergency response measures to be implemented if a fire occurs. Mitigation measures that will be implemented to reduce the potential for fires or damages resulting from fires include:

- The Project will be designed with consideration of the potential for fire and explosions and in accordance with insurance requirements, industry best practices, and the National Fire Protection Association fire codes.
- Fires or burning will not be allowed on the construction site.
- The ERP will include coordinating with local first responders.
- Designated smoking areas will be provided.
- Storage tanks will meet provincial code requirements.
- The burning of garbage and debris will be prohibited.
- Project-specific hot work procedures will be followed.
- Idling of vehicles when parked in vegetated areas will be prohibited.
- Safe work practices will be followed when handling flammable materials.
- Necessary fire-fighting equipment will be available and maintained; trained personnel will be present on site.
- Reasonable attempts will be taken to extinguish a fire should one occur.
- Construction and/or operation and maintenance and related activities taking place in the vicinity of a wildfire will cease until it is safe to resume operations.

19.5.3 VEHICLE ACCIDENTS

Movement of vehicles, equipment and personnel to the Project could result in collisions resulting in injury or death to humans and wildlife. Vehicle collisions have the potential to occur under a range of conditions related to road conditions, weather, driver fatigue and distractions, collisions with wildlife, or vehicle malfunctions. These accidents have the potential to occur during any phase of the Project.

Mitigation measures to reduce the risk of vehicle collisions will include:

- Employees and contractors will be required to comply with traffic, highway use and safety laws, and regulatory requirements.
- Project roads will be designed, constructed, and maintained for safe use.
- Speed limits will be implemented on Project roads.
- On-site emergency response personnel or regional emergency services will be contracted for the Project.
- Preventative measures for vehicle accidents will include signage, traffic control flag persons, road surface controls (e.g., dust suppression), maintaining vehicles, and reducing traffic to the Project during construction, and operation and maintenance.

19.5.4 ACCIDENTAL DAMAGES TO UTILITIES

Project activities such as ground disturbance, clearing, and equipment operation have the potential to cause damage to aboveground and underground utilities and infrastructure. Striking utilities or infrastructure can cause damage to communications, electricity transmission and distribution systems, water supply, sewage lines and storage, and natural gas infrastructure. Damages can be caused by hand tools, heavy machinery (e.g., excavators), equipment and vehicle collisions, and operating equipment under overhead lines without proper clearance. Damages to utilities have the potential to cause health and safety consequences, affect air quality, and cause work delays or shutdowns.

Construction, and operation and maintenance safety plans will include following ground disturbance protocols, which will require review of the work and advance planning prior to approval to proceed. The process will include the following measures:

- acquiring up-to-date utility plans/drawings prior to construction
- installing protection and warning materials above new buried utilities
- inclusion of tracing wires in buried plastic piping to enable accurate field location
- conducting public and private line location services in advance of ground disturbance activities, as required
- marking all above and underground utilities prior to excavation with the appropriate signage and flagging prior to construction
- using soft excavation tools when working in proximity to underground utilities or when the location of the utilities is not known
- using barriers or fencing when operating equipment in proximity to aboveground utilities
- installing signage and clearance requirements at overhead power line crossings

19.6 Fish and Fish Habitat

Effects to fish and fish habitat, as defined in subsection 2(1) of the *Fisheries Act* are not expected to be caused by the Project (GOC 1985a). The Project (including incidental activities) will not interact with water features that provide fish habitat. Routing and siting of incidental activities (e.g., 25 kV overhead distribution line) will avoid fish habitat and therefore, no change in fish habitat or change in fish mortality risk is anticipated. The PDA is located approximately 350 m northwest of Dellwood Brook and approximately 30 m northwest of an unnamed agricultural drain. The agricultural drain is connected to Wolverine Lake approximately 11 km upstream from the PDA, however the drain is unlikely to provide fish habitat because it is largely ephemeral (i.e., only containing water seasonally or after precipitation events). Dellwood Brook is the closest potential fish bearing water feature to the Project and flows southwest through the Incidental Activity Study Area before entering the Dellwood Reservoir, approximately 5.3 km downstream, eventually reaching its confluence with Lanigan Creek approximately 21.5 km south of the Incidental Activity Study Area. Given the distance to Dellwood Brook from the PDA, no interactions with fish or fish habitat are expected to occur. In addition, routing and siting of incidental activities considered within the IPD will avoid fish habitat and therefore, no change in fish habitat or change in fish mortality risk is anticipated as result of the construction, operation and maintenance, or decommissioning of the incidental activities considered.

If fish habitat is identified during future Project design, including the final routing and siting of incidental activities, SaskPower commits to the implementation of BMPs to reduce or avoid potential effects to fish and fish habitat. For a full listing of SaskPower's standard mitigation measures for fish and fish habitat please refer to BMP 01-Surface Water in SaskPower's Environmental BMP Manual (SaskPower 2022a).

19.7 Aquatic Species

There are no known aquatic species at risk, as defined by SARA, expected to occur within the Project LAA and Incidental Activity Study Area and none are expected to occur due to the lack of suitable aquatic habitats (GOC 2002, GOC 2019d). As a result, the Project is not expected to adversely affect aquatic species, as defined by the SARA.

19.8 Migratory Birds

This section summarizes the potential effects on migratory birds and their habitat resources as a result of Project construction, operation and maintenance, and decommissioning activities. Detailed methods (including desktop review and field surveys), existing conditions, and effect pathways, are presented in Sections 14.2.5 and 19.1.5.

The removal of vegetation associated with construction activities has the potential to result in direct habitat loss for nesting migratory birds. Construction activities (e.g., vegetation clearing, vehicle traffic, trenching) occurring during the migratory bird nesting period can result in the destruction of migratory bird nests. The Incidental Activity Study Area is primarily comprised of cropland that can support foraging opportunities for migrating waterfowl, including some SOCC like whooping crane. If vegetation removal occurs within the Incidental Activity Study Area, it could also result in indirect habitat loss and reducing habitat effectiveness due to sensory disturbances. The presence of overhead wires during operation and maintenance, in particular shield wires, pose a collision risk to birds because they are difficult to see during low light conditions. Birds perched on distribution towers are at risk of electrocutions due to the potential to touch two energized points at once, increasing mortality risk to migratory birds.

Increased sensory disturbances associated with construction and decommissioning activities (e.g., noise from increased vehicle traffic, heavy equipment, lights) has the potential to result in localized indirect habitat loss due to reduced habitat effectiveness in areas adjacent to the work. However, removal of noise and infrastructure associated with the Project upon decommissioning has the potential to improve habitat effectiveness and create habitat gain from reclaimed land. Project-specific mitigation measures, along with standard industry practices and avoidance measures will be implemented to reduce potential effects on migratory birds. Residual effects on migratory birds that are expected to occur as a result of the Project are summarized below.

The PDA and wildlife and wildlife habitat LAA consists of less than 15% of wetland habitat and the Incidental Activity Study Area is predominantly situated on cultivated lands that parallel existing anthropogenic disturbances (e.g., residential housing). Development and habitat conversion has compromised the effectiveness of migratory bird habitat in the wildlife and wildlife habitat LAA and parts of the Incidental Activity Study Area. Where suitable wildlife habitat does exist, mitigation measures will be used to reduce direct and indirect Project-related effects on migratory birds. For example, Project clearing and construction will occur during dry conditions outside of the migratory bird nesting period, to the extent feasible. In addition, horizontal directional drilling methods may be used at certain locations during construction of incidental activities to reduce or eliminate effects to wetland habitats.

Migratory bird mortality risk increases during construction activities (e.g., vegetation clearing, ground disturbance, and vehicle or wire collisions). The likelihood of Project activities interacting with migratory birds is greater in areas where natural habitats exist (e.g., wetlands) but the risk is greatly reduced with the implementation of mitigation measures.

The evaporation and storm water ponds will create potential habitat for wildlife, including migratory birds. The evaporation pond will receive process wastewater streams (i.e., water that cannot be recycled to Project processes). The storm water ponds will have storage, secondary containment, and handling procedures employed on-site, therefore; it is unlikely surface water runoff will encounter contaminants. As described in Section 24.1.1, in the unlikely event of a significant influx of hydrocarbons into the storm water pond immediate actions to prevent wildlife, including migratory birds, from contacting the contaminants will be deployed.

To evaluate potential quality of habitat in the evaporation pond, from the perspective of water quality, the estimated water quality of the waste stream discharged from the Project to the evaporation pond during operation and maintenance (Table 24-1) was compared to the water quality guideline values for the protection of freshwater aquatic life (Canadian Council of Ministers of the Environment (CCME) 2023). All applicable parameters that had a screening level listed in the guidelines for the protection of freshwater aquatic life were below the ecological screening levels for freshwater aquatic life except for long-term exposure to iron and chloride (CCME 2023). The predicted iron concentration in the waste stream (10 mg/L) is greater than the CCME guidelines for the protection of aquatic life long-term exposure concentration of 0.3 mg/L (CCME 2023). The predicted chloride concentration in the waste stream (185 mg/L) is greater than the CCME guidelines for the protection of aquatic life long-term exposure concentration of 120 mg/L (CCME 2023). Long-term exposure guidelines are meant to protect against negative effects during indefinite exposures (CCME 2007). Long-term exposure periods are not defined for migratory birds, however they are defined for fish and amphibians, where long-term exposure is considered 21 days or greater in duration for juveniles and adults (CCME 2007).

Iron is the fourth most abundant element, it is naturally occurring, and is generally present in surface waters (ECCC 1999). Iron is essential to all lifeforms and plays an important role in metabolic processes, however at greater concentrations, iron can be toxic (ECCC 1999). The iron concentration in Saskatchewan surface waters ranges from <0.0005 mg/L, to 41.7 mg/L (ECCC 1999). Wetlands classified as swamps commonly have iron-rich layers present (National Wetlands Working Group 1997). Therefore, the predicted iron concentration of 10 mg/L in the waste stream discharged from the Project to the evaporation pond during operation and maintenance falls within the natural range of iron concentrations in Saskatchewan surface waters. Generally, water quality in the evaporation and storm water ponds are expected to be similar to other natural habitats and therefore, mitigation measures to discourage use of the stormwater pond by wildlife, including migratory birds, are not deemed necessary and ecological health risks to migratory birds are not anticipated.

The primary strategy to mitigate the risk of migratory bird mortality during construction includes timing vegetation clearing activities outside of the migratory bird nesting period, outlined by ECCC (April 22 to August 24; GOC 2018b), to the extent feasible, to avoid mortality of ground-nesting or slow-moving wildlife during this sensitive period (i.e., nesting and rearing). The Project is scheduled to be completed in approximately 34 months and year-round construction will be required. If an active nest or other wildlife feature is encountered, a species appropriate buffer will be applied and work in that area may be temporarily shut down until an acceptable mitigation plan is developed in consultation with SK ENV and the Canadian Wildlife Service, as required. Overhead transmission line routing will avoid high risk mortality locations (e.g., wetlands) where possible. In instances where this is not feasible, mitigation measures will be implemented to increase line visibility to migratory birds (i.e., line markers) and reduce the potential for wildlife mortality following SaskPower's BMPs for line marking (SaskPower 2022a).

Mortality risk to migratory birds will be reduced through implementation of a mitigation plan acceptable to SK ENV and ongoing monitoring during construction will occur to identify any conflicts with migratory birds. Reduced speed limits in the LAA and installation of signage where specific wildlife concerns have been identified are also expected to reduce mortality risk to migratory birds. Incorporating line markers to enhance transmission line visibility in high-risk areas will reduce mortality risk for migratory birds during the operation and maintenance phase.

19.9 Summary of Effects

The Project is a 370 MW CCGT natural gas facility. Natural gas generation is a critical component in achieving both an increase in renewable capacity and a reduction in GHG emissions, in accordance with SaskPower's GHG emissions reduction strategy. The Project consists of three phases and is planned to be constructed over a 3-year period. The construction phase will be carried out year-round, with initial construction activities anticipated to start in the spring of 2024.

Air quality emissions will result in negligible effects. The air quality emissions are not expected to exceed SAAQS and CAAQS. The cumulative sound levels of the Project are expected to be at or below the PSLs at all nearby dwellings, and low frequency noise emissions are anticipated to be negligible. Noise emissions from the Project will not exceed AUC Rule 012 – Noise Control.

The Project has the potential to affect terrain and soil through changes in terrain integrity and soil quality and quantity, particularly during the construction phase. Soil disturbance activities are not expected to occur during the operation and maintenance phase of the Project. The construction phase of the Project also has the potential to affect vegetation and wetlands, particularly through vegetation removal, ground disturbance, equipment travel, and the introduction or spread of weed species. The operation and maintenance phase of the Project also has the potential to affect vegetation and wetlands through the introduction or spread of weed species. The Project will adhere to SaskPower's Environmental BMPs to mitigate the potential affects to vegetation and wetlands. Wildlife and wildlife habitat potential effects are also primarily during the construction phase, through a change in wildlife habitat and a change in wildlife mortality risk. Wildlife and wildlife habitat potential effects during the operation and maintenance phase are predominantly associated with a change in wildlife mortality risk. Mitigation measures will include strategic routing and minimizing the extent of vegetation clearing where possible, in addition to adhering to migratory bird and SOCC best practice.

Accidents and malfunctions include hazardous material spills, fires, vehicle accidents, and accidental damages to utilities. The Spill Contingency Plan, ERP, and the listed mitigation measures will address accidents and malfunctions.

Project effects on health, social and economic conditions during construction may include some access disruption to infrastructure and services and resource use locations due to construction traffic. The Project construction will have limited effects on human health since the air quality emissions and noise will be short term and negligible. The construction workforce will be provided with stipends for commuting or accommodations, and therefore is not anticipated to place significant pressure on accommodation, health, or emergency services within the RM of Usborne, town of Lanigan, or village of Drake. Employment of the workforce will provide an economic benefit to the area. Therefore, the effects of the Project on health, social and economic conditions are anticipated to be minimal.

The Project is expected to benefit all communities in the vicinity of the Project, regardless of gender, race, or social status. Consultation with the public have not identified adverse effects of the Project on social, economic or health of inhabitants of the area nor on any diverse or vulnerable groups. The Project is not expected to result in negative effects to vulnerable population groups or result in gender-based violence. The public have not indicated opposition to the Project. Therefore, the Project is expected to benefit the residents of Saskatchewan.

20 Potential Environmental Changes on Federal Lands or Lands Outside of Saskatchewan

The Project site and incidental activities are located on privately owned land. The incidental activities will be developed primarily within private agricultural land as well as developed road allowances owned by the Province of Saskatchewan to the extent feasible. As presented in Section 14.1.1, the study areas selected for the Project (i.e., LAAs and RAAs) represent the spatial extent within which the Project could have effects on specific VCs of the environment and the regional context over which cumulative effects may occur. The largest spatial extent within which the Project is expected to have effects on any VC or the regional context over which cumulative effects may occur is a 10 km x 10 km buffer of the PDA (i.e., the LAA and RAA for air quality). As presented in Section 13.6, the nearest federal lands to the Project are approximately 47 km away (Last Mountain Lake National Wildlife Area). Therefore, no changes to the environment are expected to occur on federal lands as a result of carrying out the Project. In addition, the Project is approximately 252 km from the closest provincial border (Manitoba), and 320 km from the closest national border (United States of America) (Figure 13-1). Therefore, the Project is not expected to cause any changes in the environment that would adversely affect lands outside of Saskatchewan, including other provinces or countries.

21 Indigenous Peoples of Canada Potential Impacts

21.1 Potential Environmental Impacts to Indigenous People of Canada

The Project is located within Treaty Six and the Métis Nation of Saskatchewan territory and is in close proximity to Treaty Four territory as shown in Figure 13-1. Carrying out the Project is not expected to change the environment such that it would affect Indigenous people of Canada, including Aboriginal and Treaty Rights, effects to physical and cultural heritage, the current use of lands and resources for traditional purposes or any structure, site or thing that is of historical, archaeological, palaeontological or architectural significance. Additional detail is provided in the below sections.

21.2 Potential Physical or Cultural Heritage Impacts

WLCS, working in concert with Knowledge Keepers from the George Gordon First Nation, executed a TK&P study that integrated western approaches and Indigenous Traditional Knowledge. The study involved a desktop review of publicly available data and confirmation of third-party baseline EA data provided by Stantec. In addition, WLCS conducted a TK&P assessment of the PDA on October 20, 2022. The Project site visit had Knowledge Keepers onsite and the methodology that was followed was developed by George Gordon First Nation technicians and Knowledge Keepers. Field activities included a verification of desktop findings, additional observation and documentation of landscape elements and suspected or known cultural elements and completion of ceremonial activities for suspected or known cultural features.

During the field assessment, WLCS confirmed Stantec's findings and observed additional wildlife features including a suspected American Badger burrow along the south boundary of the PDA and five stick nests immediately south of the PDA. The observation of vegetation features that may be of interest to George Gordon First Nation was limited due to the timing of the assessment outside of the active growing season, but WLCS noted that sage was observed.

During the field assessment, the Knowledge Keepers noted area(s) of potential cultural concern and WLCS recommends further assessment be conducted in spring 2023. As a result of these findings, SaskPower engaged the services of a qualified third-party archaeological consultant to conduct a reconnaissance HRIA of the PDA (see Section 21.4). Refer to Appendix B for more information on the TK&P study completed by WLCS.

21.3 Indigenous Peoples Current Use of Lands and Resources for Traditional Purposes

The Project site is located on a quarter section that is owned by SaskPower. The incidental activities will be developed primarily within private agricultural land as well as developed road allowances owned by the Province of Saskatchewan to the extent feasible. Privately owned lands and leased provincial Crown lands are typically not available for TLRU and as such, the Project is not expected to affect the ability of Indigenous people to exercise Aboriginal and Treaty Rights, or use, access or develop lands and resources currently used for traditional purposes.

As mentioned in Section 5.0, based on SaskPower's engagement with the Indigenous Consultation Unit of the Saskatchewan Ministry of Government Relations, there is no knowledge of TLRUs undertaken in the area. Through engagement efforts with the Indigenous groups to date, SaskPower is not aware of any current use of lands and resources for traditional purposes in the Project area.

The Project and Incidental Activity Study Area boundaries are located within proximity to occupied provincial Crown land administered by the Saskatchewan Ministry of Agriculture; however, no unoccupied Crown land was identified within proximity to the Project and Incidental Activity Study Area.

21.4 Archaeological Sites and Significance

The quarter section (NW 36-33-23-W2M) encompassing the Project site does not contain any known archaeological resources and is not considered to be an archaeologically sensitive area by the provincial regulator (Saskatchewan Ministry of Parks, Culture, and Sport). An HRIA was conducted of the PDA (Appendix H). To get a regional overview and provide context for the Project area, an archaeological study area was defined (Appendix H). The study area (an approximate 20 km by 20 km square area around the Project) was designed to include the proposed Project site, the WLSS, and all incidental activities (e.g., water supply line, distribution line) (Appendix H).

There are two clusters of significant archaeological sites within the study area. One cluster (referred to here as the Spooney Lake Archaeological Site Complex) consists of a series of archaeological sites associated with Spooney Lake on the northern boundary of the study area, approximately 6 km north of the Project site. These sites include a medicine wheel, some unusually shaped cairns, and possibly some drive lines for a bison jump or pound. The other cluster (Lanigan West Archaeological sites) is a pair of sites on the eastern edge of the study area, approximately 8 kilometres (km) to the southeast of the Project site. Significant and temporally diagnostic tools have been found at the Lanigan west sites, as well as a carved atlatl (javelin-like dart thrower) weight. These sites are described in detail in Appendix H. Neither of these site areas fall within the PDA of the Project and should be avoided while routing incidental activities.

There are archaeologically sensitive areas in the land parcels adjacent to the Project. Any incidental activities that approach the recorded locations of any of the known archaeological resources will be subjected to a HRIA to evaluate if the resource is at risk of being impacted. Similarly, should the incidental activities infringe upon any of the archaeologically sensitive areas, then they will likewise be subjected to an HRIA. SaskPower will engage a qualified third-party archaeological consultant to conduct the HRIA and will strive to include the participation of Indigenous peoples in any archaeological investigations.

In late October 2022, during their survey of the PDA, WLCS identified two cultural features within the same quarter section as the PDA. SaskPower took these findings seriously and contracted a qualified third-party archaeological consultant to conduct a reconnaissance HRIA on the quarter section. The reconnaissance HRIA was conducted on November 1, 2022, under archaeological resource investigation permit # 22-149 (on file with the provincial regulator). A summary of the assessment findings was communicated with SaskPower on November 2, 2022. The investigating archaeologist concluded that the two cultural sites identified by WLCS were not archaeological in nature (i.e., these objects and features were not manufactured or used during the pre-contact or early historic period), and thus did not need to be recorded as an archaeological resource, nor have their locations reported to the provincial regulator. No further archaeological investigations were recommended at these two sites.

In addition to investigating the cultural features identified by WLCS (through passive, non-invasive means), the archaeological consultant also conducted subsurface testing within the PDA and evaluated the remaining portions of the quarter section for their potential to contain archaeological resources.

The remnants of an old homestead established by Mr. Frank Fach and family in 1906 (situated along the northern boundary of the quarter section, outside of the PDA) were documented in the field and their historical context was researched at the provincial archives. The archival research did not indicate an association between this site and any significant contribution to the development of Saskatchewan. In addition, the condition of the site is considered poor, as only a few foundations/floors remain visible. As such, the archaeological significance of this site is considered low. Nonetheless, the site will be recorded and registered as an archaeological site with the provincial regulator as a matter of due diligence. The archaeological consultant did not recommend any further archaeological investigations at the homestead site. The provincial regulator may yet impose additional mitigation measures (such as avoidance of the site area) pending their review of the consultant report.

The subsurface testing within the PDA did not reveal any buried archaeological components and the archaeological consultant is not recommending further archaeological investigations in this quarter section. The reconnaissance HRIA is considered a thorough archaeological investigation and the likelihood of undiscovered archaeological sites being present within this quarter is extremely low.

21.5 Engagement Efforts Undertaken with Indigenous Peoples of Canada

As mentioned in Section 4.0, to date, no concerns regarding the Project or specific potential adverse impacts to Indigenous groups have been raised through the early engagement activities with Indigenous groups. Engagement with Indigenous groups is ongoing, and SaskPower will continue to reach out and be available for discussion as the Project proceeds to address any concerns.

22 Health, Social or Economic Changes to Indigenous Peoples of Canada

22.1 Health and Social Changes to Indigenous Peoples of Canada

The Project is not expected to affect the health, well-being, and social conditions of Indigenous Peoples of Canada. Engagement and consultation activities to date have been inclusive of women+ and diverse groups. SaskPower will include any Indigenous groups who express interest on the contractor bidding list for the Project. SaskPower will develop employment and procurement programs that actively promote local opportunities, including for Indigenous workers and businesses, taking into consideration the competitiveness and relative capacity of local suppliers.

No ingestion or inhalation pathways that could trigger the need for a human health risk assessment are anticipated. Air dispersion modelling conducted for the Project shows that maximum predicted concentrations of the substances of interest are below the relevant regulatory objectives (SAAQS and CAAQS) for all averaging periods. The NIA shows that cumulative sound levels of the Project are expected to be at or below the PSLs at all nearby dwellings, and low frequency noise emissions are anticipated to be negligible. The Project will comply with AUC Rule 012 – Noise Control. Given that the dispersion modelling and NIA indicate that the operation and maintenance of the Project will not cause or contribute to a significant degradation of ambient air quality and that the predicted concentrations of Project related air quality and noise emissions will decrease with distance from the Project, adverse effects to the health, well-being, and social setting of Indigenous groups are not expected (Appendix B). Air quality and noise emissions from the Project are not expected to adversely affect traditionally harvested species, or the health or well-being of Indigenous Peoples of Canada including women+ and diverse groups.

Impacts to the health, well-being, and social settings of the Indigenous Peoples of Canada through a change in TLRU are not expected. Indigenous peoples have relied on the land within their traditional territory to harvest a range of plants and animals for subsistence, medicinal, spiritual, and utilitarian purposes. Hunting, trapping, fishing, and harvesting continue to be culturally important traditional activities for Indigenous groups across Saskatchewan. The evaluation of potential effects to TLRU assumes that the ongoing ability to practice traditional activities for all members of Indigenous groups, including women+ and diverse groups, depends on the abundance and health of traditionally harvested species and the continued availability and access to traditional sites and areas.

The Project is located on private land that is owned by SaskPower. The incidental activities will be developed primarily within private agricultural land as well as developed road allowances owned by the Province of Saskatchewan to the extent feasible. Privately owned lands are typically not available for TLRU. Therefore, the Project will not affect Indigenous peoples' ability to exercise Aboriginal and Treaty Rights, or TLRU through:

- a change in availability of TLRU resources
- a change in access to TLRU resources or areas

- a change in TLRU sites or areas through disruption or alteration of a site or area (e.g., harvesting, habitation, and cultural and spiritual sites or areas)
- a change to the environment that affects cultural value or importance associated with TLRU and experiences

Therefore, the Project is not anticipated to affect the health, well-being, or social settings of Indigenous Peoples of Canada, including women+ and diverse groups. Potential effects from the Project to the health, well-being, and social settings of Indigenous Peoples of Canada will continue to be evaluated and Project design, monitoring, and mitigation strategies can be altered to reduce or eliminate an effect. Potential effects to the well-being of Indigenous Peoples of Canada through potential effects to physical and cultural heritage and structures, sites, and things of historical, archaeological, paleontological, or architectural significance to Indigenous groups, including cultural or ceremonial sites will also continue to be evaluated.

SaskPower will continue to provide listed Indigenous groups with information and updates on ongoing and planned construction, operation and maintenance, and decommissioning activities. Should Project effects to the health, well-being or social settings of Indigenous Peoples of Canada be identified, SaskPower will provide opportunities for the involvement of the listed Indigenous groups for mitigating said impacts. Future engagement and consultation activities with Indigenous Peoples of Canada will continue to be inclusive of all individuals, including women+, low income, under or unemployed, disabled, seniors, and systemically marginalized groups.

22.2 Economic Changes to Indigenous Peoples of Canada

Socio-economic effects are anticipated to be positive for Indigenous groups due to opportunities for employment. SaskPower will require the selected EPC partner to have and deliver on Indigenous employment targets that reflect the local Indigenous capacity. SaskPower’s Indigenous Procurement Department will monitor and assist with identifying opportunities. As an example, the Great Plains Power Station currently under construction in Moose Jaw, Saskatchewan is on track to exceed the local and Indigenous successes from the Chinook Power Station project which included over $140 million in local contracts and $10 million in Indigenous-owned contracts. To date, the Great Plains Power Station project includes over $148 million in participation from local companies and over $27 million in participation from Indigenous-owned companies.

SaskPower partners with various Indigenous institutes across Saskatchewan including First Nations University, First Nations Employment Centre, and the University of Regina Aboriginal Student Centre to provide scholarships and opportunities. The Canadian Council for Aboriginal Business has certified SaskPower with Progressive Aboriginal Relations Gold status which recognizes the company’s excellence in creating positive, meaningful relationships with Indigenous businesses and communities (SaskPower 2022b).

23 Greenhouse Gas Emissions Assessment

23.1 Emissions Target

SaskPower has made a commitment to track the emissions outcomes from its generation fleet and project these outcomes according to expansion plans. SaskPower's current forecast outlines expected emission levels from implementation of the SaskPower Supply Plan (SSP), approved in June 2022. The plan was developed in consideration of potential new regulatory requirements for management of GHGs and is based on five key themes:

1. Transition away from conventional coal;
2. Expand and integrate renewable resources into the system;
3. Leverage Natural Gas in the short-term;
4. Increase transmission interconnections to support transition to low emitting options; and
5. Investigate low or non-emitting supply options for 2035 – including SMRs, natural gas with CCS, hydroelectric power, and energy storage.

Executing the SSP will achieve corporate GHG reduction goals of -50% GHG from 2005 by 2030. These expected reductions will be achieved by near-term reliance on natural gas and imports, reduced reliance on conventional coal, and increased deployment of lower emitting technologies. SaskPower is currently evaluating what would be required to achieve net-zero GHG emissions by 2035 in anticipation of the forthcoming CER.

The Project will enable increased penetration of variable renewable generation, which is the basis for achieving a net-zero electricity system. Backing-up intermittency is indeed a key enabler for larger deployment of renewables until technology such as storage and CCS are available at sufficient scale.

23.2 Estimation of Net Greenhouse Gas Emissions

For each of its Industrial Source facilities prescribed in *The Environmental Management and Protection Act, 2010*, SaskPower prepares an EPP according to Chapter E.1.2 of the Province's Environmental Code. A key component of each plan is air contaminant modelling to evaluate the likelihood of adverse effects on air quality from emissions associated with fossil fuel-based power generation and to demonstrate whether this activity will result in adherence to provincial ambient air quality standards or will require mitigation measures. The modes of operation will vary significantly year to year, impacting the total fuel consumption at the Project.

Natural gas power stations using combined cycle technology emit 60% less CO_2 compared to conventional coal-fired generation in Saskatchewan. For reference, Units 4 and 5 at SaskPower's Boundary Dam Power Station emit approximately 2.3 million tonnes of CO_2 annually to generate 280 MW. Unit 4 was retired in 2021, and Unit 5 is slated for shut down by the end of 2024. The Project will result in a greater generation output (370 MW) with a lower GHG footprint as indicated in Table 24-9 below. As SaskPower phases out conventional coal-fired generation and adds natural gas and renewable generation to the system, the GHG emissions will continue to improve (i.e., diminish).

The Project is not forecasted to directly reduce GHG emissions; however, being able to secure the supply from the Project will afford the system the latitude needed to expand the non-emitting resources. With more renewables added to the system, the Project will smooth the transition away from coal-burning and less efficient and older natural gas generators. It is important to recognize that the Project will operate in an integrated electricity system in the context of transition to minimal GHG emissions.

Projections of direct GHG emissions have been calculated according to anticipated construction activities and planned operation and maintenance to 2035. Table 24-7 provides a total estimate of GHG emissions from both personal vehicles and construction equipment over the construction period. The estimated maximum potential direct GHG emissions associated with the Project during operation and maintenance can be found in Table 24-9.

Net GHG emission estimates for each phase of the Project based on equation 1 in the Strategic Assessment of Climate Change (GOC 2020) are provided below.

Table 23-1 Estimated Net Total GHG Emissions during Construction

Equation 1 Term	Total GHG Emissions (tonnes)
Net GHG emissions =	22,217
Direct GHG emissions[1]	22,217
+ Acquired energy GHG emissions[2]	0
- CO2 captured and stored[3]	0
- Avoided domestic GHG emissions[4]	0
- Offset credits[5]	0

Notes:

1 Refer to Table 24-7 for an annual direct GHG emission estimate for each year of construction.

2 Assumption that the Acquired energy GHG emissions for construction power is negligible.

3 No CCS has been modelled for the Project at this time.

4 There are no quantifiable reductions or removals that can be directly assigned to the Project.

5 No offset credits identified for the Project at this time.

Table 23-2 Estimated Net Annual GHG Emissions during Operation and Maintenance

Equation 1 Term	Total Annual GHG Emissions (tonnes)
Net GHG emissions =	1,252,894
Direct GHG emissions[1]	1,252,894
+ Acquired energy GHG emissions[2]	0
- CO2 captured and stored[3]	0
- Avoided domestic GHG emissions[4]	0
- Offset credits[5]	0

Notes:
[1] Refer to Table 24-10 for a theoretical maximum annual direct GHG emission estimate for the full design capacity of the Project (i.e., combined-cycle turbine operation at 100% capacity factor, with heater, fire pump and diesel generator operation).
[2] Assumption that the Acquired energy GHG emissions for operation power is negligible.
[3] No CCS has been modelled for the Project at this time.
[4] There are no quantifiable reductions or removals that can be directly assigned to the Project.
[5] No offset credits identified for the Project at this time.

Table 23-3 Estimated Net GHG Emissions during Decommissioning

Equation 1 Term	Total GHG Emissions (tonnes)
Net GHG emissions =	188,424
Direct GHG emissions[1]	188,424
+ Acquired energy GHG emissions[2]	0
- CO2 captured and stored[3]	0
- Avoided domestic GHG emissions[4]	0
- Offset credits[5]	0

Notes:
[1] Refer to Table 24-9 for an annual direct GHG emission estimate for decommissioning.
[2] Assumption that the Acquired energy GHG emissions for construction power is negligible.
[3] No CCS has been modelled for the Project at this time.
[4] There are no quantifiable reductions or removals that can be directly assigned to the Project.
[5] No offset credits identified for the Project at this time.

23.3 Mitigation and Monitoring Measures

To mitigate GHG, SaskPower has more than doubled its wind capacity in 2022, with plans for another 320 MW and 700 MW of renewables in-service by 2026 and 2028. To support the integration of renewables, natural gas is currently the only option available to Saskatchewan to enable such a significant addition of intermittent renewable generation.

CO_{2e} emissions intensity (expressed as kilograms per megawatt hour (kg CO_{2e}/MWh)) is directly related to the efficiency of the Project. Therefore, the Project will be designed with the following considerations:

- Selecting a gas turbine capable of producing the 370 MW need identified by SaskPower, in combined cycle mode, without the need for supplemental duct firing.
- Selecting the latest F-class turbine technology available from manufacturers, as opposed to an older vintage.
- Increasing temperature of fuel gas in combined cycle mode using feedwater to improve cycle efficiency.
- The use of an ACC does have a slight impact on heat rate (and CO_{2e} emissions intensity by extension). However, considering the arid condition at the Project site, its temperate climate, and the large reduction in water consumption (90% or more compared to a wet cooling tower), it is deemed a worthwhile compromise.

The F-Class GTG will have the most up-to-date technology including several features intended to keep emissions low. NOx will be controlled through use of ULN burners. Emissions of particulates will be low due to the combustion of clean-burning natural gas. In addition, CO and VOC emissions will be minimized through effectively tuned combustion turbine controls. Further, the natural gas quality expected for the Project site has a very low sulfur content (less than 23 mg/m^3) which will result in significantly lower sulphur dioxide (SO_2) emissions compared to other fuels. The Project is being designed to achieve ground level effects that will meet the SAAQs and CAAQs.

As the Project will operate as a peaking facility requiring up to 100 starts and 2200 operating hours per year, the Project will have the capability to operate in simple and combined cycle mode. This will include dispatching the GTG only (no HRSG or STG) for rapid load response to support renewable generation, and be able to transition to combined cycle mode, achieving higher overall thermal efficiency and Project output through utilization of the HRSG and STG. The Project will initially start in simple cycle mode and will transition over to combined cycle operation when increased load is required and will typically operate between 50% and 100% of GTG load.

The Project will be similar in size to SaskPower's Chinook Power Station located near Swift Current, as well as the Great Plains Power Station currently under construction near Moose Jaw. Lessons learned from Chinook were incorporated into the Great Plains Power Station which included an optimized steam cycle with larger HRSG, and a larger ACC controlled with variable frequency drives for better control and reduction in parasitic load. In addition to incorporating the lessons learned from both the Chinook and Great Plains Projects, the Project will include a HRSG bypass stack and dampers, and gas turbine evaporative inlet coolers. This will enable faster start responses and support for renewables, with lower auxiliary loads, and higher net Project output.

Only operational during peak summer temperatures, the Project will incorporate gas turbine inlet air evaporative cooling to cool the gas turbine inlet air. The direct impact of cooling the inlet air is power output augmentation and system energy efficiency. This technology is widely used in hot climates with high ambient temperatures that coincide with on-peak power demand periods.

By including a bypass stack with the Project, SaskPower will have the ability to start-up and operate the GTG independently (SCGT) if needed, independent of the steam cycle. Conversely, if demand is high, SaskPower can operate in CCGT mode to maximize output and efficiency. The ability to start and operate in simple cycle enables faster start and response times to support grid response to renewable generation and system disturbances.

- A bypass stack will be connected directly to the GTG exhaust. When operating in simple cycle mode, a damper will divert GTG exhaust gas through this stack, “bypassing” the HRSG and steam cycle.
- When operating in combined cycle mode, the damper will divert GTG gas through the HRSG, where exhaust heat will be recovered to produce steam for the STG.

Table 23-4 provides an illustration of the different potential simple cycle full load operating conditions, in 100% bypass (GTG exhaust gases flow through the HRSG), 100% HRSG bypass (GTG exhaust gases bypassing the HRSG), and with both evaporative coolers both On and Off. In 100% bypass mode, the GTG exhaust gases flow into the HRSG and a constant flow of water must be supplied for steam production, which in-turn requires auxiliary power from pumps and other Project equipment. In start-up or part-load situations, steam may be produced but not sent to the STG, in which case auxiliary power is being consumed unnecessarily.

Table 23-4 Simple Cycle 100% Bypass versus 100% HRSG Bypass Comparison

Operation	Ambient Temperature (Deg. C)	Project Gross Output (MW)	GTG Gross Lower Heating Value Heat Rate (KJ/KWh)	Auxiliary Load (kW)
SCGT 100% Bypass Evaporative Cooler OFF	20	246	9001	8120
SCGT 100% Bypass Evaporative Cooler OFF	30	229	9176	7824
SCGT 100% HRSG Bypass Evaporative Cooler OFF	20	245	9050	2954
SCGT 100% HRSG Bypass Evaporative Cooler ON	20	251	9050	2954
SCGT 100% HRSG Bypass Evaporative Cooler OFF	30	229	9170	2926
SCGT 100% HRSG Bypass Evaporative Cooler ON	30	248	9170	2926

As illustrated in Table 23-4, at higher ambient temperatures, with no evaporative cooling and 100% bypass, gas turbine power output decreases as temperature increases from 20 to 30˚C, and there are significantly higher auxiliary loads than if the HRSG were to have been 100% bypassed. In contrast, in simple cycle operation, 100% HRSG bypass, there is a significant reduction in auxiliary loads as shown above. Further, the impact of evaporative cooling on gas turbine simple cycle performance, with 100% HRSG bypass, is illustrated in Table 23-4 as well. At 30˚C, in addition to lower auxiliary loads, there is a significant improvement in gas turbine power output in addition to Project cycle efficiency and consequently emissions intensity.

In contrast, when in combined cycle operation, the impact of evaporative cooling can be seen in Table 23-5. As temperatures rise, with evaporative cooling there is an increase in Project gross power output, lower auxiliary loads, and improvements in overall heat rates. This results in a higher Project efficiency with lower emissions per unit of fuel consumed.

Table 23-5 Combined Cycle Operation – Inlet Evaporation Coolers In-Service

Operation	Ambient Temperature (Deg C)	Project Gross Output Improvement (MW)	GTG Gross Lower Heating Value Heat Rate Improvement (KJ/KWh)	Auxiliary Load (kW)
CCGT	20	9.5	87	327
CCGT	30	26	186	407

The Project design enhancements described above were designed to enable:

- A higher number of starts, faster start and electrical grid support response, and lower number of operating hours to support the SSP, with lower overall emissions, and higher integration of intermittent renewable generation
- Improved power output, Project efficiency, and emissions during peak summer temperatures
- Improved power output, Project efficiency, and emissions in both simple and combined cycle mode.

To that end, the Project will be dispatched, monitored, and controlled in the Projects local control room as well as SaskPower's grid control centre and will be operated using AGC for the purpose of load following the variable and intermittent renewable generation.

Monitoring of the Projects equipment and systems will be completed internally by SaskPower and the GTG OEM due to the OEMs expertise. Like all SaskPower's generating facilities, the digital control system and OSI Pi Historian will be used by SaskPower to collect, control and monitor equipment and systems health and performance. Like the Chinook and Great Plains projects, a long-term service agreement (LTSA) will be executed with the gas turbine OEM to provide 24-hour support and monitoring of the equipment and systems performance. Under the terms of the LTSAs, the GTG OEM will be contractually responsible for correction and restoration of equipment and system performance after each major maintenance cycle.

In addition, a CEMS will be installed at the Project to measure, monitor, and report emission data per the requirements of the annexed New Source Emission Guidelines for Thermal Electricity Generation.

23.3.1 CARBON CAPTURE

SaskPower commissioned an engineering study on carbon capture and compression for sequestration on our natural gas CCGT power stations. The study scope included evaluating the optimal method of incorporating carbon capture on a 350 MW CCGT power station while minimizing unit gross output loss, parasitic power losses, and water requirements. The study also included an estimation of the required footprint for the carbon capture facility. The study assumed a Siemens SGT6-5000F gas turbine, the largest F-Class gas turbine (selected for Chinook and Great Plains Power Stations) that SaskPower is able to integrate into the power grid, meet the North American Electric Reliability Corporations requirements, as well as transmission interchange requirements/agreements with neighbouring jurisdictions.

The study found that by adding an auxiliary boiler, there is no impact on the gross output of power; however, the fuel required for the auxiliary boiler increases the total fuel consumption by 20% and leads to higher CO_2 emissions and a larger carbon capture facility. Results also show that if the steam turbine is modified or replaced to allow steam to be withdrawn from the intermediate pressure-low pressure cross over, the loss of the power station output due to steam extraction was estimated to be 6.6%. By extracting steam from the cold or hot reheat systems without optimizing the steam turbine, the parasitic loss (due to steam extraction) is estimated to be between 9-10% of the gross output. Full load operation has been evaluated, and currently results are being modelled and evaluated for 30%, 50%, and 70% operation.

The estimated carbon capture facility footprint was based on information provided by a CO_2 capture technology vendor for another project of similar size and the heat rejection system designed for dry cooling to minimize water consumption. The study found that the carbon capture facility footprint, based on a design ambient temperature ranging between 19 and 28°C, would be between 2.5 ha and 4.4 ha in size, respectively. Existing 350 MW SaskPower CCGT power stations either currently have the required additional space or land is being procured to accommodate the integration of future carbon capture infrastructure.

As per Section 11.3, space is being left on the east side of the Project site to facilitate future carbon capture integration. Further studies are required to understand the geology in the Project area to determine whether there is a favourable formation to sequester the carbon. SaskPower is continuing to investigate the feasibility of carbon capture for the Project to ensure it is compliant with the forthcoming CER.

24 Waste and Emissions

24.1 Wastes Generated during Construction and Startup

24.1.1 LIQUID DISCHARGES

The main sources of plausible liquid discharge during the construction phase include sanitary waste, rainwater, snowmelt, and machinery fluids (e.g., diesel fuel, lubricating oils). Each source will be controlled differently to avoid spills and unplanned releases.

During the construction phase, portable toilets will be used by personnel. Sanitary waste will be stored in a septic tank with a holding capacity of approximately 7,570 L and will be pumped and removed from site by licensed contractors and disposed of in accordance with federal, provincial, and municipal regulations.

Rainwater and snowmelt runoff will be monitored and controlled during construction and operation and maintenance of the Project. The Project site will be graded to drain surface water to temporary drainage ditches and a storm water pond. The storm water pond will be designed to collect the main sources of water including surface water runoff and ACC wash water only (see Table 24-2), therefore it is extremely unlikely to come into contact with contaminants given the storage, secondary containment and handling procedures employed at site. The limited possible exception could be very small amounts of hydrocarbons from minor, undetected leakages from vehicles or incidental grease or oil contact when washing dust from the ACC. The storm water pond has been designed to accommodate a 100-year storm event and preliminary design anticipates the pond will be approximately 7,000 m^2 and approximately 2 m deep. The overflow structure will allow for excess water to slowly release over a period of a few days, until the pond is returned to its normal depth of water. This will be done in accordance with a Drainage approval from the WSA and the release of storm water will be designed to maintain existing drainage patterns on the Project site. Water quality in the storm water pond is expected to be similar to that of natural wetland habitats. Regular testing of storm water prior to release is not part of the storm water pond normal operations, as the pond is designed to collect surface water runoff only and is thus highly unlikely to come into contact with contaminants.

Out of an abundance of caution a storm water pond hydrocarbon monitoring and mitigation procedure will be established and employed throughout the life of the Project (including construction and operation and maintenance).

Storm water pond design and function is such that only a water volume attaining sufficient water head height within the pond can be released, via controlled pipe conduit(s). Water below that level is lost only through evaporation to the atmosphere. The pond’s controlled pipe conduit(s) will be equipped with manually operated shut-off(s) (i.e., gates. See Photo 1 for an example). These shut-off(s) will be maintained in a normally closed position.

Photo 1 Example of manually operated shut-off as a control gate from SaskPower's Queen Elizabeth Power Station located in Saskatoon, SK

Weekly visual inspections for oil sheen will be conducted during dry weather periods and daily visual inspections during wet weather periods (rainfall events) during both construction and operation and maintenance phases. Should an oil sheen be detected then hydro-vac units will be contracted to remove the contamination and take it off site for proper disposal by a licensed operator. Further, prior to release of any storm water pond detained water a visual sheen inspection will be conducted and only if no sheen is detected will the shutoffs be opened and the water allowed to pass. Should an oil sheen be detected then hydro-vac units will be employed per above.

In the event of a larger accidental spill the required response actions will immediately be undertaken to control and isolate the spill, and to remove the contaminant and any effected water or soils from site for proper disposal by a licensed contractor. All remedial actions required, water quality limits and mandatory reports as dictated by the Saskatchewan Ministry of Environment's "Guidance Document: Impacted Sites" established under the Saskatchewan Environmental Code will be adhered to, as well as SaskPower's BMP10 governing spills and releases (SK ENV 2015b). The scheduled visual sheen inspections would serve as an additional backstop to these protective measures.

In the very unlikely event of a significant influx of hydrocarbons into the storm water pond immediate actions to prevent water birds, species at risk, or other wildlife including but not limited to migratory birds, from contacting the contaminants would include deployment of staff with flags to deter them from entering the pond. Additionally, other devices, such as scare cannons, “scary-man” inflatables, etc., would be utilized until hydro-vac units could be summoned to vacuum up the contaminants and remove them from site for proper disposal.

Given the unlikely probability of hydrocarbons being translocated to the storm water pond, from any source, combined with the storm water pond hydrocarbon monitoring and mitigation procedure, any possible wildlife exposure will be extremely small in terms of quantity and time. Any possible exposure to hydrocarbons should not pose a threat to water birds, or other wildlife, that may occasion the storm water pond.

Current site drainage flows from the north and west sides of the Project site to the southeast quadrant over generally flat terrain. The existing site is farmland and the drainage currently flows onto the adjacent grassland property to the south, which ultimately flows into a man-made ditch. Water flows from the ditch and eventually spills into the Dellwood Reservoir, 6.4 kilometre south of the Project site. The drainage outflow from the stormwater pond will be controlled to match pre-construction flows up to and including the 100-year, 24-hour design storm.

Machinery will be kept in proper working order during construction to avoid spills of machinery fluids such as oils, fuels, and coolants. The Project procedures manual will identify proper spill handling techniques such as:

- Having a spill kit (including absorbent material and disposal bags) and emergency spill repair kit available on site.
- Having SaskPower employees and contractors working on the Project informed on spill reporting criteria for the Project.
- Insuring awareness of SaskPower’s incident reporting through e-mail or phone. For a review of SaskPower’s incident mitigation measures and reporting structure.

Please refer to SaskPower’s Environmental BMPs (SaskPower 2022a) for BMP #10 Spills and Releases, and a full listing of SaskPower’s standard mitigation measures.

24.1.2 STARTUP LIQUID DISCHARGES

Startup and commissioning of the Project will require several testing and cleaning processes involving liquid waste. First, the HRSG will be filled with a chemical solution to clean boiler tubes of mill scale and debris accumulated throughout construction. The cleaning solution will be contained at all times within the HRSG, and upon completion, will be collected through HRSG drains into temporary holding tanks, where it will be hauled off-site and disposed of by a licensed contractor in accordance with applicable regulations.

Piping will by hydrostatically pressure tested in accordance with governing codes. Additionally, steam lines will be hydrolazed. Hydrolazing involves spraying high pressure (HP) water along the interior surface of pipes to remove mill scale and construction debris. Both hydrolazing and hydrostatic test water will drain through piping low points to building floor drains, and ultimately flow to the wastewater evaporation pond. These processes will not result in any liquid effluent from the Project site.

Finally, prior to first start-up of the GTG the Project will undergo “steam blows”. Steam blows involve running the Project to generate steam, before being admitted to the steam turbine, steam is initially vented to atmosphere to ensure HRSG and pipe cleanliness. As steam is vented to atmosphere, a considerable amount of demineralized water make-up will be required. During this time, several mobile water treatment trailers will be rented to support the additional demand. The mobile trailers will include RO units, which will produce demineralized water and reject water steams. While the rental trailers are on-site, any RO reject water produced will be routed to the wastewater evaporation pond via temporary piping and hoses.

24.1.3 SOLID WASTES

Solid wastes that will be generated during construction and startup will be typical of activities associated with power generation construction, such as packing materials, office wastes, scrap lumber, excess concrete, metals, cables, glass, cardboard containers, and other miscellaneous debris. Solid waste will be sorted and any recyclable materials (e.g., cardboard, wood, and metal) will be diverted for recycling, where facilities or programs for that material are available. Waste will be collected in labelled, designated waste containers and regularly hauled off and disposed of by licensed waste contractors in accordance with federal, provincial, and municipal regulations. Waste disposal will only occur at either locally or regionally approved facilities.

24.2 Wastes Generated During Operation and Maintenance

24.2.1 LIQUID DISCHARGES

The Project will contain various sources of possible liquid discharges that must be controlled during operation and maintenance. The Project will utilize an ACC which significantly reduces the water consumption and associated discharges. The estimated process wastewater that will be discharged during normal operation and maintenance will range between 46-150 L/minute (67-216 cubic metres per day (m^3/day)) across various ambient conditions. Table 24-1 describes the estimated water quality for the waste stream. The wastewater discharge stream will be limited to the waste stream from the ultrafilter and RO system. The waste stream will be primarily cycled-up water with some chemical additives in the feedwater cycle, including phosphate and ammonia from the HRSG blowdown, chlorine from service water use, and anti-scalant, sulfite/sulfate, and caustic, chemically converted to additional sodium bicarbonate, from the RO system. Since a rental mixed bed ion exchange system will be used, all regeneration will take place offsite at the supplier’s facility, and no waste disposal is expected from the mixed bed.

Table 24-1 Estimated Water Quality of the Waste Stream (mg/L) Discharged from the Project to the Project Site Evaporation Pond During Operation and Maintenance

Parameter	Concentration (mg/L)
Total Dissolved Solids (TDS)	5,400
Cations	
Calcium (Ca)	695
Magnesium (Mg)	640
Sodium (Na)	2,380
Iron (Fe)	10
Anions	
M-Alkalinity (M-Alk) Amount of base needed to reach a pH of 4.5	768
Sulphate (SO_4)	2,680
Chloride (Cl)	185
Nitrate (NO_3)	Non-detectable
CO_2	20
Silicon Dioxide (SiO_2)	50
Notes: Cations are reported as $CaCO_3$, all others as ion. Estimates are based on the water quality of the on-site wells.	

The wastewater generated from the Project will mainly consist of effluent water from the water treatment process and will be discharged to an on-site evaporation pond. The evaporation pond will have a HDPE or clay liner to prevent seepage of wastewater into the soil.

The pond will be sized based on the Project site climate and the necessary rate of evaporation. Based on preliminary design, the bottom of the pond is estimated to be approximately 53,900 m^2 and approximately 2.5 m deep. The pond will be sized to receive the waste volume described above, as well as account for annual expected rainfall. The average rate of evaporation from nearby lakes is approximately 98 cm. The average annual precipitation rate for the area is assumed to be approximately 36 cm, giving a net evaporation rate of approximately 70 cm. After using a factor of safety of 1.5 and a correction for salinity of 0.90, a design evaporation rate of 1500 cubic metres per year will be used. The minimum winter depth of the pond will be six inches with a yearly water level variation of approximately 70 cm. There will be an added 15 cm of design depth to allow for the occurrence of a 100-year rainfall event along with an added 15 cm for salt storage. The total design life of the evaporation pond will be 30 years. No dredging of the pond is expected.

During operation and maintenance of the Project, sanitary waste will be collected and pumped to an on-site septic tank and leach field. The design of the leach field (i.e., absorption field) will be in accordance with the Saskatchewan Onsite Wastewater Disposal Guide Version 3 (GOS 2018) and will be permitted through the Saskatoon Health Region and comply with the requirements of *The Public Health Act, 1994* and will be regulated by *The Private Sewage Works Regulations.*

In addition to the liquid stream during operation and maintenance, there are also other liquid waste streams associated with maintenance work. These streams are usually intermittent flows such as gas turbine compressor wash, ACC wash, lube oil, etc. Details regarding the disposal and effects of the intermittent flows can be found in Table 24-2.

Table 24-2 Summary of the Estimated Quantities of the Intermittent Liquid Waste Streams

Liquid Waste	Description	Volume		Containment	Disposal Method	Potential Effects on the Environment
		Normal	Maximum			
Waste effluent from HRSG blowdown	Blowdown from HRSG HP, IP, and LP drums. Used to maintain boiler chemistry by blowing down solids from the bottom of the boiler drums into a blowdown tank. Liquid effluent is quenched and sent to the Project sump and vapor is sent to an atmospheric vent	7.8 m^3/hour	8.2 m^3/hour	Project Sump	Recycled back to service water storage tank and filtered in Project demineralizer.	None
Waste effluent from evaporative cooler blowdown	Blowdown from GTG air inlet evaporative cooler. Only operational during peak summer temperatures.	N/A	3.6 m^3/hour	Evaporation Pond	Effluent will be pumped to the evaporation pond.	None
Waste effluent from demineralized water treatment plant	Water treatment plant discharge waste stream	2.7 m^3/hour	4.3 m^3/hour	Evaporation pond	Effluent will be pumped to the evaporation pond.	None
Sampling discharge	Sample panel drains	0.9 m^3/hour	0.9 m^3/hour	Project Sump	Recycled back to service water storage tank and filtered in Project demineralizer.	None

Table 24-2 Summary of the Estimated Quantities of the Intermittent Liquid Waste Streams

Liquid Waste	Description	Volume		Containment	Disposal Method	Potential Effects on the Environment
		Normal	Maximum			
Drainage within powerhouse building	Miscellaneous floor drains and equipment drains	2.3 m^3/hour	2.3 m^3/hour	Project Sump	Water will be sent through oil/water separators and recycled back to the service water tank or sent to the evaporation pond.	None; oil/water separators will have oil level switches and pump interlock to prevent discharging oil laden water. Oil will be trucked offsite.
Gas turbine water wash	Gas turbine compressor water wash will be a combination of water and cleaning agent that will be collected in a drains tank and trucked offsite.	5.2 m^3/hour	7.9 m^3/hour	Water Wash Drains Tank	Will be treated as hazardous waste and trucked offsite.	None
ACC water wash	ACC fin wash to remove dust accumulation on the outside of the ACC fins.	200 m3 per wash (wash quantity dependent on weather cycles, est. 2 washes per year)	N/A	N/A	Plant storm water system.	Extremely minimal; clean plant water is used in the pressure washer. Potential rare occurrence for hydrocarbons to be present on the ACC and contaminate the waste wash water.
Used oil and other solvents (hazardous waste)	Used lube oil and control oil for turbines and other cleaners used in plant.	TBD	TBD	Plastic totes or barrels	Oil will be sold or recycled to/by qualified carrier.	None
Sewage	Sanitary waste from admin building.	5 m^3/day	N/A	N/A	Sewage will be pumped to an on-site septic tank and leach field.	None

Note:
1. Information in this table is preliminary and values will be updated as required during permit application process.

24.2.2 ACCIDENTS AND MALFUNCTIONS

In the event of a liquid discharge due to an accident or equipment malfunction, wastewater drains from the area around the equipment that have the potential to be contaminated will be gravity drained and directed through the oil/water separator. Oil/water separator effluent will be pumped and discharged to the water treatment building sump for reuse. Oil will be stored in the separator and removed periodically by a vacuum truck and disposed of at an appropriate facility offsite.

Floor and equipment drains or trenches will be located near equipment which contains or uses oil. The floor trenches will be used to collect and convey drainage inside the Project. Containment curbs, floor trenches, and underground piping will contain, collect, and transport oil contaminated drainage to the oil/water separator(s) for treatment. Oil containment areas will be provided with normally closed isolation valves and gravity drain to the oily drains system.

24.2.3 SOLID WASTES

Solid wastes generated during the operation and maintenance phase of the Project will be typical of activities associated with the operation of a power generation facility. Wastes will include domestic and office waste generated by operations personnel, packaging wastes from supplies, as well as wastes from ongoing maintenance activities (e.g., oil containers, rags, etc.). Wastes generated during operation and maintenance will be disposed of by licensed waste contractors in accordance with federal, provincial, and municipal regulations using approved facilities. Table 24-3 provides the estimated quantity of solid wastes that will be generated during operation and maintenance of the Project.

Table 24-3 Estimated Quantity of Solid Wastes Generated from the Project During Operation and Maintenance

Waste Material	Disposal Method	Estimated Annual Quantity (tonnes)
Waste oil/hazardous waste/oily rags/aerosol cans	Collected and disposed of through registered collectors and recovered/recycled through registered processors/disposal class 2 landfill.	3
Domestic waste	Municipal landfill	3
Paper/cardboard/tin/plastic	Approved recycling facility	8-15
Scrap metal	Approved recycling facility	15

24.3 Wastes Generated During Decommissioning and Reclamation

The main sources of liquid discharge during the decommissioning phases will include sanitary waste, rainwater, snowmelt, and machinery fluids (e.g., diesel fuel and lubricating oils). Each source will be controlled differently to avoid spills and unplanned releases.

Portable toilets will be used by personnel. Sanitary waste will be stored in portable toilets and will be pumped and removed from site by licensed contractors and disposed of in accordance with federal, provincial, and municipal regulations.

Rainwater and snowmelt runoff will be monitored and controlled during decommissioning in a manner consistent with the operation and maintenance of the Project up until the decommissioning phase requires removal of the ponds.

Solid wastes that may be generated during decommissioning and reclamation fall into several categories:

- Regulated and Universal Waste (i.e., oils, fluids, mercury, bulbs, ballasts, batteries, freon, lead based paint, etc.)
- Asbestos Containing Materials (i.e., insulation on units, floor tile, mastics, etc.)
- Construction and demolition debris
- Scrap Steel (Ferrous and Non- Ferrous)
- Residual Fuels (#6 Fuel Oil, combustion source, etc.)

Solid waste will be collected, hauled off, and recycled and/or disposed of by licensed waste contractors in accordance with federal, provincial, and municipal regulations. Waste disposal will only occur at either locally or regionally approved facilities.

24.4 Mobile Combustion Emissions Generated During Construction

Air emissions generated during construction of the Project will result from several sources and activities. TPM is the term used to refer to solid particles and liquid droplets found in the air and is produced as a combustion by-product. TPM is reported according to the diameter of the particle size; PM_{10} refers to coarse dust particles 10 microns in diameter or smaller. $PM_{2.5}$ refers to fine particles 2.5 microns or less in diameter and can only be seen with an electron microscope. Fueled construction equipment will also release nitrogen oxide (NOx), non-methane hydrocarbons (NMHC), and CO as combustion by-products.

In general, the process of estimating construction emissions is dependent on the Project schedule and construction equipment plan. The estimated equipment to be used for construction of the Project is provided in Table 24-4, with a breakdown of hours expected for each of the three years of construction. Once the type and quantity of construction equipment is estimated, emissions factors are applied to the expected work hours along with any applicable correction factors.

Table 24-4 Estimated Construction Equipment to be Used for the Project

Equipment Type	Fuel Type	Quantity	Estimated Work Hours On-Site		
			Year 1 (hours / year)	Year 2 (hours / year)	Year 3 (hours / year)
Vibratory Compactor	Diesel	3	2,625	0	0
Motor Grader	Diesel	1	1,463	2,925	975
Dump Truck	Diesel	3	1,875	0	0
Wheel Loader	Diesel	3	3,000	0	0
Dozer	Diesel	3	1,875	0	0
Excavator	Diesel	5	7,500	0	0
Scraper	Diesel	3	1,875	0	0
Pavers	Diesel	1	0	500	0
Trencher	Diesel	2	2,600	0	0
Skid Steer	Diesel	2	260	3,118	1,819
Concrete Truck	Diesel	2	4,000	500	0
Concrete Pump Truck	Gasoline	2	2,000	250	0
Flat Bed Truck	Diesel	1	1,000	1,500	0
Water Truck	Diesel	1	2,000	2,000	1,000
Forklift 5 Ton	Diesel	5	779	7,274	3,118
Generators/Compressors/ Welding Rigs	Diesel	11	2,338	13,769	2,598
Pick-up Truck	Gasoline	9	6,149	18,446	8,573
Light Towers	Diesel	45	12,470	37,411	7,274
Manlift	Diesel	20	520	24,161	2,078
Crawler Cranes <200T	Diesel	2	2,600	8,775	2,275
Crawler Cranes >200T	Diesel	3	87	2,901	0
Rough Terrain Cranes	Diesel	5	130	6,105	1,559

The potential emissions from construction equipment are summarized in Table 24-5. The United States (US) Environmental Protection Agency (EPA) emissions standards were used to determine the PM emissions from fueled construction equipment. For conservativeness, it was assumed that PM_{10} and $PM_{2.5}$ combustion emissions from the Project are equivalent to TPM emissions, as there are no PM_{10} and $PM_{2.5}$ emissions standards.

TPM emissions presented in Table 24-5 are estimated from fuel combustion only. Additional TPM emissions may be generated through fugitive dust associated with typical construction activities such as vehicle traffic, earthwork, or grinding and crushing. To control fugitive emissions, water trucks will be used regularly to spray down heavy traffic areas on disturbed or unpaved surfaces.

To estimate potential CO_{2e} emissions from the construction equipment emissions factors for CO_2, methane (CH_4), and nitrous oxides (N_2O) were obtained from the National Inventory Report (NIR) 1990-2020: Greenhouse Gas Sources and Sinks in Canada, Part 2, Annex 6, Table A6.1-14 and ratioed with their appropriate Global Warming Potentials (GWP) obtained from Schedule 3 of the *Greenhouse Gas Pollution Pricing Act*. The potential GHG construction emissions were calculated using operating hours shown above and GHG emission factors.

Table 24-5 Estimated Air Emissions from Construction Equipment

Pollutant	Construction Year 1 (tonnes / year)	Construction Year 2 (tonnes / year)	Construction Year 3 (tonnes / year)	Total Construction Equipment Emissions (tonnes)
NO_x + NMHC	23	23	5	51
SO_2	< 0.1	< 0.1	< 0.1	< 0.1
CO	21	22	5	48
TPM/PM_{10}/$PM_{2.5}$	1.2	1.4	0.3	2.9
CO_2	5,580	5,424	1,269	12,272
CH_4	0.2	0.2	0.1	0.5
N_2O	< 0.1	< 0.1	< 0.1	0.1
CO_2e	5,630	5,472	1,280	12,382

In addition to the on-site construction equipment listed above in Table 24-4, there will be daily vehicle traffic along Highway 16 as workers commute to and from the Project site. Most workers are expected to reside in the Saskatoon metro area with a daily commute of approximately 100 km, each way. Table 24-6 provides an estimate of GHG emissions associated with personal vehicles over the construction period, assuming an average of two passengers per vehicle.

Table 24-6 Estimated GHG Emissions from Personal Vehicle Usage While Commuting to the Project

Pollutant	Construction Year 1 (tonnes / year)	Construction Year 2 (tonnes / year)	Construction Year 3 (tonnes / year)	Total Personal Vehicle Emissions (tonnes)
CO_2	1,863	5,590	2,320	9,773
CH_4	0.1	0.3	0.1	0.5
N_2O	< 0.1	0.1	< 0.1	0.2
CO_2e	1,875	5,625	2,335	9,835

Table 24-7 provides a total estimate of GHG emissions from both personal vehicles and construction equipment over the construction period.

Table 24-7 Estimated Maximum Potential Annual GHG Emission Rates of the Project During Construction

Pollutant	Construction Year 1 (tonnes / year)	Construction Year 2 (tonnes / year)	Construction Year 3 (tonnes / year)	Total GHG Emissions (tonnes)
CO_2	7,443	11,014	3,589	22,045
CH_4	0.4	0.6	0.2	1.0
N_2O	0.2	0.3	0.1	0.5
CO_2e	7,505	11,097	3,615	**22,217**

24.5 Stationary Combustion Emissions Generated During Operation and Maintenance

Emission of air contaminants during operation and maintenance of the Project will result from the combustion of natural gas in the proposed combustion turbine. There will also be emissions of air contaminants generated from the emergency diesel generator, emergency diesel fire pump, and dew point heater. The maximum emissions from any operating load including start-up and shut down emissions for the combustion turbine were used to demonstrate the maximum potential emissions for each pollutant. The maximum potential air emissions associated with the Project, based on 8,760 hours per year of operation in combined cycle mode, including start-up and shut down emissions for the turbine plus auxiliary equipment emissions, can be found in Table 24-8.

Table 24-8 Theoretical Maximum Potential Air Emissions Associated with the Project During Combined Cycle Operation and Maintenance

Pollutant	Theoretical Maximum Potential Combined Cycle Air Emissions (tonnes per year)
NO_x	469.4
CO	326.0
TPM/PM_{10}/$PM_{2.5}$	38.7
SO_2	29.6
CO_2	1,250,698
CO_2e	**1,252,894**

Note:
(a) Represents combined-cycle turbine operation at 100% capacity factor, with heater, fire pump and diesel generator operation.

The CO_{2e} estimate in Table 24-8 is based on a combined cycle operating scenario of 100% load for 100% of the year, which is not a realistic operating profile for this peaking facility. Capacity factor is defined as the ratio of actual electrical energy output over a given period of time to the theoretical maximum electrical energy output over that period. SaskPower currently anticipates this unit will primarily provide reserve capacity margin and back-up generation to renewables and therefore expects the Project will not exceed a 15% capacity factor. This results in CO_{2e} emissions of approximately 188,424 tonnes/year (Table 24-9). This scenario assumes 1,314 operating hours of the gas turbine and the natural gas dew point heater, includes 95 combustion turbine starts a year based on cold start emissions, and 100 operating hours for the emergency fire pump and emergency diesel generator. The estimated maximum potential GHG emissions associated with the Project during operation and maintenance using this scenario can be found in Table 24-9. SaskPower's SSP forecasts the combined cycle facility to operate at a variable load rate while maintaining the 15% capacity factor resulting in approximately 100 starts/year and not exceeding 2200 operating hours per year.

CO_{2e} emissions from the combustion turbine are due to CO_2, CH_4, and N_2O produced from the combustion of natural gas. Combustion turbine CO_{2e} emissions were estimated based on emission information from the gas turbine OEM for CO_2. Emission factors for CH_4 and N_2O for natural gas were obtained from the NIR 1990-2020: Greenhouse Gas Sources and Sinks in Canada for the combustion turbine and auxiliary equipment. The appropriate GWP obtained from Schedule 3 of the *Greenhouse Gas Pollution Pricing Act* were used to estimate CO_{2e} emissions for the combustion turbine and auxiliary sources. The GWP of CH_4 and nitrous oxide emissions are normalized to the warming potential of CO_2 (as CO_{2e}) by multiplying the CH_4 emissions by 28 and the nitrous oxide emissions by 265. Despite the higher warming potentials of CH_4 and N_2O compared to CO_2, it is expected that CO_2 emissions will still account for over 99 percent of the CO_{2e} for this combustion turbine.

Table 24-9 Estimated Potential Annual GHG Emissions Associated with the Project During Operation and Maintenance (15% Capacity Factor)

Pollutant	Combined-Cycle Combustion Turbine (tonnes per year)	Dew Point Heater (tonnes per year)	Emergency Diesel Fire Pump (tonnes per year)	Emergency Diesel Generator (tonnes per year)	Piping Fugitives (tonnes per year)	Circuit Breakers (tonnes per year)	Total (tonnes per year)[(a)]
CO_2	187,525	64	12.4	93.6	-	-	187,695
CH_4	4.7	0.02	0.001	0.004	16.5	-	3.3
N_2O	0.5	0.002	0.0001	0.001	-	-	0.3
CO_2e	187,783	65	12	94	461	8.5	**188,424**

Note:

(a) Based on 1,314 hours of turbine and heater operation (15% capacity factor), and 100 hours of pump and generation operation per year.

When looking at capacity factor (i.e., measure of how often a plant is running at maximum power), while 100% load for 100% of the year is not realistic (i.e., 100% capacity factor) for the expected operation it is theoretically possible. The estimated maximum potential GHG emissions associated with the Project during operation and maintenance for the 100% load scenario can be found in Table 24-10.

Table 24-10 Estimated Potential Annual GHG Emissions Associated with the Project During Operation and Maintenance (100% Capacity Factor)

Pollutant	Combined-Cycle Combustion Turbine (tonnes per year)	Dew Point Heater (tonnes per year)	Emergency Diesel Fire Pump (tonnes per year)	Emergency Diesel Generator (tonnes per year)	Piping Fugitives (tonnes per year)	Circuit Breakers (tonnes per year)	Total (tonnes per year)[(a)]
CO_2	1,250,165	427	12.4	93.6	-	-	1,250,698
CH_4	31.5	0.11	0.001	0.006	16.5	-	48.1
N_2O	3.2	0.011	0.0001	0.001	-	-	3.2
CO_2e	1,251,884	433	12	94	461	8.5	**1,252,894**

Note:
(a) Based on 8,760 hours of turbine and heater operation, and 100 hours of pump and generation operation per year.

However, even if the Project did need to be relied on all of the time there would still be needed periods of shut down for maintenance. In the case that conditions evolve, and the Project has to run at a higher capacity factor, a realistic operating profile for the Project would be a cycle operating scenario of an overall 85% capacity factor as shown in Table 24-11. SaskPower anticipates this unit would then provide mainly baseload generation along with limited reserve capacity margin and load following generation for renewables.

Table 24-11 Estimated Potential Annual Greenhouse Gas Emissions Associated with the Project During Operation and Maintenance (85% Capacity Factor)

Pollutant	Combined-Cycle Combustion Turbine (tonnes per year)	Dew Point Heater (tonnes per year)	Emergency Diesel Fire Pump (tonnes per year)	Emergency Diesel Generator (tonnes per year)	Piping Fugitives (tonnes per year)	Circuit Breakers (tonnes per year)	Total (tonnes per year)[(a)]
CO_2	1,062,640	363	12.4	93.6	-	-	1,063,110
CH_4	26.8	0.09	0.001	0.006	16.5	-	43.4
N_2O	2.7	0.009	0.0001	0.001	-	-	2.7
CO_2e	1,064,102	368	12	94	461	8.5	**1,065,046**

Note:
(a) Based on 7,446 hours of turbine and heater operation (85% capacity factor), and 100 hours of pump and generator operation per year.

The Project is expected to emit between 338 kg/MWh to 383 kg/MWh of CO_2 during combined cycle operation at full load, depending on ambient conditions. As mentioned previously, one of the primary differences from previous SaskPower projects will be the addition of a HRSG bypass stack, to permit simple-cycle operation. When operating in SCGT mode, total emissions will remain the same, but the MW generated will be reduced. Therefore, CO_2 emissions intensity will increase to between 510 kg/MWh to 548 kg/MWh at full load, depending on ambient conditions. These emission rates are based on the unit in a new and clean condition, with no consideration for Project degradation.

In 2018, Canada enacted the *Regulations Limiting Carbon Dioxide Emissions from Natural Gas-fired Generation of Electricity* (under CEPA*, 1999*). The regulation covers natural gas plants that have a minimum installed capacity of 25 MW, sell or distribute more than 33% of their average annual potential electricity output to the grid, and receive more than 30% of their heat input from natural gas. The standards are set at 420 t CO_2/GWh (420 kg/MWh) for units with capacity of at least 150 MW or 550 t CO_2/GWh for units with capacity between 25 MW and 150 MW (see Canada Statutory Orders and Regulations (SOR/2018-261).

As the Project has a combustion turbine with a 250 MW nominal capacity, SaskPower will be required to limit capacity factor of the Project to 33% or less (or 2,891 hours per year) considering SCGT operation. shows what the maximum Project emissions would look like in this scenario. In the event that both simple and combined cycle operating modes are used in the same calendar year, SaskPower will be required to limit overall capacity of the Project so as to maintain annual average CO_2 emissions intensity below 420 kg CO_2/MWh. However, as mentioned previously, the forecasted capacity factor for Project (regardless of operating mode) is not expected to exceed 15%, corresponding to 2200 operating hours or less.

Table 24-12 Theoretical Maximum Potential Air Emissions Associated with the Project During Simple Cycle Operation and Maintenance

Pollutant	Potential Simple Cycle Air Emissions (tonnes per year)[(a)]
NO_x	163.5
CO	201.7
TPM/PM_{10}/$PM_{2.5}$	13.0
SO_2	9.8
CO_2	413,088
CO_2e	419,238

Note:

(a) Represents simple-cycle turbine operation at 33% capacity factor, with heater, fire pump and diesel generator operation.

24.5.1 GAS TURBINE GENERATOR

Emissions from the F-Class GTG are dependent on the ambient temperature conditions and operating load. To account for representative seasonal climatic variations, potential emissions from the proposed combustion turbine were analyzed at minimum emissions compliance load (MECL), 50, 75, and 100 percent load conditions for ambient temperatures ranging from -30 degrees °C to +39°C. Projected emissions were based on data provided by the potential F-Class combustion turbine manufacturers and/or from AP-42 emission factors.

In addition to the combustion turbine, there will also be emissions of air contaminants generated from the emergency diesel generator, emergency diesel fire pump, and dew point heater. Detailed calculations of the combustion turbine and auxiliary equipment's emissions are provided in Appendix E.

24.5.2 EMERGENCY DIESEL FIRE PUMP

An emergency diesel fire pump will be built to support the Project in case of a fire. The emergency diesel fire pump is expected to have a maximum power output of 237 horsepower and will be fired solely by ultra-low sulfur #2 fuel oil. The Project expects to operate the emergency diesel fire pump for up to 100 hours annually for testing and maintenance purposes, and therefore supports a limit on routine hours of operation of the emergency diesel fire pump. Vendor data, AP-42 emission factors, and NIR emission factors were used to determine emissions for the fire pump.

24.5.3 EMERGENCY DIESEL GENERATOR

An emergency diesel generator will be built to provide essential services to the Project in case of a power interruption. The emergency diesel generator is expected to have a maximum power output of 1,250 kW and will be fired solely by ultra-low sulfur #2 fuel oil. The Project expects to operate the emergency diesel generator for up to 100 hours annually for testing and maintenance purposes, and therefore supports a limit on routine hours of operation of the emergency diesel generator. Vendor data, AP-42 emission factors, and NIR emission factors were used to determine emissions from the emergency diesel generator.

24.5.4 CIRCUIT BREAKER EQUIPMENT

Nine sulfur hexafluoride (SF_6) containing circuit breakers (245-kilovolts (kV) each), is proposed for the substation. Annual potential to emit emissions of SF_6 from the circuit breakers were based on maximum leakage rate of 0.5 percent per year, the amount of SF_6 in each circuit breaker, and the GWP. Project potential emissions of CO_{2e} leakage from all proposed circuit breakers combined are estimated to be 8.5 tonnes per year.

24.5.5 VENTING AND FUGITIVE EMISSIONS GENERATED

Fugitive emissions will come from small leaks in equipment connections throughout the Project. The estimated number of connectors, flanges, open ended lines, pump seals and valves were determined from engineering plans for the Project. The emissions were then estimated using the emission factors listed in NIR 1990-2020: Greenhouse Gas Sources and Sinks in Canada. The emissions estimates for fuel oil fugitives is "total organics" which includes non-VOCs such as methane and ethane and is assumed to be VOCs for calculation purposes. The emissions estimates for natural gas VOC fugitive emissions was calculated using the minimum methane content. Further, to determine natural gas CO_{2e} fugitive emissions the maximum methane content was used.

Table 24-13 Estimated Potential Annual Fugitive Emissions Associated with Natural Gas

Natural Gas			CO_2e
Equipment Type	**Quantity**	**Factors (g-THC /hr/source)**	**Potential to emit (tonnes / year)**
Connectors	279	0.267	17.8
Flanges	465	1.099	122.2
Open Ended Lines	30	35.764	256.6
Valves	856	0.314	64.3
Total			**461**

Note:
(a) Canada National Inventory Report 1990-2020 table A3.2-15 Fugitive Equipment Leak Emission Factors - Natural Gas, Process Gas, Policy 2

24.6 Emissions Generated During Decommissioning and Reclamation

During the decommissioning phase, fugitive dust and fine particulate emissions will be generated from demolition activities, material handling, and vehicles creating dust by traveling on land. In addition, off-road construction equipment (excavator, dozers, etc.) will release combustion by-products such as NOx, CO, and VOCs when they operate by combusting fuel.

During the decommissioning phase the Project will be idle; however, it is anticipated that the fire protection system will remain operational. As such, the only anticipated emission source would be the periodic testing required of the diesel fire pump. The expected emissions would be consistent with Table 24-9.

Precise activities, timing, and emissions estimates for the decommissioning of the Project cannot be predicted at this time, as they depend on many variables that will be determined in the future. In general, the overall duration of the decommissioning process, as well as the size of the crews involved, are expected to be substantially less than that required for construction of the Project. All relevant environmental regulations in existence at the time of decommissioning will be adhered to.

25 References

AAFC (Agriculture and Agri-food Canada). 2009. Saskatchewan Land Resource Unit. Saskatchewan Soil Resource spatial database. https://open.canada.ca/data/en/dataset/3734623c-25c5-4e69-936d-26f764a2807f. Accessed August 2022.

ACRB (Agriculture Canada Research Branch). 1981. A soil mapping system for Canada: Revised. https://sis.agr.gc.ca/cansis/publications/manuals/1981-smsc/81-142-soil-mapping.pdf. Accessed August 2022.

Acton, D.F., G.A. Padbury, C.T. Stushnoff. 1998. The Ecoregions of Saskatchewan. Saskatchewan Environment and Resource Management. Canadian Plains Research Centre, University of Regina, Regina, SK.

AUC Rule 012. Alberta Utilities Commission. Rule 012 Noise Control. March 5, 2021.

Bayne, E.M., L. Habib and S. Boutin. 2008. Impacts of chronic anthropogenic noise from energy sector activity on abundance of songbirds in the boreal forest. Conservation Biology 22: 1186-1193.

Birds Canada. 2022a. Saskatchewan Breeding Bird Atlas: Square Summary (13UDT74). Available at: https://naturecounts.ca/nc/skatlas/squaresummaryform.jsp?squareID=13UDT74&prov=SK. Accessed November 2022.

Birds Canada. 2022b. Saskatchewan Breeding Bird Atlas: Square Summary (13UDT84). Available at: https://naturecounts.ca/nc/skatlas/squaresummaryform.jsp?squareID=13UDT84&prov=SK. Accessed November 2022.

Brenzil, C. 2010. New weed control Bill introduced in Legislature. Government of Saskatchewan, Ministry of Agriculture. Available at: http://publications.gov.sk.ca/documents/20/83632-agv_dec_09.pdf. Accessed November 2022.

Canada's Top 100 Employers. 2022. SaskPower. Available at: https://reviews.canadastop100.com/top-employer-saskpower. Accessed November 2022.

CBC Radio Canada. 2019. New group in Humboldt meant to answer questions for parents of LGBTQ youth. Available at: https://www.cbc.ca/news/canada/saskatchewan/parents-of-the-rainbow-lgbtq-group-humboldt-1.5389812. Accessed October 2022.

CCME (Canadian Council of Ministers of the Environment). 2007. A protocol for the derivation of water quality guidelines for the protection of aquatic life 2007. In: Canadian environmental quality guidelines, 1999, Canadian Council of Ministers of the Environment, 1999, Winnipeg.

CCME. 2012. The Air Quality Management System. Federal, Provincial and Territorial Roles and Responsibilities. Canadian Council of Ministers of the Environment. October 2012. Available at: https://ccme.ca/en/air-quality-report#slide-7. Accessed December 2022.

CCME. 2023. Canadian Water Quality Guidelines for the Protection of Aquatic Life. Available at: https://ccme.ca/en/resources/water-aquatic-life. Accessed January 2023.

CLI (Canada Land Inventory). 1972. Soil capability classification for agriculture. Department of Economic Expansion, Ottawa, ON. Report No.2.

Cornell Lab of Ornithology and the American Ornithologists' Union. 2022. Birds of the World Online database. Available at: https://birdsoftheworld.org/bow/home?login. Accessed November 2022.

Digital Globe. 2016. ESRI World Imagery. Accessed using ArcGIS 10.8.1. Accessed November 2022.

ECCC (Environment and Climate Change Canada). 1999. Federal Environmental Quality Guidelines: Iron. Last amended: 2018. Available at: https://www.canada.ca/content/dam/eccc/documents/pdf/pded/feqg-iron/Federal-Environmental-Quality-Guidelines-Iron.pdf. Accessed January 2023.

ECCC (Environment and Climate Change Canada). 2017. Guidelines for the Reduction of Nitrogen Oxide Emissions form Natural Gas-fuelled Stationary Combustion Turbines. Environment and Climate Change. November 2017.

Francis, C.D. and J.R. Barber. 2013. A framework for understanding noise impacts on wildlife: An urgent conservation priority. Frontiers in Ecology and the Environment 11: 305-313.

GOA (Government of Alberta). 2013. Integrated Standards and Guidelines, Enhanced Approval Process. Sustainable Resource Development, Lands Division. Edmonton, AB. Available at: https://open.alberta.ca/dataset/633dc6c2-8b96-4602-bbf0-f1bd40437ae9/resource/feddfcb8-d81d-4011-8247-59b1f5b162c6/download/2013-enhanced-approval-process-eap-integrated-standards-guide-2013-12-01.pdf. Accessed November 2022.

GOC (Government of Canada). 1985a. *Fisheries Act.* Last amended: 2019. Available at: https://laws-lois.justice.gc.ca/PDF/F-14.pdf. Accessed September 2022.

GOC. 1985b. *Aeronautics Act*. Last amended: 2018. Available at: https://laws-lois.justice.gc.ca/PDF/A-2.pdf. Accessed September 2022.

GOC. 1994. *Migratory Birds Convention Act*. Last amended: 2017. Available at: https://laws-lois.justice.gc.ca/PDF/M-7.01.pdf. Accessed September 2022.

GOC. 1999. *Canadian Environmental Protection Act*. Last amended: 2021. Available at: https://laws-lois.justice.gc.ca/PDF/C-15.31.pdf. Accessed September 2022.

GOC. 2002. *Species at Risk Act*. Last amended: 2022. Available at: https://laws-lois.justice.gc.ca/PDF/S-15.3.pdf. Accessed September 2022.

GOC. 2018a. Legal protection of migratory birds: overview. Available at: https://www.canada.ca/en/environment-climate-change/services/migratory-birds-legal-protection/overview.html. Accessed September 2022.

GOC. 2018b. Nesting Periods. Last amended: 2018. Available at: https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/general-nesting-periods/nesting-periods.html#_zoneB_calendar. Accessed November 2022.

GOC. 2018c. Regulations Limiting Carbon Dioxide Emissions from Natural Gas-fired Generation of Electricity. Last amended: 2019. Available at: https://laws-lois.justice.gc.ca/PDF/SOR-2018-261.pdf. Accessed September 2022.

GOC. 2019a. *Impact Assessment Act*. Last amended: 2019. Available at: https://www.laws-lois.justice.gc.ca/PDF/I-2.75.pdf. Accessed September 2022.

GOC. 2019b. Physical Activities Regulations. Last amended: 2021. Available at: https://laws-lois.justice.gc.ca/PDF/SOR-2019-285.pdf. Accessed September 2022.

GOC. 2019c. Information and Management of Time Limits Regulations. Last amended: 2019. Available at: https://laws.justice.gc.ca/PDF/SOR-2019-283.pdf. Accessed September 2022.

GOC. 2019d. Aquatic Species at Risk Map. Last amended 2022. Available at: https://www.dfo-mpo.gc.ca/species-especes/sara-lep/map-carte/index-eng.html. Accessed November 2022.

GOC 2020. Strategic Assessment of Climate Change. Last amended: 2020. Available at: https://www.strategicassessmentclimatechange.ca/. Accessed September 2022.

GOC. 2021a. Gender Results Framework placemat. Last amended: 2021. Available at: https://women-gender-equality.canada.ca/en/gender-results-framework/gender-results-framework-placemat.html. Accessed October 2022.

GOC. 2021a. Request a review of your project near water: Step 2. Understand the project review process. Last amended: 2021. Available at: https://www.dfo-mpo.gc.ca/pnw-ppe/reviews-revues/request-review-demande-d-examen-002-eng.html. Accessed September 2022.

GOC. 2021b. Standard 621 – Obstruction Marking and Lighting – Canadian Aviation Regulations (CARs). Last amended: 2021. Available at: https://tc.canada.ca/en/corporate-services/acts-regulations/list-regulations/canadian-aviation-regulations-sor-96-433/standards/standard-621-obstruction-marking-lighting-canadian-aviation-regulations-cars. Accessed September 2022.

GOC. 2021c. Marking and lighting of obstacles to air navigation. Available at: https://tc.canada.ca/en/aviation/general-operating-flight-rules/marking-lighting-obstacles-air-navigation. Accessed September 2022.

GOC. 2022a. Guide to Preparing an Initial Project Description and a Detailed Project Description. Available at: https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/guide-preparing-project-description-detailed-project-description.html. Accessed September 2022.

GOC. 2022b. Search Registry. Last Amended: 2022. Available at: https://iaac-aeic.gc.ca/050/evaluations/exploration?search=regional+assessment. Accessed September 2022.

GOC. 2022c. *Species at Risk Act* public registry. Available at: https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html. Accessed November 2022.

GOC. 2022d. About the National Pollutant Release Inventory. Last amended: 2022. Available at: https://www.canada.ca/en/environment-climate-change/services/national-pollutant-release-inventory/about-national-pollutant-release-inventory.html. Accessed September 2022.

GOC. 2022e. Clean Electricity Regulations. Last amended: 2022. Available at: https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/clean-electricity-regulation.html. Accessed September 2022.

GOS (Government of Saskatchewan). 1980a. *The Environmental Assessment Act*. Last amended: 2018. Available at: https://publications.saskatchewan.ca/api/v1/products/488/formats/616/download. Accessed September 2022.

GOS. 1980b. *The Heritage Property Act.* Last amended: 2019. Available at: https://publications.saskatchewan.ca/api/v1/products/558/formats/756/download. Accessed September 2022.

GOS. 1989. The Hazardous Substances and Waste Dangerous Goods Regulations. Last amended: 2000. Available at: https://publications.saskatchewan.ca/api/v1/products/671/formats/982/download . Accessed September 2022.

GOS. 1997. *The Highways and Transportation Act*. Last amended: 2022. Available at: https://publications.saskatchewan.ca/api/v1/products/559/formats/758/download. Accessed September 2022.

GOS. 1998. *The Wildlife Act.* Last amended: 2020. Available at: https://publications.saskatchewan.ca/api/v1/products/938/formats/1513/download. Accessed September 2022.

GOS. 1999. The Wild Species at Risk Regulations. Chapter W-13.11 Reg 1. Available at: https://publications.saskatchewan.ca/#/products/1609. Accessed November 2022.

GOS. 2005. *The Water Security Agency Act.* Last amended: 2019. Available at: https://publications.saskatchewan.ca/api/v1/products/68084/formats/75665/download. Accessed September 2022.

GOS 2007. *The Planning and Development Act*. Last amended: 2019. Available at: https://publications.saskatchewan.ca/api/v1/products/23220/formats/29813/download. Accessed September 2022.

GOS. 2010a. *The Weed Control Act.* Last amended: 2020. Available at: https://publications.saskatchewan.ca/#/products/31364. Accessed September 2022.

GOS. 2010b. *The Environmental Management and Protection Act*. Last amended: 2018. Available at: https://publications.saskatchewan.ca/api/v1/products/31893/formats/81952/download. Accessed September 2022.

GOS. 2010c. *The Management and Reduction of Greenhouse Gases Ac*t. Last amended: 2018. Available at: https://publications.saskatchewan.ca/api/v1/products/88509/formats/105170/download. Accessed September 2022.

GOS. 2013. *The Saskatchewan Employment Act*. Last amended: 2021. Available at: https://publications.saskatchewan.ca/api/v1/products/70351/formats/78194/download. Accessed September 2022.

GOS. 2014a. Technical Proposal Guidelines: A Guide to Assessing Projects and Preparing Proposals under The Environmental Assessment Act. Available at: https://publications.saskatchewan.ca/api/v1/products/113159/formats/137589/download. Accessed September 2022.

GOS. 2014b. Chapter E.1.2 Industrial Source (Air Quality). Available at: https://publications.saskatchewan.ca/api/v1/products/77463/formats/110395/download. Accessed September 2022.

GOS. 2017a. Saskatchewan Activity Restriction Guidelines for Sensitive Species. Ministry of Environment, Fish, Wildlife and Lands Branch. Regina, SK. Available at: https://publications.saskatchewan.ca/#/categories/2062. Accessed November 2022.

GOS. 2017b. Prairie Resilience: A Made-in-Saskatchewan Climate Change Strategy. Available at: https://publications.saskatchewan.ca/api/v1/products/91091/formats/107966/download. Accessed September 2022.

GOS. 2018. Saskatchewan's Climate Resilience Measurement Framework. Available at: https://publications.saskatchewan.ca/api/v1/products/92479/formats/109479/download. Accessed September 2022.

GOS. 2019. Saskatchewan's Growth Plan: The Next Decade of Growth | 2020-2030. Available at: https://publications.saskatchewan.ca/api/v1/products/103260/formats/114516/download. Accessed September 2022.

GOS. 2020a. 2020 Traffic Volume Map Average Annual Daily Traffic. Available at: https://publications.saskatchewan.ca/api/v1/products/86557/formats/100199/download. Accessed November 2022.

GOS. 2020b. The Occupational Health and Safety Regulations. Last amended: 2021. Available at: https://publications.saskatchewan.ca/api/v1/products/112399/formats/126367/download. Accessed September 2022.

GOS. 2021a. Saskatchewan Air Quality Report – Meeting the Canadian Ambient Air Quality Standards 2017-2019. Government of Saskatchewan. 2021.

GOS. 2021b. Saskatchewan Hunters and Trappers Guide 2021/22. Available at: https://saskregionalparks.ca/wp-content/uploads/2021/07/2021-222BHunters2Band2BTrappers2BGuide.pdf. Accessed November 2022.

GOS. 2022a. Environmental Assessment Process. Available at: https://www.saskatchewan.ca/business/environmental-protection-and-sustainability/environmental-assessment/environmental-assessment-process. Accessed September 2022.

GOS. 2022b. Weed Inspectors in Saskatchewan. Available at: https://www.saskatchewan.ca/business/agriculture-natural-resources-and-industry/agribusiness-farmers-and-ranchers/crops-and-irrigation/weeds/weed-inspectors-in-saskatchewan. Accessed September 2022.

GOS. 2022c. Developers' Online Screening Tool. Available at: https://www.saskatchewan.ca/residents/parks-culture-heritage-and-sport/heritage-conservation-and-commemoration/archaeology/developers-online-screening-tool. Accessed September 2022.

GOS. 2022d. Roadside Development Permits. Available at: https://www.saskatchewan.ca/business/transportation-and-road-construction/apply-for-a-roadside-development-permit. Accessed September 2022.

GOS. 2022e. Saskatchewan's Climate Change Strategy. Available at: https://www.saskatchewan.ca/business/environmental-protection-and-sustainability/a-made-in-saskatchewan-climate-change-strategy/saskatchewans-climate-change-strategy. Accessed September 2022.

GOS. 2022f. 2022-2023 Saskatchewan Wildlife Management Zones. Available at: https://publications.saskatchewan.ca/api/v1/products/80439/formats/92279/download. Accessed November 2022.

GOS. 2022g. More than $50 Million Worth of Passing Lanes on Highway 16. Available at: https://www.saskatchewan.ca/government/news-and-media/2022/august/04/more-than-$50-million-worth-of-passing-lanes-on-highway-16. Accessed November 2022.

Habib, L., E.M. Bayne, and S. Boutin. 2007. Chronic industrial noise affects pairing success and age structure of ovenbirds Seiurus aurocapilla. Journal of Applied Ecology 44: 176-184.

Humboldt and Area Pride Network. 2022. Humboldt & Area Pride Network. Available at: https://www.facebook.com/HumboldtSKPride/?ref=page_internal. Accessed October 2022.

National Wetlands Working Group. 1997. The Canadian Wetland Classification System Second Edition. The Wetlands Research Centre. University of Waterloo, Waterloo, Ontario.

NatureServe. 2022. NatureServe Network Biodiversity Location Data accessed through NatureServe Explorer [web application]. NatureServe, Arlington, Virginia. Available at: https://explorer.natureserve.org/. Accessed November 2022.

NAV Canada. 2022. Land Use Program. Available at: NAV CANADA Land Use Program. Accessed September 2022.

Out Saskatoon. 2022a. Home. Available at: https://www.outsaskatoon.ca/. Accessed October 2022.

Out Saskatoon. 2022b. Our Principles. Available at: https://www.outsaskatoon.ca/our-principles/. Accessed October 2022.

Out Saskatoon. 2022c. Our History. Available at: https://www.outsaskatoon.ca/our-history/. Accessed October 2022.

Railway Association of Canada. 2022. Canadian Rail Atlas. Available at: https://rac.jmaponline.net/canadianrailatlas/. Accessed November 2022.

RM of Usborne (Rural Municipality of Usborne). 2011. Building Bylaw. Available at: https://rmusborne.ca/wp-content/uploads/Office/Bylaws/Building%20Bylaw.pdf. Accessed September 2022.

RM of Usborne. 2012. Official Community Plan. Available at: https://rmusborne.ca/wp-content/uploads/Office/Planning/RM%20of%20Usborne%20Official%20Community%20Plan.pdf. Accessed September 2022.

RM of Usborne. 2014. Zoning Bylaw. Available at: https://rmusborne.ca/wp-content/uploads/Office/Bylaws/RM310%20Zoning%20Bylaw.pdf. Accessed September 2022.

RM of Usborne. 2020. Dust Control Policy. Available at: https://rmusborne.ca/wp-content/uploads/Office/Bylaws/Dust%20Control%20Policy%20Nov%2020.pdf. Accessed September 2022.

RM of Usborne. 2022. RM of Usborne No. 310. Available at: https://rmusborne.ca/. Accessed October 2022.

RM of Viscount. 2022. Firefighting. Available at: https://rmviscount.ca/firefighting/. Accessed November 2022.

RM of Wolverine. 2022. RM of Wolverine No. 340. Available at: https://rmwolverine.ca/. Accessed November 2022.

Saskatoon Health Region. 2017. Find a Location. Available at: https://www.saskatoonhealthregion.ca/locations_services/locations/Pages/Home.aspx. Accessed October 2022.

Saskatoon Health Region. 2020. Lanigan Hospital. Available at: https://www.saskatoonhealthregion.ca/locations_services/locations/Pages/Hospitals/Lanigan-Hospital.aspx. Accessed October 2022.

Saskatoon Health Region. 2022. About the Region. Available at: https://www.saskatoonhealthregion.ca/about/Pages/Home.aspx. Accessed October 2022.

SaskPower (Saskatchewan Power Corporation). 2021. Environmental Assessment and Monitoring Handbook. Pp 1-25. Accessed October 2022.

SaskPower. 2022a. Environmental Beneficial Management Practices Manual. Available at: https://www.saskpower.com/about-us/for-our-suppliers/supplier-resources-and-corporate-practices/environmental-resources. Accessed November 2022.

SaskPower. 2022b. What We're Recognized For. Available at: https://www.saskpower.com/careers/why-work-for-saskpower/what-were-recognized-for. Accessed November 2022.

SaskPower. 2022c. Commitment to Diversity and Inclusion. Available at: https://www.saskpower.com/about-us/Our-Company/Commitment-to-Diversity-and-Inclusion. Accessed October 2022.

Saskatchewan Watershed Authority. 2008. Getting to the Source: Upper Qu'Appelle River and Wascana Creek Watersheds Source Water Protection Plan. Available at: https://www.wsask.ca/wp-content/uploads/2021/02/Upper-QuAppelle-River-and-Wascana-Creek-Watersheds-Source-Water-Protection-Plan.pdf. Accessed September 2022.

SKCDC (Saskatchewan Conservation Data Centre). 2022. Species Lists. Available at: http://biodiversity.sk.ca/SppList.htm. Accessed November 2022.

SK ENV (Saskatchewan Ministry of Environment). 2012. Saskatchewan Air Quality Modelling Guideline. Saskatchewan Ministry of Environment. March 2012.

SK ENV. 2014. Species Detection Survey Protocol: Yellow Rail December 2014. Saskatchewan Ministry of Environment, Fish, Wildlife and Lands Branch, Regina, SK. Available at: https://publications.saskatchewan.ca/#/categories/2067. Accessed November 2022.

SK ENV. 2015a. Saskatchewan Ambient Air Quality Standards. Available at: https://envrbrportal.crm.saskatchewan.ca/Pages/SEQS/Table20-SEQS-SAAQS.pdf. Accessed December 2022.

SK ENV. 2015b. Guidance Document: Impacted Sites. Available at: https://publications.saskatchewan.ca/api/v1/products/77475/formats/110310/download. Accessed October 2022.

SK ENV. 2017. Saskatchewan Activity Restriction Guidelines for Sensitive Species. Available at: https://publications.saskatchewan.ca/#/products/79241. Accessed November 2022.

SK ENV. 2020a. Species Detection Survey Protocol: 1.0 Amphibian Auditory Surveys April 2020 Update. Saskatchewan Ministry of Environment, Fish, Wildlife and Lands Branch, Regina, SK. Available at: https://publications.saskatchewan.ca/#/categories/2066. Accessed November 2022.

SK ENV. 2020b. Species Detection Survey Protocol: 2.0 Amphibian Visual Surveys January 2020 Update. Saskatchewan Ministry of Environment, Fish, Wildlife and Lands Branch, Regina, SK. Available at: https://publications.saskatchewan.ca/#/categories/2066. Accessed November 2022.

SK ENV. 2020c. Species Detection Survey Protocol: 9.0 Grassland Birds Surveys April 2020 Update. Saskatchewan Ministry of Environment, Fish, Wildlife and Lands Branch, Regina, SK. Available at: https://publications.saskatchewan.ca/#/categories/2067. Accessed November 2022.

SK ENV. 2020d. The Management and Reduction of Greenhouse Gases (Reporting) Standard. Available at: https://publications.saskatchewan.ca/api/v1/products/90935/formats/107832/download. Accessed September 2022.

SK ENV. 2021. Species Detection Survey Protocol: 20.0 Vascular Plant June 2021 Update. Saskatchewan Ministry of Environment, Fish, Wildlife and Lands Branch, Regina, SK. Available at: https://publications.saskatchewan.ca/#/categories/2069. Accessed November 2022.

SK ENV. 2022. Hunting, Angling and Biodiversity Information of Saskatchewan (HABISask) online mapping application. Available at: https://gisappl.saskatchewan.ca/Html5Ext/?viewer=habisask. Accessed November 2022.

SK ENV. 2023. Hunting, Angling and Biodiversity Information of Saskatchewan (HABISask) online mapping application. Available at: https://gisappl.saskatchewan.ca/Html5Ext/?viewer=habisask. Accessed February 2023.

SK PCAP (Saskatchewan Prairie Conservation Action Plan). 2008. Native Grassland and Forest: Rangeland Health Assessment. Available at: https://www.pcap-sk.org/rsu_docs/documents/Native_Grassland_and_Forest-Red.pdf. Accessed November 2022.

SKSIS (Saskatchewan Soil Information Systems) Working Group. 2018. Saskatchewan Soil Information System – SKSIS. A. Bedard-Haughn, M. Bentham, P. Krug, K. Walters, U. Jamsrandorj, and J. Kiss, eds. https://soilsofsask.ca/saskatchewan-soil-information-system.php. Accessed August 2022.

Statistics Canada. 2017a. Census Profile. 2016 Census. *Statistics Canada Catalogue no. 98-316-X2016001. Ottawa. Released November 29, 2017.* https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/index.cfm?Lang=E *(accessed October 17, 2022).*

Statistics Canada. 2017b. Map 10 Saskatchewan Health Regions, 2019. Last amended: 2017. Available at: https://www150.statcan.gc.ca/n1/pub/82-402-x/2017001/maps-cartes/rm-cr10-eng.htm. Accessed October 2022.

Statistics Canada. 2018. Table 13-10-0078-01 Infant and perinatal mortality, by sex, three-year average, Canada, provinces, territories, health regions and peer groups. Available at: https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1310007801. Accessed October 2022.

Statistics Canada. 2019. Table 13-10-0389-01 Life expectancy, at birth and at age 65, by sex, three-year average, Canada, provinces, territories, health regions and peer groups. Available at: https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1310038901. Accessed October 2022.

Statistics Canada. 2020. Table 13-10-0777-01 Number and percentage of adults (aged 18 years and older) in the household population with underlying health conditions, by age and sex (two-year period). Available at: https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1310077701. Accessed October 2022.

Statistics Canada. 2021. Table 13-10-0815-01 Selected socio-demographic and health indicators to better understand the impact of school closures during the COVID-19 pandemic on children (various reference periods). Available at: https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1310081501. Accessed October 2022.

Statistics Canada. 2022a. Census Profile. 2021 Census of Population. Statisti*cs Canada Catalogue no. 98-316-X2021001. Ottawa. Released September 21, 2022.* https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/index.cfm?Lang=E (*accessed October 17, 2022).*

Statistics Canada. 2022b. Table 13-10-0113-01 Health characteristics, two-year period estimates. Available at: https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1310011301. Accessed October 2022.

Statistics Canada. 2022c. More information: Usborne No. 310, Rural municipality (RM) [Census subdivision], Saskatchewan. Available at: https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/details/moreinfo-plusinfo.cfm?Lang=E&cdguid=2021A00054711046&SearchText=usborne&DGUIDlist=2021A00054711046&GENDERlist=1,2,3&STATISTIClist=1&HEADERlist=0. Accessed October 2022.

Stewart, R. E., and H. A. Kantrud. 1971. Classification of natural ponds and lakes in the glaciated prairie region. Resource Publication 92, Bureau of Sport Fisheries and Wildlife, U.S. Fish and Wildlife Service, Washington, D.C.

Thorpe, J. 2014a. Saskatchewan Rangeland Ecosystems, Publication 1. Ecoregions and Ecosites. Version 2. Saskatchewan Prairie Conservation Action Plan. Saskatchewan Research Council Pub. No. 1181-1E14.

Thorpe, J. 2014b. Saskatchewan Rangeland Ecosystems, Publication 5: Communities on the Sand and Sandy Loam Ecosites. Version 2. Saskatchewan Prairie Conservation Action Plan. Saskatchewan Research Council Pub. No. 11881-5E14

Town of Lanigan. 2022. Lanigan Union Hospital. Available at: http://lanigan.ca/health-care/lanigan-union-hospital/. Accessed October 2022.

Transport Canada. 2000. Standards Respecting Pipeline Crossings Under Railways TC E-10. Available at: https://tc.canada.ca/sites/default/files/2021-01/tc_e_10e.pdf. Accessed September 2022.

WSA (Water Security Agency). 2012. 25 Year Saskatchewan Water Security Plan. Available at: https://www.saskatchewan.ca/-/media/news-archive/2012/october/15/25-year-water-security-plan-creates-vision-for-the-future/wsa-25-year-report.pdf. Accessed September 2022.

Appendix A Stakeholder Engagement

We want your input on a

PROJECT NEAR YOU

SaskPower will potentially build up to two new natural gas power stations by the end of the decade.

As we plan the future power system, we're looking at a range of power generation options. Natural gas is one of them.

Given the demand for power from large urban centres, we're looking for site locations in the Regina and Saskatoon regions. We're also evaluating gas quality and supply in the Estevan area.

Please join us for a workshop.

At this early stage, we're working with municipalities, Indigenous rightsholders and regional planning groups around Saskatoon and Regina to get feedback on:

- The study areas in each region;
- Our expression of interest process to find potential sites;
- Future development plans in each region; and
- How you'd like to stay in touch throughout the process.

The workshops in **Saskatoon** will be held:

Tuesday, March 24, 2020
and
Tuesday, March 31, 2020

8:30 AM to 1 PM
Saskatoon Travelodge
Hercules Room

The workshops in **Regina** will be held:

Thursday, March 26, 2020
and
Thursday, April 2, 2020

8:30 AM to 1 PM
Mackenzie Art Gallery
Agra Torchinsky Salon

Please RSVP by March 20, 2020. Lunch and refreshments will be provided.

If you're unable to make it to a workshop, we're happy to meet with you in your community. Please call or email with your preference. Contact information below.

1-855-566-2903
PublicConsultation@SaskPower.com

SaskPower
Powering the future®

We want your input on a

PROJECT NEAR YOU

Chinook Power Station near Swift Current is a 350 MW natural gas power generation facility. It closely resembles what we'll potentially build.

Why natural gas?

Natural gas is an important part of SaskPower's plans to ensure reliable electricity, while meeting environmental regulations and an increasing need for power. It's also a baseload source of power that supports renewable generation such as wind and solar power. We expect we'll need more power generation by 2027 and beyond. We're considering a range of options and natural gas power generation is one of them.

What does SaskPower consider when choosing sites?

As a starting point, SaskPower considers environmental factors, Indigenous knowledge, land use, social aspects, technical components, and cost.

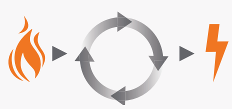
Why are you looking for land now when a new facility isn't needed until 2027?

Finding land that's suitable for large power plants takes time. There's lots of information to collect and consider. In early 2022 we'll decide whether to proceed with a natural gas power station and determine the size and location at that time as well. Before that happens, we need to select potential sites, complete technical and environmental studies, and fulfill both provincial and federal regulatory review processes.

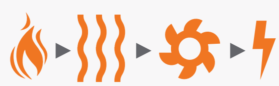
CONSIDERATIONS FOR GAS SITING

WHY NATURAL GAS?

- Provides ideal back-up to wind and solar.
- Option for baseload power.
- Lower CO_2 emissions than coal.
- Mature technology.
- Emissions Regulations add risk.



NATURAL GAS GENERATES POWER BY USING THE HEAT OF COMBUSTION TO TURN A TURBINE. Simple cycle plants produce power from gas turbines alone.



COMBINED CYCLE GAS PLANTS ARE ABOUT 15% MORE EFFICIENT. They use the gas turbine exhaust heat to generate steam that turns another turbine to create additional power.

RELIABILITY	COST RATING	GREENHOUSE GAS EMISSIONS
HIGH	MEDIUM	MEDIUM

APPLICATIONS OF NATURAL GAS GENERATION

Simple Cycle

- Provides peak load and load following capability
- Provides fast start-up.
- Faster and less expensive to construct.
- Less equipment, smaller footprint.
- Less water usage.

Combined Cycle

- Provides intermediate and base-load capability.
- Gas is utilized more efficiently.
- Load following capability.
- Lower emissions output per kW.

SIMPLE CYCLE GAS FACILITY

- Typical footprint for a 50-100 MW facility is about 20 acres.
- Requires minimal staff, up to 2 employees, may be operated remotely.
- Construction duration is 2.5 years, with up to 200 people at peak manpower.

Ermine Power Station

COMBINED CYCLE GAS FACILITY

- Typical footprint for a 350 MW facility is 40 – 75 acres.
- Requires 20-25 staff.
- Creates up to 35 other positions to provide services to the plant.
- Construction duration is 3 years, with up to 500 people at peak manpower.

Chinook Power Station

SITING CONSIDERATIONS

ENVIRONMENT

We consider many factors like land cover, wetlands, waterbodies, and potential archaeology, as well as potential impact on rare and endangered plant and animal species and their habitats.

When avoidance isn't possible, we will work with stakeholders and regulators to find the most responsible way to offset or mitigate effects and impacts. We follow Environmental Beneficial Management Practices.

INDIGENOUS KNOWLEDGE

We engage Indigenous communities to seek invaluable knowledge. Local and Indigenous knowledge refers to the understandings, skills and philosophies developed by societies with long histories of interaction with their natural surroundings like hunting, fishing, trapping, ceremonial and spiritual uses.

LAND USE

We recognize that land and resource use is important to agricultural operations, property owners, communities and resource users like hunters and trappers, commercial operators, nature, environmental organizations and the public.

We consider how resources or access to resources may be affected as well as community land use plans and proximity to communities, residences, habitable buildings, outbuildings.

SOCIAL

We consider the social value communities place on landscapes, points of interest, economic benefits to local communities, job opportunities and recreation activities.

TECHNICAL

We consider engineering and construction standards as well as access, terrain, design, system reliability, proximity to required and other existing infrastructure.

SaskPower is committed to ensuring public safety and safe access for construction and maintenance activities.

COST

We consider capital costs (project budget), operating budget (long term maintenance), land acquisition costs and impact on power rates.

WHAT ELSE SHOULD WE BE CONSIDERING?

From: Public Consultation
Bcc:

Subject: Workshops cancelled, exploring other alternatives
Date: Wednesday, March 18, 2020 7:51:51 AM

In follow-up to an invitation we sent out last week asking for your participation in a SaskPower workshop, we'd like to provide an update.

The safety of our staff, stakeholders and customers is SaskPower's priority. Unfortunately, we need to cancel the face-to-face workshops. Given current COVID-19 events and how rapidly new information is evolving, we felt this was the right thing to do.

We are evaluating the other options available to us. We'll reach out soon to let you know what those options are and get a better sense of what will work for you.

If you have any thoughts or preferences right now as to what would work for you, please let us know.

Kind regards,

Erin

Erin Lord, B.Comm SaskPower | Consultant, Stakeholder Engagement, Corporate Relations and Communications
toll free. 1.855.566.2903 | publicconsultation@saskpower.com
2NE - 2025 Victoria Avenue, Regina, SK, S4P 0S1

From: Public Consultation
Sent: March 11, 2020 4:19 PM
Subject: Siting for Potential Natural Gas Power Stations - Workshop Invitation

Good afternoon,

SaskPower will potentially build up to two new natural gas power stations by the end of the decade. As we plan the future power system, we're looking at a range of power generation options. Natural gas is one of them.

Given the demand for power from large urban centres, we're looking for site locations in the Regina and Saskatoon regions. We're also evaluating gas quality and supply in the Estevan area.

You're invited to our workshop and have four dates to choose from (see below or the attached invite).

At this early stage, we'd like to work with municipalities, Indigenous rightsholders and regional planning representatives around Saskatoon and Regina to get feedback on:

- The study area in each region;
- Our expression of interest process to find potential sites;
- Future development plans in each region; and
- How you'd like to stay in touch throughout the process.

Further information is in the attached pdf. **Please RSVP by March 20th by replying to this email.** Make sure to let us know who from your organization will attend and dietary restrictions. Lunch will be included.

Event details:

The workshops in **Saskatoon** will be held:

The workshops in **Regina** will be held:

Tuesday, March 24, 2020 and Tuesday, March 31, 2020 8:30 AM to 1 PM Saskatoon Travelodge Hercules Room	Thursday, March 26, 2020 and Thursday, April 2, 2020 8:30 AM to 1 PM Mackenzie Art Gallery Agra Torchinsky Salon

If this format doesn't work for you, please let us know how we can exchange information with you as we build this new siting process.

We'll follow up with your office to confirm receipt of this email and answer questions.

Warmest regards,

Erin

Erin Lord, B.Comm SaskPower | Consultant, Stakeholder Engagement, Corporate Relations and Communications

toll free. 1.855.566.2903 | publicconsultation@saskpower.com | 2NE - 2025 Victoria Avenue, Regina, SK, S4P 0S1

Public Engagement & Stakeholder Consultation
2 NE – 2025 Victoria Avenue
Regina SK Canada S4P 0S1
Toll free: 1-855-566-2903
PublicConsultation@saskpower.com

July 16, 2021

LETTER TO STAKEHOLDERS AT WOLVERINE & SHAND

Re: Evaluating Sites for New Natural Gas Power Stations

SaskPower is looking at a range of options to meet Saskatchewan's future power generation needs. Natural gas generation is one supply option being evaluated. A decision to proceed with new natural gas generation has not been made. However, we are looking for suitable sites now so that if a decision to proceed is made, we will be ready to move forward. We expect a supply decision could be made as early as 2022.

You are receiving this letter because you own land near one of the two sites being studied:

- NW 36-33-24 W2M, near our Wolverine Switching Station; or
- S 03-02-07 W2M, the site of our Shand Power Station.

We want to learn from our stakeholders what they would like us to consider as we continue to evaluate these sites. We'd also appreciate if you'd share your local knowledge about these sites to help in our evaluation. These sites were evaluated using a consistent set of siting criteria which included seeking to understand Indigenous Knowledge, land use, social considerations, potential environmental concerns, technical requirements, and cost implications. Moving forward, further analysis will be conducted concerning the criteria and stakeholder feedback.

Each of these sites is being considered for potential natural gas generation ranging from 50 to 350 megawatts (MW). We are considering smaller simple cycle gas turbines and larger combined cycle plants. This decision will depend on many factors, such as the forecast for future power demand and the availability of other supply options. SaskPower also continues to explore the potential to add or replace generation at existing facilities to fill the province's future power generation needs.

An information sheet about both types of gas generation and our siting considerations is attached. You can also visit our website at www.saskpower.com/futuresite for information on the sites that were included in the initial evaluation.

We'd like to hear your thoughts on potential future gas generation at Wolverine or Shand. Please contact us by email at publicconsultation@saskpower.com or telephone at

855-566-2903 to let us know how you'd like to exchange information. We can arrange video conference or teleconference meetings at your convenience.

Thank you in advance for taking time to participate in our process. Your input is important to us as we plan for future generation.

Sincerely,

<Original signed by>

Christine Enmark
Public Engagement & Stakeholder Consultation
Enc.

Learn more about our supply planning and help us plan our power future at:
https://www.saskpower.com/Our-Power-Future/Powering-2030/Help-Plan-Our-Power-Future

Sign up for updates on natural gas siting at: saskpower.com/futuresite

Public Engagement & Stakeholder Consultation
9 SE – 2025 Victoria Avenue
Regina SK Canada S4P 0S1
Toll free: 1-855-566-2903
PublicConsultation@saskpower.com

July 12, 2022

LETTER TO STAKEHOLDERS AT SHAND

Re: Proposed Natural Gas Power Station

Dear NAME,

We're writing to provide you an update on land SaskPower was evaluating for a proposed natural gas power station: S 03-02-07 W2M, SaskPower's Shand Power Station.

After further study, SaskPower has selected land near our Wolverine Switching Station in the Lanigan area. A decision to proceed with new natural gas generation has not been made. Our next step is to collect input from stakeholders that will help inform a decision in early 2023 to build this project.

The Lanigan-area site was selected based on the opportunities it presented such as road access, potential for groundwater availability, proximity to natural gas and transmission infrastructure and cost.

We continue to study other possibilities at Shand, including natural gas generation options that may be better suited to the natural gas availability in the area. Please contact us by email at publicengagement@saskpower.com or telephone at 855-566-2903 if you have any questions or comments.

Thank you for taking time to participate in our process. Your input is important to us as we plan for future generation.

Sincerely,

Christine Enmark
Public Engagement & Stakeholder Consultation

Public Engagement & Stakeholder Consultation
9 SE – 2025 Victoria Avenue
Regina SK Canada S4P 0S1
Toll free: 1-855-566-2903
PublicConsultation@saskpower.com

July 12, 2022

LETTER TO STAKEHOLDERS AT WOLVERINE

Re: Proposed Natural Gas Power Station

Dear NAME,

SaskPower has been evaluating land for a potential new natural gas power station. We're writing to let you know we've now selected our land, NW 36-33-24 W2M, near our Wolverine Switching Station, in the Lanigan area.

We selected the Lanigan site based on the opportunities it presented such as road access, potential for groundwater availability, proximity to natural gas and transmission infrastructure and cost.

As a landowner near this site, we also wanted to reach out to you to outline next steps. Our next priority is to learn from stakeholders– like you– to understand what you want us to consider as we continue to evaluate this project.

We want your input! Please get in touch by email at publicengagement@saskpower.com or phone at 855-566-2903 to let us know how you'd like to exchange information. As a nearby landowner, it'd be our pleasure to meet with you in-person on July 26th or July 28th at the Lanigan Town Hall. Please call to book a time. We'll also hold an open house for the general public on July 27th from noon to 7 p.m. at the Lanigan Town Hall.

Please note: we haven't made a final decision to build the new power station. Your input will help inform the engagement process, project interests and concerns.

About the project

As we begin to phase out conventional coal power, we'll need to replace it with another source of reliable power. Natural gas is our best option for meeting this need in the near term. It will help us meet environmental regulations because it produces half the emissions of conventional coal. And it will support us in bringing more renewable generation options online, like wind and solar.

As a result, we’re looking to build a 370-megawatt (MW) combined cycle natural gas power station near Lanigan. A 260-MW combustion turbine, for simple cycle dispatch, is forecast to be in-service in 2027, and the remainder of the plant would be built by 2028. The facility will be designed to have the capability to operate in both simple cycle and combined cycle mode, which will have more flexibility when demand for power changes. This plan may need to shift based on future regulations that may come through the Government of Canada’s Clean Electricity Standard.

Thank you in advance for taking time to participate in this process. Your input is important to us as we plan for future generation.

Sincerely,

<Original signed by>

Christine Enmark
Public Engagement & Stakeholder Consultation

Public Engagement & Stakeholder Consultation
9 SE – 2025 Victoria Avenue
Regina SK Canada S4P 0S1
Toll free: 1-855-566-2903
PublicConsultation@saskpower.com

July 12, 2022

LETTER TO STAKEHOLDERS AT WOLVERINE

Re: Proposed Natural Gas Power Station

Dear NAME,

SaskPower has been evaluating land for a potential new natural gas power station. We're writing to let you know we've now selected our land, NW 36-33-24 W2M, near our Wolverine Switching Station, in the Lanigan area.

We selected the Lanigan site based on the opportunities it presented such as road access, potential for groundwater availability, proximity to natural gas and transmission infrastructure and cost.

As a landowner near this site, we also wanted to reach out to you to outline next steps. Our next priority is to learn from stakeholders– like you– to understand what you want us to consider as we continue to evaluate this project.

We want your input! Please get in touch by email at publicengagement@saskpower.com or phone at 855-566-2903 to let us know how you'd like to exchange information. We'll also hold an open house for the general public on July 27th from noon to 7 p.m. at the Lanigan Town Hall.

Please note: we haven't made a final decision to build the new power station. Your input will help inform the engagement process, project interests and concerns.

About the project

As we begin to phase out conventional coal power, we'll need to replace it with another source of reliable power. Natural gas is our best option for meeting this need in the near term. It will help us meet environmental regulations because it produces half the emissions of conventional coal. And it will support us in bringing more renewable generation options online, like wind and solar.

As a result, we're looking to build a 370-megawatt (MW) combined cycle natural gas power station near Lanigan. A 260-MW combustion turbine, for simple cycle dispatch, is forecast to be in-service in 2027, and the remainder of the plant would be built by 2028. The facility will be designed to have the capability to operate in both simple cycle and combined cycle mode, which will have more flexibility when demand for power changes. This plan may need to shift based on future regulations that may come through the Government of Canada's Clean Electricity Standard.

Thank you in advance for taking time to participate in this process. Your input is important to us as we plan for future generation.

Sincerely,

<Original signed by>

Christine Enmark
Public Engagement & Stakeholder Consultation

We want your input on a

PROJECT NEAR YOU

POTENTIAL NATURAL GAS POWER STATION

Come and go from Lanigan Town Hall:

Noon to 7 p.m. on July 27

SaskPower
Powering our future®

POTENTIAL LANIGAN NATURAL GAS POWER STATION

July 2022

SaskPower
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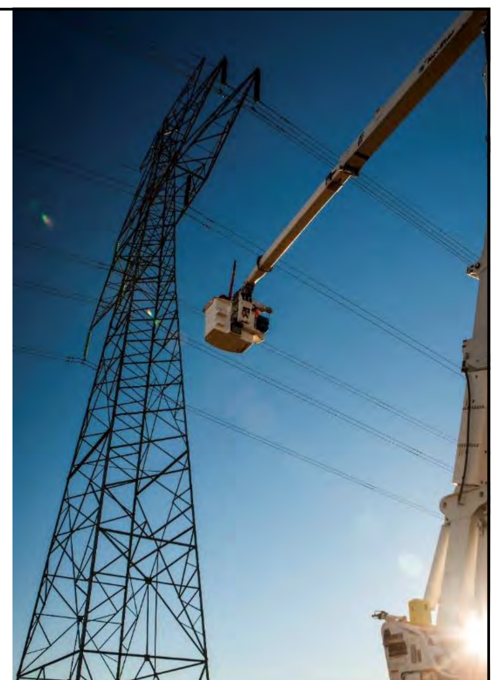
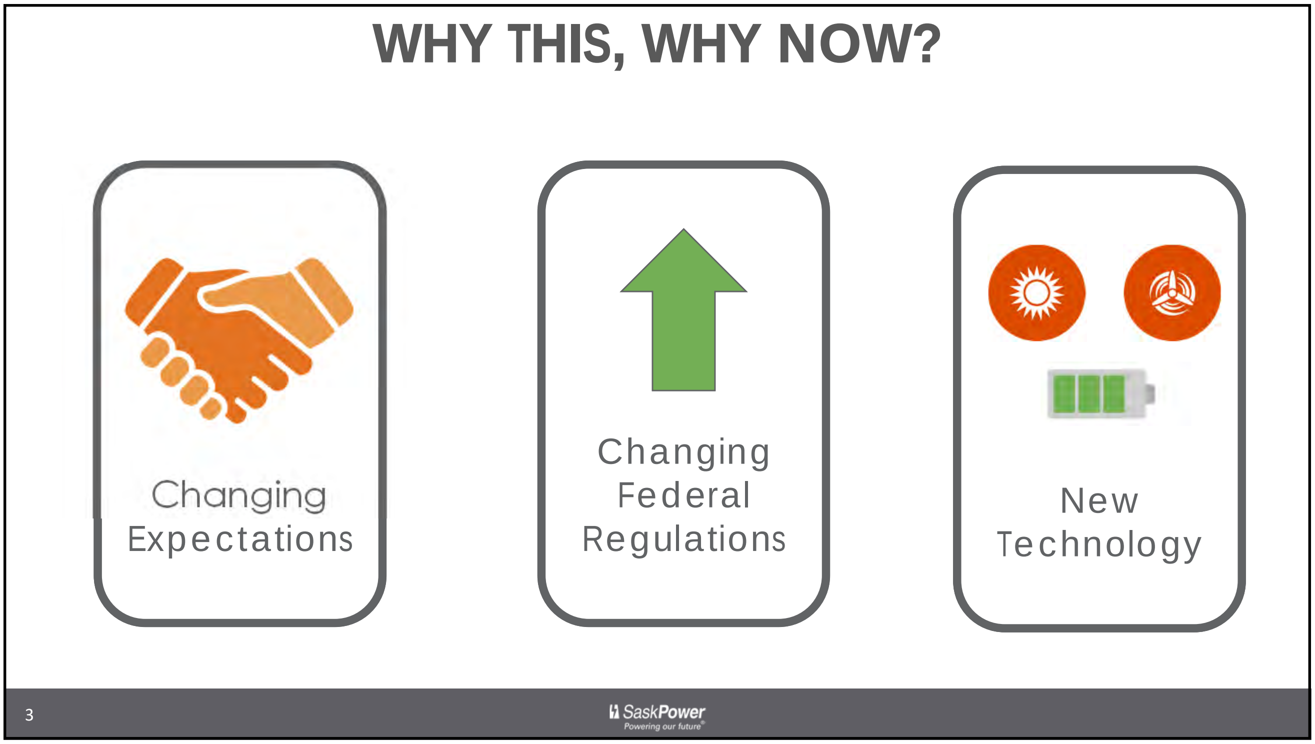
TOPICS FOR DISCUSSION

- Project Need
- Site Selection Process
- Feedback from You
- Group Discussion
- Next Steps




WHY THIS, WHY NOW?
Changing Expectations
Changing Federal Regulations
New Technology
3
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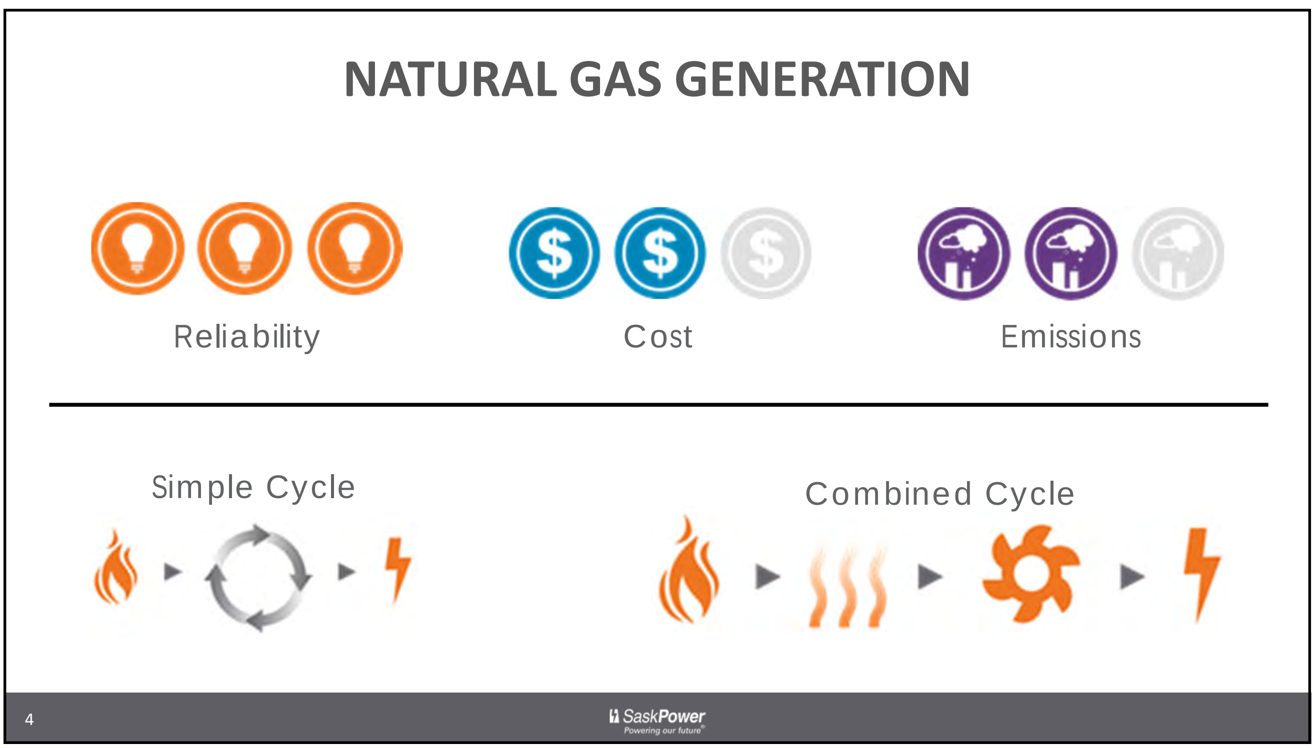
NATURAL GAS GENERATION
Reliability
Cost
Emissions
Simple Cycle
Combined Cycle
4
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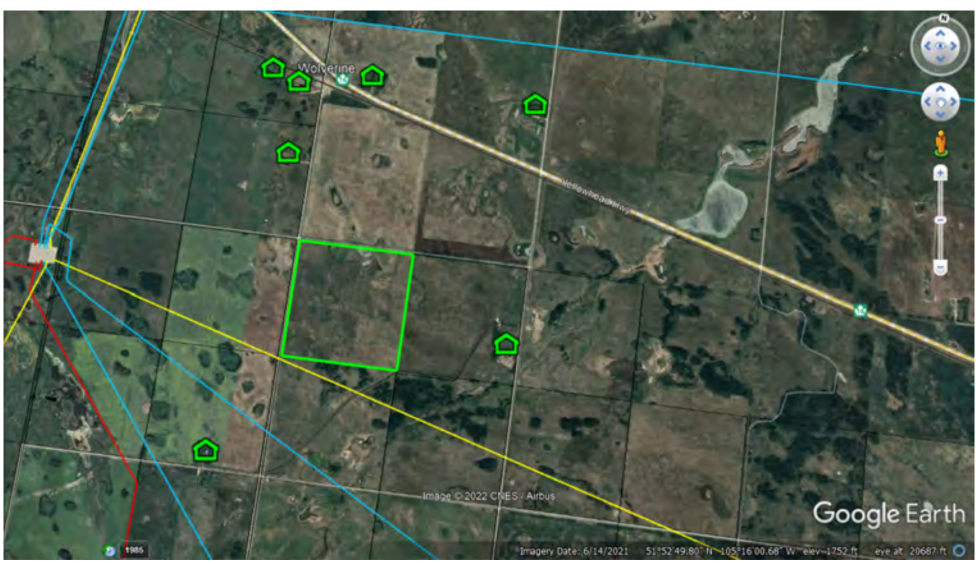
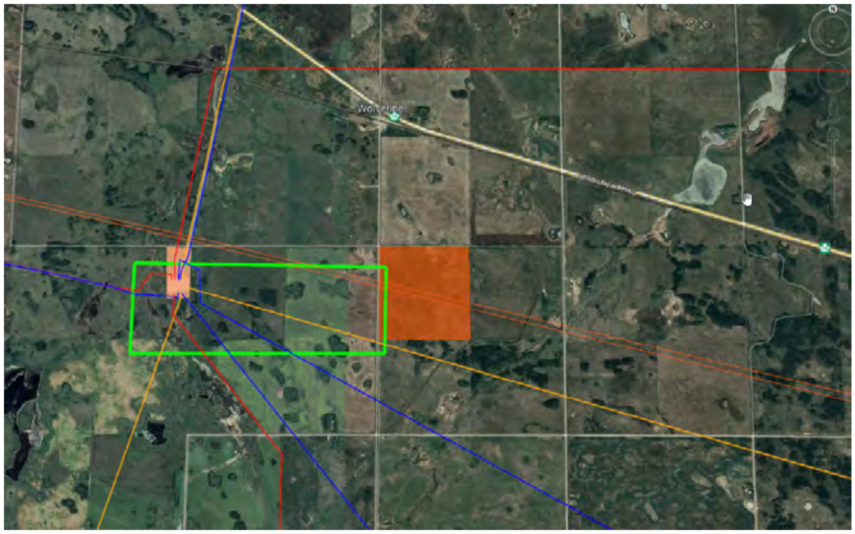
NATURAL GAS GENERATION

SITE SELECTION PROCESS



SITE SELECTION PROCESS



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SITE SELECTION PROCESS

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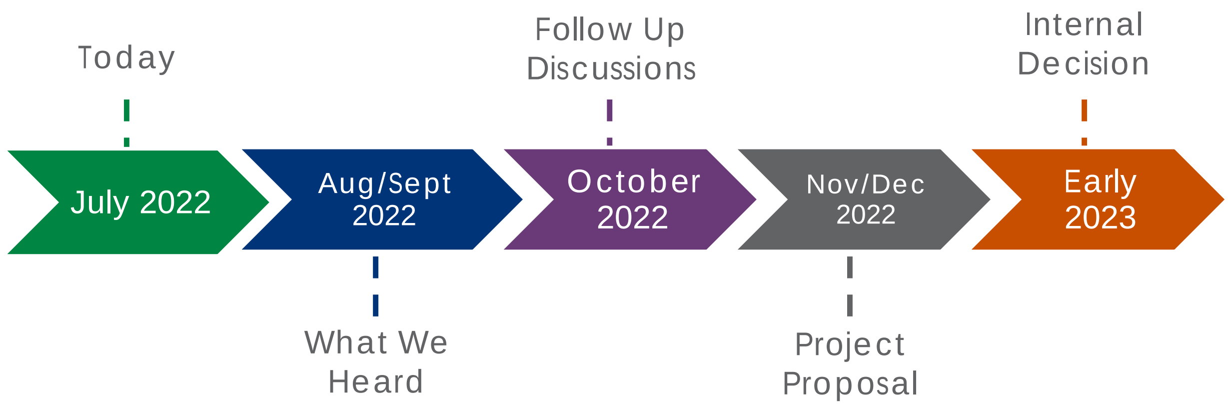
FEEDBACK AND DECISION



DISCUSSION

Noise	Emissions	Light
Water	Environment	Traffic
Transmission	Community	Other

WHAT'S NEXT?

- Session Summary
- Future Engagement Opportunities
- **Sign up for the newsletter at the project page:**
  https://www.saskpower.com/Our-Power-Future/Infrastructure-Projects/Construction-Projects/Current-Projects/Potential-Lanigan-Natural-Gas-Power-Station

TRAFFIC

Get familiar with the

POTENTIAL NATURAL GAS POWER STATION

Construction at Great Plains Power Station

WE'RE INVESTING IN SASKATCHEWAN'S POWER FUTURE

We've selected land near our Wolverine Switching Station, by Lanigan, to potentially build a natural gas power station. We're looking to build a facility with the ability to produce up to 370 megawatts (MW) of power— enough to power about 370,000 homes. SaskPower's goal is to reduce carbon dioxide emissions by at least 50% by 2030 from 2005 levels. Natural gas generation is part of our plan to reach that goal.

WHY WE NEED NATURAL GAS GENERATION

We're beginning to phase out using coal as a power source. This means we'll need to replace it with another reliable source of power. Natural gas is our best option for meeting our province's power needs in the near future. It will help us meet environmental regulations and produces half the emissions of conventional coal.

PROJECT BENEFITS AND OPPORTUNITIES

- Supports renewable power generation, like wind and solar
- Can act as a baseload source, meaning it's available 24/7
- Provides operational flexibility
- Creates job opportunities during and after construction

WHAT WE'VE DONE SO FAR

SaskPower purchased this site in 2013 in anticipation of needing a future site for a natural gas power facility. In 2020, we started to look at many sites to ensure that if we need new natural gas stations leading up to 2030, we were ready to move forward. We selected this site based on:

- Road access
- Potential for groundwater availability
- Proximity to infrastructure
- Cost

Get familiar with the POTENTIAL NATURAL GAS POWER STATION

WHAT WE'RE LOOKING FOR FEEDBACK ON

We want your input on how to engage with you during this project, your project interests and any concerns you have. We are interested in your perspectives like:

- How the project might affect you
- How we can lessen effects; and
- What else we should know as we complete our site studies

Our goal is to maintain open communication channels throughout this project.

CURRENT STATUS

Technical studies are underway for the project. We are working with local municipalities, First Nations and Metis communicates and local landowners to collect feedback. A decision to build this project will be brought forward in early 2023.

PROJECT OVERVIEW

The facility will initially be built with a 260-MW combustion turbine for simple cycle dispatch. After that, we'll add a combined cycle function that will allow the power station to generate 370 MW. This will allow SaskPower flexibility to use the facility to support solar/wind on calm or cloudy days, or provide baseload, 24/7 power to the province.

ANTICIPATED TIMELINE

- Public engagement – July 2022 – late 2022
- Decision to build – early 2023
- Construction start – mid-to-late 2024
- Simple cycle facility – operational early 2027
- Combined cycle facility – operational mid-to-late 2028

IF YOU HAVE QUESTIONS, OR WOULD LIKE TO KNOW MORE ABOUT THIS PROJECT, PLEASE CONTACT SASKPOWER.

1-855-566-2903
PublicEngagement@SaskPower.com

SaskPower, Stakeholder Consultation & Public Engagement

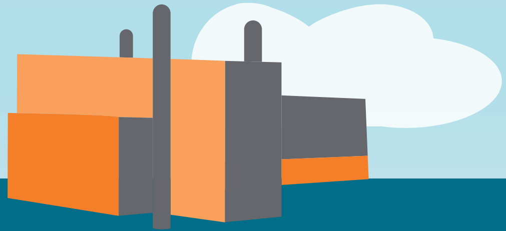
9SE, 2025 Victoria Avenue, Regina, SK. S4P 0S1

POTENTIAL LANIGAN NATURAL GAS POWER STATION

AIR QUALITY

AIR EMISSIONS
FROM A NATURAL GAS POWER STATION INCLUDE:

- **NITROGEN OXIDE**
- **PARTICULATE MATTER**
- **CARBON MONOXIDE AND CARBON DIOXIDE**
- **SULPHUR DIOXIDE**



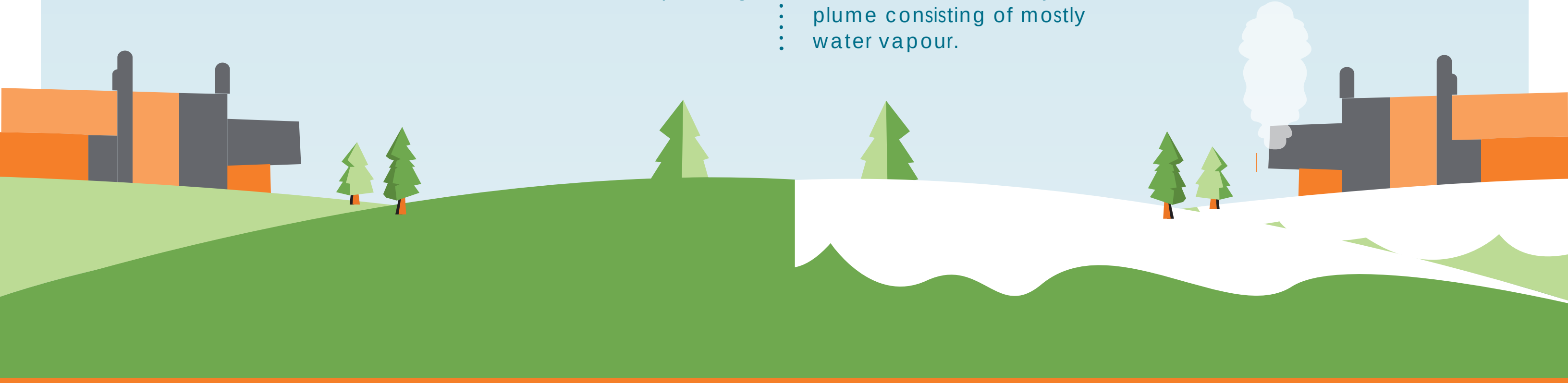
THE NEW FACILITY WILL FOLLOW
PROVINCIAL AND FEDERAL AIR QUALITY STANDARDS.
THIS WILL HELP:

1. **Minimize risk** to human health
2. **Minimize risk** to environment

A CLOUD OR "PLUME" WILL EXIT THE PLANT'S STACK. IT WILL LOOK DIFFERENT DEPENDING ON THE TEMPERATURE.

There is little to no plume in the summer when operating.

Like your furnace chimney in winter there is a steady steam plume consisting of mostly water vapour.



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POTENTIAL LANIGAN NATURAL GAS POWER STATION

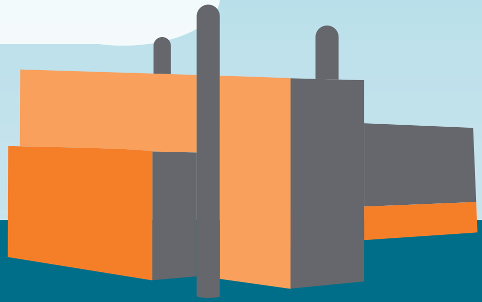
NOISE

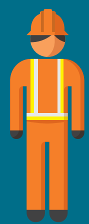
SOUND IS MEASURED IN DECIBELS (dB)

20 dB	**50 dB**	**70 dB**	**100 dB**	**150 dB**
RUSTLING LEAVES	A CONVERSATION AT HOME	A VACUUM CLEANER	A LAWNMOWER OR MOTORCYCLE	A JET TAKING OFF

PLANT OPERATION
40-50 dB
FROM THE NEAREST HOUSE

CONSTRUCTION NOISE
60 dB+
FOR LIMITED DAYS

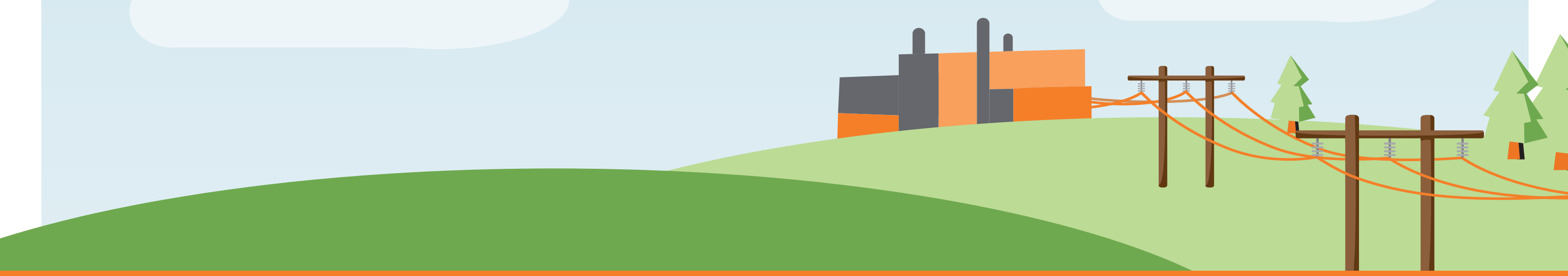




SOME SUBSTANTIAL NOISE WILL BE **UNAVOIDABLE**

- **Early construction** - pile driving for a suitable foundation. This is typically during the daytime and takes a couple months.
- **End of construction** - steam blows to clean out our piping. This noise will be off-and-on for a few weeks.

When possible, we'll let you know about these events in advance.



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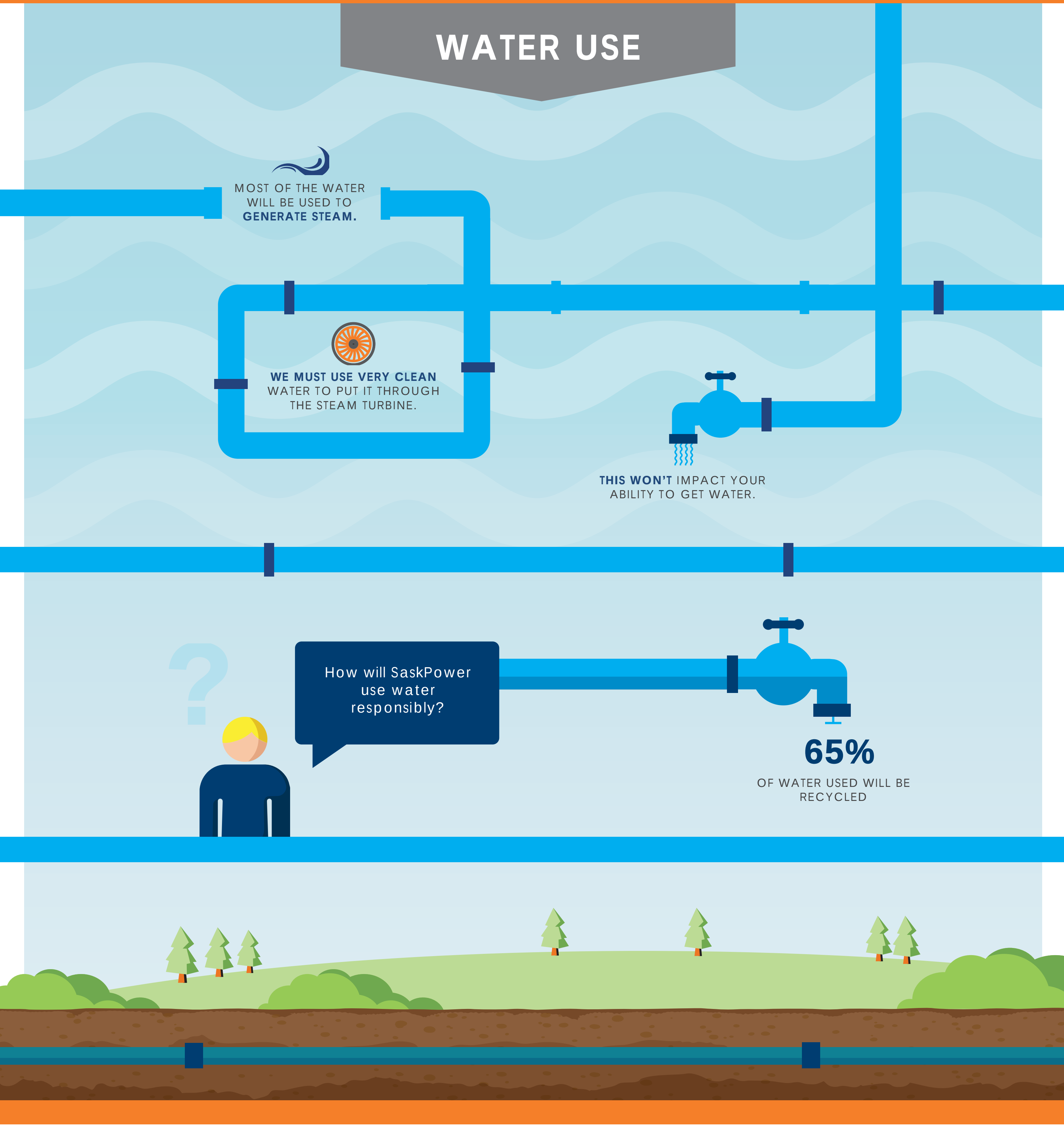

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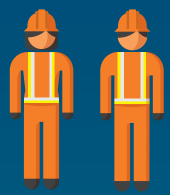
POTENTIAL LANIGAN NATURAL GAS POWER STATION

LIGHTING



SAFETY FIRST

Our top priority is to make sure all personnel on site are safe and we're visible to aircraft.

The lights will be kept on

24 HOURS

a day to generate power for SaskPower's customers.

POTENTIAL LANIGAN NATURAL GAS POWER STATION

ENVIRONMENT

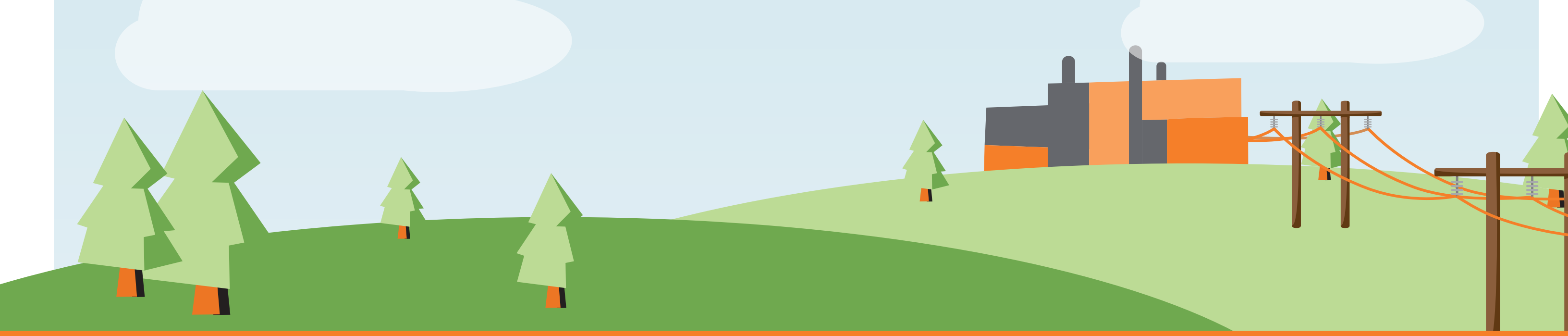
WE RECOGNIZE THAT WHAT WE DO TODAY IMPACTS OUR FUTURE. AS WE PLAN PROJECTS, WE:

USE TOOLS LIKE DATABASES, SATELLITE IMAGERY AND FIELD SURVEYS TO UNDERSTAND THE ENVIRONMENT

ENSURE ALL PROTECTION STANDARDS ARE IN PLACE

DEVELOP A PLAN TO REDUCE OR AVOID IMPACTS TO RARE AND ENDANGERED SPECIES, HABITATS, SENSITIVE LANDSCAPE FEATURES OR HERITAGE RESOURCES

We'll follow all applicable federal and provincial environmental assessment and approval processes.



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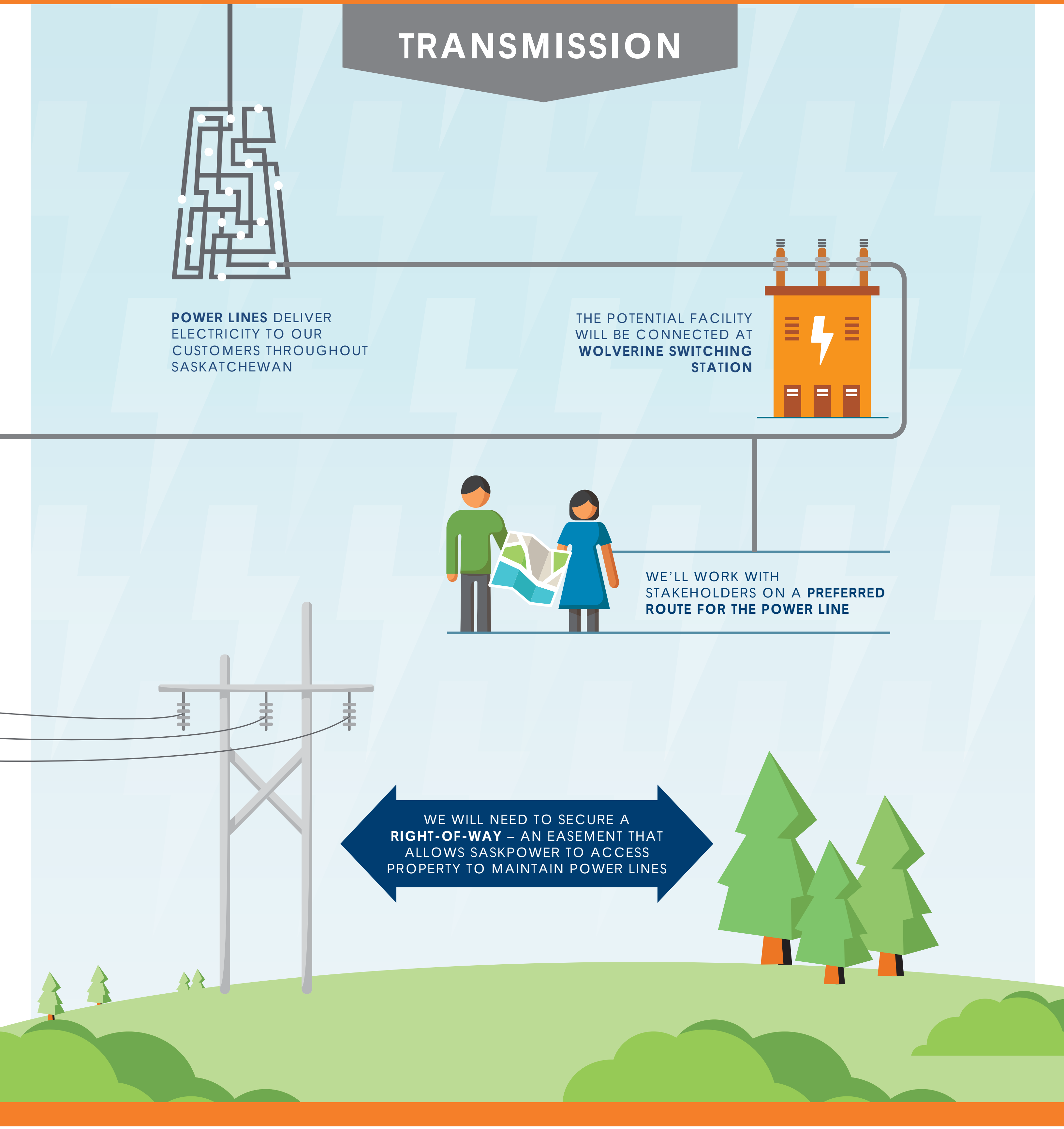
POTENTIAL LANIGAN NATURAL GAS POWER STATION



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WHAT WE DID

On July 26 and 27, 2022, we hosted workshops and an open house to hear feedback on a potential power station. Participants included stakeholders, landowners and interested parties.

Thank you to those who gave their time and offered their sincere perspectives. We appreciate your participation.

WHAT WE HEARD

We compiled what we heard into ten themes. Each theme includes our comments. We did our best to summarize conversations. If you see something missing or misconstrued, please reach out to us by email at **publicengagement@saskpower.com** or phone at 855-566-2903 so we can make corrections.

LOCATION

Many people wanted to know how we chose this location.
SaskPower purchased this land in 2013 anticipating the need for a power station site. We've been evaluating this land since that time. As some recalled, this site was our second choice when we built Chinook, near Swift Current. In 2021, we once again considered Lanigan and also considered Estevan. After studying each area, we chose Lanigan based on the following opportunities:

- road access
- potential for groundwater availability
- proximity to natural gas and transmission infrastructure
- cost

There is interest in what SaskPower will do with unused portions of the site if we build the facility.
SaskPower currently rents out the land. Once we build the facility, our renter may use the unused land. If the renter cancels their lease, we will re-evaluate what is available and what is best for the facility.

There is concern with the aesthetics of the power station.
The closest house is approximately half a kilometre away from the site. We will work with landowners on options for improving their line of sight and creating visual buffers.

There is interest in how SaskPower will secure the facility.
We'll enclose the entire facility with a fence. With electrical infrastructure present, it's our duty to keep the public safe. We will also work to keep cattle and wildlife nearby safe and away from the facility. We'll watch the site with closed-circuit television (CCTV) and only those with key passes will have access.

There is concern about garbage at the site.
During construction, we'll conduct daily walks to address safety and housekeeping. We'll ensure contractors dispose of waste and prevent it from blowing around the site.

WHY NATURAL GAS

There are questions about why we are building natural gas over other options.
We're beginning to phase out using conventional coal as a power source. This means we'll need to replace it with another reliable source of power. Natural gas is our best option for meeting our province's near-term power needs. We're on track to reduce our greenhouse gas (GHG) emissions by at least 50 per cent below 2005 levels by 2030. And we're working on how to make even deeper cuts to GHG emissions – like achieving a net zero future.

There was interest in nuclear, wind, solar and other options for the future.
We continue evaluating different options for how we'll supply power to Saskatchewan. We recognize the decisions we make today will impact you and future generations. Anyone interested in our future plans can take part in **Planning Our Power Future**. Read more about different supply options at **Balancing Supply Options**.

There was interest in the lifespan of this facility.
It will take three or four years to build the facility. Construction would start in late 2024 or early 2025. Typical life expectancy of the facility is 25 years. The actual lifespan will depend on any new regulations and how we decide to balance power supply.

There was interest in who this facility would serve.
Power from the facility would go to the provincial power grid serving all our customers. The grid functions like a pool, so it's difficult to say who uses the electricity.

NATURAL GAS SUPPLY

There are questions about where the natural gas is from.

TransGas will be routing a natural gas line to the site from the Patience Lake area. TransGas is in their planning phase. They're looking at opportunities to use the line for other customers as well as SaskPower.

There are existing high-pressure gas lines that run through our quarter section. These are at capacity, so we cannot use them for our facility. TransGas will reroute existing lines so we can build on the site.

TRANSMISSION

There is interest in how the facility will connect to SaskPower's grid.
We'll need to build a power line. It will connect the new facility to Wolverine Switching Station, two quarter sections west. We will work with landowners to find a line route that reduces impact to their property.

Once we find a route, we'll negotiate landowner agreements to help us build, operate and maintain the line. We'll let landowners know if construction activity will take place on their property.

Be respectful of the land.
Landowners shared that previous line construction had left their land in poor shape. We apologize and will ensure future contractors better restore the construction area.

A SaskPower supervisor will oversee the contractor. This will ensure they are following SaskPower's standard and policies. This includes having a clean job site and leaving the area in the same or better condition.

NOISE

There's concern with how loud the facility will be in operation and construction.
During operation, noise must stay below 50 decibels (dB) during the day and 40 dB during night. We are conducting noise studies in the area and will share results when they are available.

Some construction stages have unavoidable noisy activities – pile driving and steam blows. The noise will be intermittent. The highest noise recorded when we built Chinook Power Station was 85 dB. As a reference, a vacuum cleaner is around 70 dB in use. We'll do our best to let nearby landowners know about pile driving and steam blows in advance.

There is some existing noise from our Wolverine Switching Station.
Landowners identified they can hear noise at our existing facilities. This hum comes from our transmission lines as they carry electricity. It may be more noticeable with different wind directions.

WATER

We need clean water to run the facility.
SaskWater is studying the best way to supply water to the facility so it doesn't impact other users. There are three wells on the site that we're testing to determine how much water they supply. We'll share results from this study when available. The Zelma or Dellwood Reservoir can supply additional water that's needed through a pipeline.

We'll build a water treatment facility on site to ensure the water used in the process is very clean. This allows the facility to operate efficiently. The water we use at the facility will not impact your water supply.

LOCAL IMPACTS AND ECONOMICS

There is interest in how many people will work at the facility.
We estimate that during construction there will be 375 people on site with a peak of around 500 people. We're looking into construction camps to accommodate these large numbers. In operation, the power station will employee approximately 25 people.

Local suppliers want to be part of the project.
A partner will work with us to build the power station. We'll assess potential partners on how they plan to work with local and Indigenous suppliers. We'll ensure they meet their commitments. Once we select our partner, we'll hold open houses in Regina, Saskatoon and in the community. This gives local and Indigenous suppliers the chance to meet them. They'll also get on bid lists so they know about opportunities.

There were questions about taxes on the property.
Power generation facilities are tax exempt through the Grants-in-Lieu of Property Tax Policy. This facility would be part of this policy.

There were concerns about impacts to local restaurants, accommodations and the hospital.
This is something we will need to consider with the large number of workers that can be on site at one time. We want to be responsible in the community and will create plans for safety.

ENVIRONMENT

We heard information about local wildlife.

Residents shared that they have observed elk, deer, hawks and grouse on the site. We're committed to environmental stewardship and sustainability. A third-party environmental assessment program began this year. It is ongoing and will help us understand the current environmental conditions. We look for plants, animals, archaeological resources and natural water patterns for example. We expect to share our findings with the federal and provincial regulators next year.

During construction, unavoidable noise may deter wildlife from the area. But once in operation, the facility shouldn't continue to deter local wildlife.

TRAFFIC AND ROADS

There were questions about traffic to the site.
We'll need to widen the grid road from Highway 16 south to our site. This will accommodate the construction traffic. We'll work with the RM to determine road use plans.

There were concerns with the increase in dust.
We will take steps to reduce dust from construction traffic. We'll work with the RM and community to determine dust control methods. We'll stay in touch with local landowners to identify problems as they arise so we can find solutions.

Public Engagement & Stakeholder Consultation
9 SE – 2025 Victoria Avenue
Regina SK Canada S4P 0S1
Toll free: 1-855-566-2903
PublicConsultation@saskpower.com

September 26, 2022

Re: Proposed Natural Gas Power Station

Dear Sir or Madame,

In July 2022 we hosted workshops and an open house to hear feedback on a potential power station in the Lanigan area. We appreciate everyone who took the time to share their perspectives with us. If you missed it – don't worry! You can learn more about the project and what we heard from the consolidated feedback summary which is attached for your review. If you see something missing or misconstrued, please reach out so we can make corrections.

We'd like to continue conversations once you've had a chance to review the feedback summary. We are planning to be back in the area later this fall and we can also have video conference or teleconference meetings at your convenience prior to then. Please contact us by email at publicengagement@saskpower.com or telephone at 855-566-2903 to let us know how you'd like to continue to exchange information.

Again, thank you for taking time to participate in our process. Your feedback is important as we plan for the future.

Sincerely,

<Original signed by>

Christine Enmark
Public Engagement & Stakeholder Consultation
Encl.

SaskPower is in the process of deciding whether to build a natural gas power station in the Lanigan area.

Visit our site office, where you can get an update on the project, tell us about the area and ask questions.

TWO IN-PERSON EVENTS

No registration necessary

Merry Mixers Hall, 53 Main Street

Oct. 25, 2022
1 - 6 p.m.
Come-and-go

Oct. 26, 2022
9 a.m - noon
Come-and-go

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Get familiar with the

POTENTIAL NATURAL GAS POWER STATION

WE'RE INVESTING IN SASKATCHEWAN'S POWER FUTURE

We've selected land near our Wolverine Switching Station, by Lanigan, to potentially build a natural gas power station. We're looking to build a facility with the ability to produce up to 370 megawatts (MW) of power— enough to power about 370,000 homes. SaskPower's goal is to reduce carbon dioxide emissions by at least 50% by 2030 from 2005 levels. Natural gas generation is part of our plan to reach that goal.

PROJECT OVERVIEW

The facility will be built with a 260 MW combustion turbine for simple cycle dispatch and an additional 110 MW combined cycle function that will allow the power station to generate 370 MW.

This will allow SaskPower flexibility to use the facility to support solar/wind on calm or cloudy days, or provide baseload, 24/7 power to the province.

ANTICIPATED TIMELINE

- Public engagement – July 2022 – late 2022
- Decision to build – early 2023
- Federal and Provincial environmental determinations – mid-to-late 2023
- Construction start – mid-to-late 2024 (pending regulatory decisions)
- Simple and combined cycle facility – operational mid-2027

NEXT STEPS

The project team will provide a recommendation through the SaskPower governance process regarding whether to proceed with the project. The decision to proceed with the project will be finalized in early 2023.

SaskPower will submit a Project Description to the Impact Assessment Agency of Canada in early 2023. A determination from the Agency will inform next steps of the process. A provincial environmental submission will follow in mid-2023.

Get familiar with the
POTENTIAL NATURAL GAS POWER STATION

WHAT WE'RE LOOKING FOR FEEDBACK ON

We want your input on how to engage with you during this project, your project interests and any concerns you have. We are interested in your perspectives like:

- How the project might affect you
- How we can lessen effects; and
- What else we should know as we complete our site studies

Our goal is to maintain open communication channels throughout this project.

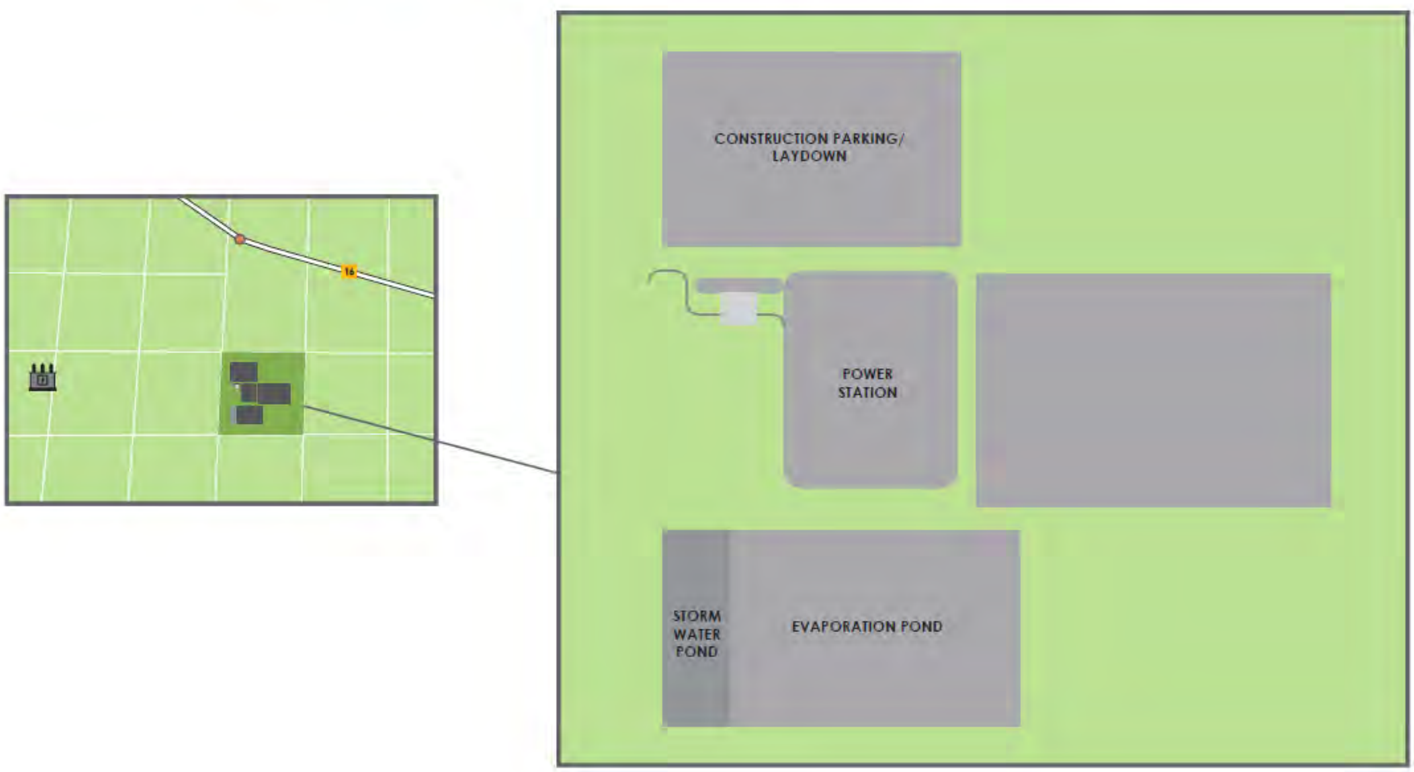
IF YOU HAVE QUESTIONS, OR WOULD LIKE TO KNOW MORE ABOUT THIS PROJECT, PLEASE CONTACT SASKPOWER.

1-855-566-2903
PublicEngagement@SaskPower.com

SaskPower, Stakeholder Consultation & Public Engagement

9SE, 2025 Victoria Avenue, Regina, SK. S4P 0S1

LANIGAN AREA NATURAL GAS POWER PLANT



Get familiar with the

POTENTIAL NATURAL GAS POWER STATION

TECHNICAL STUDIES

Since we last met studies have been underway at the site. The results of the studies have been summarized. Please reach out if you have further questions.

ENVIRONMENT

SaskPower contracted an environmental consultant to conduct a desktop analysis and biological field assessment in the summer of 2022 to characterize baseline environmental conditions on the project site. The assessment looked at terrain and soils, wildlife and wildlife habitat, vegetation, and wetlands. Based on the assessment, land cover on the quarter section is a combination of cultivation (29%), tame pasture (23%), native grassland (32%), wetlands (15%) and forested (1%). Four seasonal wetlands were identified on the quarter section. Two wildlife species of conservation concern were observed. No rare plants were observed but four noxious weed species were documented. The results of the assessment will support future mitigation planning as well as the development of the environmental assessment applications.

WATER

A hydrogeologic investigation to test the existing two wells on the proposed natural gas facility site has been completed. The wells draw from the Empress Group Aquifer. It was found that the Empress Group Aquifer has approximately 100 meters of available drawdown. At the anticipated peak flow at the facility of 6.5 liters per second, SaskPower does not anticipate any detrimental impact to current or future neighboring wells.

The existing wells on site have the capacity to provide the water needed for the facility under normal operating conditions, however extra capacity is needed to satisfy NFPA 850 fire regulations. SaskPower needs to determine whether to develop a third well or build a pipeline to meet these requirements. We are considering water quality in addition to the capacity of the aquifer.

NOISE

The noise impact assessment at the site for the proposed natural gas power station has been completed. This assessment determines the sound level limits applicable to the project. Saskatchewan does not currently have guidelines regarding noise limits, so the Alberta Utilities Commission (AUC Rule 12) limits are used as the permissible limits. Noise models were developed using receivers in the area along with historical and vendor data. These models analyzed for operation of the facility in combined cycle and simple cycle mode. The results for nighttime operation (the lowest permissible sound level) have been summarized.

Operation in simple cycle is slightly louder than in combined cycle. During the day the permissible sound level is 50dB from the nearest house. At night the permissible sound level is 40dB. A conversation is about 50dB. In both operation modes the natural gas facility meets the permissible sound levels.

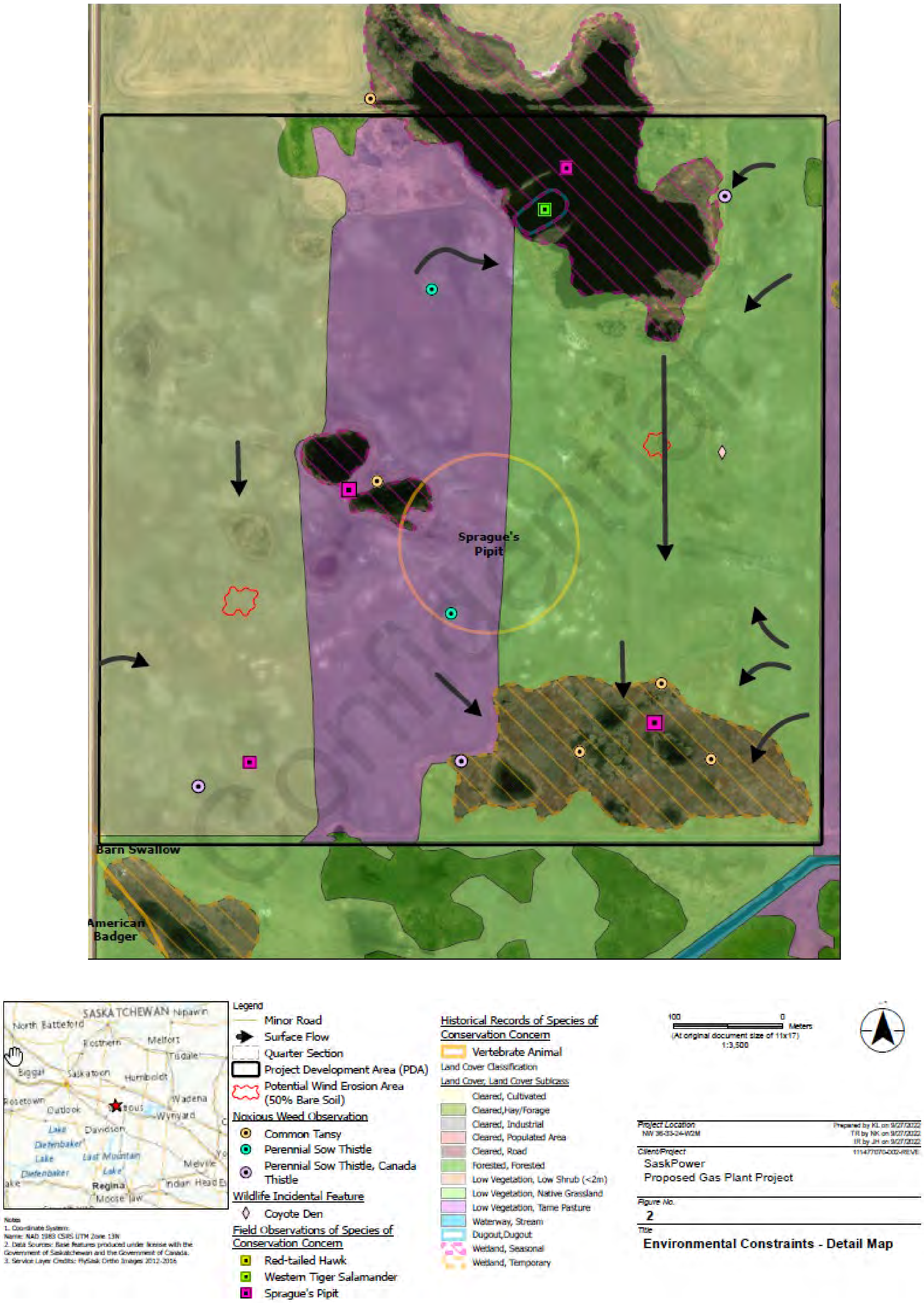
AIR

The air dispersion modelling is underway using the Saskatchewan Air Quality Modelling Guideline. Initial model results have determined the project will not exceed emissions requirements and the project will not cause or contribute a significant degradation to ambient air quality.

Get familiar with the

POTENTIAL NATURAL GAS POWER STATION

Environmental Constraints Map Summary



Get familiar with the
POTENTIAL NATURAL GAS POWER STATION

Combined Cycle Sound Levels (dBA)

Receiver	Modeled Project Sound Level	Existing Substation Estimated Sound Level	Assumed Nighttime Ambient Sound Level	Operational Nighttime Sound Level	Nighttime Permissible Sound Level
RES1	38.3	22.8	35	40	40
RES2	37.3	23.3	35	39	40
RES3	35.4	15.3	35	38	40

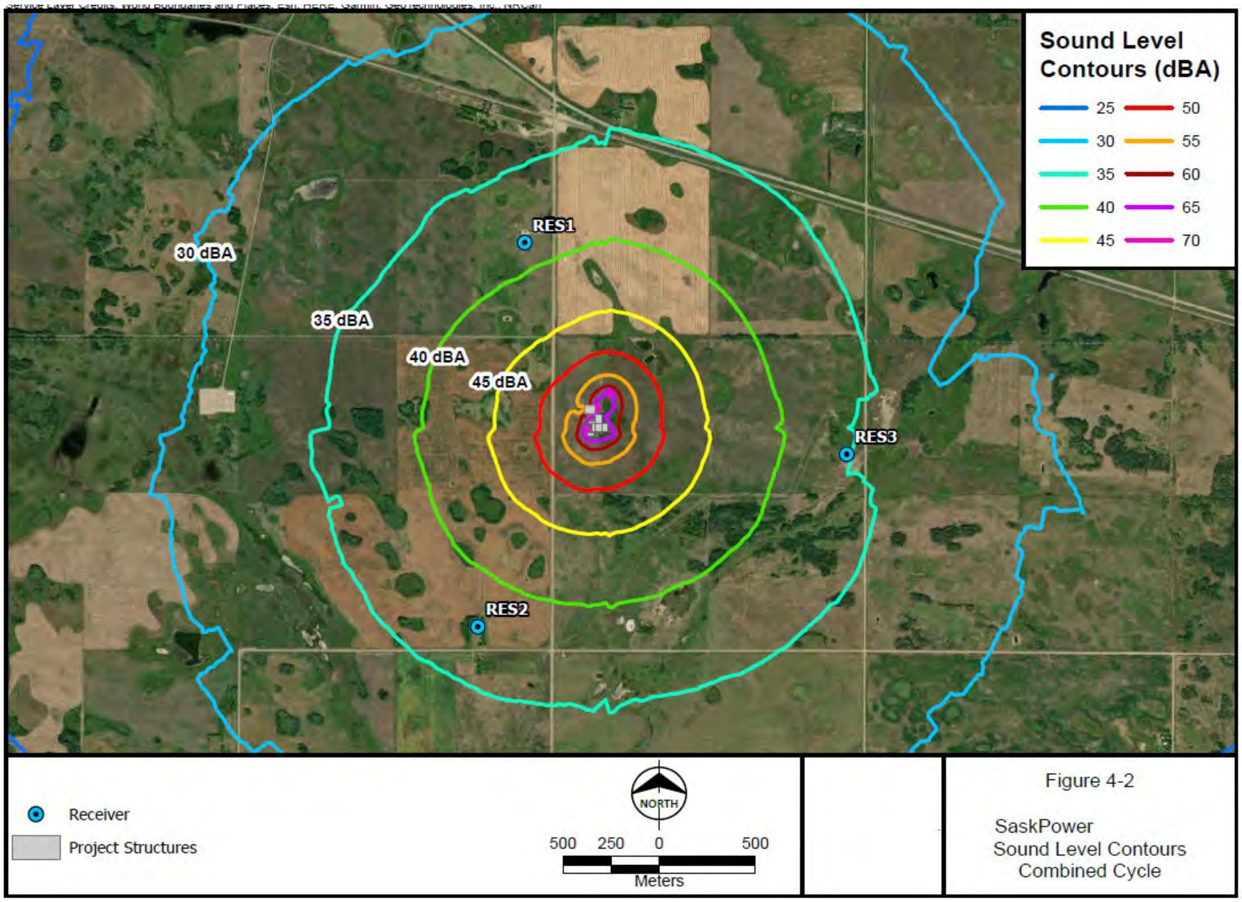


Figure 4-2
SaskPower
Sound Level Contours
Combined Cycle

Get familiar with the

POTENTIAL NATURAL GAS POWER STATION

Simple Cycle Sound Levels (dBA)

Receiver	Modeled Project Sound Level	Existing Substation Estimated Sound Level	Assumed Nighttime Ambient Sound Level	Operational Nighttime Sound Level	Nighttime Permissible Sound Level
RES1	37.8	22.8	35	40	40
RES2	38.2	23.3	35	40	40
RES3	35.6	15.3	35	40	40

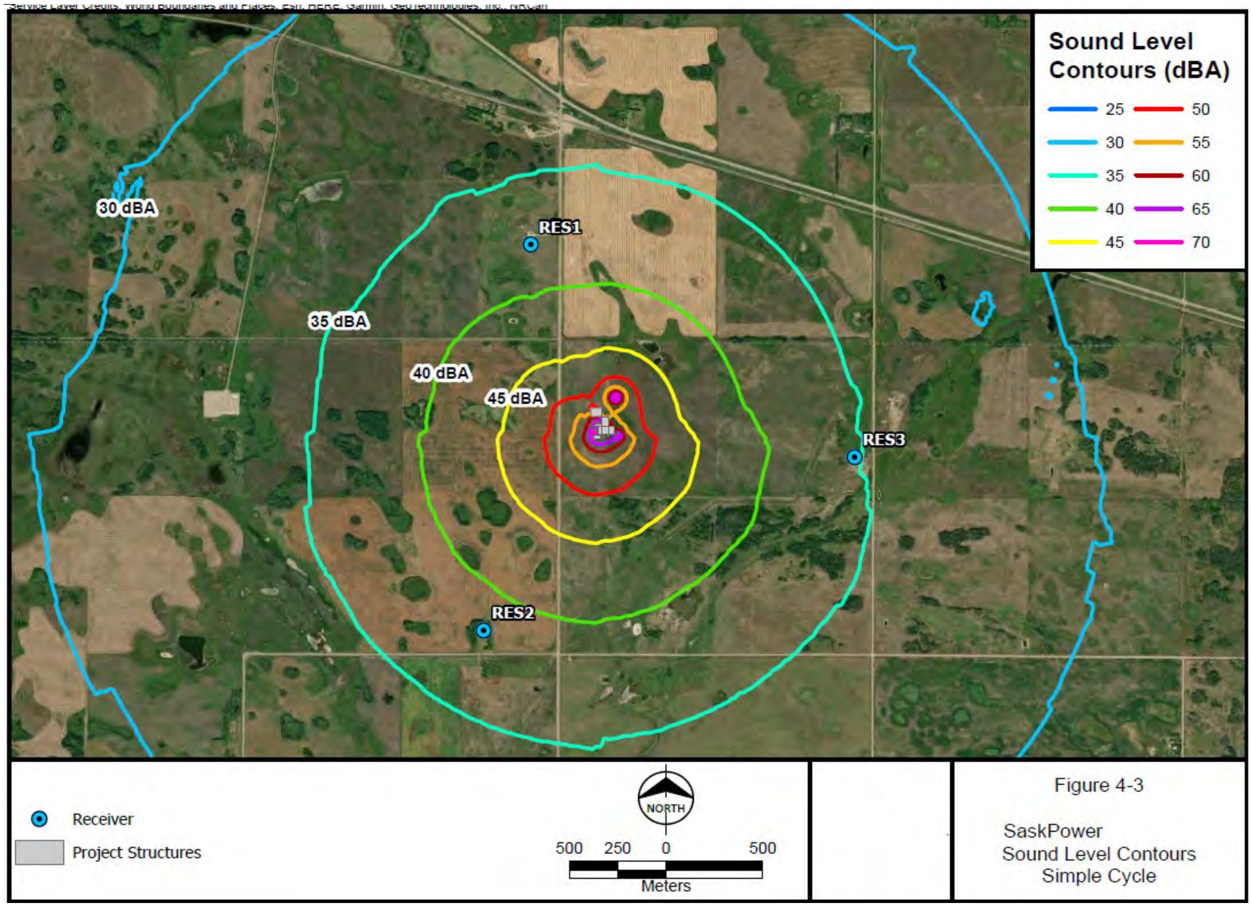


Figure 4-3

SaskPower
Sound Level Contours
Simple Cycle

LOOKING FOR INPUT ON A PROJECT NEAR YOU

EVALUATING SITES FOR NEW NATURAL GAS POWER STATIONS - JUNE 2020

As we begin to phase out conventional coal, we need to replace it with another source of reliable power. Natural gas is an option for meeting this need. It can help us meet environmental regulations because it produces half the greenhouse gas emissions of coal. It also supports renewable sources of power like wind and solar. By the end of 2021, we'd like to have 2 sites selected.

In March 2020, SaskPower invited you to attend a workshop to learn more about this project and include your feedback in our site selection process. Due to COVID-19, we needed to cancel the session. Now, we're looking to exchange information with you in different ways as we settle into our new normal.

We're working to evaluate land SaskPower already owns in the Saskatoon and Lanigan areas. We're also exploring opportunities in Estevan. At the same time, we want to consider new potential land options. This is where you come in.

Below are some ways to provide your input and stay in touch.

TAKE THE 5-MINUTE SURVEY

Our first step is getting to know your preferences.

Let us know how you'd like to provide input and receive information about this project.

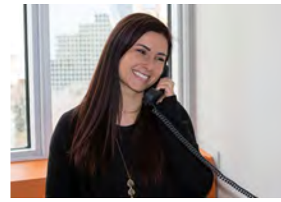
TAKE THE SURVEY

STAY IN THE LOOP

To continue to receive newsletters as we hit major project milestones, subscribe to our mailing list.

By the end of this year, we'll share the feedback we've received to date and our preferred site options.

SUBSCRIBE



HAVE A CONVERSATION WITH US

Do you have questions or concerns? We're happy to chat with you one-on-one.

CONTACT US

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Want to change how you get these emails? You can update your preferences or unsubscribe.
Please don't reply to this email.

REMINDER: YOUR FEEDBACK IS NEEDED

Complete the 5-minute survey below by July 31. Let us know the best way to share information with you, learn about your concerns, and answer your questions. We want to hear from you!

LOOKING FOR INPUT ON A PROJECT NEAR YOU

EVALUATING SITES FOR NEW NATURAL GAS POWER STATIONS

As we begin to phase out conventional coal, we need to replace it with another source of reliable power. Natural gas is an option for meeting this need. It can help us meet environmental regulations because it produces half the greenhouse gas emissions of coal. It also supports renewable sources of power like wind and solar. By the end of 2021, we'd like to have 2 sites selected.

We're working to evaluate land SaskPower already owns in the Saskatoon and Lanigan areas. We're also exploring opportunities in Estevan. At the same time, we want to consider new potential land options. This is where you come in.

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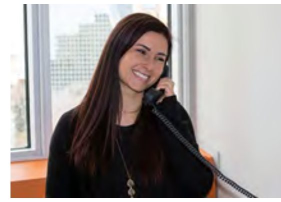
By the end of this year, we'll share the feedback we've received to date and our preferred site options.

SUBSCRIBE



HAVE A CONVERSATION WITH US

Do you have questions or concerns? We're happy to chat with you one-on-one.

CONTACT US

EVALUATING SITES FOR NEW NATURAL GAS POWER STATIONS

LANIGAN SELECTED FOR POTENTIAL NATURAL GAS POWER STATION

In 2021, we narrowed down potential locations for a new natural gas power station near Lanigan and Estevan. After studying each area, we've chosen the Lanigan site — located near our existing Wolverine Switching Station. We selected and purchased this site in 2015 in anticipation of needing a future site for a natural gas power facility.

Natural gas is our best option for meeting our province's power needs in the near future. It will help us meet environmental regulations and produces half the emissions of conventional coal. As a power source that can be available 24/7, it will also support renewable generation sources — like wind and solar — as we add them to our power grid.

This decision wasn't easy. We made the choice based on the following opportunities at the Lanigan site, such as:

- road access
- potential for groundwater availability
- proximity to natural gas and transmission infrastructure
- cost

We plan to add more natural gas generation in the future. We'll continue to study other possibilities at Shand Power Station in Estevan — including natural gas and other generation options for the Estevan area.

YOUR INPUT MATTERS!

We'll begin engaging with stakeholders and members of the Lanigan community this summer. We want your input to help inform the engagement process, project interests and concerns. We expect to make a final decision to build the new natural gas power station in 2023, after we complete our evaluations.

Watch for updates about engagement at the link below.

STAY INFORMED

STAYING IN TOUCH!

Now that our site location has been chosen, the siting process that began in 2019 has officially finished. This is our last newsletter.

Looking to stay informed about the Potential Lanigan Natural Gas Power Station project? Sign up below!

SIGN UP

FUTURE PLANNING

To reduce greenhouse gas (GHG) emissions, we must change how we design and generate power.

Learn more about our power future at the link below.

LEARN MORE

NATURAL GAS EXPANSION PROJECTS

As part of this site selection process, we're also adding natural gas turbines to the existing Yellowhead and Ermine Power Stations.

This is a fast and cost-effective way to add more 24/7 baseload power to our grid.

Learn more about these projects at the link below.

LEARN MORE

..

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Want to change how you get these emails? You can update your preferences or unsubscribe.
Please don’t reply to this email.

POTENTIAL LANIGAN NATURAL GAS POWER STATION

KEEPING YOU IN THE LOOP

We held landowner workshops and an open house on July 26 and 27 in Lanigan. We wanted to discuss and learn about local interests and concerns. Thanks to everyone who took time to come and talk with us. If you missed it – don't worry! You can learn more about the project and what we heard below.

We'll have more information to share this fall. Stay tuned as we plan for our next sessions in the area!

DISCOVER MORE

WE WANT YOUR FEEDBACK!

SPREAD THE WORD

How are you affected by the project? What can we do to reduce the impact?

We'd like you to let us know! How? It's easy!

Email us below or call us at 1-855-566-2903 (toll-free).

Your feedback will be used to help inform the engagement process, project interests and concerns.

CONTACT US

Do you know someone who might be interested in updates for the potential gas power station?

Help them stay informed. Share the link below so they can stay up to date with the latest information by signing up for this newsletter.

SHARE

POTENTIAL LANIGAN NATURAL GAS POWER STATION

WE'RE LOOKING FOR YOUR FEEDBACK

We're coming back to Lanigan to hear from you! Feel free to pop by the Merry Mixers Hall at 53 Main Street during one of the below time slots to chat with our team.

Oct. 25	**Oct. 26**
1 to 6 pm	9 am to noon

At the session, you'll get to:

- hear updates about the project
- tell us more about the project area
- discuss your interests and concerns

We'd like to thank everyone who has taken time to talk with us so far about the potential natural gas power station in the Lanigan area.

If you can't make it to either of the sessions, but have questions about the project, email us.

Learn more about the project at the link below:

LEARN MORE

Appendix B Indigenous Engagement

B.1 Indigenous Engagement

We want your input on a

PROJECT NEAR YOU

SaskPower will potentially build up to two new natural gas power stations by the end of the decade.

As we plan the future power system, we're looking at a range of power generation options. Natural gas is one of them.

Given the demand for power from large urban centres, we're looking for site locations in the Regina and Saskatoon regions. We're also evaluating gas quality and supply in the Estevan area.

Please join us for a workshop.

At this early stage, we're working with municipalities, Indigenous rightsholders and regional planning groups around Saskatoon and Regina to get feedback on:

- The study areas in each region;
- Our expression of interest process to find potential sites;
- Future development plans in each region; and
- How you'd like to stay in touch throughout the process.

The workshops in **Saskatoon** will be held:

Tuesday, March 24, 2020
and
Tuesday, March 31, 2020

8:30 AM to 1 PM
Saskatoon Travelodge
Hercules Room

The workshops in **Regina** will be held:

Thursday, March 26, 2020
and
Thursday, April 2, 2020

8:30 AM to 1 PM
Mackenzie Art Gallery
Agra Torchinsky Salon

Please RSVP by March 20, 2020. Lunch and refreshments will be provided.

If you're unable to make it to a workshop, we're happy to meet with you in your community. Please call or email with your preference. Contact information below.

306.566.2514
IndigenousRelations@SaskPower.com

SaskPower
Powering the future®

We want your input on a

PROJECT NEAR YOU

Chinook Power Station near Swift Current is a 350 MW natural gas power generation facility. It closely resembles what we'll potentially build.

Why natural gas?

Natural gas is an important part of SaskPower's plans to ensure reliable electricity, while meeting environmental regulations and an increasing need for power. It's also a baseload source of power that supports renewable generation such as wind and solar power. We expect we'll need more power generation by 2027 and beyond. We're considering a range of options and natural gas power generation is one of them.

What does SaskPower consider when choosing sites?

As a starting point, SaskPower considers environmental factors, Indigenous knowledge, land use, social aspects, technical components, and cost.

Why are you looking for land now when a new facility isn't needed until 2027?

Finding land that's suitable for large power plants takes time. There's lots of information to collect and consider. In early 2022 we'll decide whether to proceed with a natural gas power station and determine the size and location at that time as well. Before that happens, we need to select potential sites, complete technical and environmental studies, and fulfill both provincial and federal regulatory review processes.

306.566.2514
IndigenousRelations@SaskPower.com

SaskPower
Powering the future®

From: Indigenous Relations
To: Indigenous Relations
Subject: Siting for potential Natural Gas Power Stations - Workshop Invitation
Date: Wednesday, March 11, 2020 4:23:46 PM
Attachments: Workshop Invitation - Indigenous Relations Contact.pdf
image001.jpg

Good afternoon,

SaskPower is looking for two sites that could potentially host new natural gas power stations. We are consulting with municipalities, Indigenous rightsholders, and other planning groups to help us identify a willing host and potential land locations.

You are invited to attend any of four workshops to provide input. Workshop information is in the attached pdf.

Please RSVP by March 20th and let us know who from your organization will be attending and if any dietary restrictions exist.

Event dates are:

The workshops in **Saskatoon** will be held:
Tuesday, March 24, 2020
and
Tuesday, March 31, 2020
8:30 AM to 1 PM
Saskatoon Travelodge
Hercules Room

The workshops in **Regina** will be held:
Thursday, March 26, 2020
and
Thursday, April 2, 2020
8:30 AM to 1 PM
Mackenzie Art Gallery
Agra Torchinsky Salon

We hope you can make it to one of the workshops. If not, please let us know how we can start to share information and learn from you as we build this new siting process.

Regards,

Indigenous Relations
Corporate and Regulatory Affairs
SaskPower
email (indigenousrelations@saskpower.com) | saskpower.com
f. 306-566-2548
2 NE, 2025 Victoria Avenue
Regina, SK, S4P 0S1

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Indigenous Relations
9 SE – 2025 Victoria Avenue
Regina SK Canada S4P 0S1
Toll free: 1-855-566-2903
IndigenousRelations@saskpower.com

July 12, 2022

LETTER TO INDIGENOUS GROUPS

Re: Proposed Natural Gas Power Station

Dear Rightsholder,

As you are aware, SaskPower was evaluating land for a potential new natural gas power station. We have now selected our land, NW 36-33-24 W2M, near our Wolverine Switching Station, in the Lanigan area. We selected the Lanigan site based on the opportunities it presented such as road access, potential for groundwater availability, proximity to natural gas, transmission infrastructure and cost.

We are reaching out to learn from First Nations and Métis communities to understand what we need to consider as we continue to evaluate this project. **We need your input! Please get in touch by email indigenousrelations@saskpower.com or phone at 855-566-2903 to discuss further.** Your input will help inform the final decision in early 2023. Please note: A final decision has not been made to build the new power station.

About the project

As we begin to phase out conventional coal power, we will need to replace it with another source of reliable power. Natural gas is our best option for meeting this need. It will help us meet environmental regulations because it produces half the emissions of conventional coal. It will support us in bringing more renewable generation options online, like wind and solar.

As a result, we are looking to build a 370-megawatt (MW) combined cycle natural gas power station near Lanigan. A 260-MW combustion turbine is forecast to be in-service in 2027, with the expansion of the plant built by 2028. The facility will be designed to have the capability to operate in both simple cycle and combined cycle mode, which will provide more flexibility when demand for power changes. This plan may need to shift based on future regulations that may come through the Government of Canada’s Clean Electricity Standard.

Thank you in advance for taking time to participate in this process. Your input is important to us as we plan for future generation.

Sincerely,

SaskPower Indigenous Relation

SaskPower
Powering our future®

Indigenous Relations
9 SE – 2025 Victoria Avenue
Regina SK Canada S4P 0S1
Toll free: 1-855-566-2903
IndigenousRelations@saskpower.com

October 31, 2022

LETTER TO INDIGENOUS GROUPS

Re: Proposed Natural Gas Power Station

Dear Rightsholder,

In July 2022, SaskPower reached out to share information and to see if there were any questions regarding the proposed Natural Gas Power Station near Lanigan, Saskatchewan. To date SaskPower has not received your response so we are following up. As mentioned, SaskPower has selected NW 36-33-24 W2M, near our Wolverine Switching Station, in the Lanigan area based on the opportunities it presented such as road access, potential for groundwater availability, proximity to natural gas and transmission infrastructure and cost. Please note: we haven't made a final decision to build the new power station. In fact, your input will help inform the final decision in early 2023.

We would like input from First Nation and Metis communities. Please get in touch by email indigenousrelations@saskpower.com or phone at 855-566-2903 to let us know how you'd like to exchange information.

As we begin to phase out conventional coal power, we'll need to replace it with another source of reliable power. Natural gas produces half the emissions of conventional coal, and it will support more renewable generation options like wind and solar. The facility will have the capability to operate in both simple cycle and combined cycle mode, which will provide more flexibility when demand for power changes.
Thank you in advance for taking time to participate in this process. Your input is important to us as we plan for future generation.

Sincerely,

SaskPower Indigenous Relations
Enc.

B.2 Traditional Knowledge and Protocol Study

Wolverine Project: SaskPower
Traditional Knowledge and Protocol Study
Letter to Impact Assessment Agency of Canada

Wicehtowak Limnos Consulting Services LP
A George Gordon First Nation Company
November 25, 2022

ATTN: Impact Assessment Agency of Canada

Introduction

Wicehtowak Limnos Consulting Services LP (WLCS) conducts environmental and consultation work on behalf of George Gordon First Nation. WLCS meets the criteria used to determine if a business entity is Indigenous and we are registered on the federal PSIB database.

WLCS has extensive experience in assessing projects using a braided approach that constructively relies on braiding western approaches and Indigenous Knowledge. This focus has been used successfully on other large projects and we have conducted work for the Impact Assessment Agency of Canada (IAAC) on the Deltaport Expansion Project.

WLCS was approached in Q3 of 2022 by SaskPower (the proponent) to co-develop and execute a Traditional Knowledge and Protocol (TK&P) study for the proposed Wolverine Project. Our goal is to document the following:

- Provide regulatory context from the perspective of George Gordon First Nation
- Provide a statement of knowledge ownership
- Define methodologies and protocols
- Provide desktop and field assessment results
- Define next steps

We would like to acknowledge the proponent for their proactive approach to project assessment and we are hopeful that the IAAC finds the information useful moving forward in project assessment.

Regulatory Context

This document is provided to the proponent in support of their initial project description to the IAAC regarding the Wolverine Project. We have provided the proponent with an analysis of the role of the IAAC in assessing projects such as these, but have also identified other key federal acts, laws, and policies that define the roles and responsibilities that George Gordon First Nation considers when engaging proponents, the Crown and their agents. It is beyond the scope of this document to provide this summary, but we wish to be transparent with the IAAC that regulatory oversight defined in the Impact Assessment Act does not fulsomely encompass the obligations of the Crown to Section 35 Rights Holders; and other acts, laws and policies may inform Indigenous-based assessments and be the basis for consultation. Within the context of this submission we do not provide any information to be considered other than what should be reasonably considered by the IAAC.

Knowledge Ownership and Usage

All data contained within this document may be released publicly and used by the proponent and the Crown for the limited purpose of informing the submission of an initial project description by the proponent to the IAAC. All intellectual property within this document remains the exclusive domain of George Gordon First Nation and may not be relied on any other party and may not be relied upon by the proponent or the IAAC for subsequent steps in the regulatory process without written consent.

Methodology and Protocol

WLCS working in concert with Knowledge Keepers developed a braided approach to conducting work that relied on accepted western approaches with necessary Protocols. All results communicated in this document were determined using a braided approach. Western approaches mirrored those undertaken by western technicians working with the proponent and the Crown but were done so following internal Protocols developed by our Knowledge Keepers. The site visits had Knowledge Keepers present and all work presented here has been reviewed by George Gordon First Nation and can be relied upon as defined above.

Desktop Review

As part of the scope of work for this project, WLCS undertook a desktop review of publicly available data for the site. This was largely focused on confirmation of third-party data provided by Stantec to SaskPower. We did not note any errors or issues. We would like to ensure that the IAAC understands that there are a plurality of landscape, environmental and historical variables important to Indigenous Rights Holders that are not captured in any provincial or federal databases. Within this context we are satisfied with the desktop findings assessed using western methodologies and databases, but offer no opinion regarding valued Indigenous components (VICs) through desktop assessment.

Site Visit

Background

As part of this review, WLCS travelled to the location on two dates. On October 14, 2022, the site was accessed to conduct a reconnaissance assessment of safety, access and other considerations that may have impacted the subsequent field assessment. On October 20, 2022, WLCS returned to the location to undertake our initial traditional knowledge and protocol assessment. WLCS met with two SaskPower team members on location and the assessment was observed by all six persons present. Assessments took place without snow cover, but vegetation was dormant and therefore a complete assessment was not possible.

Methodology

The methodology followed for this project was developed by George Gordon First Nation technicians and Knowledge Keepers and braids western approaches with Indigenous Knowledge. This approach relied upon observations of the site, and when necessary conducting appropriate protocol activities to allow for further work. Field activities included:

- Verification of Stantec findings
- Observation and documentation of landscape elements not noted in the Stantec field assessment.
- Observation and documentation of suspected or known cultural elements.
- Ceremony completed for suspected or known cultural features.

The site was inspected in fair weather conditions and was free of snow. The entire location was inspected with the exception of the active laydown yard which is located in the northwest corner of the site.

Results

The location consists of roughly 1/3 cultivated land in the western area of the site, with the eastern 2/3 being uncultivated with low shrubs and wetlands, as described by Stantec (2022). Our field observations largely confirm Stantec's findings, with some additional information. This document provides a summary of findings that can be released publicly, but the proponent is in receipt of detailed field reports that have proprietary and confidential information. As stated above the Crown may rely only on the data shared in this document, but we will consider sharing more information if requested by the Crown.

Wildlife

One large suspected American Badger burrow as noted along the south portion of the site, and five stick nests were noted in the wooded area immediately south of the site. None of these features are of immediate concern but should be reassessed in spring 2023.

Vegetation

Our assessment of vegetation features of interest to George Gordon First Nation was limited due to the late season. We noted sage, but no other traditionally important plants. Many plant species of concern are difficult to assess unless actively growing. We suggest a site vegetation assessment during growing conditions in Spring 2023.

Historic Resources and Occupation History

Large willow trees were noted in the north area of the site and were interpreted to be associated with a former homestead structure and yard. Some remnants of the foundation were observed along with other features consistent with a homestead site. A tree core was taken from one of the willow trees and rings were provisionally counted in the field. A nominal age of 90 years was ascribed to the tree but this should be confirmed through a more thorough dendrochronological assessment in spring 2023.

The evaluation of historic resources in Saskatchewan is governed by the provincial Heritage Conservation Branch. Under this legislation and current practice, only those with a Master's or Ph.D. in Archaeology may access historical resource records or complete assessments that may be considered under provincial regulatory practices. The federal Crown has no heritage resource function and as such assigns all heritage resource regulation to the province. Within the current system, we have no ability to acquire or assess heritage resource data, nor provide mitigation that conforms to provincial regulation unless completed by an accredited archaeologist. We therefore have no comment on any heritage resource data held by the provincial Crown. Due to the current regulatory regime we refer to all areas that may be heritage resources as area(s) of cultural concern. Given the sensitivity of these areas, we are not providing detailed information in this document but we have provided the proponent with sufficient information to support interim mitigation measures and protocol considerations.

We conducted a field assessment of the site and noted area(s) of cultural concern. These area(s) need further assessment in spring of 2023. The proponent has confirmed that there are no planned disturbances in the area(s) of concern prior to our planned next assessment steps. As such, there are no specific concerns with these area(s) and/or temporary or permanent mitigation steps to be undertaken supporting the proponent's submission of an initial project description.

Next Steps

Information shared in this document is applicable only to the submission of an initial project description by the proponent to the IAAC. This section defines suggested next steps to further the assessment of the project in subsequent stages of the IAAC process and to gather more pertinent data using our braided model. We feel it is appropriate for the IAAC to commit to resourcing WLCS to complete this work, as it directly informs the decision-making process undertaken by the Crown without limitation to the consideration of Section 35 Rights. This support should not be extended under a participant funding program model as that perpetuates asymmetric resourcing for Indigenous Knowledge acquisition as compared to resourcing for Crown-led western approaches.

Desktop Review

At this time there are no immediate action items. We anticipate that further desktop reviews will be required. Our suggested approach is to ensure that WLCS is mirroring the activities undertaken by SaskPower's technical consultant to continue to provide an Indigenous lens for submissions to the IAA and/or other regulators.

Field Assessment

At this time there are no immediate action items.

- The area(s) of cultural concern noted in this report remain unassessed and warrant further examination in spring. We suggest co-developing a heritage resources scope of work for Q2 2023 following regulatory requirements and Indigenous Protocols.
- Traditional plants remain unassessed. We suggest conducting an independent field assessment in Q2 of 2023.

- We anticipate that SaskPower's technical consultant will reassess nests and burrows in 2023. We request field participation in this activity.
- The occupation history (colonial and Indigenous) of the site is not complete at this time. We have requested third party information that may allow for a better understanding of occupation. If warranted we will request that SaskPower supports field activities to define occupation in Q2 of 2023.

Regulatory Considerations

Our analysis of the pertinent laws, acts and policies that may affect this project in particular, but also other SaskPower initiatives is provided to give context to the stewardship obligations of George Gordon First Nation and our understanding of the various options available to the Nation to ensure that interests are protected. By having WLCS involved at this early stage of the project we hope to demonstrate that inclusion of Indigenous Knowledge as a core part of the impact assessment process reduces risk and allows for a more complete submission to the IAAC. As the project moves through the regulatory process, we aim to remain involved in the same fashion. We are hopeful that practice emerging from the Impact Assessment Act supported by the IAAC allows Section 35 Rights Holders to meaningfully and fully participate in Impact Assessment in a manner that respects Protocols and precludes the need for George Gordon First Nation to rely on other Crown acts, laws, regulations or practices to achieve our affirmed stewardship obligations.

Conclusions

WLCS would like to acknowledge SaskPower for this opportunity to redefine the process by which Indigenous Knowledge is meaningfully included in project assessment activities. We are confident that the data included in this report has provided SaskPower with timely information assessed using Traditional Knowledge approaches that creates more certainty for the project. We look forward to feedback and next steps.

Scott Barnes, Ph.D., P.Ag.
President, Wicehtowak Limnos Consulting Services LP

A George Gordon First Nation Company

Appendix C Natural Gas Infrastructure

TransGas Limited Saskatoon East Expansion Project

January 31, 2023

Prepared by: TransGas Limited

1. Introduction

TransGas Limited (TransGas) is a wholly owned subsidiary of SaskEnergy Incorporated (SaskEnergy) and responsible for the transmission and storage of natural gas within the province of Saskatchewan. TransGas has prepared an environmental overview for the proposed construction of a natural gas pipeline, meter station and potential compression facility east of Saskatoon, Saskatchewan (The Project). The Project is being considered to service the proposed Saskatchewan Power Corporation (SaskPower) Aspen natural gas power station.

The Project will include the installation of approximately 80 km of either a 16-inch or 20-inch diameter pipeline (or a combination of both). TransGas is currently evaluating two options for servicing SaskPower's Aspen station. Option A is proposed to be routed adjacent to TransGas' existing right-of-way (ROW) beginning at SW16-36-3-W3M east of Saskatoon, Saskatchewan. Option B is proposed to begin at an existing TransGas facility at SW-12-38-28-W2M near Prud'homme, Saskatchewan. Both options end at the proposed SaskPower Aspen natural gas power station proposed at NW-36-33-24-W2M near Lanigan, Saskatchewan. The routing is still underway; however, efforts will be made to parallel existing disturbances such as roads and other TransGas/SaskEnergy infrastructures.

Routing and siting of the Project is currently in progress. As a result, this environmental overview will identify potential environmental concerns within a Project Study Area (PSA) in which the proposed pipeline, meter station and potential compression facility may be constructed. Customer specific compression facilities may be required to meet minimum delivery pressure requirements. The requirements, and potential location for compression assets are being evaluated in association with the routing evaluation. The environmental overview describes the mitigation measures that will be implemented during construction to reduce or avoid effects associated with the construction and operation of the proposed Project.

SaskPower is the proponent for developing the Aspen natural gas power station and will be the owner-operator. TransGas is the proponent for the construction of the proposed compressor station, meter station and natural gas supply pipeline (up to the SaskPower property boundary) required to supply natural gas to the proposed Aspen natural gas power station. The proposed Project will be subject to the regulatory approval process under the Saskatchewan Ministry of Environment (ENV), Saskatchewan Ministry of Energy and Resources (MER), and the Ministry of Parks, Culture and Sport. TransGas will make applications to these regulators to obtain approval to proceed with the Project prior to beginning construction.

2. Project Description

2.1 Project Overview

TransGas is in the process of determining the infrastructure requirements to provide natural gas to the proposed SaskPower Aspen natural gas power station. To address these requirements, TransGas has identified two options with several routing possibilities for a high-pressure natural gas line, a meter station located near the Aspen natural gas power station and the potential for a compressor station. The project in service date for the Aspen natural gas power station is Q4 2026. The Project in-service date for the propose natural gas line and stations is no later than Q4 2026.

These are the current options that TransGas is considering at this time, however, based on current system capacity, operation requirements and other internal factors this has the potential to change as the Project progresses.

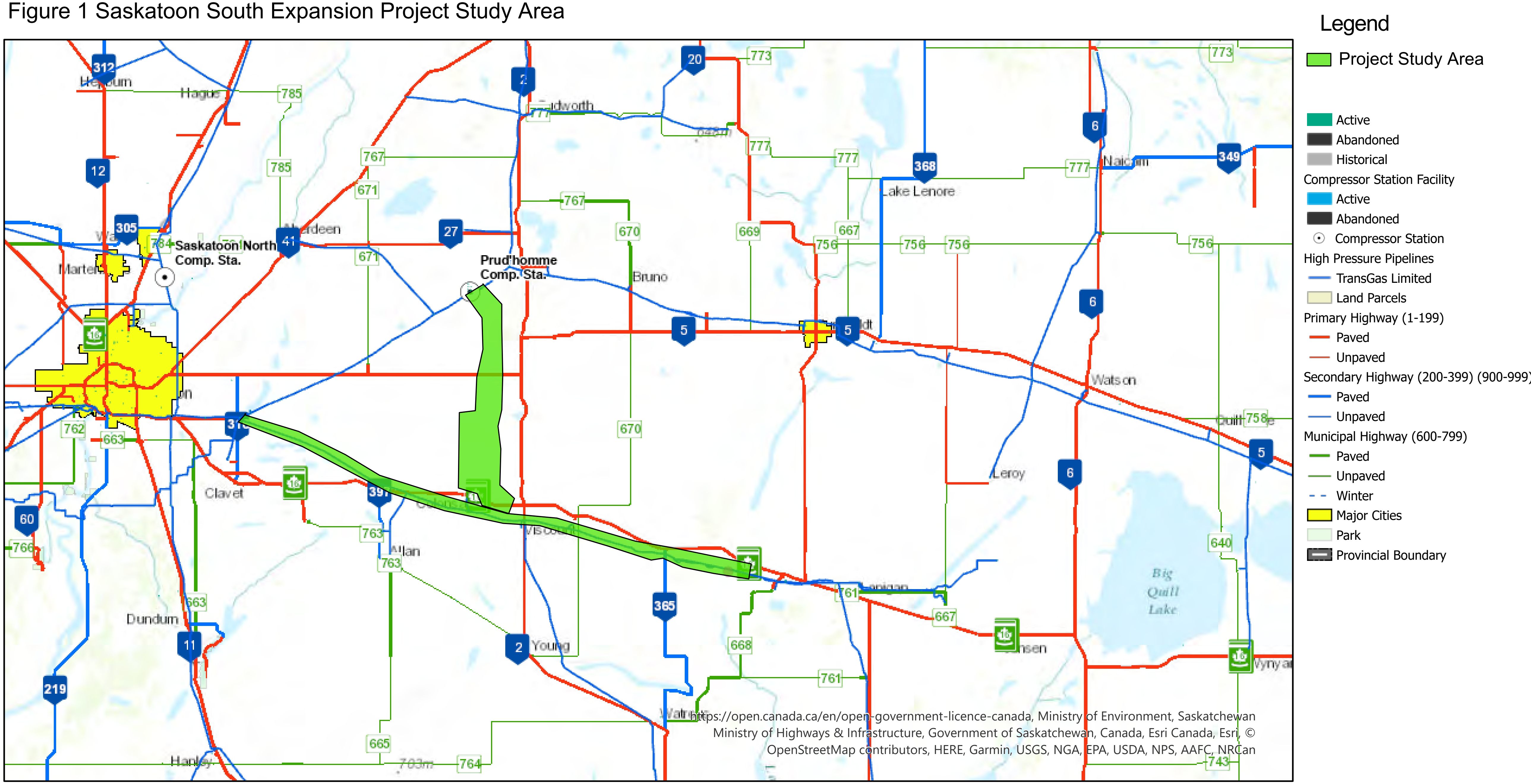
2.2 Project Location

The proposed Project is in the Moist Mixed Grassland Ecoregion and Aspen Parkland Region and within the rural municipalities (RMs) of Viscount No. 341, Wolverine No. 340, Colonsay No. 342, Bayne No. 371, Grant No. 372, Aberdeen No. 373, Blucher No. 343 and Usborne No. 310. The study area begins near Patience Lake, east of Saskatoon, north to Prud'homme, Saskatchewan and ends at the Aspen natural gas power station (Figure 1). The proposed meter station will be sited near the proposed SaskPower Aspen natural gas power station to be located at NE 36-33-24 W2M. Although final routing and siting has not been completed, the Project will primarily be located on private, freehold lands with some portions intersecting lands protected by Saskatchewan's The Wildlife Habitat Protection Act (WHPA) (Government of Saskatchewan [GOS] 1992), Agricultural Crown Land and The Conservation Easements Act (GOS 1996). The Project Study Area location is illustrated in Figure 1.

The project location is in an area with significant industrial activity, with several nearby potash mines currently served by TransGas pipelines that are operating at or near capacity. This proposed pipeline and associated facilities, while being constructed primarily to serve the proposed Aspen natural gas power station, will be designed and constructed to provide ancillary benefits and capacity to support other natural gas customers in the area. Some of the TransGas system benefits associated with this project could include:

- Incremental volume in the area to support future growth;
- Secondary source of supply to accommodate planned or unplanned outages on existing pipelines;
- Renewal of certain affected facilities.

Figure 1 Saskatoon South Expansion Project Study Area



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Date: 2023-02-03

1 cm = 10,910 m

2.3 Project Schedule

The proposed Project schedule is provided in the table below.

Table 2-3 Project Schedule

Description	Schedule
Route selection, engagement, and consultation	2023/2024
Biophysical and Heritage Resource Studies	2023/2024
Regulatory Applications, Permitting and Approvals	2024/2025
Project Construction	2025/2026
Reclamation	2026 to completion
Commissioning	Q4 2026

2.4 Required Inputs and Outputs

The coated transmission pipeline will be designed in accordance with TransGas' internal design standards, Canadian Standards Association (CSA) Z662 Oil and Gas Pipeline Systems (latest edition), and Saskatchewan's The Pipelines Act (GOS 1998a) as well as The Pipelines Administration and Licensing Regulations (2020) and Directive PNG034: Saskatchewan Pipelines Code (2020).

Any waste generated on-site to complete the installation or commissioning of the Project will be collected in containers and removed for disposal. Likewise, reusable or recycle material will be placed in their own containers or stored separately for re-use at other projects or transported to the appropriate recycling receiver where feasible. All hazardous materials will be stored and disposed in accordance with established regulations. During operation, garbage and recycling containers will be stored on-site and emptied or removed as necessary.

Waste generation is expected to be limited and confined largely to wooden pallets, spent welding rods, covers for shrink sleeves, steel pipe segments that may be cut-out or trimmed, paint cans, and wooden laths. All garbage will be collected daily in secured containers and transported off-site for disposal or recycling.

3. Engagement

Keeping stakeholders and rightsholders informed is an important aspect of all TransGas projects, and as such, if deemed necessary, TransGas will execute a Stakeholder and Rightsholder Engagement Plan for the Project. Engagement will begin during the routing phase of the project, engaging with Stakeholders and Rightsholders through open houses, letters, and other forms of engagement deemed necessary by TransGas.

The overall goal of Project-specific engagement will be to allow for constructive communication with Indigenous communities, the public, and stakeholders potentially interested or affected by the Project. Issues, concerns, and knowledge identified during the engagement process are important and will be considered in the planning, routing and development of the Project.

4. Environmental Components Scoping

4.1 Valued Components

Desktop sources were used to evaluate existing conditions and to identify potential Project-related environment and socio-economic effects. The following valued components were scoped for inclusion in the environmental overview due to their likelihood of being most directly affected based on anticipated Project-environment interactions:

- Terrain and Soil – Potential effects include rutting, admixing, compaction, and erosion resulting from soil exposed during site clearing, grading, and excavation.
- Vegetation and Wetlands – Construction activities might cause a loss or alteration of rare species or sensitive plant communities that may be present and wetland areas may be altered or lost. Operation and maintenance of the pipeline ROW, including weed management and reclamation, may cause loss or alteration of sensitive plant communities and alterations to wetlands.
- Wildlife and Wildlife Habitat – Wildlife may come into direct contact with construction equipment resulting in direct mortality. Wildlife habitat will be temporarily lost during construction activities. It is anticipated that the pipeline ROW, and wildlife habitats along it (i.e., wetlands), will be avoided or reclaimed to pre-construction conditions as vegetation reclaims the ROW.
- Heritage Resources – Construction activities may disturb previously unidentified surface and buried archeological artifacts or features. A Heritage Resource Review Form will be required to be submitted to the Saskatchewan Ministry of Parks Culture and Sport - Heritage Conservation Branch (HCB) for heritage sensitive quarter sections intersected by the Project. Following the submission of the Heritage Resource Review Form, the HCB will either provide clearance or indicate if a Heritage Resource Impact Assessment (HRIA) is required prior to development.

The following components have not been included in the environmental overview because Project interactions are unlikely to occur, can be addressed through standard, well-established mitigation measures, or where additional project design is required and potential effects will be addressed through assessment at a later date (i.e., atmospheric environment):

- Hydrogeology – Groundwater quality and quantity will not be affected during construction activities through the avoidance of construction in or near wetland margins. Additionally, surface disturbances are not expected to affect near surface aquifers or alter subsurface flows.
- Surface Hydrology and Aquatic Resources – Surface water quality or fish habitat are not anticipated to be affected by the Project through avoidance of construction in or near waterbodies and/or wetland margins, and because construction activities will be short-term in duration, and surface drainage patterns will be re-established during reclamation activities.
- Air Quality – The Project has the potential to result in air emissions including Criteria Air Contaminants (CACs) and greenhouse gases (GHGs) from construction equipment; however, potential effects are expected to be limited due to the relatively

short Project length and short construction period. Standard mitigation practices will be applied. During operation, the compressor station will result in emissions (CACs and GHGs). Project design, including siting and equipment selection for the compressor station has not been progressed to a state in which potential effects the atmospheric environment can adequately or accurately be assessed. Potential effects to air quality and associated mitigation will be addressed by TransGas in future regulatory applications, as required.

- Acoustic Environment – The Project will generate noise during construction and operation. The construction phase will result in noise emissions that are expected to be transient in nature and occur only for short intervals during the daytime period. During operation, the compressor station will emit noise. Project design, including siting and equipment selection for the compressor station has not been progressed to a state in which potential effects the acoustic environment can adequately be assessed. Potential effects to the acoustic environment and associated mitigation will be addressed by TransGas through future regulatory applications, as required.
- Socio-economic – TransGas is in the process of establishing easement and purchase agreements for the Project footprint. The size and duration of construction activities for the Project will likely provide limited short-term economic benefits to the local economy.

4.2 Environmental Study Area

Routing and siting for the Project has not been finalized. As a result of this, a PSA has been defined which encompasses the area in which Project components could be routed and sited. The PSA is described with respect to biophysical and human environment resources to aid in siting of routes and to provide context for the environmental setting, potential environmental effects, and likely mitigation measures. The Project components to be routed and sited within this study area and their approximate footprint associated with construction and operation are as follows:

- natural gas pipeline: ~80 km x 30 m-wide ROW
- compressor station: 200 m x 200 m
- meter station: 150 m x 150 m

The Project Study Area is outlined in Figure 1 above.

4.3 Species of Conservation Concern

SOCC are defined as federally and provincially legislated species at risk and species identified in federal and provincial tracking lists and activity restriction guidelines, including species:

- listed under Schedule 1, Schedule 2, or Schedule 3 of the federal *Species at Risk Act* (SARA) (GOC 2022a) as endangered, threatened, or special concern (GOC 2022).

- listed in *The Wildlife Act* of Saskatchewan as endangered, threatened, or vulnerable (GOS 1998b).
- listed by the Committee of the Status of Endangered Wildlife in Canada (COSEWIC) as endangered, threatened, or special concern (NatureServe 2022).
- assigned a rank of S1, S2, or S3 (or a combination of these ranks) by the Saskatchewan Conservation Data Centre (SKCDC) (SKCDC 2022a).
- included in the Saskatchewan Activity Restriction Guidelines for Sensitive Species (GOS 2017).

A list of species found through a desktop search of HABISask database is outlined in table 4-3 below. Mitigation measures for SOCC are listed in section 5.3 below.

Table 4-3 Species of Conservation Concern in Project Study Area

Scientific Name	Common Name	SARA Status	Provincial Rank	Occurrence Class
Ancyloxypha numitor	Common Least Skipper	N/A	S3	Invertebrate Animal
Satyrium liparops aliparops	Striped Hairstreak (S)	N/A	S3	Invertebrate Animal
Alisma gramineum	Narrow-leaved Water Plantain	N/A	S3	Vascular Plant
Cirsium drummondii	Short-stemmed Thistle	N/A	S3	Vascular Plant
Cypripedium parviflorum var. pubescens	Large Yellow Lady's-slipper	N/A	S2	Vascular Plant
Festuca hallii	Plains Rough Fescue	N/A	S3	Vascular Plant
Lomatogonium rotatum var. fontanum	Marsh Felwort	N/A	S3	Vascular Plant
Myosurus minimus	Least Mousetail	N/A	S3	Vascular Plant
Potentilla rubricaulis	Red-stemmed Cinquefoil	N/A	S3	Vascular Plant
Scirpus pallidus	Pale Bulrush	N/A	S3	Vascular Plant
Sisyrinchium mucronatum	Mucronate Blue-eyed-grass	N/A	S3	Vascular Plant
Accipiter cooperii	Cooper's Hawk	N/A	S4B,S2N,S2M	Vertebrate Animal
Anthus spragueii	Sprague's Pipit	Threatened	S3B	Vertebrate Animal
Asio flammeus	Short-eared Owl	Special Concern	S3B,S2N	Vertebrate Animal
Athene cunicularia	Burrowing Owl	Endangered	S2B	Vertebrate Animal
Cathartes aura	Turkey Vulture	No Data	S3B	Vertebrate Animal
Centronyx bairdii	Baird's Sparrow	Special Concern	S4B	Vertebrate Animal
Charadrius melodus circumcinctus	Piping Plover	Endangered	S3B	Vertebrate Animal
Chordeiles minor	Common Nighthawk	Threatened	S4B	Vertebrate Animal
Cygnus buccinator	Trumpeter Swan	No Data	S3B	Vertebrate Animal
Dolichonyx oryzivorus	Bobolink	Threatened	S5B	Vertebrate Animal
Euphagus carolinus	Rusty Blackbird	Special Concern	S3B,SUN	Vertebrate Animal
Falco peregrinus anatum	Peregrine Falcon	Special Concern	S1B,SNRM	Vertebrate Animal
Grus americana	Whooping Crane	Endangered	SXB,S1M	Vertebrate Animal
Hirundo rustica	Barn Swallow	Threatened	S4B	Vertebrate Animal
Lanius ludovicianus excubitorides	Loggerhead Shrike	Threatened	S3B	Vertebrate Animal
Lithobates pipiens	Northern Leopard Frog	Special Concern	S3	Vertebrate Animal
Perognathus fasciatus	Olive-backed Pocket Mouse	No Data	S3	Vertebrate Animal
Phalaropus lobatus	Red-necked Phalarope	Special Concern	S4B,S3M	Vertebrate Animal
Podiceps auritus	Horned Grebe	Special Concern	S5B	Vertebrate Animal
Riparia riparia	Bank Swallow	Threatened	S4B,S5M	Vertebrate Animal
Taxidea taxus taxus	American Badger	Special Concern	S3	Vertebrate Animal

5. Potential Effects and Mitigation Measures

5.1 Terrain and Soil

The Project has the potential to affect terrain and soil through a change in terrain integrity and soil quality and quantity. Potential effects include wind and water erosion as a result of soil exposed during soil stripping and stockpiling activities, as well as rutting, admixing, and compaction resulting from work during wet conditions or in areas with saturated soil.

Vegetation clearing and removal during construction exposes soil, which can lead to erosion and soil loss. The wind erosion risk for 49.9% of the PSA is rated as high or very high due to coarse-textured soils on the east end of the PSA. Erosion and soil loss are typically related to exposure to wind and water, including one-time severe weather events.

During construction, compaction and rutting can affect soil structure and reduce the soil's ability to support plant growth. Compaction can reduce pore space through increased bulk density and is largely driven by soil texture, with finer soil (i.e., clay) more prone to compaction than coarser soil (i.e., sand). Compaction can also increase water runoff, leading to reduced water infiltration, increased water erosion and less water for plant uptake. Rutting is largely influenced by moisture; as soil moisture increases, the soil's susceptibility to rutting also increases.

In addition to the implementation of the SaskEnergy/TransGas Environmental Protection Standards (TransGas 2016), potential mitigation measures to reduce potential effects to terrain and soil will include but not be limited to:

- The Project footprint will be reduced to the extent feasible;
- The pipeline component of the Project will be routed to parallel existing TransGas ROW and other existing disturbances where determined to be feasible;
- Topsoil stripping will be limited to the extent feasible to reduce the disturbance area;
- Work will be completed in dry or frozen ground conditions to reduce the potential for rutting, compaction, and clumping;
- Activities will be suspended if near-saturated soil conditions or high winds exist;
- Surface and subsoil will be properly stripped, stockpiled, and handled to prevent mixing;
- Equipment (i.e., paratiller) will be used to reduce areas with compacted soil, if required;
- Exposed soil and soil stockpiles will be stabilized to reduce the potential for erosion and soil loss where required;
- Appropriate erosion and sediment control measures will be implemented and maintained, as needed, until topsoil is replaced or long-term storage topsoil storage areas (i.e., from the compressor station and meter station footprint) are revegetated or have self-sustaining cover; and
- All other soil handling practices will follow the *SaskEnergy/TransGas Environmental Protection Standards.*

5.2 Vegetation and Wetlands

Potential effects on vegetation and wetlands include a changes native vegetation communities, including wetlands, and changes in species diversity including plant SOCC. Vegetation clearing, equipment travel, and introduction or spread of weed species may cause a loss or change in native vegetation communities. Vegetation clearing or grading may cause a loss or change in plant SOCC. A loss of wetland area or change in wetland class could occur during vegetation clearing and ground disturbance.

Wetland classification will be based on vegetation and water permanency according to Stewart and Kantrud (1971) following SaskPower's Standard Land Cover Classification

Table 5-1 Wetland Classification

Land Cover Class	Land Cover Subclass	Wetland Class	Definition
Wetland	Temporary	Class II	Characterized by standing or slow-moving water for a few weeks after snowmelt or several days after a heavy storm. Typically dominated by foxtail barley (*Hordeum jubatum*), dock spp (*Rumex spp*), wild mint (*Mentha arvensis*) and other wet meadow vegetation.
	Seasonal	Class III	Characterized by a shallow marsh zone that dominates the deepest part of the wetland area. Example species include awned sedge (*Carex antherodes*), water smartweed (*Persicaria amphibia var. emersa*) and slough grass (*Beckmannia syzigachne*).
	Semi-Permanent	Class IV	Characterized by marsh vegetation which dominates the central zone of the wetland as well as submerged aquatic plants including cattail (*Typha latifolia*), hard-stemmed bullrush (*Schoenoplectus acutus var acutus*) and Siberian water-milfoil (*Myriophyllum sibiricum*).
	Open Water	Class V	Characterized by a permanent-open-water zone that dominates the deepest part of the wetland area. Generally, have very little to no vegetation in the central zone. Plants commonly present is cattail (*Typha latifolia*) and spiral ditch grass (*Ruppia cirrhosa*).
	Alkali Ponds	Class VI	Dominated by an intermittent-alkali zone in the deepest part of the wetland area. They have a pH above 7 and a high concentration of salts. Dominant plants include red samphire (*Salicornia rubra*) and beaked ditch-grass (*Ruppia maritima*).
SOURCE: Stewart & Kantrud (1971)			

The following mitigation measures will be carried out during construction to reduce or avoid effects to vegetation and wetlands:

- Land will be cleared only within the marked limits of the Project footprint and limited to the minimal area necessary to safely construct the pipeline, compressor site, and meter station to help prevent erosion and loss of habitat;
- Areas of native vegetation will be avoided where possible (i.e., potential SOCC habitat) through routing and siting and reducing the size of the Project footprint to the extent feasible;
- Equipment will arrive to the Project clean and free of soil, debris, or plant material to reduce biosecurity concerns. Equipment will be inspected by an Environmental Monitor prior to entering the Project footprint. Equipment that arrives containing loose or compacted soil, debris, and plant material will not be allowed on the construction site until it has been cleaned using brooms, brushes, shovels or high pressure water;
- Standard Biosecurity measures are outlined in the *SaskEnergy/TransGas Environmental Protection Standards;*
- Vegetation removal (e.g., brushing, mulching), in areas of low vegetation (e.g., native grassland, shrubland) and forested land, will occur during frozen ground conditions and outside of sensitive species timing windows to the extent feasible;
- TransGas will obtain approvals from the appropriate agencies (e.g., ENV) prior to the commencement of work in wetlands and complete work in accordance with regulatory permit conditions;
- Wetland boundaries adjacent to Project footprint will be clearly marked in the field with signs and/or flagging prior to construction;
- Wetland boundaries within 10 m of the Project footprint or where the ROW slopes toward a wetland will be marked and protected using a suitable sediment barrier (e.g., embedded silt fence) prior to construction. Sediment barriers will be regularly inspected and maintained during construction until reclamation measures are successful and upland areas adjacent to wetlands are stabilized;
- Construction activities will be located a minimum of 10 m from wetland boundaries, if practical;
- Pipeline construction through seasonal and temporary wetlands will be conducted under dry or frozen conditions while following applicable permit conditions (e.g., Aquatic Habitat Protection Permit);
- Pipeline construction through permanent wetlands will be completed using methods that avoid impacts to the wetlands (i.e., directional drill);
- Erosion control measures will be implemented, including matting if working within wetlands unless the work is in dry or frozen conditions. If working during wet

conditions, an Environmental monitor will be on site to monitor effects to wetlands including rutting;

- Work around wetlands will follow the *SaskEnergy/TransGas Environmental Protection Standards;*
- If grading is not required on the ROW in forested areas, woody cover will be mulched to ground level to maintain the rooting structure and growth crown, limit disturbance, and minimize disturbance to the seedbank;
- Pre-construction vascular plant surveys will be completed to identify SOCC and weed species locations prior to construction in accordance with ENV Species Detection Survey Protocol 20.0 Vascular Plant Surveys;
- Known SOCC locations will be avoided where possible and applicable ENV Saskatchewan Activity Restriction Guidelines for Sensitive Species (2017) buffers will be applied by staking/fencing buffer zones;
- If previously unidentified SOCC occurrences are identified during construction, then locations will be flagged and buffered according to GOS 2017;
- Weed control measures will be applied for any prohibited or noxious weed species infestations;
- Reclamation activities, including topsoil replacement and seeding, will be completed as soon as feasible following construction when ground conditions and moisture levels permit;
- Seed mixtures(s), if required, will be consistent and compatible with the baseline vegetation community. Seed mixes will be certified weed free (i.e., analyzed for species and percentage of prohibited and noxious weeds). Seed certificates will be reviewed and approved by TransGas prior to application and retained on file. Appropriate seed mixes will be applied as needed to assist in the re-establishment of pre-disturbance construction conditions and ecological function, as to comply with applicable government agency requirements, or Project-specific environmental instructions; and,
- On non-cultivated lands, post-construction vegetation growth will be inspected annually to confirm a self-sustaining vegetation cover is established and maintained. Any sites with sparse growth will be re-seeded as necessary.

5.3 Wildlife and Wildlife Habitat

Potential Project-related environmental effects include a change to wildlife habitat and mortality risk. Vegetation clearing and ground disturbance, as well as sensory disturbances are the primary pathways for a direct and indirect change to wildlife habitat. Vegetation clearing, ground disturbance and Project-related traffic are the primary pathways for a direct change to wildlife mortality risk. Indirect habitat loss (i.e., reduced habitat effectiveness) may occur during construction of the pipeline through temporary sensory disturbance associated with construction activities (e.g., noise and lights from vehicles and equipment). Responses to sensory disturbance will vary depending on species and individuals but could include habitat avoidance of an area because of noise, artificial lights, or vibrations (Bayne et al. 2008), diminished reproductive success (Habib et al. 2007) or increased stress response (Francis and Barber 2013). Sensory disturbance during construction may affect wildlife species, but this effect is expected to be low due to the short-term duration of Project activities.

Project construction has the potential to result in increased mortality risk for wildlife species, including SOCC and migratory birds. SOCC found in the proposed PSA are outlined in Table 4-3 above. Removal of vegetation and topsoil, and grading activities have to potential to result in the disturbance of bird nests or animal burrows, and consequently, the accidental mortality of small, less mobile species or individuals (e.g., small mammals, amphibians, reptiles, juvenile birds). In addition, there may be an increased risk of direct mortality to wildlife due to accidental collisions with Project-related equipment or vehicles during construction, including increased traffic volume and use of heavy equipment along local roadways. Increased mortality risk during construction could also occur if animals become trapped in the open pipe trench, before lowering-in of the pipe and backfilling. Trench related mortalities are primarily of concern for amphibians, reptiles, and small mammals that have reduced capabilities to escape entrapment (Woinarski et al. 2000), but this mechanism may affect larger mammalian wildlife species as well.

The potential for wildlife mortality will be short term and limited to the duration of construction activities. With the implementation of mitigation measures, the risk of wildlife mortality during pipeline installation is expected to be low.

Sensory disturbance during operation and maintenance may result in indirect habitat loss by altering wildlife habitat availability but will be limited to the Project footprint (i.e., compressor station). The increase in noise levels near the Project footprint during operation and maintenance may result in the displacement of wildlife. Potentially affected species may return after a period of acclimatization. Additionally, affected species are currently exposed to habitat degradation and anthropogenic disturbance (e.g., agriculture practices, highway, towns, mines), which may lessen the severity of potential Project-related effects during both construction and operation and maintenance.

Standard industry practices and avoidance measures, along with Project-specific mitigation measures, will be implemented during Project activities to reduce Project-related environmental effects to wildlife habitat and mortality risk. Key mitigation measures will include:

- Loss or modification of wildlife habitat (i.e., wetlands) will be reduced or eliminated by only clearing land within the marked limits of the construction site and adhering to provincial aquatics habitat protection permit (AHPP) conditions;
- Pre-construction species detection surveys will be completed to identify wildlife SOCC and wildlife features (e.g., nests, dens, leks) prior to construction in accordance with ENV Species Detection Survey Protocols;
- Sensitive wildlife features (e.g., active nests, wetlands) will be flagged/marked in the field, as specified by project environmental permits and approvals and related environmental instructions, prior to commencement of clearing and construction;

- All work near wildlife, habitat and sensitive wildlife features will follow the *SaskEnergy/TransGas Environmental Protection Standards;*
- Clearing activities scheduled to occur within suitable habitat during the migratory birds primary nesting period (i.e., Zone B4; April 14 to August 29) (ECCC 2018) will include migratory bird nest sweeps prior to construction activities to determine the presence of active nests. If an active migratory bird nest is detected, an appropriate setback (to be determined in consultation with regulatory agencies such ECCC and ENV) will be established around the nest and construction activities will not be permitted in that area until nesting activities are completed;
- Any previously unidentified sensitive habitat features will be reported to TransGas and the environmental monitor who will report the information to appropriate regulator and a mitigation plan will be developed, if required;
- Vehicular traffic and construction activities will be restricted to the designated construction footprint and temporary workspaces. If boundary stakes are inadvertently damaged or destroyed, they will be replaced immediately;
- Project-related vehicle traffic will be limited to the Project footprint and approved access routes. All vehicles will adhere to designated speed limits. Recreational use of ATVs by construction personnel will be prohibited on the construction site;
- Fencing will be erected around open excavations to exclude wildlife;
- Project-related wildlife deaths or injury and nuisance animals will be reported to TransGas and appropriate regulators;
- Good housekeeping practices and garbage disposal will be followed to avoid attracting scavenger species. Construction personnel will not feed, lure or harass wildlife; and,
- Noise attenuation is considered in proposed potential compressor station design.

5.4 Heritage Resources

Any potential changes to heritage resources are expected to be confined to the Project footprint that is yet to be defined. Effects to heritage resources will be able to be appropriately mitigated prior to construction through desktop screening to determine heritage status. Heritage Resource Impact Assessments will be completed where deemed necessary by the Heritage Conservation Branch. If significant heritage resources are identified in unavoidable conflict with the Project footprint, a heritage resource impact mitigation, which is the standard required by the HCB under Section 63 of *the Heritage Property Act* (GOS 1980), will be completed prior to construction.

6. Summary

The Project will include the installation of roughly 80 km of either a 16-inch or 20-inch diameter pipeline (or combination of both) in a new 30 meter (m)-wide right-of-way (ROW) east of Saskatoon, a 200 m by 200 m compressor station (location to be determined), and a 150 m by

150 m meter station (location to be determined). The pipeline will terminate at a proposed Saskatchewan Power Corporation (SaskPower) Aspen natural gas power station located near Lanigan, Saskatchewan.

Routing and siting will consider environmental timing and mitigation strategies when developing a final route and schedule for the Project. In addition, TransGas will route along existing disturbances where possible throughout the PSA. Where environmentally sensitive areas cannot be avoided by routing, mitigation measures will be considered and will follow the *SaskEnergy/TransGas Environmental Protection Standards, 2020*.

7. References

Acton, D.F., G.A. Padbury, and C.T. Stushnoff. 1998.The ecoregions of Saskatchewan. Canadian Plains Research Center, University of Regina, Regina.

AAFC (Agriculture and Agri-food Canada). 2009. Saskatchewan Soil Resource database. Saskatchewan Land Resource Unit.

AAFC. 2021. Annual Crop Inventory. Available at: https://open.canada.ca/en/apps/aafc-crop-inventory. Accessed November 2022.

Bayne, E.M., L. Habib and S. Boutin. 2008. Impacts of chronic anthropogenic noise from energy sector activity on abundance of songbirds in the boreal forest. Conservation Biology 22: 1186-1193.

Bird Studies Canada and Nature Canada. 2022. Important Bird and Biodiversity Areas in Canada. Available at: https://www.ibacanada.com/index.jsp?lang=en. Accessed November 2022.

CSA (Canadian Standards Association). 2015. CSA Z662.1

COSEWIC (Committee on the status of Endangered Wildlife in Canada). 2022. COSEWIC. Available at: https://www.cosewic.ca/index.php/en-ca/. Accessed November 2022.

ESRI. 2022. World Imagery. Available at: https://www.arcgis.com/home/item.html?id=10df2279f9684e4a9f6a7f08febac2a9#!. Accessed November 2022.

ECCC (Environment and Climate Change Canada). 2018. Nesting periods. Available at: https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/general-nesting-periods/nesting-periods.html. Accessed November 2022.

ECCC. 2022a. Species at Risk Public Registry. Available at: https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html. Accessed November 2022.

ECCC. 2022b. General Nesting Periods of Migratory Birds in Canada; Nesting Calendar for Zone B. Available at: https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/general-nesting-periods/nesting-periods.html#_zoneB_calendar. Accessed October 2022.

ENV 2022. Hunting, Angling, and Biodiversity Information of Saskatchewan (HABISask) online mapping application. Available at: https://gisappl.saskatchewan.ca/Html5Ext/?viewer=habisask. Accessed November 2022.

Francis, C.D. and J.R. Barber. 2013. A framework for understanding noise impacts on wildlife: An urgent conservation priority. Frontiers in Ecology and the Environment 11: 305-313.

Google LLC. 2020. Google Earth Pro Version 7.3.3.7786 (64-bit).

GOC (Government of Canada). 2019. Species at Risk Act public registry. Available at: https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html. Accessed November 2022.

GOC. 2002. Species at Risk Act (S.C. 2002, c. 29). Last amended on 2018-12-12.

GOS (Government of Saskatchewan). 1980. The Heritage Property Act, 1980 (Chapter H-2.2).

GOS. 1992. Wildlife Habitat Protection Act, W-13.2 of the Statues of Saskatchewan.

GOS. 1996. The Conservation Easements Act, C-27.01.

GOS. 1998a. The Pipelines Act. Chapter P-12.1 of the Statues of Saskatchewan, 1998 (effective April 1, 2000) as amended by the Statues of Saskatchewan, 2000, c.50; 2003, c.29; 2005, c.M- 36.1; 2009, c.24; 2010, c.N-5.2; 2014, c.21; and 2017, c.22.

GOS. 1998b. The Wildlife Act, W-13.12.

GOS. 1999. The Wild Species at Risk Regulations. Chapter W-13.11 Reg1.

GOS. 2019. Southern Digital Land Cover geodatabase. Saskatchewan Research Council. Available at: https://geohub.saskatchewan.ca/maps/saskatchewan::southern-digital-landcover/about. Accessed November 2022.

Habib, L., E.M. Bayne and S. Boutin. 2007. Chronic industrial noise affects pairing success and age structure of ovenbirds *Seiurus aurocapilla*. Journal of Applied Ecology 44: 176-184.

iMapInvasives. 2022. iMapInvasives: NatureServe's online data system supporting strategic invasive species management. NatureServe. Available at http://www.imapinvasives.org. Accessed November 2022.

NatureServe. 2022. NatureServe Network Biodiversity Location Data accessed through NatureServe Explorer [web application]. NatureServe, Arlington, Virginia. Available at: https://explorer.natureserve.org/. Accessed November 2022.

SKSIS Working Group (2018). Saskatchewan Soil Information System online mapping application. Available at: https://soilsofsask.ca/saskatchewan-soil-information-system.php. Accessed November 2022.

SKCDC (Saskatchewan Conservation Data Centre). 2022a. Species lists. Available at: http://biodiversity.sk.ca/lists.htm. Accessed November 2022.

SKCDC. 2022b. Saskatchewan Tracked Vascular Plant Taxa by Ecoregion and Landscape Area. Regina, Saskatchewan. Available at: www.biodiversity.sk.ca/SppList.htm. Accessed November 2022.

Stewart, R. E., and H. A. Kantrud. 1971. Classification of natural ponds and lakes in the glaciated prairie region. Resource Publication 92, Bureau of Sport Fisheries and Wildlife, U.S. Fish and Wildlife Service, Washington, D.C.

TransGas. 2020. SaskEnergy/TransGas Environmental Protection Standards

USDA (United States Department of Agriculture). 2022. USDA Plants Database. Available at: https://plants.usda.gov/home. Accessed November 2022.

Woinarski, J.C.Z., M. Armstrong, K. Brennan, G. Connors, D. Milne, G. McKenzie and K. Edwards. 2000. A different fauna?: Captures of vertebrates in a pipeline trench compared with conventional survey techniques and a consideration of mortality patterns in a pipeline trench. Australian Zoologist 31: 421-431.

Appendix D Land Title and Rural Municipality Maps

D.1 Land Title

Province of Saskatchewan
Land Titles Registry
Title

Title #: 144440467
Title Status: Active
Parcel Type: Surface
Parcel Value: $90,000.00 CAD
Title Value: *$90,000.00 CAD*
Converted Title: 73S10799
Previous Title and/or Abstract #: 112495170

As of: 17 Oct 2022 11:10:15
Last Amendment Date: 30 Dec 2015 16:10:47.473
Issued: 05 Dec 2013 08:36:10.906

Municipality: RM OF USBORNE NO. 310

SASKATCHEWAN POWER CORPORATION is the registered owner of Surface Parcel #119232929

Reference Land Description: NW Sec 36 Twp 33 Rge 24 W 2 Extension 0
As described on Certificate of Title 73S10799.

This title is subject to any registered interests set out below and the exceptions, reservations and interests mentioned in section 14 of *The Land Titles Act, 2000.*

Registered Interests:

Interest #:
165080246

CNV Pipeline Easement

Value: N/A
Reg'd: 23 May 1968 01:53:31
Interest Register Amendment Date: N/A
Interest Assignment Date: N/A
Interest Scheduled Expiry Date: N/A
Expiry Date: N/A

Holder:
TRANSGAS LIMITED
700 - 1777 Victoria Ave
Regina, Saskatchewan, Canada S4P 4K5
Client #: 105200985

Int. Register #: 104718001
Converted Instrument #: 68S10971
Feature #: 100065619

Interest #:
167429526

TransGas Easement - SaskEnergy Act (s.19)

Value: N/A
Reg'd: 09 Jun 2014 08:27:13
Interest Register Amendment Date: 30 Dec 2015 16:10:47
Interest Assignment Date: N/A
Interest Scheduled Expiry Date: N/A
Expiry Date: N/A

See Plan of Survey for Gas Pipeline Right of Way on Plan 102200487

Holder:
TRANSGAS LIMITED
700 - 1777 Victoria Ave
Regina, Saskatchewan, Canada S4P 4K5
Client #: 105200985

Int. Register #: 120072978

Interest #:
169026992

Water Security Agency Act Notice (s.64)

Value: N/A
Reg'd: 20 Oct 2014 08:27:43
Interest Register Amendment Date: N/A
Interest Assignment Date: N/A
Interest Scheduled Expiry Date: N/A
Expiry Date: N/A

Holder:
WATER SECURITY AGENCY
101 - 111 Fairford Street East
Moose Jaw, Saskatchewan, Canada S6H 7X9
Client #: 100005174

Int. Register #: 120404764

Addresses for Service:

Name	**Address**
Owner:	

SASKATCHEWAN POWER CORPORATION   2025 VICTORIA AVE REGINA, SK, Canada S4P 0S1
Client #: 100307618

Notes:

Parcel Class Code: Parcel (Generic)

Back

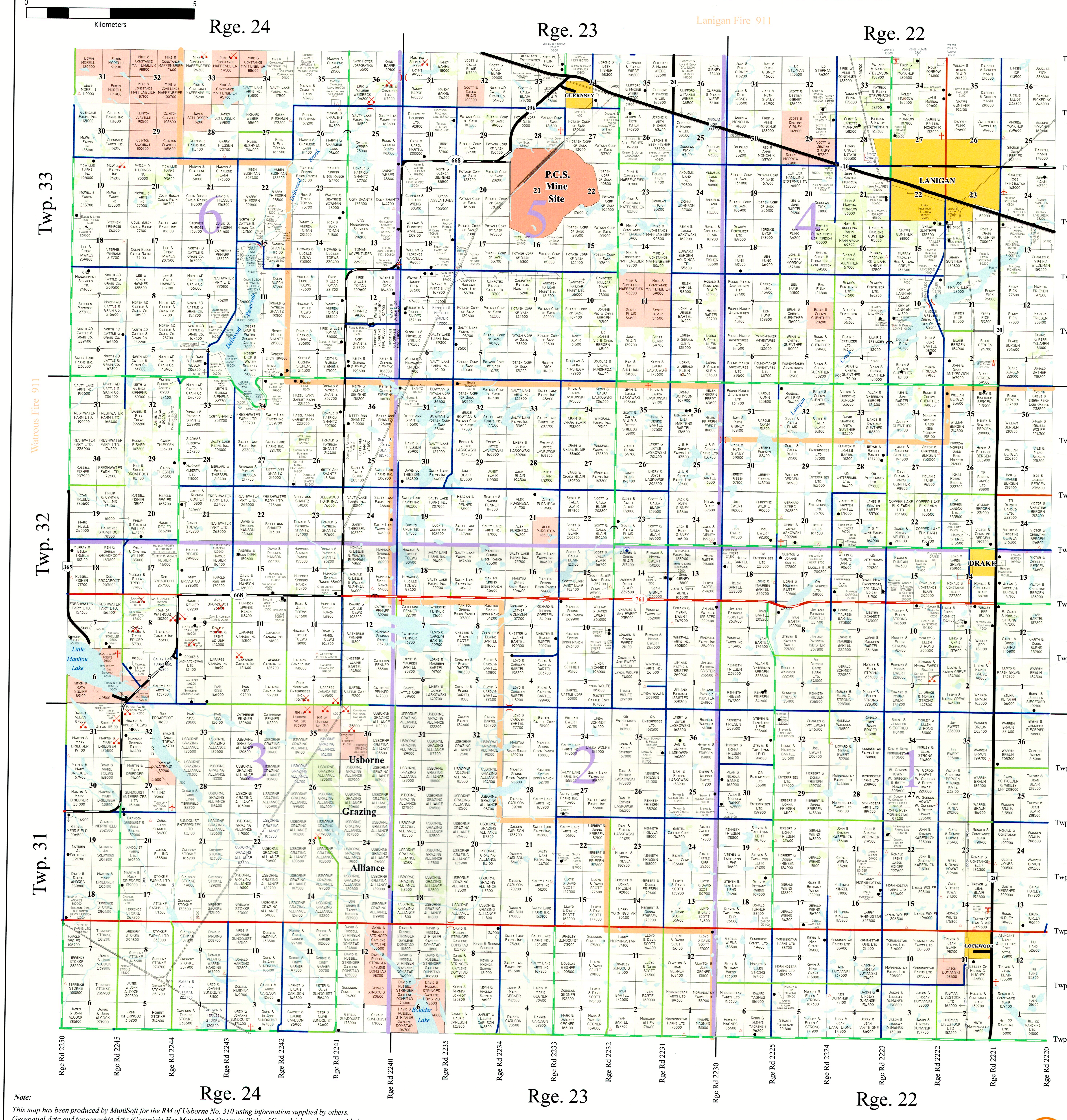
Back to top

D.2 Rural Municipality of Usborne

RURAL MUNICIPALITY OF USBORNE No. 310

WEST OF 2nd MERIDIAN

Box 310
Lanigan, SK.
S0K 2M0
Ph: 306-365-2924
Fax: 306-365-2129
email: rm310@sasktel.net



Reeve:	Jack Gibney
Div. 1:	Ryan Morningstar
Div. 2:	Darren Carlson
Div. 3:	Howard Toews
Div. 4:	Lance Gunther
Div. 5:	Fred Toman
Div. 6:	Don Shantz
Administrator:	Anna Wright

Emergency Numbers
CP Emergency: 1-800-716-9132
CN Emergency: 1-800-465-9239
Controlled Burn:1-866-404-4911

Legend

- Highway
- Primary Grid Road - Paved
- Primary Grid Road - Gravel
- Grid Road
- Main Farm Access Road
- Gravel Road
- Other Road
- Trail
- Fire Boundary
- Division Boundary
- Railway
- Watercourse
- Waterbody
- Vegetation
- Occupied Residence
- Vacant Residence
- Airport
- Cemetery
- Gravel Pit
- Communication Tower
- Waste Disposal Site
- Community Well
- Bridge
- Culvert
- Urban Area
- Crown Land

Residence Listing

Owner_Name	Legal_Description
ANTYPOVICH, John & Shani	SW-2-33-22
BAKER, Allan & Teresa	NE-30-33-23
BANKS, Alan & Nichola	NW-30-31-22
BARTEL, Bryce & Rachel	NE-28-32-22
BARTEL, Chester	SE-9-32-23
BARTEL, Doug	SE -22-32-22
BARTEL, Floyd & Carolyn	NW-4-32-23
BARTEL, Ivan & Irene	NW-8-32-22
BARTEL, James & Kirsten	NW-21-32-22
BARTEL, John & Denise	SW-36-32-23
BARTEL, Ken & June	NE-3-33-22
BARTEL, Lorne & Maureen	NW-9-32-22
BARTEL, Quinton & Joanne	NW-17-32-22
BARTEL, Shawn & Allison	SE-25-31-23
BAUMANN, James & Ruth	SW-13-32-23
BERGEN, Allan & Sherilynn	SW 13-32-22
BERGEN, Blake & Lindsay	NW-35-32-22
BERGEN, Ed & Joanne	NW -13-32-22
BERGEN, Henry & Beatrice	NE-35-32-22
BERGEN, Victor & Christine	SE-23-32-22
BERGEN, William	NW-35-32-22
BERGSVEINSON, Shannon, Donn & Maureen	SW-18-31-24
BERNAUER, Alois	SE-34-33-22
BLAIR, Nolan	NE-24-32-23
BLAIR, Scott & Calla	SW-23-32-23
BOEHR, Dan & Kornelia	NW-9-32-24
BOISVERT, Shawn & Dian	NW-26-32-24
BOWMAN, Bruce & Brenda	NW-32-32-23
BOWMAN, Walter & Beatrice	SE-23-33-24
BRAUN, Warren & Corinne	SW-36-31-22
BROADFOOT, Andy & Irena	SW-16-32-24
BURNETT, Howard	NW-35-32-24
BUZTYNSKI, Keith & Susan	SW-26-32-24
CAREY, Allan & Corinne	NE-33-33-23
CARLSON, Garnet & Laurie	NE-3-31-24
CARROLL, Maurice	SW-16-32-22
CHISHOLM, Donald & KARDASH, Kim	SE -9-33-22
CLARK, Leann	NE-7-33-23
COOPER, James & Rhonda	NW-21-32-24
DAIGLE, Michel	NW-31-32-23
DENEIKO, Laurie & Sharlene	SW-4-32-24
DICK, Robert	SE-3-33-24
DICK, Rod & Holly	NW-5-33-23
DICK, Wayne & Janice	NE-12-33-24
DIEHL, Andrew & Susan	NW-15-32-24
DUMANSKI, Jason & Lindsay	NE-4-31-22
DUMANSKI, Ken & Judy	NE-4-31-22
EBY, Curtis & Audrey	NW -10-32-23
EPP, Wesley & Lorraine	NE-11-32-22
EVENSON, Brodie & Erin	NE-2-33-24
EWERT, Charles & Amy	NW-18-32-22
EWERT, D. James	SE-10-32-23
EWERT, Joel & Lois	SE-19-32-22
FAILLER, Curtis & Kim	SW-35-33-22
FAILLER, Dustyn & Jayline	NW-14-33-22
FAILLER, Greg & Connie	NW-14-33-22
FISHER, Jerome & Beth	NW-26-33-23
FRAESS, Keith & Lorraine	NW-27-33-22
FRANCIS, Craig & Rhonda	NE-18-33-23
Freshwater Farms Ltd.	SW-9-32-24
FREY, Murray & Lori Ann	NE-6-33-24
FRIESEN, Herb & Donna	SE-31-31-22
FRIESEN, Ken & Betty	SE -6-32-22
FUNK, Ben	SW-18-33-22
GERBRANDT, Reginald	NE-8-31-22
GIBNEY, Jack & Ruth	SE -24-32-23
GIBNEY, Sean	SE-14-32-23
Grazing Alliance Residence	NE-13-31-24
GUENTHER, Brian & Cheryl	SW-3-33-22
GUNTHER, Lance & Darlene	NE-28-32-22
GUNTHER, Shawn	NE-15-33-22
HAEUSLER, Bradley & Nicole	SW-10-33-22
HEIN, James & Rhoda	NE-33-33-23
HELSTROM, Mark & Laura	NE-15-33-22
HUCULAK, Krystal	NE-13-33-24
HUGHES, Estate	SE-11-31-22
HUMMOCK SPRINGS	SW-32-31-24
HURLEY, Brian	SE-13-31-22
ISBISTER, James & Patty	NE-12-32-23

Owner_Name	Legal_Description
JOHNSON, Charles	NW-17-31-24
KARN, Hazel	NW-35-32-24
KISS, Ivan	SE-4-32-24
KLASSEN, Jeff	SW-22-31-23
KLASSEN, Rick	NE-6-33-23
KLASSEN, Woody	NE-8-31-23
KRAUSE, Michael & Amy	NW-32-24
KYRYCHENKO, Vladmir	NW-5-31-22
LAMONT, Carter & Rebecca	SE-32-33-22
LASKOWSKI, Dan & Esther	SW-36-31-23
LASKOWSKI, Emery & Joyce	SW-20-32-22
LEHR, Steven & Tami-Lynn	NW-32-31-22
L'HEUREUX, Gladys	NE-13-33-22
MACKENZIE, Robin	SE-6-31-22
MAFFENBEIER, Mike & Constance	NW-14-33-23
MANN, Darrell	SE-25-33-22
MANN, Doreen	NE-24-33-22
MARTELL, Devon	SE-18-33-23
MARTELL, Greg	SW-30-33-23
MARTENS BARTEL, Ben & Lisa	SW-36-32-23
MAU, Christiaan & Lorraine	NE-1-33-24
MCWILLIE Farms	NW-19-33-24
MEHLMANN, Sergej & Alla	SE-3-33-24
MERRIFIELD, Gerald	NW-19-31-24
MORNINGSTAR, Larry & Donna	NE-16-31-22
MORNINGSTAR, Ryan & Lisa	NE-16-31-22
MORROW, Clint & Lanette	NW-28-33-22
MORROW, John & Martha	SE-21-33-22
MORROW, Lane	SE-34-33-22
MORROW, Roley & Karen	SE-21-33-22
MULLET, Wendell & Joyce	NE-2-33-24
NEUFELD, Duane & Kristy	SW-22-32-22
NUNAN, Renee	NW-34-33-22
Nutrien Ag Solutions	SW-19-31-24
PICKERING, Craig & Norma	NW-13-33-22
PIPRELL, Cam & Sherri	SW-21-32-22
PURSHEGA, Alex	NE-21-32-23
PURSHEGA, Doug & Laura	SE-34-33-23
RHODE, Thomas & Heike	NW-19-33-23
ROBITAILLE, Johanie	NW-34-32-24
SCHELLENBERG, Ben & Veronica	SE-7-32-24
SCHMIDT, Kelly & Paula	SE-35-31-23
SCHMIDT, Linda	NW-11-32-22
SCOTT, David	NE-12-31-23
SHANTZ, Betty	SW-36-32-24
SIEGFRIED, Brent & Jennifer	SE-1-32-22
SIEMENS, Keith & Glenda	SE-35-32-24
SNIDER, Ken & Michelle	SW-7-33-23
SNIDER, Wilfred & Margaret	SW-7-33-23
SODERBERG, Eldon & Linda	NW-18-33-24
SROCHENSKI, Jeff & Holly	NW-14-33-22
STEPHAN, Linda	NE-29-33-22
STEVENSON, Patrick & Kathy	SE-33-33-22
STRONG, E. Grace	NW-12-32-22
STRONG, Morley & DOTTEN, Ellen	NE-10-32-22
SUNDQUIST, Brandon	NW-20-31-24
SUNDQUIST, Gerald	SW-1-31-24
SUNDQUIST, Glen	SW-29-31-24
SUNDQUIST, Greg & Jo-Anne	SE-3-31-24
SUNDQUIST, Murray & Denise	NW-20-31-24
THIESSEN, David & Patti	SW-30-32-23
TOEWS, Brad & Angel	NE-10-32-24
TOEWS, Devin & Laura	SE-15-33-24
TOEWS, Howard & Lucille	NW-32-31-24
TOEWS, Lester	SW-9-32-24
TOMAN, Fred & Elsie	NW-1-33-24
TOMAN, Randy & Andrea	SE-11-33-24
TOMAN, Rick & Tracy	NE -14-33-24
TREBLE, Murray & Bella	NW-18-32-24
WEBER, Dwight & Sherry	NE-24-33-24
WEBER, Jesse & Claire	SW-4-33-24
WHELER, Gordon & Kathleen	SW-7-32-24
WIEBE, Clifford & Maxine	SW-35-33-23
WIENS, Gerald & Susan	SW-17-31-22
WIENS, Riley & Bethany	NE-18-31-22
WILLEMS, Randall	NE-32-32-22
WILLMS, Philip & Cynthia	SW-20-32-24
WILTON, Garry	SW-27-31-23

Note:
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Updated November 2022

MUNISOFT
Municipal Software... and More!

D.3 Rural Municipality of Wolverine

RURAL MUNICIPALITY OF WOLVERINE No. 340

PRAIRIE MAPPING INDUSTRIES LTD.
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Specializing in G.I.S. Mapping Applications

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Administrator: Sandi Dunne
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Burr, Saskatchewan S0K 0T0
Phone: (306) 682-3640
Fax: (306) 682-3614
E-mail: rm340@sasktel.net
www.rmwolverine.ca

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IMPROVEMENT ASSESSED VALUE NOT INCLUDED

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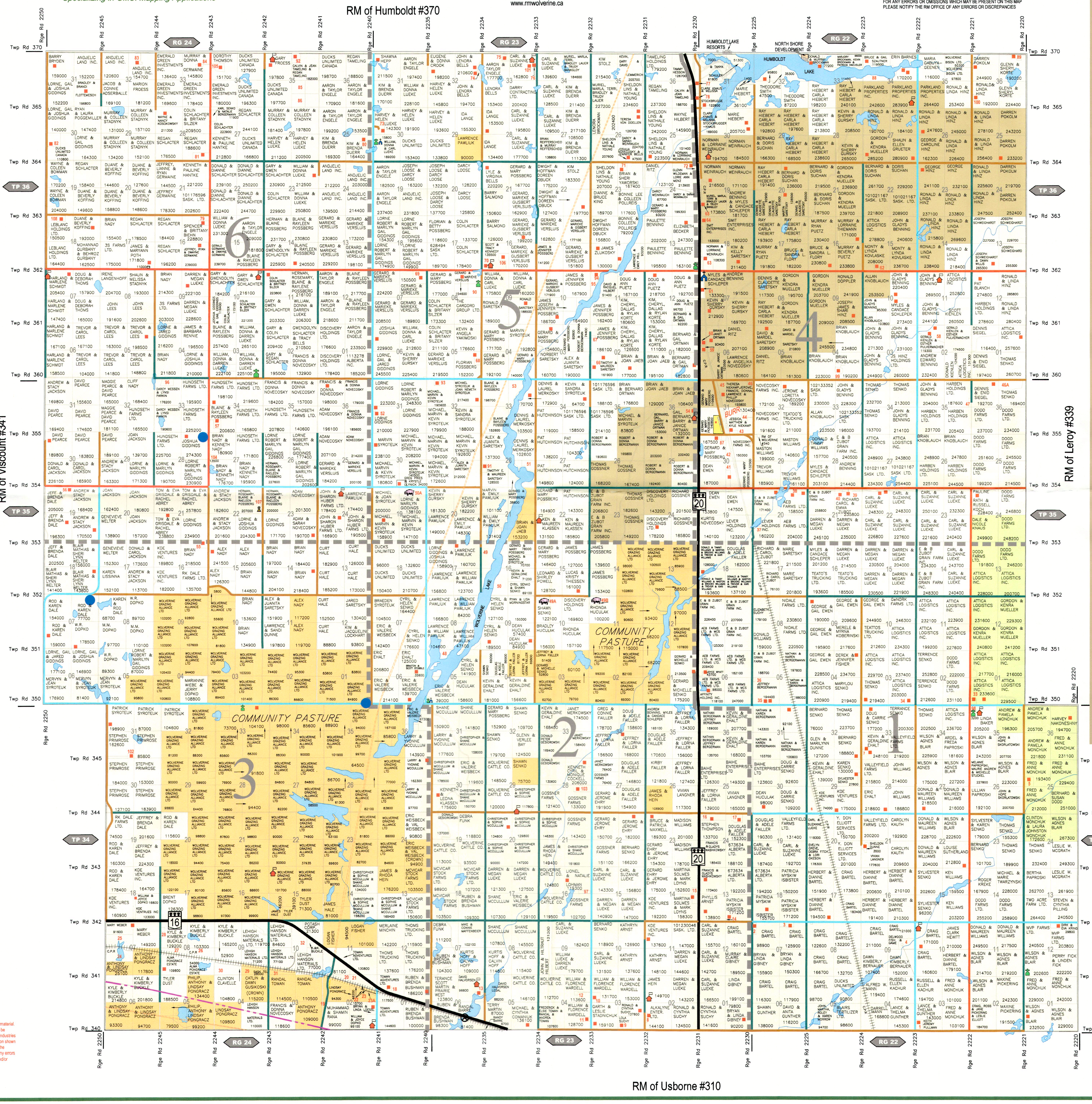


SCALES

KILOMETERS

MILES

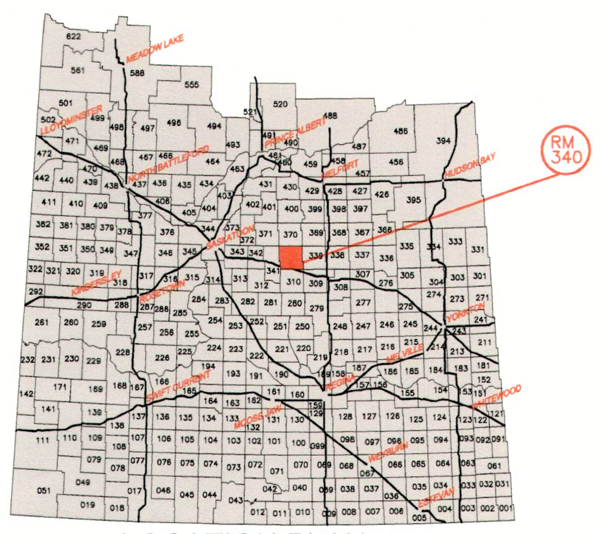
Saskatoon Regional Health Authority	
Assessment:	230,911,100 (Assessed Value)
Population:	480
Office Days:	Monday to Friday
Meeting:	Monthly as called by Council
Reeve:	Bryan Gibney
Division 1:	
Division 2:	Ron Suchy
Division 3:	Rod Dale
Division 4:	Sandy Flory
Division 5:	Joan Nemeth-Syroteuk
Division 6:	Blaine Possberg

LEGEND

- Provincial Highway
- Primary Grid Road
- Primary Grid (Paved)
- Grid Road
- Main Farm Access
- Special Roads
- Gravel Road
- Bladed Road
- Other Road
- Railway
- Transmission Line
- Pipeline
- Division Boundary
- Residence
- Church
- Cemetery
- Church Monument
- School
- Community Well
- ILO SITE
- Lake
- River/Creek
- Crown Land
- Burr Conservation & Development Area
- North Upper Hunter Creek Water Control Area

NOT ALL FEATURES IN LEGEND NECESSARILY APPEAR ON MAP

SMALL PARTS INDEX			
1	SW 03-34-22	KEITH JEREMY PULLMAN	41000
2	NW 07-34-22	DARCY & WENDY MEHRER	11000
3	NE 07-34-22	KERRY & MARSHA WEST	13900
4	NE 09-34-22	DELWOOD FISH & GAME	16100
5	NW 25-34-22	ANDREW & PAMELA MONCHUK	27600
6	SW 29-34-22	DOUG & CARRIE SENKO	29400
7	SW 33-34-22	KEVIN & GERALDINE EHALT	11000
8	SW 02-34-23	DEREK STADNICHUK	22400
9	SE 03-34-23	LOLA SUCHY	52900
10	NW 03-34-23	NICHOLAS DICK	36300
11	SE 04-34-23	RONALD & MARILYN BIEBER	23200
12	NE 04-34-23	WILLIAM & FLORENCE WARDELL	4000
13	NE 06-34-23	BONNIE BARRE	25500
14	SE 13-34-23	KURT PAVELICH	11000
15	NE 14-34-23	MARTINA SOLMES & MARK LOYNS	44700
16	NW 24-34-23	ROGER CHAPMAN	41400
17	NE 24-34-23	DOUGLAS & ADELE FAILLER	38100
18	NW 01-34-24	LARRY HUBER	23000
19	SW 02-34-24	ESTATE OF ANTHONY PONGRACZ	5600
20	NW 02-34-24	TOMAN AGVENTURES LTD.	13200
21	NE 02-34-24	TOMAN AGVENTURES LTD.	35700
22	NE 02-34-24	MELANIE LOESSL	29600
23	NE 02-34-24	DANIEL G. RITZ	4400
23A	NE 02-34-24	KEITH & JENNIFER FLEISCHHACKER	19500
24	SW 07-34-24	CANADIAN PACIFIC RAILWAY	24000
25	NW 07-34-24	CANADIAN PACIFIC RAILWAY	44900
26	SE 08-34-24	CANADIAN PACIFIC RAILWAY	51900
27	SW 08-34-24	TYLER DUST	26400
28	NW 08-34-24	VERONICA MATTSON	4900
29	SE 09-34-24	CATLIN & DAWN GUSIKOSKI	33100
30	SW 09-34-24	CLINTON CLAVELLE	58400
31	SW 10-34-24	RANDAL TOMAN	23200
32	NE 10-34-24	CANADIAN PACIFIC RAILWAY	21300
33	SW 01-35-22	MADISON WILLIAMS	27500
34	SE 03-35-22	JONATHAN PEARCE & LEAH PEARCE	43700
35	SW 05-35-22	JEFFREY BERGERMANN	11000
36	SW 05-35-22	SHARON ZUBOT	2400
37	SW 20-35-22	GEORGE & GAIL EWEN	6500
38	NE 20-35-22	CRAIG PEIRRARD & MICHAEL LEMMERICH	23800
39	NE 21-35-22	RICHARD & CAROL ZUBOT	3200
40	NE 21-35-22	RICHARD & CAROL ZUBOT	29100
41	SE 30-35-22	DUSTIN EWEN	29800
42	NE 30-35-22	MARY ZUBOT	20400
43	SE 31-35-22	KARLAN HALL	20200
44	SE31-35-22	DEAN LOTHAMMER	28800
45	NW 31-35-22	WOLVERINE CATTLE CO.	32400
46	NE 31-35-22	DANIEL G. RITZ	8800
46A	NE 36-35-22	DENNIS & ENID SIEGEL	20600
47	NE 35 -35-22	MURRAY WIEGERS	7500
48	NW 05-35-23	CYRIL & HELEN SENKO	12200
49	NW 16-35-23	LAWRENCE & WILLIAM PAWLIUK	99400
49A	NW 10-35-23	OLYSKY LP INC.	14400
49B	NW 11-35-23	OLYSKY LP INC.	16000
50	NW 16-35-23	CYRIL & HELEN SENKO	11200
50A	NE 19-35-23	OLYSKY LP INC.	28600
51	SE 28-35-23	GERARD & MARY POSSBERG	31200
52	SW 31-35-23	LORNE ROBERT & MARILYN GAIL GIDDINGS	15800
53	NE 33-35-23	GERARD & MARY POSSBERG	18300
54	SE 36-35-23	KEVIN & CAROLYNE SPENCER	20800
55	NE 16-35-24	ELISE DALE	35700
56	NW 19-35-24	JEFFREY & BRENDA DALE	3600
57	SW 34-35-24	ERIC BENZ	44400
58	NW 02-36-22	GERALD KIENLEN & ESTER PULVERMACHER	74600
59	NW 06-36-22	GERALD SWAN BATTY	42800
60	NW 06-36-22	NORMAN & REGINNA ORTMAN	61300
61	NW 07-36-22	HILBERT HONEY CO. LTD.	55900
62	SW 15-36-22	MONTY & LYNDA KOVLASKE	26100
63	SW 18-36-22	FRED ERNEST ESTATE	24900
64	NW 18-36-22	CASEY & LAURIE ANNE SMIT	48500
65	SW 19-36-22	KARA BATTY	45900
66	SW 02-36-23	ALEX & JUANITA SARETSKY	35800
67	NW 02-36-23	ROBERT & DONNA BERGERMANN	2500
68	SE 05-36-23	FLORIAN POSSBERG	46500
69	NE 07-36-23	CURT & TRACY BELLS	52200
70	SW 16-36-23	ZACKARY & KAITLYN BIEHN	31000
71	NE 23-36-23	BRIAN C. & SHERI LYNNE YAWORSKI	45700
72	NE 24-36-23	OLYSKY LP INC.	29800
73	NW 30-36-23	DEB MacPHERSON	34000
74	NE 32-36-23	LEO & DEBRA BELLS	19500
75	NW 33-36-23	CYNTHIA GRIEMAN & GARY STADNICHUK	45900
76	NE 33-36-23	BRIAN & BRENDA REIFFERSCHIED	46100
77	SE 36-36-23	RENEE MACKENZIE	45900
78	SE 36-36-23	KEVIN & ELAINE SARETSKY	45900
79	NE 16-36-24	SPENCER & BRITTANY BIEHN	32200
80	SE 25-36-24	STEVEN VICZKO & SHELBY JOHNSON	34000
81	SE 28-36-24	REGAN SCHLACTER	63300
82	SW 30-36-24	BRIAN & RAELEEN KEEN	56300
83	NE 32-36-24	THERESA FORTOWSKY	22700
84	NE 33-36-24	MEGAN DONLEVY	21800
85	SE 35-36-24	DUCKS UNLIMITED CANADA	70500
86	SE 35-36-24	DUCKS UNLIMITED CANADA	63500
87	NW 30-35-22	GILBERT & NORA THURLOW & RODNEY JACQUES	3000
88	NW 34-36-22	101117453 SASK. LTD.	40900
89	NE 36-36-22	GLENN & SHERYL KORTE	51000
90	NE 08-36-23	SHAWN & MICHELLE PETERS	58200
91	SW 28-35-23	DANIEL & KATHRYN DUFFLEY	28200
92	NE 35-36-24	RICHARD SARETSKY	28200
93	NW 32-35-23	CARSON SARETSKY & JESSICA WEIMAN	34300
94	NW 11-36-23	TERRY & YVONNE SARETSKY	45800
95	NW 11-36-23	TERRY & YVONNE SARETSKY	5800
96	NW 33-35-24	DARCY WESSEN & LYNSI PARKIN	29400
97	NE 16-34-23	RYAN & KENDRA VEDRESS	27600
98	NE 35-34-22	JOE & SUSAN REITER	4700
99	SE 04-36-22	CHARLENE TOOP	60600
100	SW 36-36-22	BRIAN & JENNIFER HINZ	51400
101	NE 33-36-23	GERARD & NANCY DELEURME & GRANT SCHMIDT	33200
102	SW 31-34-24	BARRY & SANDRA LEIGH SENKO	31100
103	SE 28-34-23	OLEKSANDER & TETIANA RIZNYK	41700
104	NW 27-35-24	R.M. OF WOLVERINE #340	17000
105	NW 34-36-24	MELVIN BOLEN & KAREN HOLDEN	34500
106	SW 16-36-23	SCOTT & TRACY KENNEDY	49000
107	NE 22-35-24	HERMAN POSSBERG	
108	NW 18-36-24	MITCHELL & KATHLEEN KLEITER	29600



LOCATION PLAN

PURCHASING INFORMATION

This map may be purchased from the RM of Wolverine in Burr, SK or by mail/e-mail, or phone from Prairie Mapping Industries Ltd. @ (306) 647-2350. E-mail: prairiemapping@sasktel.net
Mailing Address: Box 40 Theodore, SK S0A 4C0
Orders may be charged to VISA, MC, paid by Money Order or Certified Cheque.

Revised by: C. Bilokreli May 27, 2022
Drawn by: Bruce Frederickson February 18, 2010

Appendix E Air Dispersion Modelling

Air Dispersion Modelling

SaskPower

Wolverine Power Station
Project No. 146929

Revision 0
11/29/2022

Air Dispersion Modelling

prepared for

SaskPower
Wolverine Power Station
Wolverine, Saskatchewan

Project No. 146929

Revision 0
11/29/2022

prepared by

Burns & McDonnell
Kansas City, Missouri

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LIST OF ABBREVIATIONS

Abbreviation	**Term/Phrase/Name**
$\mu g/m^3$	microgram per cubic meter
AERMAP	AMS/EPA Regulatory Model's terrain pre-processor
AERMOD	AMS/EPA Regulatory Model
ARM	Ambient Ratio Method
BPIP-PRIME	Building Profile Input Program – Plume Rise Model Enhancements
CAAQ	Canadian Ambient Air Quality Standards
CO	carbon monoxide
g/s	grams per second
GEP	Good Engineering Practice
hp	horsepower
HRSG	heat recovery steam generator
kW	kilowatt
MECL	minimum emissions compliant load
m/s	meters per second
Ministry	Saskatchewan Ministry of Environment
MMBtu/hr	million British thermal units per hour
MW	megawatt
NAD 83	North American Datum of 1983
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
ºC	degrees Celsius

Abbreviation	**Term/Phrase/Name**
OLM	Ozone Limiting Method
PM_{10}	particulate matter of 10 microns in diameter or smaller
$PM_{2.5}$	particulate matter of 2.5 microns in diameter or smaller
ppm	parts per million
PVMRM	Plume Volume Molar Ratio Method
SAAQS	Saskatchewan Ambient Air Quality Standards
SaskPower	Saskatchewan Power
SO_2	sulphur dioxide
TPM	total particulate matter
U.S. EPA	United States Environmental Protection Agency
UTM	Universal Transverse Mercator

1.0 INTRODUCTION

Pursuant to the Saskatchewan air quality regulatory requirements, Burns & McDonnell Canada LTD was retained by Saskatchewan Power (SaskPower) to perform air dispersion modelling to determine compliance with ambient air quality standards for a proposed combined-cycle power plant. The Wolverine Power Station Project (Project) is anticipated to be a nominal 370 megawatts (MW) gas-fired power plant which will consist of one F-Class combustion turbine with heat recovery steam generator (HRSG), one steam turbine and associated equipment. The Project will be located south of Wolverine, Saskatchewan. The combustion turbine will be designed to utilize pipeline-quality natural gas only. In addition to the combustion turbine, one natural gas-fired dew point heater, an emergency diesel fire pump, and an emergency diesel generator will also be included as part of the Project. The location of the Project is shown in Figure A-1 (Appendix A) and a plot plan of the Project is shown in Figure A-2 (Appendix A).

Emission of air contaminants will result from the combustion of natural gas in the proposed combined-cycle combustion turbine. Simple-cycle emissions will vent from the by-pass stack and combined-cycle emissions will vent from the main stack. There will also be emissions of air contaminants generated from the emergency diesel generator, emergency diesel fire pump, and dew point heater. Table 1-1 shows the maximum potential air emissions associated with the Project including start-up and shutdown emissions for the turbine and auxiliary equipment emissions. The maximum emissions from any operating load and including start-up and shutdown emissions for the combustion turbine were used to demonstrate the maximum potential emissions for each pollutant. Combined-cycle air emissions are based on 8,760 hours per year of operation (100% capacity factor) and simple-cycle air emissions are based on 2,891 hours per year of operation (33% capacity factor).

Table 1-1. Project Potential Emissions

Pollutant	Combined-Cycle Project Potential Emissions (tonnes per year)	Simple-Cycle Project Potential Emissions (tonnes per year)
NO_x	469.4	163.5
CO	326.0	201.7
TPM/PM_{10}/$PM_{2.5}$	38.7	13.0
SO_2	29.6	9.8

1.1 Combustion Turbine

Emissions from the F-Class combustion turbine are dependent on the ambient temperature conditions and operating load, which can vary from minimum emissions compliant load (MECL) to 100 percent for combined-cycle operation. To account for representative seasonal climatic variations, potential emissions from the proposed combustion turbine was analyzed at MECL, 50, 75, and 100 percent load conditions for ambient temperatures ranging from negative 30 degrees Celsius (°C) to 39°. Projected emissions were based on data provided by the potential F-Class combustion turbine manufacturer and/or from AP-42 emission factors. Detailed calculations of the combustion turbine and auxiliary equipment's emissions are provided in Appendix B. Start-up and shutdown emissions were based on the start-up profile and 95 start-up/shutdown events per year for combined-cycle operation and 95 start-up/shutdown events per year for simple-cycle operation. One start-up/shutdown event is equal to one start-up plus one shutdown. All start-ups were conservatively assumed to be cold start-ups.

1.2 Auxiliary Equipment

Emissions of air contaminants generated from the dew point heater, emergency diesel fire pump, emergency diesel generator are discussed below.

1.2.1 Natural Gas Dew Point Heater

A 9.30 million British thermal units per hour (MMBtu/hr) natural gas-fired dew point heater will be used to heat the natural gas and will be permitted for 8,760 hours of operation per year. AP-42 data was used to estimate the emissions from the heater. Detailed emissions calculations are provided in Appendix B.

1.2.2 Emergency Diesel Fire Pump

An emergency diesel fire pump will be built to support the Project in case of a fire. The emergency diesel fire pump will have a maximum power output of 237 horsepower (hp) and will be fired solely by ultra-low sulphur # 2 fuel oil. The applicant proposes to operate the emergency diesel fire pump for up to 100 hours annually for testing and maintenance purposes, and therefore supports a limit on routine hours of operation of the emergency diesel fire pump. Vendor data and AP-42 emission factors were used to determine emissions for the fire pump. Detailed calculations of diesel fire pump emissions are provided in Appendix B.

1.2.3 Emergency Diesel Generator

An emergency diesel generator will be built to provide essential services to the plant in case of a power interruption. The emergency diesel generator will have a maximum power output of 1,250 kilowatt (kW) and will be fired solely by ultra-low sulphur # 2 fuel oil. The applicant proposes to operate the emergency diesel generator for up to 100 hours annually for testing and maintenance purposes, and therefore supports a limit on routine hours of operation of the emergency diesel generator. Vendor data and AP-42 emission factors were used to determine emissions from the emergency diesel generator. Detailed calculations of diesel generator emissions are provided in Appendix B.

2.0 AIR DISPERSION MODELLING

Pursuant to the Saskatchewan air quality regulatory requirements, an air dispersion modelling analysis is required for each regulated pollutant. An air quality analysis was performed for nitrogen oxides (NO_x), carbon monoxide (CO), sulphur dioxide (SO_2), total particulate matter (TPM), particulate matter of 10 microns in diameter or smaller (PM_{10}), and particulate matter of 2.5 microns in diameter or smaller ($PM_{2.5}$) using the U.S. Environmental Protection Agency (EPA)-approved AMS/EPA Regulatory Model (AERMOD). The Saskatchewan Air Quality Modelling Guideline was used to conduct the air dispersion modelling analysis for this Project. A summary of the models, the modelling techniques, and modelling results for the Project are discussed in the following sections.

2.1 Air Dispersion Model

Air dispersion modelling was performed using the latest version of the AERMOD model (Version 22112). The AERMOD model is a steady-state Gaussian air dispersion model that is designed to estimate downwind ground-level concentrations from single or multiple sources using detailed meteorological data. AERMOD is a model currently approved for industrial sources. The Saskatchewan Air Quality Modelling Guideline approves the use of AERMOD and SaskPower has chosen to demonstrate regulatory compliance through its use.

Details of the modelling algorithms contained in the AERMOD model may be found in the User's Guide for AERMOD (EPA, 2022). The regulatory default option was selected for this analysis.

The following default model options were used:

- Gradual Plume Rise
- Stack-tip Downwash
- Buoyancy-induced Dispersion
- Calms and Missing Data Processing Routine
- Calculate Wind Profiles
- Calculate Vertical Potential Temperature Gradient
- Rural Dispersion

2.2 Model Parameters

Modelling runs were conducted at full load and partial loads of the combustion turbine to assess the air quality effects of the Project emissions and to demonstrate the compliance of the predicted maximum ground-level concentrations with applicable Saskatchewan Ambient Air Quality Standards (SAAQS) and

Canadian Ambient Air Quality Standards (CAAQS). The expected hourly emission rates and modelling parameters for the combined-cycle combustion turbine and simple-cycle combustion turbine are shown in Table 2-1 and Table 2-2. These emission rates represent projected worst-case ambient conditions under various operating loads and include start-up and shutdown emissions. The annual emissions are based on worst-case annual emissions.

Table 2-1. Combined-Cycle Combustion Turbine Maximum Emissions and Modelling Parameters

Pollutant	100% Load	75% Load	50% Load	MECL[c]	Start-up/ Shutdown
	grams per second (g/s)				
NO_x	14.7[a]	11.9	8.4	6.7	18.9[b]
CO	6.0	2.4	3.8	3.0	341.5[b]
$PM/PM_{10}/PM_{2.5}$	1.2[a]	1.1	1.1	1.1	1.2
SO_2	0.9[a]	0.8	0.5	0.4	0.9
Stack Parameters					
Stack temperature (ºC)[c]	87.4	78.6	47.2	47.2	85.5
Exit velocity (m/s)[c]	17.7	14.3	11.9	10.0	17.4
Stack height (meters)	51.8				
Stack diameter (meters)	6.4				

(a) Maximum annual emission rate ratioed for 8,760 hours per year
(b) Maximum 1-hour start-up emissions (worst-case combustion turbine emissions during start-up)
(c) m/s = meters per second; ºC = degrees Celsius; MECL = minimum emissions compliant load

Table 2-2. Simple-Cycle Combustion Turbine Maximum Emissions and Modelling Parameters

Pollutant	100% Load	75% Load	50% Load	MECL[c]	Start-up/ Shutdown
	grams per second (g/s)				
NO_x	14.7[a]	11.9	8.4	6.7	13.3[b]
CO	6.0	2.4	3.8	3.0	74.5[b]
$PM/PM_{10}/PM_{2.5}$	1.2[a]	1.1	1.1	1.1	1.2
SO_2	0.9[a]	0.8	0.5	0.4	0.9
Stack Parameters					
Stack temperature (ºC)[c]	584.7	599.8	599.8	599.8	584.9
Exit velocity (m/s)[c]	43.4	36.7	30.8	26.3	43.2
Stack height (meters)	51.8				
Stack diameter (meters)	6.4				

(a) Maximum annual emission rate ratioed for 8,760 hours per year
(b) Maximum 1-hour start-up emissions (worst-case combustion turbine emissions during start-up)
(c) m/s = meters per second; ºC = degrees Celsius; MECL = minimum emissions compliant load

The combustion turbine will comply with the guidelines for the reduction of nitrogen oxide emissions from natural gas-fuelled stationary combustion turbines (Government of Canada, 2017). The combustion turbine NO_x emissions in Table 2-1 are based on a NO_x emission limit of 12 parts per million at 15 percent oxygen, which is below the NO_x emission limits published in the guideline. Compliance will be determined with NO_x CEMs.

The expected hourly emission rates and modelling parameters for the auxiliary equipment are shown in Table 2-3. Annual emissions for the emergency diesel fire pump and emergency diesel generator were based on operation of 100 hours per year.

Table 2-3. Auxiliary Equipment Emissions and Modelling Parameters

Pollutant	Dew Point Heater	Diesel Fire Pump	Diesel Generator
	grams per second (g/s)		
NO_x	0.1	0.2 (0.003)[a]	2.2 (0.03)[a]
CO	0.1	0.2	1.2
$PM/PM_{10}/PM_{2.5}$	0.01	0.01 (0.0001)[a]	0.1 (0.001)[a]
SO_2	0.001	0.1 (0.001)[a]	0.2 (0.003)[a]
Stack Parameters			
Stack temperature (ºC)[b]	179.7	530.0	448.9
Exit velocity (m/s)[b]	3.7	44.3	52.2
Stack height (meters)	4.9	4.6	4.6
Stack diameter (meters)	0.8	0.1	0.4

(a) Equivalent g/s emissions averaged over 8,760 hours per year, based on operation of 100 hours, used for annual averaging periods only.
(b) m/s = meters per second; ºC = degrees Celsius

2.3 Modelling Methodology and Parameters

The modelling methodology used for this analysis is summarized in the sections below.

2.3.1 Good Engineering Practice

Emission sources are subject to Good Engineering Practice (GEP) stack height requirements outlined in Section 5.7 of the Saskatchewan Air Modelling Guideline. As GEP height is calculated as the greater of 65 meters (measured from the ground level elevation at the base of the stack) or the height resulting from the following formula:

$$GEP = H + 1.5L$$

Where

- H = the height of nearby structure(s) measured from the ground level elevation at the base of the stack; and
- L = the lesser dimension (height or projected width) of nearby structure(s) (i.e., building height or the greatest crosswind distance of the building - also known as maximum projected width).

To meet stack height requirements, the point sources were evaluated in terms of the proximity to nearby structures. The purpose of this evaluation is to determine if the discharge from each stack will become caught in the turbulent wake of a building or other structure, resulting in downwash of the plume. Downwash of the plume can result in elevated ground-level concentrations. In EPA's 1985 *Guideline for Determination of Good Engineering Practice Stack Height*, EPA provides guidance for determining whether building downwash will occur. The downwash analysis was performed consistent with the methods prescribed in this guidance document.

Calculations for determining the direction-specific downwash parameters were performed using the most current version of the EPA's Building Profile Input Program – Plume Rise Model Enhancements (Version 04274), otherwise referred to as the BPIP-PRIME downwash algorithm. The BPIP-PRIME model provides direction-specific building dimensions to evaluate downwash conditions. The Project is located in a rural area and the only buildings that could potentially affect emissions from the Project are the on-site structures.

After running the BPIP-PRIME model, it was determined that the GEP stack height for this Project will not exceed 65 meters. A stack height of 51.8 meters (170 feet) was used in the AERMOD modelling. The major on-site buildings and their dimensions are provided in Appendix B.

2.3.2 Receptor Grid

The overall purpose of the modelling analysis is to assess the air quality effects of the Project emissions and to demonstrate the compliance of the predicted maximum ground-level concentrations with applicable SAAQS and CAAQS. The modelling runs were conducted using the AERMOD model in simple and complex terrain mode within a 10- by 10-kilometer Cartesian grid and is shown in Figure C-1 (Appendix C). The grid incorporates the receptor spacing specified in Table 2-4. Receptors were also placed along the fence line boundary at a spacing of 20 meters.

Table 2-4: Receptor Spacing from Fence Line Boundary

Distance from Fence Line (kilometers)	Receptor Spacing (meters)
0 - 0.5	50
0.5 – 2	250
2 – 5	500
5 – 10	1,000

The appropriate Canadian terrain data was downloaded from GeoBase Canada and was used to obtain the necessary receptor elevations. North American Datum of 1983 (NAD 83) was used to develop the Universal Transverse Mercator (UTM) coordinates for this Project.

AERMOD has a terrain preprocessor (AERMAP) which uses gridded terrain data for the modelling domain to calculate not only a XYZ coordinate, but a representative terrain-influence height associated with each receptor location selected. This terrain-influenced height is called the height scale and is separate for each individual receptor. AERMAP (Version 18081) utilized the electronic terrain data to populate the model with receptor elevations.

2.3.3 Meteorological Data

Meteorological data obtained from the Saskatchewan GeoHub were used for the modelling analysis. The data set located closest to the site is AERMOD ID: 519N1049W. Integrated Surface Hourly meteorological data and upper air data from were used for years 2012 to 2016. A profile base elevation of 536 meters was used.

2.3.4 Land Use Parameters

The existing land use for a three-kilometer area surrounding the Project is more than 50 percent rural, and the population density is less than 750 people per square kilometer for the same area. Therefore, rural dispersion coefficients were used in the AERMOD models.

2.3.5 Background Existing Ambient Air Quality

The air quality standards are set up to protect the air quality for all sensitive populations. As such, there is an existing concentration of each criteria pollutant that is present in ambient air that must be included in an analysis to account for items such as mobile source emissions that are not accounted for in the model. Monitored ambient concentrations will be added to the modeled ground level impacts to account for these sources.

For the Project, background values for each pollutant were identified from the representative monitors in the area. The Saskatchewan Ministry of Environment (Ministry) provides regional background air contaminant concentrations for five divisions of Saskatchewan. The values listed in Table 2-5 will be used as background levels and will be added to the modeled impacts for each pollutant for modelling compliance determinations. Per the modelling guideline, for refined modelling, the 90th percentile value from the cumulative frequency distribution of the background monitoring data was used for the 1-hour and 24-hour averaging times. For the annual distribution the 50th percentile was used.

Table 2-5. Central Region Background Concentration

Pollutant	Averaging Period	Percentile	Background Concentration[a]		Region
			ppm	μg/m³	
CO	1-hour	90	0.5	577.0	Central
	8-hour	90	0.4	480.0	
NO_2	1-hour	90	0.021	40.0	Central
	24-hour	90	0.017	32.0	
	Annual	50	0.008	15.0	
SO_2	1-hour	90	0.001	2.6	Central
	24-hour	90	0.001	2.6	
	Annual	50	0.000	0.0	
$PM_{2.5}$	24-hour	90	--	7.5	Central
	Annual	50	--	3.3	
PM_{10}[b]	24-hour	90	--	36.3	Southeastern
PM[c]	24-hour	90	--	7.5	Central
	Annual	50	--	3.3	

Source: Saskatchewan Air Quality Modelling Guideline, 2012
(a) ppm = parts per million; μg/m³ = micrograms per cubic meter
(b) No PM_{10} background was listed in the modelling guidance for the central region; therefore, the southeastern region background was used.
(c) No PM background was listed in the modelling guidance; therefore, the $PM_{2.5}$ central region background was used.

2.3.6 Modelling Thresholds

The SAAQS for the modelled pollutants are shown in Table 2-6.

Table 2-6: Saskatchewan Ambient Air Quality Standards

Pollutant	Averaging Period	SAAQS micrograms per cubic meter ($\mu g/m^3$)
CO	1-hour	15,000
	8-hour	6,000
NO_2	1-hour	300
	24-hour	200
	Annual	45[a]
SO_2	1-hour	450
	24-hour	125
	Annual	20[a]
$PM_{2.5}$	24-hour	28[b]
	Annual	10
PM_{10}	24-hour	50
PM	24-hour	100
	Annual	60[c]

Source: SAAQS, https://envrbrportal.crmp.saskatchewan.ca/Pages/SEQS/Table20-SEQS-SAAQS.pdf
(a) Arithmetic mean
(b) The 3-year average of the annual 98th percentile of the daily 24-hour average concentrations
(c) Geometric means

The CAAQS for the modelled pollutants are shown in Table 2-7.

Table 2-7: Canadian Ambient Air Quality Standards

Pollutant	Averaging Period	CAAQS		Statistical Form
		Effective 2020	Effective 2025	
		micrograms per cubic meter ($\mu g/m^3$)		
NO_2	1-hour	113	79	3-year average of the 98th percentile of the daily maximum 1-hour average concentrations
	Annual	32	23	Average over a single calendar year of all 1-hour average concentrations
SO_2	1-hour	183	170	3-year average of the annual 99th percentile of the SO_2 daily maximum 1-hour average concentrations
	Annual	13	10	Average over a single calendar year of all 1-hour average SO_2 concentrations
$PM_{2.5}$	24-hour	27	--	3-year average of the annual 98th percentile of the daily 24-hour average concentrations
	Annual	8.8	--	3-year average of the annual average of all 1-hour concentrations

Source: CAAQS, https://ccme.ca/en/air-quality-report

2.3.7 Intermittent Sources

The emergency diesel generator and emergency diesel fire pump will operate less than 100 hours annually and are considered intermittent sources. In addition to modelling normal plant operation impacts, emergency condition plant operation was modelled with the emergency equipment operating simultaneous to the combustion turbine and natural gas dew point heater.

2.3.8 NO_2 Modelling – Multi Tiered Screening Approach

The AERMOD model predicts ground-level concentrations of any generic pollutant without chemical transformations. Thus, the modeled NO_x emission rate will predict ground-level modeled concentrations of NO_x. The SAAQS and CAAQS modelling concentration standards are presented as NO_2.

Recommended methods for estimating NO_2 concentrations presented in the order of the most conservative first are:

1. Tier I – total conversion, or all NO_x equals NO_2

2. Tier II – use a default NO_2/NO_x ratio
3. Tier III – case-by-case detailed screening methods, such as the Ozone Limiting Method (OLM) or Plume Volume Molar Ratio Method (PVMRM)

The ambient ratio method was used to determine all NO_2 Project modeled results. The EPA has replaced the existing Ambient Ratio Method (ARM) with a revised ARM2 option. ARM2 is based on hourly measurements of the NO_2 to NO_x ratios and provides more detailed estimates of this ratio based on the total NO_x present. The EPA default minimum and maximum ratios of 0.5 and 0.9, respectively, were applied to the model to determine the predicted ground-level concentration of NO_2.

2.4 SAAQS Refined Modelling Results

Refined modelling was performed for CO, NO_x, SO_2, and $PM/PM_{10}/PM_{2.5}$ for the Project for normal plant operation for both combined-cycle and simple-cycle operation. The combustion turbine in combined-cycle or simple-cycle operation plus the natural gas dew point heater represents normal plant operation. After examining the modelling results for normal plant operation at all combustion turbine load levels, it was determined that all impacts are below the SAAQS. The maximum operating load modeled concentrations for each pollutant and averaging period are presented in Table 2-8 for combined-cycle operation and Table 2-9 for simple-cycle operation.

Table 2-8. Maximum Operating Load Modelled Concentrations for Normal Combined-Cycle Plant Operation

Pollutant	Averaging Period	UTM Coordinates[a]		Year	Worse-Case Maximum Operating Load[c]	Maximum Concentration			SAAQS Threshold
		Easting (meters)	Northing (meters)			Predicted	Background	Total	
						micrograms per cubic meter (µg/m³)			
CO	1-hour	480,900.00	5,747,300.00	2016	Starts	985.2	577	1,562.2	15,000
	8-hour	480,800.00	5,747,200.00	2014	Starts	513.5	480	993.5	6,000
NO_2	1-hour	480,600.00	5,747,500.00	2014	100%	77.8[b]	40	117.8	300
	24-hour	480,598.61	5,747,434.42	2016	Starts	28.1[b]	32	60.1	200
	Annual	480,598.61	5,747,453.12	2015	MECL	5.9[b]	15	20.9	45
SO_2	1-hour	481,050.00	5,747,800.00	2013	MECL	3.1	2.6	5.7	450
	24-hour	480,400.00	5,747,200.00	2016	MECL	1.8	2.6	4.4	125
	Annual	480,900.00	5,747,200.00	2015	MECL	0.2	0	0.2	20
$PM_{2.5}$	24-hour	480,598.61	5,747,453.12	5 years	MECL	2.4	7.5	9.9	28
	Annual	480,598.61	5,747,453.12	2015	MECL	0.5	3.3	3.8	10
PM_{10}	24-hour	480,400.00	5,747,200.00	2016	MECL	4.6	36.3	40.9	50
PM	24-hour	480,400.00	5,747,200.00	2016	MECL	4.6	7.5	12.1	100
	Annual	480,598.61	5,747,453.12	2015	MECL	0.5	3.3	3.8	60

(a) Universal Transverse Mercator NAD 83
(b) ARM2 methodology was used
(c) MECL = minimum emissions compliant load

Table 2-9. Maximum Operating Load Modelled Concentrations for Normal Simple-Cycle Plant Operation

Pollutant	Averaging Period	UTM Coordinates[a] Easting (meters)	UTM Coordinates[a] Northing (meters)	Year	Worse-Case Maximum Operating Load[c]	Maximum Concentration Predicted (µg/m³)	Maximum Concentration Background (µg/m³)	Maximum Concentration Total (µg/m³)	SAAQS Threshold (µg/m³)
CO	1-hour	480,598.62	5,747,415.72	2013	Starts	94.3	577	671.3	15,000
	8-hour	480,598.61	5,747,509.21	2012	Starts	39.3	480	519.3	6,000
NO_2	1-hour	480,600.00	5,747,500.00	2014	100%	77.8[b]	40	117.8	300
	24-hour	480,598.61	5,747,434.42	2016	100%	28.2[b]	32	60.2	200
	Annual	480,598.61	5,747,453.12	2015	MECL	5.6[b]	15	20.6	45
SO_2	1-hour	480,598.62	5,747,415.72	2013	100%	1.2	2.6	3.8	450
	24-hour	480,598.61	5,747,434.42	2016	100%	0.3	2.6	2.9	125
	Annual	480,598.61	5,747,453.12	2015	MECL	0.0	0	0.0	20
$PM_{2.5}$	24-hour	480,600.0	5,747,450.0	5 years	100%	2.4	7.5	9.9	28
	Annual	480,598.61	5,747,453.12	2015	MECL	0.5	3.3	3.8	10
PM_{10}	24-hour	480,598.61	5,747,434.42	2016	100%	3.5	36.3	39.8	50
PM	24-hour	480,598.61	5,747,434.42	2016	100%	3.5	7.5	11.0	100
	Annual	480,598.61	5,747,453.12	2015	MECL	0.5	3.3	3.8	60

(a) Universal Transverse Mercator NAD 83
(b) ARM2 methodology was used
(c) MECL = minimum emissions compliant load

The following highs were used for each modelled averaging period:

- 1-hour average used the 9th highest concentration for a single calendar year
- 8-hour average used the 5th highest concentration for a single calendar year
- 24-hour average used the 2nd highest concentration for NO_2, SO_2, PM_{10}, and PM for a single calendar year
- 24-hour $PM_{2.5}$ used the 8th highest concentration (98th percentile) averaged over 5 years
- Annual average used the 1st highest concentration for a single calendar year

Isopleths of the maximum impact concentrations from either combined-cycle or simple-cycle operation for each pollutant and averaging period are shown in Figures C-2 to C-14 in Appendix C. Model input and output files for each pollutant will be provided via electronic file transfer.

In addition to modelling normal plant operation impacts, emergency condition plant operation was modelled with the emergency equipment operating simultaneous to the combustion turbine and natural gas dew point heater. After examining the modelling results for emergency condition plant operation at all combustion turbine load levels, it was determined that all impacts are below the SAAQS. The maximum operating load modeled concentrations for each pollutant and averaging period for this analysis are presented in Table C-1 for combined-cycle operation and Table C-2 for simple-cycle operation in Appendix C.

2.5 CAAQS Refined Modelling Results

Modelling was performed for NO_x, SO_2, and $PM_{2.5}$ to determine Project impacts for normal plant operation at the nearest residential receptors for comparison to the most conservative CAAQS listed in Table 2-7. The combustion turbine and natural gas dew point heater represent normal plant operation. Impacts at the nearest residential receptors within 2-kilometers of the Project were evaluated. The evaluated receptors are listed in Table 2-10 and are shown in Figure C-15 in Appendix C.

Table 2-10. Nearest Modelled Residential Receptors

Receptor ID	UTM Coordinates[a]	
	Easting (meters)	Northing (meters)
Residence 1	480,110	5,748,440
Residence 2	479,889	5,746,357
Residence 3	481,816	5,747,318
Residence 4	479,890	5,749,084
Residence 5	480,115	5,749,021
Residence 6	480,606	5,749,065
Residence 7	481,788	5,749,025

(a) Universal Transverse Mercator NAD83

After examining the modelling results at all load levels for normal plant operation, it was determined that the impacts are all below the most conservative CAAQS thresholds at the nearest residential receptors. The maximum operating load modeled concentrations for each pollutant and averaging period are presented in Table 2-11 for combined-cycle operation and Table 2-12 for simple-cycle operation.

Table 2-11. Maximum Operating Load Modelled Concentrations for Normal Combined-Cycle Plant Operation

Pollutant	Averaging Period	Receptor ID	Year	Worse-Case Maximum Operating Load[c]	Maximum Concentration			CAAQS Threshold[a]
					Predicted	Background	Total	
					micrograms per cubic meter (µg/m³)			
NO_2	1-hour	3	5 years	MECL	13.1[b]	40.0	53.1	79
	Annual	3	2015	MECL	0.8[b]	15.0	15.8	23
SO_2	1-hour	3	5 years	MECL	1.1	2.6	3.7	170
	Annual	3	2015	MECL	0.05	0.0	0.05	10
$PM_{2.5}$	24-hour	3	5 years	MECL	0.5	7.5	8.0	27
	Annual	3	5 years	MECL	0.1	3.3	3.4	8.8

(a) The modelled impacts were compared to the most conservative CAAQS threshold
(b) ARM2 methodology was used
(c) MECL = minimum emissions compliant load

Table 2-12. Maximum Operating Load Modelled Concentrations for Normal Simple-Cycle Plant Operation

Pollutant	Averaging Period	Receptor ID	Year	Worse-Case Maximum Operating Load[c]	Maximum Concentration			CAAQS Threshold[a]
					Predicted	Background	Total	
					micrograms per cubic meter (µg/m³)			
NO_2	1-hour	3	5 years	100%	6.5[b]	40.0	46.5	79
	Annual	3	2015	MECL	0.1[b]	15.0	15.1	23
SO_2	1-hour	3	5 years	100%	0.1	2.6	2.7	170
	Annual	3	2012	MECL	0.004	0.0	0.004	10
$PM_{2.5}$	24-hour	1	5 years	MECL	0.1	7.5	7.6	27
	Annual	3	5 years	MECL	0.01	3.3	3.31	8.8

(a) The modelled impacts were compared to the most conservative CAAQS threshold
(b) ARM2 methodology was used
(c) MECL = minimum emissions compliant load

The following highs were used for each modelled averaging period:

- 1-hour NO_2 used the 8th highest concentration (98th percentile) averaged over 5 years
- 1-hour SO_2 used the 4th highest concentration (99th percentile) averaged over 5 years
- 24-hour $PM_{2.5}$ used the 8th highest concentration (98th percentile) averaged over 5 years
- Annual NO_2 and SO_2 average used the 1st highest concentration over a single calendar year
- Annual $PM_{2.5}$ average used the 1st highest concentration over 5 years

2.6 Conclusion

The modelling results shown in Table 2-8, Table 2-9, Table 2-11, and Table 2-12 demonstrate that no exceedances of the NO_2, CO, SO_2, or $PM_{2.5}$/PM_{10}/PM modelling levels are predicted; consequently, the Project will be below the SAAQS and CAAQS.

The operation of the Project will not cause or contribute to a significant degradation of ambient air quality. After examining the results of the model, it has been determined that the modelling requirements for CO, NO_2, SO_2, and PM/PM_{10}/$PM_{2.5}$ have been fulfilled, and no further modelling is required.

3.0 REFERENCES

Canadian Council of Ministers of the Environment. Canadian Ambient Air Quality Standards (CAAQS), https://ccme.ca/en/air-quality-report. Accessed October 12, 2022.

Government of Canada. *Guidelines for the Reduction of Nitrogen Oxide Emissions from Natural Gas-fuelled Stationary Combustion Turbines*. Environment and Climate Change Canada, November 2017.

Ministry of Environment. Saskatchewan Air Quality Modelling Guideline. Government of Saskatchewan. March 2012.

Table 20: Saskatchewan Ambient Air Quality Standards (µg/m^3). https://envrbrportal.crm.saskatchewan.ca/Pages/SEQS/Table20-SEQS-SAAQS.pdf. Accessed October 12, 2022.

U.S. Environmental Protection Agency. *Guideline for Determination of Good Engineering Practice Stack Height (Technical Support Document for Stack Height Regulations)*. EPA-450/4-80-023LR. North Carolina: Office of Air Quality Planning and Standards, 1985.

U.S. Environmental Protection Agency. *User's Guide for the AMS/EPA Regulatory Model –AERMOD*. EPA-454/B-22-007. North Carolina: Office of Air Quality Planning and Standards, June 2022.

APPENDIX A - FIGURES

Path: C:\Users\tjkimmel\OneDrive - Burns & McDonnell\Documents\ArcGIS\Projects\Wolverine_Location\Wolverine_Location.aprx tjkimmel 10/25/2022
Service Layer Credits: World Imagery: Earthstar Geographics

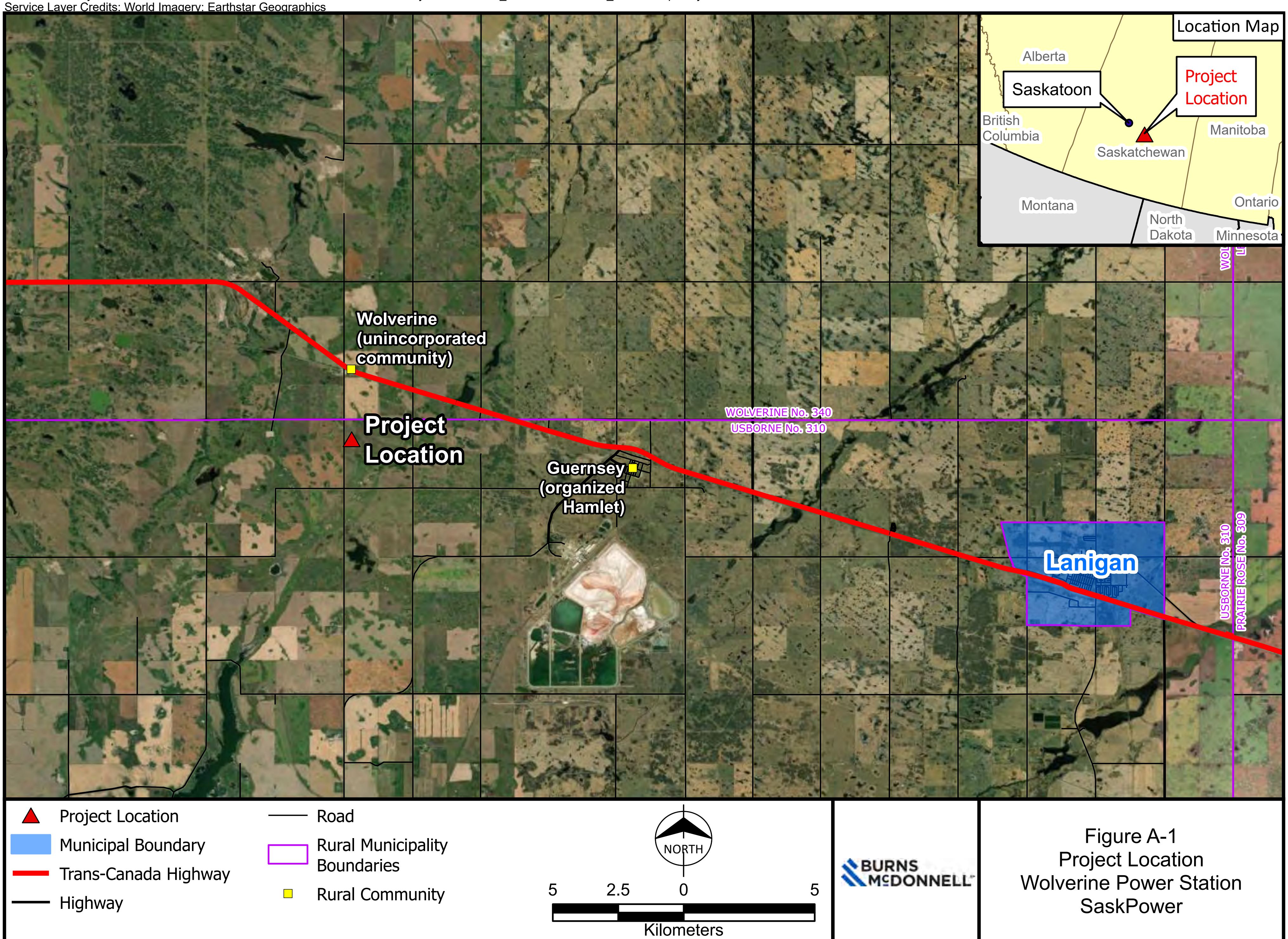

Figure A-1
Project Location
Wolverine Power Station
SaskPower

Source: ESRI, Saskatchewan GeoHub, TIGER/Line, and Burns & McDonnell

Issued: 10/25/2022

Path: Z:\Clients\ENR\SaskPwr\146929_WolverineECI\7_Studies\Permitting\Modeling\Air\Layouts\GIS\Wolverine_Air_Modelling_Figures.aprx gweger 10/24/2022
Service Layer Credits: World Boundaries and Places: Esri, HERE, Garmin, NRCan

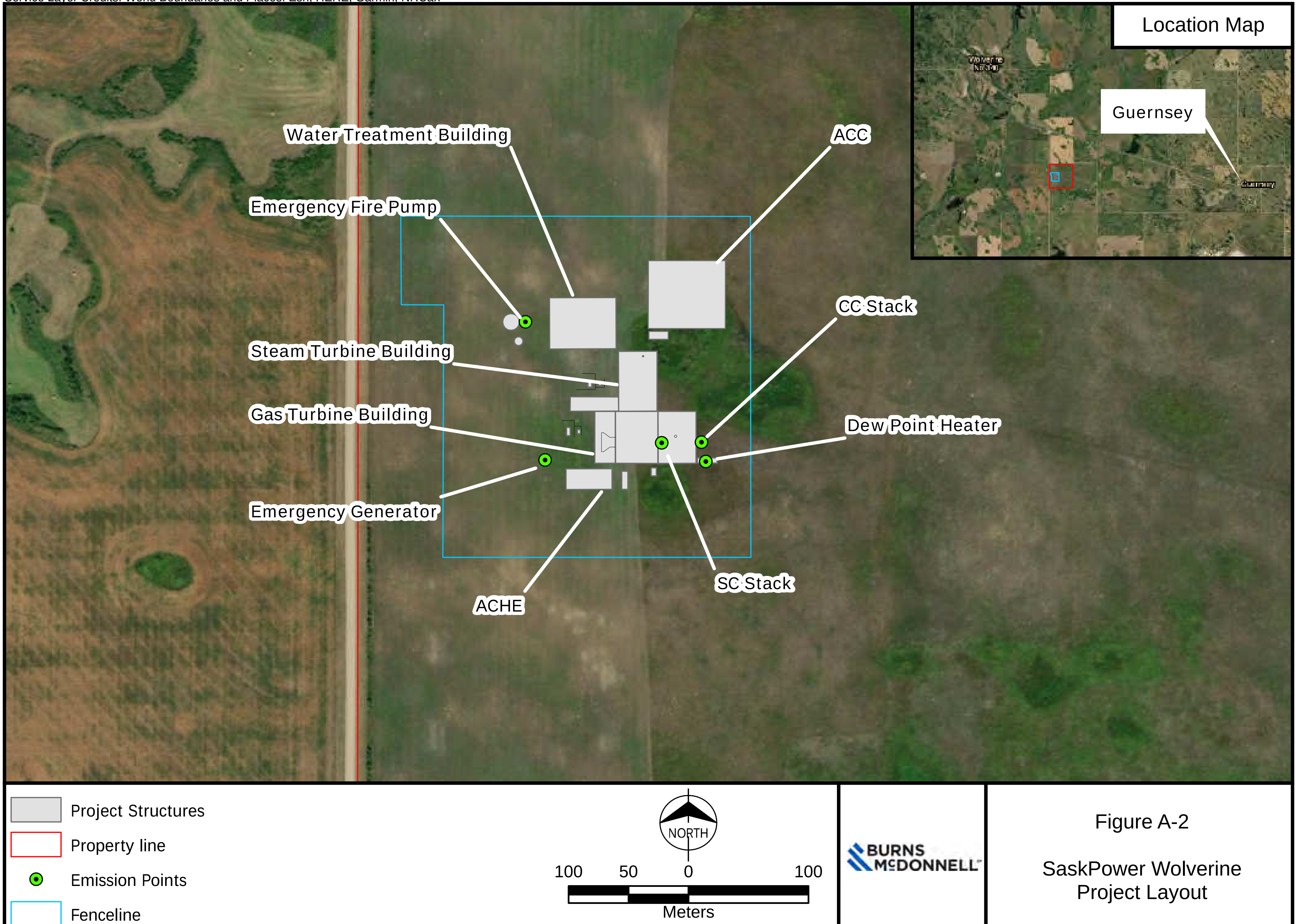

Figure A-2

SaskPower Wolverine
Project Layout

Source: ESRI, Burns & McDonnell

Issued: 10/24/2022

APPENDIX B – EMISSIONS ESTIMATES

Wolverine Power Station Project
Air Dispersion Modeling Inputs

Source ID	Source Description	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Stack Height (m)	Temperature (°C)	Exit Velocity (m/s)	Stack Diameter (m)	NO_2 24-hour (g/s)	NO_2 Annual (g/s)	NO_2 1-hour (g/s)	CO (g/s)	PM/PM_{10}/$PM_{2.5}$ 24-hour (g/s)	PM/$PM_{2.5}$ Annual (g/s)	SO_2 24-hour (g/s)	SO_2 Annual (g/s)	SO_2 1-hour (g/s)
EP01_100	Turbine 100%	480,557.00	5,747,454.30	532.0	51.8	87.4	17.7	6.4	14.7	14.7	14.7	6.0	1.2	0.4	0.9	0.9	0.9
EP01_75	Turbine 75%	480,557.00	5,747,454.30	532.0	51.8	78.6	14.3	6.4	11.9	14.7	11.9	2.4	1.1	0.4	0.8	0.9	0.8
EP01_50	Turbine 50%	480,557.00	5,747,454.30	532.0	51.8	47.2	11.9	6.4	8.4	14.7	8.4	3.8	1.1	0.4	0.5	0.9	0.5
EP01_MECL	Turbine - MECL	480,557.00	5,747,454.30	532.0	51.8	47.2	10.0	6.4	6.7	14.7	6.7	3.0	1.1	0.4	0.4	0.9	0.4
EP01_SS	Turbine - Starts	480,557.00	5,747,454.30	532.0	51.8	85.5	17.4	6.4	18.9	14.7	18.9	341.5	1.2	0.4	0.9	0.9	0.9
EP02_100	SC Turbine 100%	480,525.60	5,747,454.30	532.0	51.8	584.7	43.4	6.4	14.7	4.9	14.7	6.0	1.2	0.4	0.9	0.9	0.9
EP02_75	SC Turbine 75%	480,525.60	5,747,454.30	532.0	51.8	599.8	36.7	6.4	11.9	4.9	11.9	2.4	1.1	0.4	0.8	0.9	0.8
EP02_50	SC Turbine 50%	480,525.60	5,747,454.30	532.0	51.8	599.8	30.8	6.4	8.4	4.9	8.4	3.8	1.1	0.4	0.5	0.9	0.5
EP02_MECL	SC Turbine - MECL	480,525.60	5,747,454.30	532.0	51.8	599.8	26.3	6.4	6.7	4.9	6.7	3.0	1.1	0.4	0.4	0.9	0.4
EP02_SS	SC Turbine - Starts	480,525.60	5,747,454.30	532.0	51.8	584.9	43.2	6.4	13.3	4.9	13.3	74.5	1.2	0.4	0.9	0.9	0.9
EP03_DPH	Dew Point Heater	480,561.07	5,747,439.43	532.0	4.9	176.7	3.7	0.8	0.1	0.1	0.1	0.1	0.01	0.01	0.001	0.001	0.001
EP04_EG	Emergency Generator	480,421.24	5,747,439.04	532.0	4.9	448.9	52.2	0.4	2.2	0.03	2.2	1.2	0.1	0.001	0.2	0.003	0.2
EP05_EF	Emergency Fire Pump	480,410.72	5,747,555.80	532.0	4.6	530.0	44.3	0.1	0.2	0.003	0.2	0.2	0.01	0.0001	0.1	0.001	0.1

Wolverine Power Station Project

Overall Project Emissions - Combined-Cycle Operation

Maximum Annual Emission Rates

Pollutant	Combined-Cycle Combustion Turbine[a] (tonnes per year)	Dew Point Heater (tonnes per year)	Emergency Diesel Fire Pump (tonnes per year)	Emergency Diesel Generator (tonnes per year)	Total (tonnes per year)
NO_x	464.9	3.6	0.07	0.8	**469.4**
CO	322.5	3.0	0.06	0.4	**326.0**
PM	38.4	0.3	0.004	0.03	**38.7**
PM_{10}	38.4	0.3	0.004	0.03	**38.7**
$PM_{2.5}$	38.4	0.3	0.004	0.03	**38.7**
SO_2	29.4	0.02	0.02	0.09	**29.6**

(a) Represents worse-case emissions scenario

Assumptions

Unit	Limitation	Units
Combined Cycle Operation	8,760	Hours Per Year
Number of Cold Startups per year	95	Events Per Year
Hours of Startup/Shutdowns per year	161	Hours Per Year
Natural Gas Dew Point Heater	8,760	Hours Per Year
Emergency Diesel Fire Pump	100	Hours Per Year
Emergency Diesel Generator	100	Hours Per Year
Heating Value of Natural Gas		
Natural Gas	1,020	MMBtu/MMCF

Combined Cycle Combustion Turbine

Hours per year: 8,760
Number of Units: 1

Source Description	Operating Load	NOx Emission Rate (g/s)	CO Emission Rate (g/s)	$PM/PM_{10}/PM_{2.5}$ Emission Rate (g/s)	SO2 Emission Rate (g/s)
Turbine\ HRSG	100%	14.7	6.0	1.2	0.9
	75%	11.9	2.4	1.1	0.8
	50%	8.4	3.8	1.1	0.5
	50%	6.7	3.0	1.1	0.4

Emissions Including Startup/Shutdown Operation

Predicted Annual Emission Rates - Combined Cycle Combustion Turbine

Pollutant	Emissions (Tonnes per year) per Turbine		
	Normal Operation	Startup/ Shutdown	Max Total Turbine Emissions
NO_x	456.3	8.6	464.9
CO	185.5	137.0	322.5
$PM/PM_{10}/PM_{2.5}$	37.7	0.3	38.0
SO_2	28.9	0.2	29.1

Emissions Including Normal Operation Only

Predicted Annual Emission Rates - Combined Cycle Combustion Turbine

Pollutant	Emissions (Tonnes per year) per Turbine		
	Normal Operation	Startup/ Shutdown	Max Total Turbine Emissions
NO_x	464.8	--	464.8
CO	189.0	--	189.0
$PM/PM_{10}/PM_{2.5}$	38.4	--	38.4
SO_2	29.4	--	29.4

Wolverine Power Station Project

Overall Project Emissions - Simple-Cycle Operation

Maximum Annual Emission Rates

Pollutant	Simple-Cycle Combustion Turbine[a] (tonnes per year)	Dew Point Heater (tonnes per year)	Emergency Diesel Fire Pump (tonnes per year)	Emergency Diesel Generator (tonnes per year)	Total (tonnes per year)
NO_x	159.0	3.6	0.07	0.8	**163.5**
CO	198.2	3.0	0.06	0.4	**201.7**
PM	12.7	0.3	0.004	0.03	**13.0**
PM_{10}	12.7	0.3	0.004	0.03	**13.0**
$PM_{2.5}$	12.7	0.3	0.004	0.03	**13.0**
SO_2	9.7	0.02	0.02	0.09	**9.8**

(a) Represents worse-case emissions scenario

Assumptions

Unit	Limitation	Units
Simple-Cycle Operation	2,891	Hours Per Year
Number of Cold Startups per year	95	Events Per Year
Hours of Startup/Shutdowns per year	55	Hours Per Year
Natural Gas Dew Point Heater	8,760	Hours Per Year
Emergency Diesel Fire Pump	100	Hours Per Year
Emergency Diesel Generator	100	Hours Per Year
Heating Value of Natural Gas		
Natural Gas	1,020	MMBtu/MMCF

Simple-Cycle Combustion Turbine

Hours per year: 2,891

Number of Units: 1

Source Description	Operating Load	NOx Emission Rate (g/s)	CO Emission Rate (g/s)	$PM/PM_{10}/PM_{2.5}$ Emission Rate (g/s)	SO2 Emission Rate (g/s)
Turbine\ HRSG	100%	14.7	6.0	1.2	0.9
	75%	11.9	2.4	1.1	0.8
	50%	8.4	3.8	1.1	0.5
	50%	6.7	3.0	1.1	0.4

Emissions Including Startup/Shutdown Operation

Predicted Annual Emission Rates - Simple-Cycle Combustion Turbine

Pollutant	Emissions (Tonnes per year) per Turbine: Normal Operation	Startup/ Shutdown	Max Total Turbine Emissions
NO_x	150.4	8.6	159.0
CO	61.2	137.0	198.2
$PM/PM_{10}/PM_{2.5}$	12.4	0.3	12.7
SO_2	9.5	0.2	9.7

Emissions Including Normal Operation Only

Predicted Annual Emission Rates - Simple-Cycle Combustion Turbine

Pollutant	Emissions (Tonnes per year) per Turbine: Normal Operation	Startup/ Shutdown	Max Total Turbine Emissions
NO_x	153.4	--	153.4
CO	62.4	--	62.4
$PM/PM_{10}/PM_{2.5}$	12.7	--	12.7
SO_2	9.7	--	9.7

Wolverine Power Station Project
Start-up Emissions - Combined-Cycle Operation

BURNS McDONNELL

Client SaskPower
Project SaskPower Self Build Combined-Cycle

PRELIMINARY Combined-Cycle Startup Emissions Estimate
1x1 5000F5ee Configuration

	CO		NOx		VOC		SO2		PM	
	g/Start		g/Start		g/Start		g/Start		g/Start	
	GT1	GT2	GT1	GT2	GT1	GT2	GT1	GT2	GT3	GT4
Cold Start	1,275,502	N/A	71,214	N/A	176,901	N/A	1,269.4	N/A	2,268.0	N/A
Warm Start	1,033,737	N/A	53,977	N/A	119,295	N/A	997.6	N/A	1,814.4	N/A
Hot Start	266,259	N/A	16,783	N/A	32,205	N/A	400.8	N/A	453.6	N/A
Shutdown	166,468	N/A	19,051	N/A	21,047	N/A	568.4	N/A	907.2	N/A

	CO		NOx		VOC		SO2		PM	
	g/s		g/s		g/s		g/s		g/s	
	GT1	GT2	GT1	GT2	GT1	GT2	GT1	GT2	GT1	GT2
Cold Start	341.5	N/A	18.9	N/A	48	N/A	0.3	N/A	0.6	N/A
Warm Start	322.6	N/A	16.4	N/A	38	N/A	0.3	N/A	0.6	N/A
Hot Start	197.8	N/A	12.6	N/A	24	N/A	0.3	N/A	0.5	N/A
Shutdown	274.7	N/A	20.2	N/A	35	N/A	0.4	N/A	0.6	N/A

Notes

1) Startup for the Permit is defined as the operation period beginning when continuous fuel flow to the gas turbine is initiated and ending when stack emissions compliance is achieved.

2) Startup for the Contract is defined as the operation period beginning when the gas turbine start is initiated and ending when the steam turbine is accepting full steam flow.

Startup Times

	Permit Time	Contract Time
	Minutes	
Cold Start	70	296
Warm Start	53	195
Hot Start	22	104
Shutdown	32	32

Wolverine Power Station Project
Start-up Emissions - Simple-Cycle Operation

Client SaskPower
Project SaskPower Self Build Simple Cycle

PRELIMINARY Simple Cycle Startup Emissions Estimate
1x1 5000F5ee Configuration

	CO		NOx		VOC		SO2		PM	
	lb/Start		lb/Start		lb/Start		lb/Start		lb/Start	
	GT1	GT2	GT1	GT2	GT1	GT2	GT1	GT2	GT3	GT4
Cold Start	560	N/A	28	N/A	63	N/A	0.3	N/A	1.9	N/A
Shutdown	310	N/A	21	N/A	35	N/A	0.2	N/A	1.3	N/A

	CO		NOx		VOC		SO2		PM	
	lb/hr		lb/hr		lb/hr		lb/hr		lb/hr	
	GT1	GT2	GT1	GT2	GT1	GT2	GT1	GT2	GT1	GT2
Cold Start	591.44	N/A	105.91	N/A	69.65	N/A	5.20	N/A	1.86	N/A

Notes

1) Startup for the Permit is defined as the operation period beginning when continuous fuel flow to the gas turbine is initiated and ending when stack emissions compliance is achieved.

2) Startup for the Contract is defined as the operation period beginning when the gas turbine start is initiated and ending when the steam turbine is accepting full steam flow.

Startup Times

	Permit Time
	Minutes
Cold Start	20
Shutdown	15

Wolverine Power Station Project
Buildings

Building ID	Building Name	Number of Tiers	Tier Number	Base Elevation (m)	Tier Height (m)	Number of Corners	Corner 1 East (X) (m)	Corner 1 North (Y) (m)	Corner 2 East (X) (m)	Corner 2 North (Y) (m)	Corner 3 East (X) (m)	Corner 3 North (Y) (m)	Corner 4 East (X) (m)	Corner 4 North (Y) (m)	Corner 5 East (X) (m)	Corner 5 North (Y) (m)	Corner 6 East (X) (m)	Corner 6 North (Y) (m)	Corner 7 East (X) (m)	Corner 7 North (Y) (m)	Corner 8 East (X) (m)	Corner 8 North (Y) (m)	Corner 9 East (X) (m)	Corner 9 North (Y) (m)	Corner 10 East (X) (m)	Corner 10 North (Y) (m)
ACHE	Air Cooling Heat Exchanger	1	1	532	6.4	4	480,482.93	5,747,431.00	480,444.65	5,747,431.84	480,444.27	5,747,414.49	480,482.55	5,747,413.65												
GEN	Generator Building	1	1	532	3.0	4	480,423.55	5,747,443.46	480,419.56	5,747,443.42	480,419.56	5,747,434.58	480,423.56	5,747,434.58												
FP	Fire Pump Building	1	1	532	3.4	4	480,412.82	5,747,551.70	480,412.91	5,747,560.08	480,408.23	5,747,560.14	480,408.14	5,747,551.75												
DPH	Dew Point Heater Building	1	1	532	3.0	4	480,553.98	5,747,438.06	480,553.98	5,747,442.56	480,566.98	5,747,442.56	480,566.98	5,747,438.06												
CTG1	Electrical Room	5	1	532	8.1	10	480,520.06	5,747,531.56	480,488.30	5,747,531.98	480,488.27	5,747,493.60	480,447.96	5,747,493.60	480,447.96	5,747,481.69	480,469.88	5,747,481.69	480,469.97	5,747,437.28	480,552.88	5,747,437.38	480,552.88	5,747,481.69	480,520.10	5,747,481.69
CTG1	Gas Turbine Building	*	2	*	10.7	8	480,520.06	5,747,531.56	480,488.30	5,747,531.98	480,488.30	5,747,481.69	480,469.88	5,747,481.69	480,469.97	5,747,437.28	480,552.88	5,747,437.38	480,552.88	5,747,481.69	480,520.10	5,747,481.69				
CTG1	Steam Turbine Building	*	3	*	19.8	6	480,520.06	5,747,531.56	480,488.30	5,747,531.98	480,488.30	5,747,437.28	480,552.88	5,747,437.38	480,552.88	5,747,481.69	480,520.10	5,747,481.69								
CTG1	Gas Turbine Building	*	4	*	24.8	5	480,488.30	5,747,481.69	480,488.30	5,747,437.28	480,552.88	5,747,437.38	480,552.88	5,747,481.69	480,520.10	5,747,481.69										
CTG1	Gas Turbine Building	*	5	*	40.4	4	480,529.81	5,747,481.69	480,529.81	5,747,437.28	480,552.88	5,747,437.38	480,552.88	5,747,481.69												
WTB	Water Treatment Building	1	1	532	7.6	4	480,430.83	5,747,533.01	480,430.83	5,747,575.68	480,486.35	5,747,575.68	480,485.93	5,747,533.44												
ACC	Air Cooled Condenser	1	1	532	24.4	4	480,513.56	5,747,549.63	480,577.57	5,747,549.77	480,577.44	5,747,607.20	480,513.43	5,747,607.06												

Wolverine Power Station Project
Auxiliary Combustion Sources Emissions Calculations

Dew Point Heater

Size	9.30	MMBtu/hr
HHV	1,020	Btu/cf
Operation	8,760	hours/year

Dew Point Heater Stack Parameters

Height (meters)	Temp. (ºC)	Velocity (m/s)	Diameter (meters)	Stack Discharge Type	Fuel
4.9	176.7	3.7	0.8	Vertical	Natural Gas

	Emission Factors			Emissions	
Pollutant	lb/MMcf	lb/MMBtu	Source	g/s	tonnes per year
NO_X	100.0	0.10	AP-42[a]	0.1	3.6
CO	84.0	0.08	AP-42[a]	0.10	3.0
$PM/PM_{10}/PM_{2.5}$	7.6	0.007	AP-42[a]	0.01	0.3
SO_2	0.6	0.0006	AP-42[a]	0.001	0.02

(a) AP-42 Section 1.4 (7/98)

Emergency Fire Pump

Size	237.0	HP
	1.7	MMBtu/hr
	12.0	gal/hr
Operation	100.0	hours/year

Emergency Fire Pump Stack Parameters

Height (meters)	Temp. (ºC)	Velocity (m/s)	Diameter (meters)	Stack Discharge Type	Fuel
4.6	530.0	44.3	0.1	Vertical	Diesel

	Emission Factors				Emissions		
Pollutant	g/kw-hr	g/hp-hr	lb/hp-hr	Source	g/s	tonnes per year	g/s Equivalent
NO_X	4.0	3.0	--	NSPS[a]	0.2	0.1	0.003
CO	3.5	2.6	--	NSPS[a]	0.2	0.06	--
$PM/PM_{10}/PM_{2.5}$	0.2	0.15	--	NSPS[a]	0.01	0.004	0.0001
SO_2	--	--	0.002	AP-42[b]	0.1	0.02	0.001

(a) NSPS 40 CFR Part 60, Subapart IIII Limits

NSPS Limits - 40 CFR Part 60, Subapart IIII, (40 CFR 60 Table 4)

	NOx + VOM	CO	PM
g/kW-hr	4.0	3.5	0.20
g/hp-hr	3.0	2.6	0.15

(b) AP-42 Section 3.3 (10/96)

Emergency Generator

Size	1250.0	KW
	932.1	hp
	241.0	gal/hr
	12.6	MMBtu/hr
Operation	100.0	hours/year

Emergency Generator Stack Parameters

Height (meters)	Temp. (ºC)	Velocity (m/s)	Diameter (meters)	Stack Discharge Type	Fuel
4.9	448.9	52.2	0.4	Vertical	Diesel

	Emission Factors				Emissions		
Pollutant	g/kw-hr	g/hp-hr	lb/hp-hr	Source	g/s	tonnes per year	g/s Equivalent
NO_X	6.4	4.8	--	NSPS[a]	2.2	0.8	0.03
CO	3.5	2.6	--	NSPS[a]	1.2	0.4	--
$PM/PM_{10}/PM_{2.5}$	0.2	0.15	--	NSPS[a]	0.1	0.03	0.001
SO_2	--	--	0.002	AP-42[b]	0.2	0.09	0.003

(a) NSPS 40 CFR Part 60, Subapart IIII Limits

NSPS Limits - 40 CFR Part 60, Subapart IIII, (40 CFR 60.4202(a)(2) and 40 CFR 89.112 - Table 1)

	NOx + VOM	CO	PM
g/kW-hr	6.4	3.5	0.2
g/hp-hr	4.8	2.6	0.15

(b) AP-42 Section 3.3 (10/96)

APPENDIX C – MODELLING FIGURES

Figure C-2: CO 1-Hour Concentration Plot
Worst-Case Operating Load Impacts: Start-up/Shutdown Operation

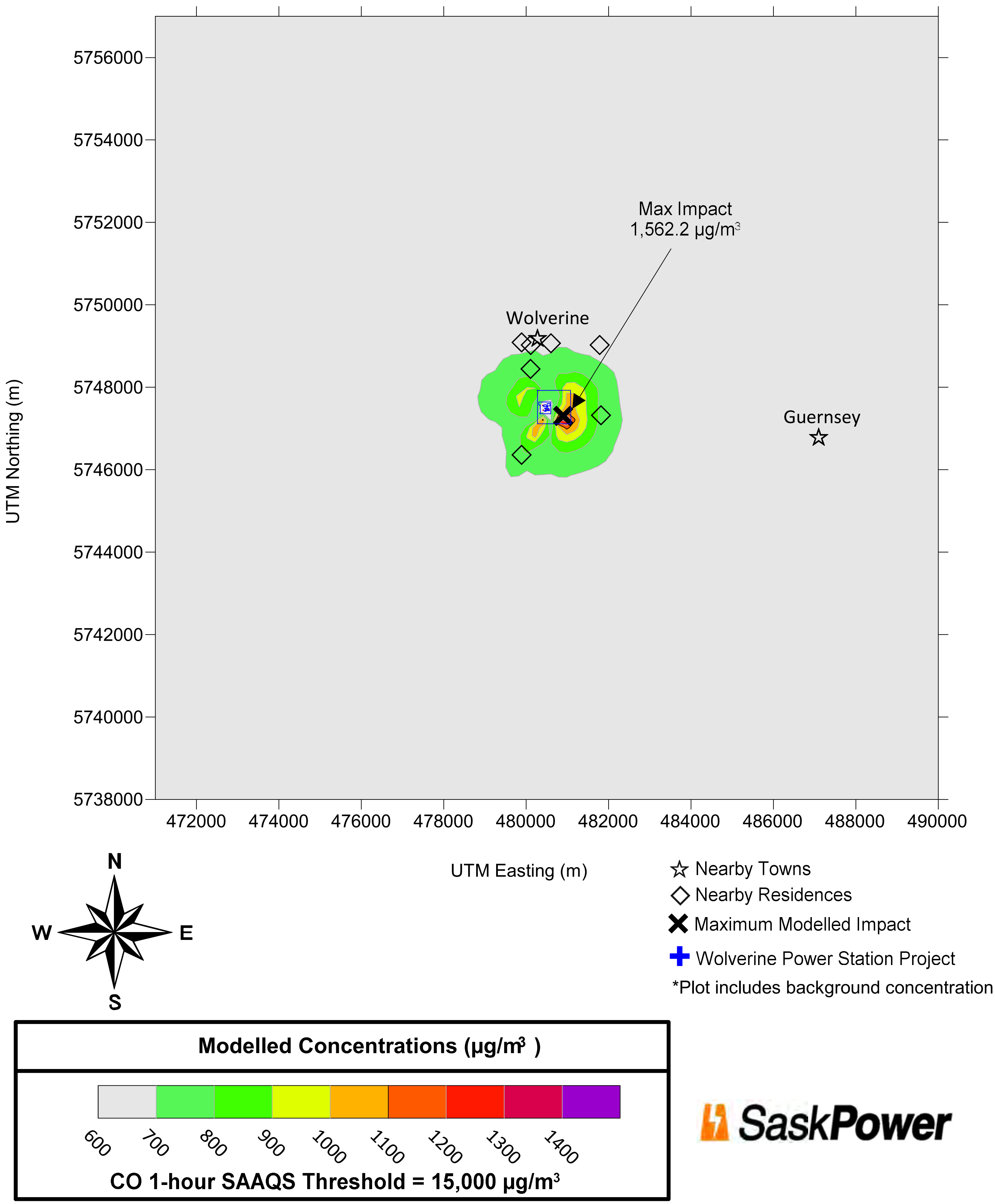

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Figure C-3: CO 8-Hour Concentration Plot
Worst-Case Operating Load Impacts: Start-up/Shutdown Operation

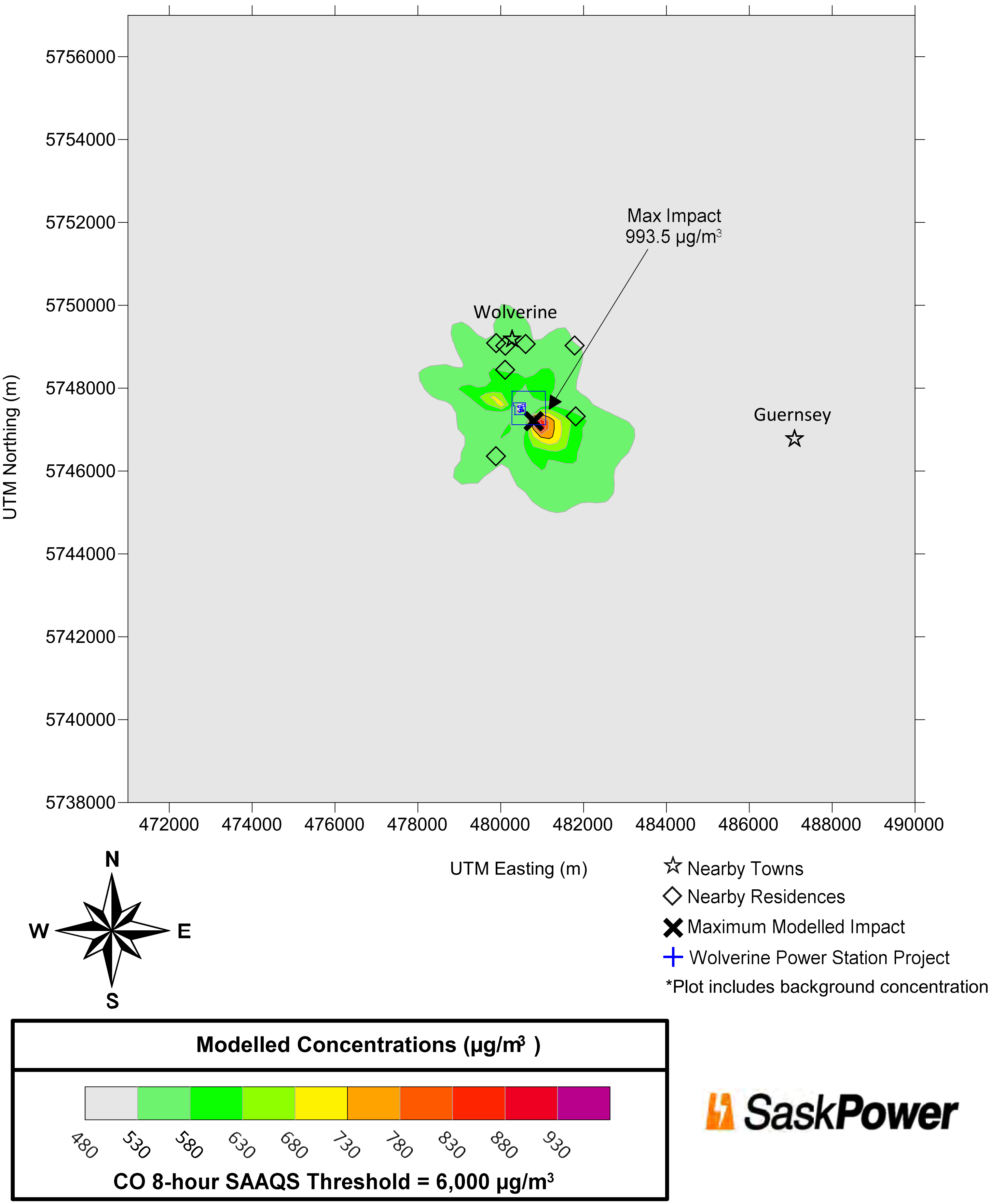
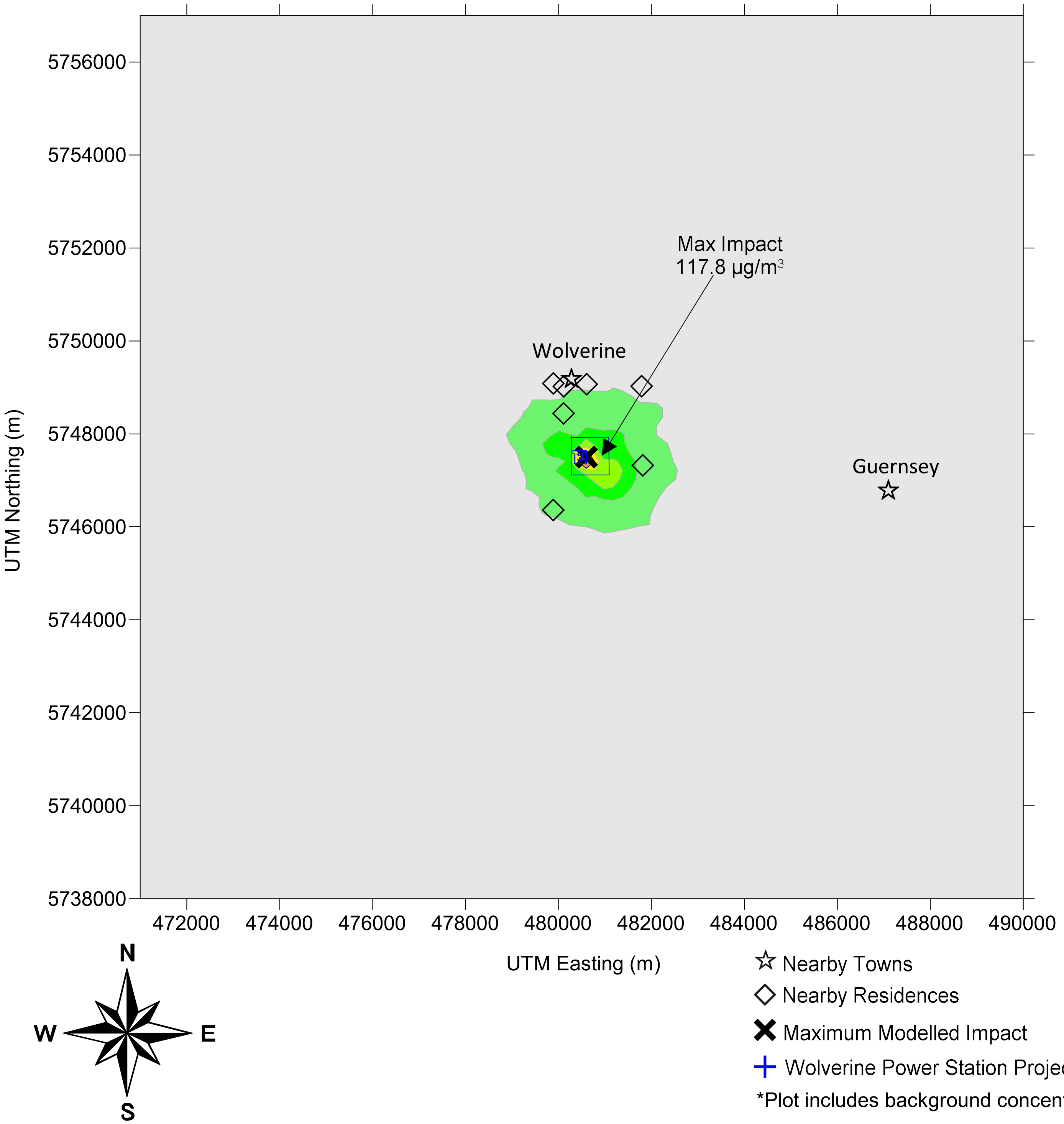


Figure C-4: NO_2 1-Hour Concentration Plot
Worst-Case Operating Load Impacts: 100% Load Operation



☆ Nearby Towns
◇ Nearby Residences
✖ Maximum Modelled Impact
+ Wolverine Power Station Project
*Plot includes background concentration

Modelled Concentrations (µg/m³)

40 45 50 55 60 65 70 75 80 85

NO_2 1-hour SAAQS Threshold = 300 µg/m³

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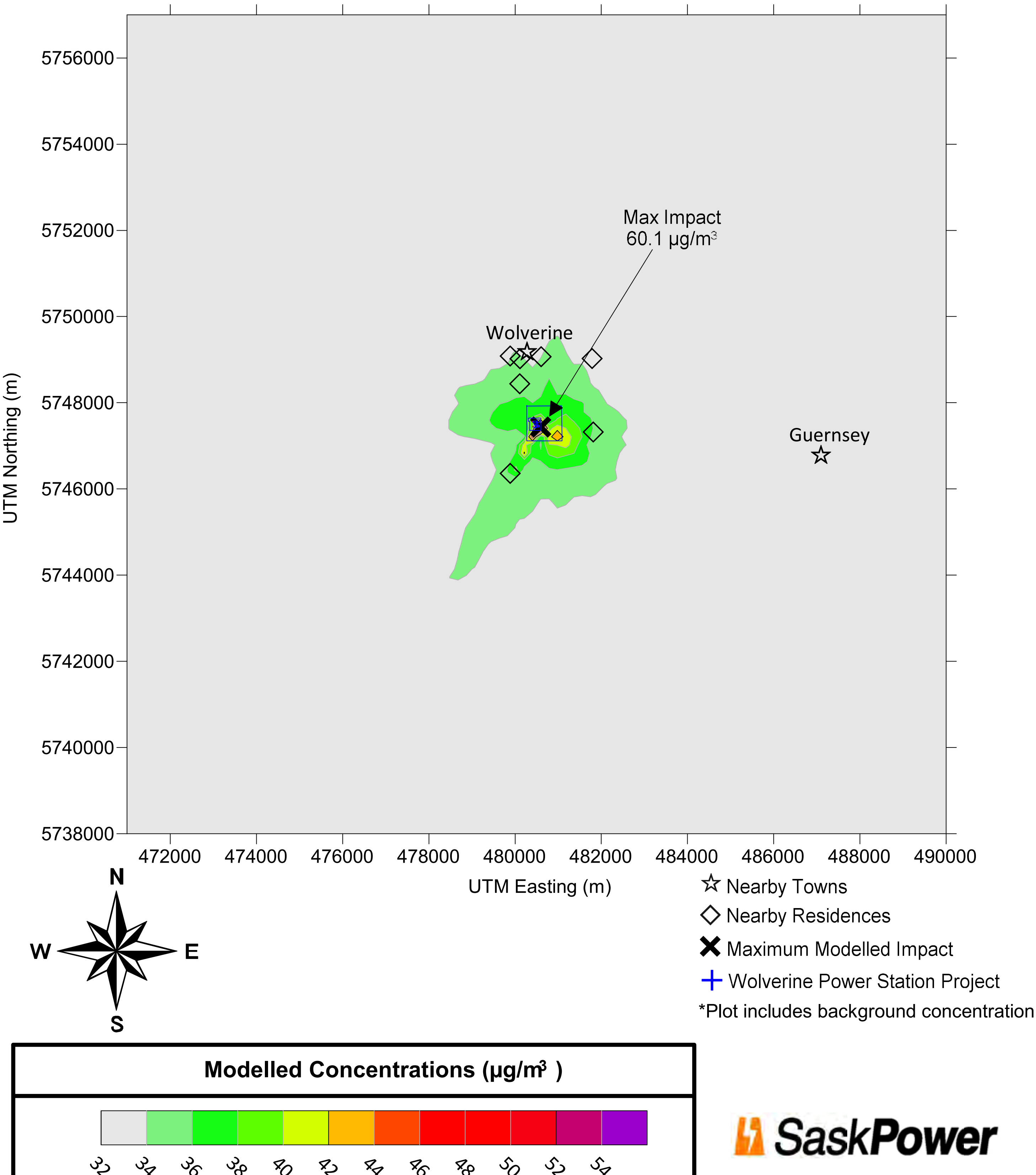
Figure C-5: NO_2 24-Hour Concentration Plot
Worst-Case Operating Load Impacts: Start-up/Shutdown Operation



NO_2 24-hour SAAQS Threshold = 200 µg/m³

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Figure C-6: NO_2 Annual Concentration Plot
Worst-Case Operating Load Impacts: Minimum Emissions Compliant Load Operation

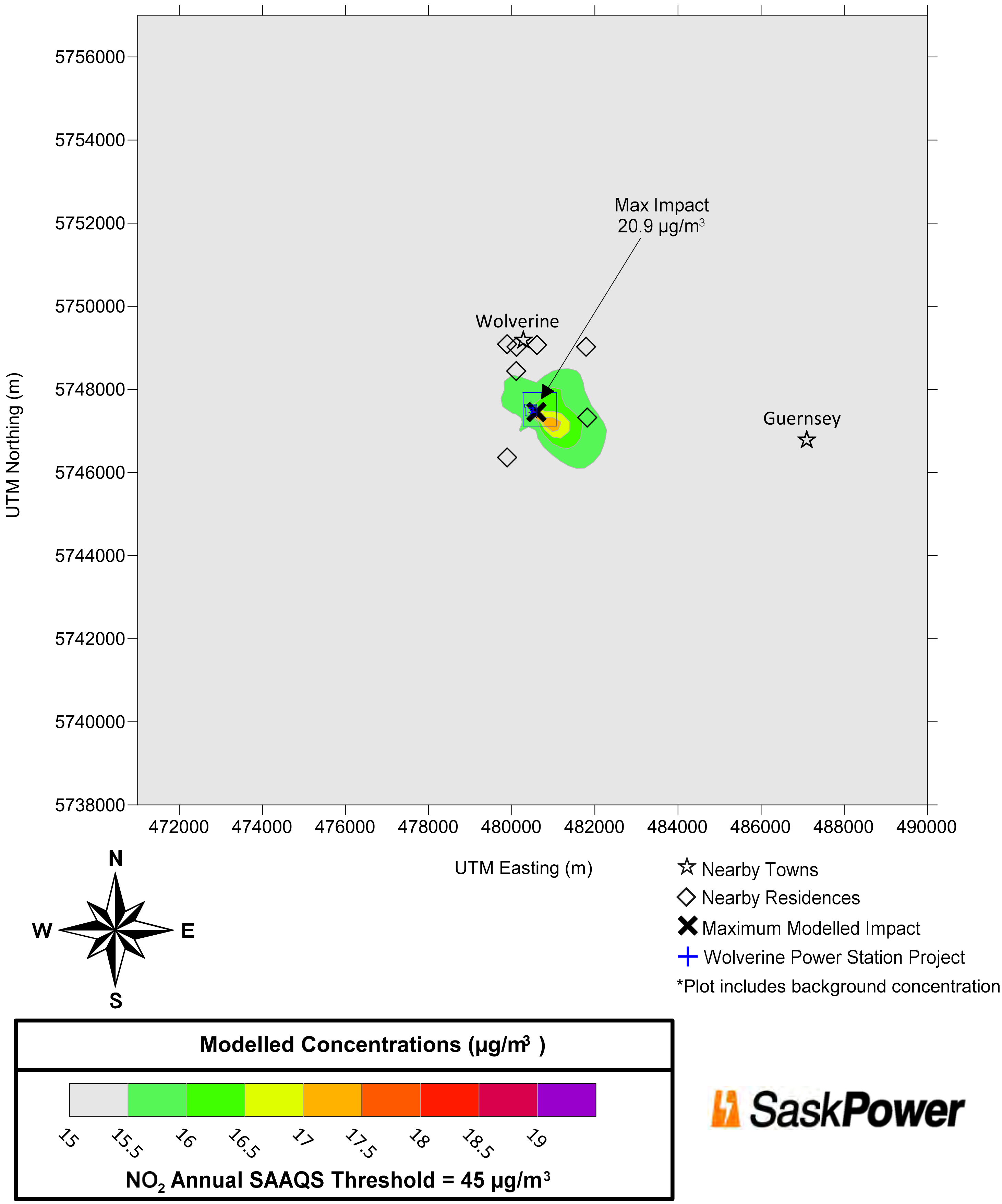


Figure C-7: SO_2 1-hour Concentration Plot
Worst-Case Operating Load Impacts: Minimum Emissions Compliant Load Operation

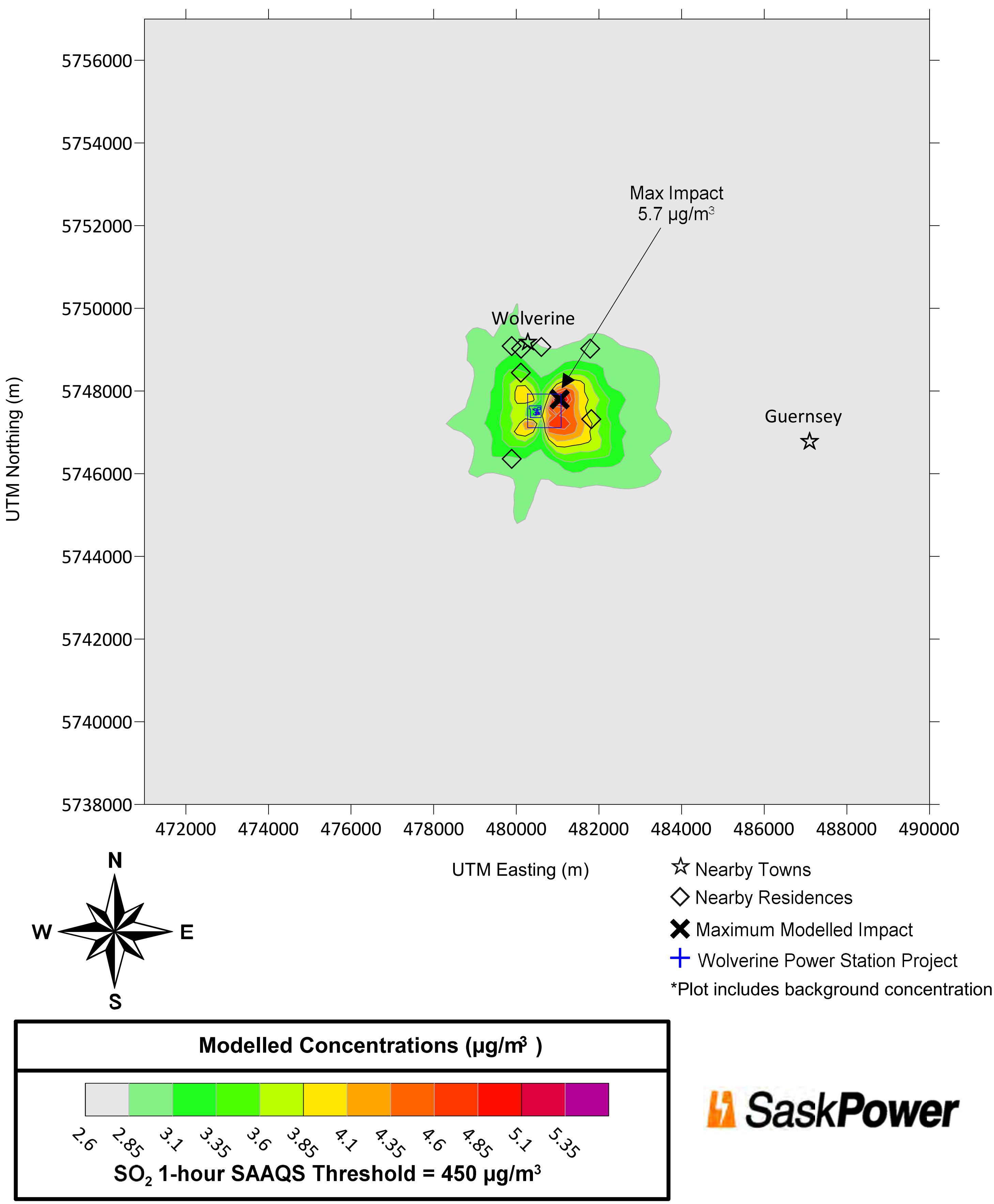


Figure C-8: SO_2 24-hour Concentration Plot
Worst-Case Operating Load Impacts: Minimum Emissions Compliant Load Operation

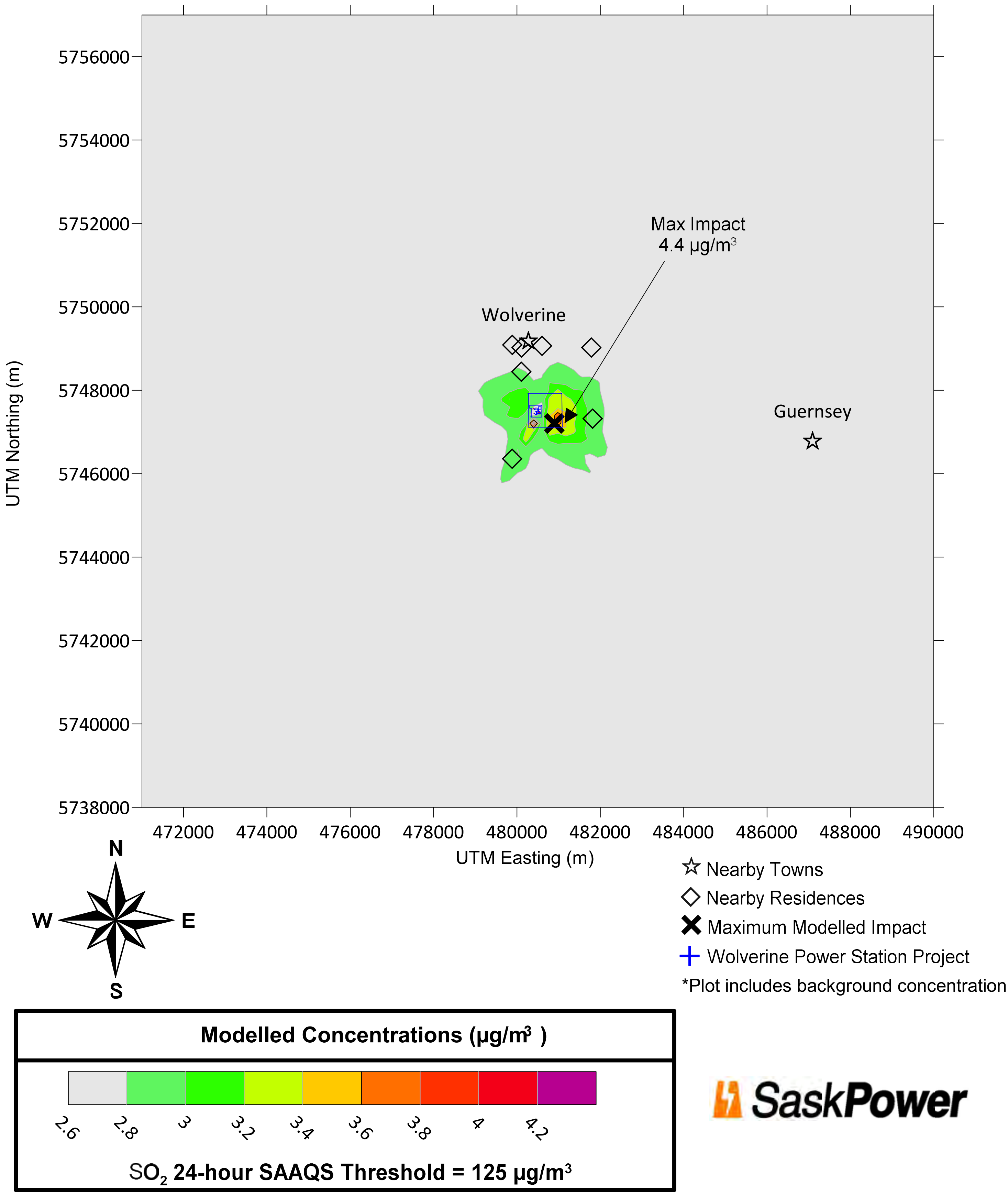
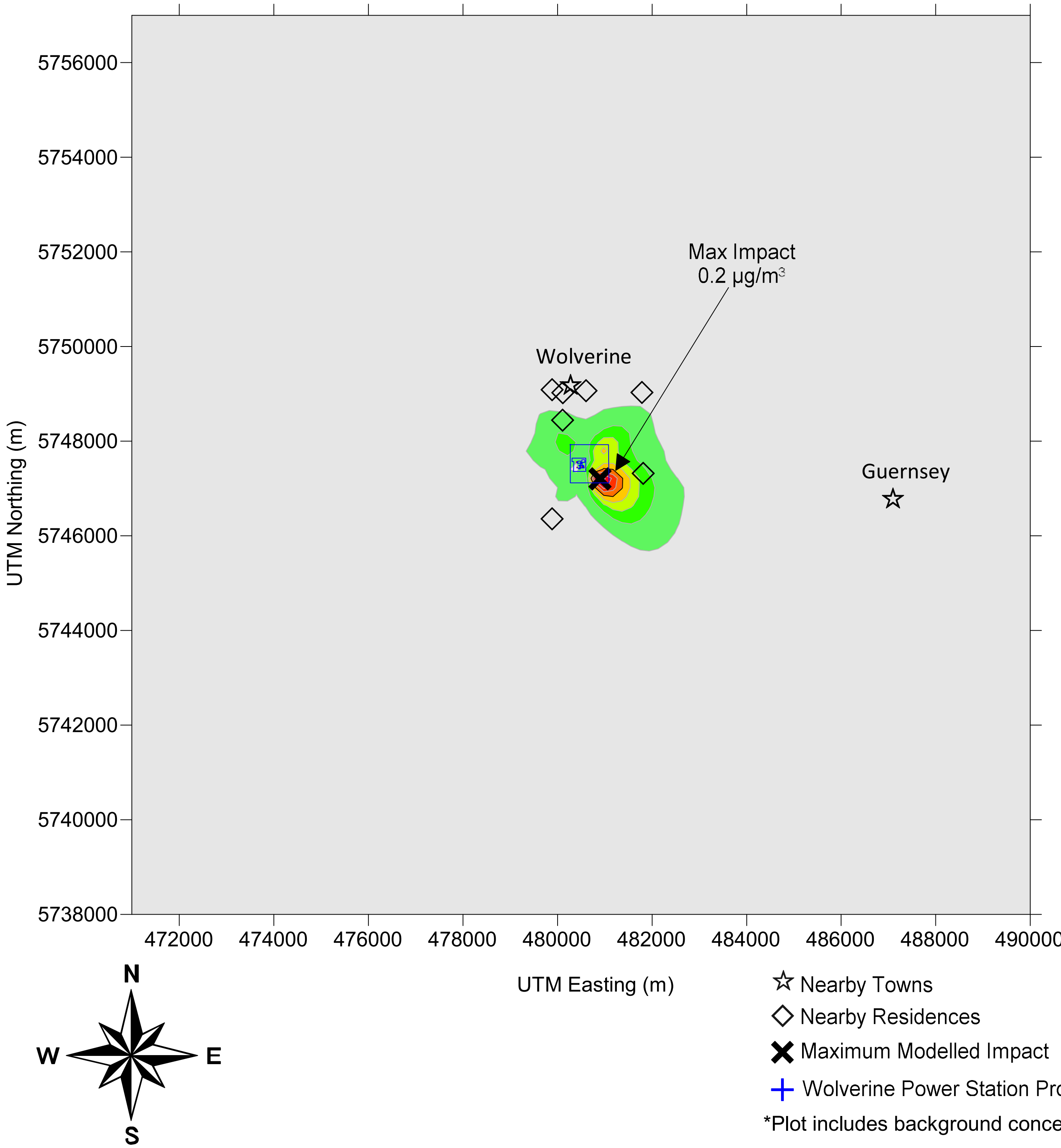


Figure C-9: SO_2 Annual Concentration Plot
Worst-Case Operating Load Impacts: Minimum Emissions Compliant Load Operation



*Plot includes background concentration

Modelled Concentrations (µg/m³)
0, 0.02, 0.04, 0.06, 0.08, 0.1, 0.12, 0.14, 0.16
SO_2 Annual SAAQS Threshold = 20 µg/m³

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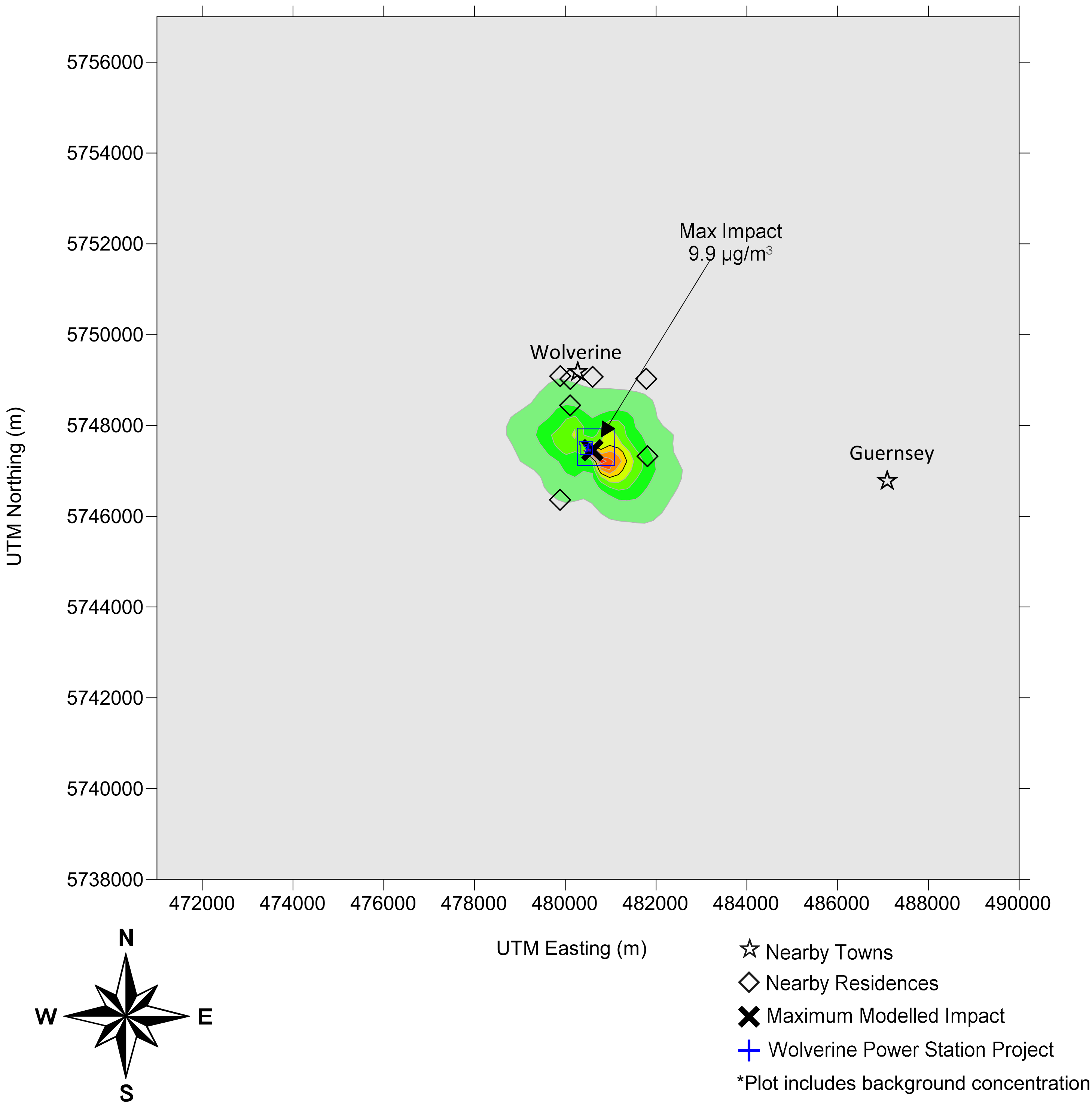
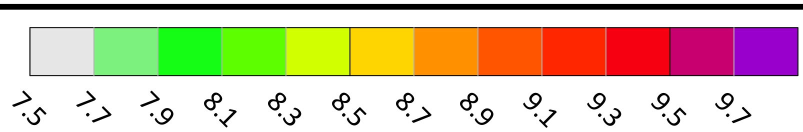
Figure C-10: $PM_{2.5}$ 24-hour Concentration Plot
Worst-Case Operating Load Impacts: Minimum Emissions Compliant Load Operation



Modelled Concentrations (µg/m³)



$PM_{2.5}$ 24-hour SAAQS Threshold = 28 µg/m³

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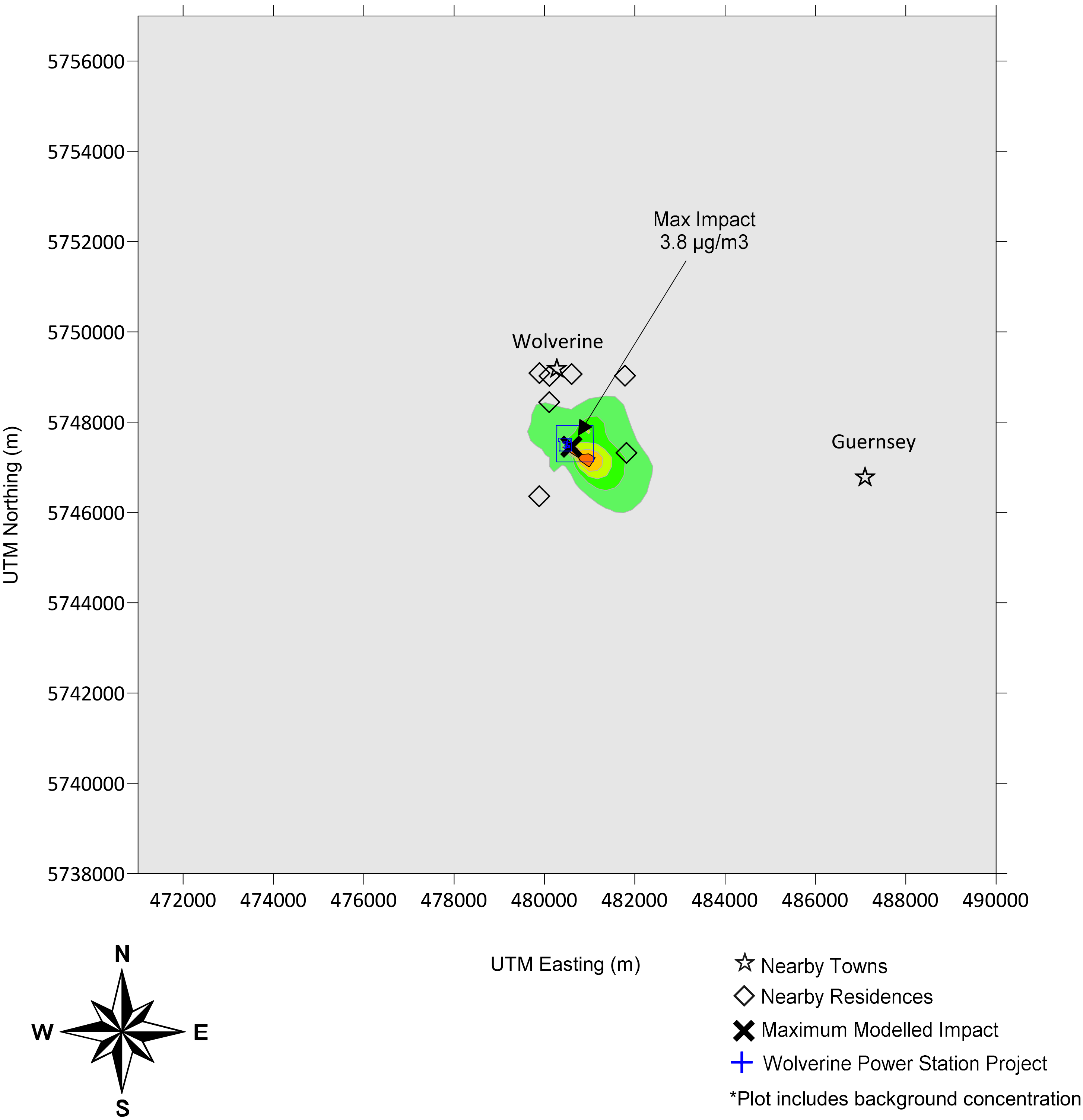
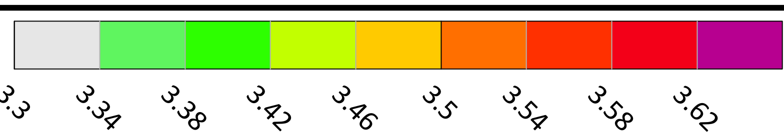
Figure C-11: PM$_{2.5}$ Annual Concentration Plot
Worst-Case Operating Load Impacts: Minimum Emissions Compliant Load Operation



*Plot includes background concentration

Modelled Concentrations (µg/m³)



PM$_{2.5}$ Annual SAAQS Threshold = 10 µg/m³

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Figure C-12: PM_{10} 24-hour Concentration Plot
Worst-Case Operating Load Impacts: Minimum Emissions Compliant Load Operation

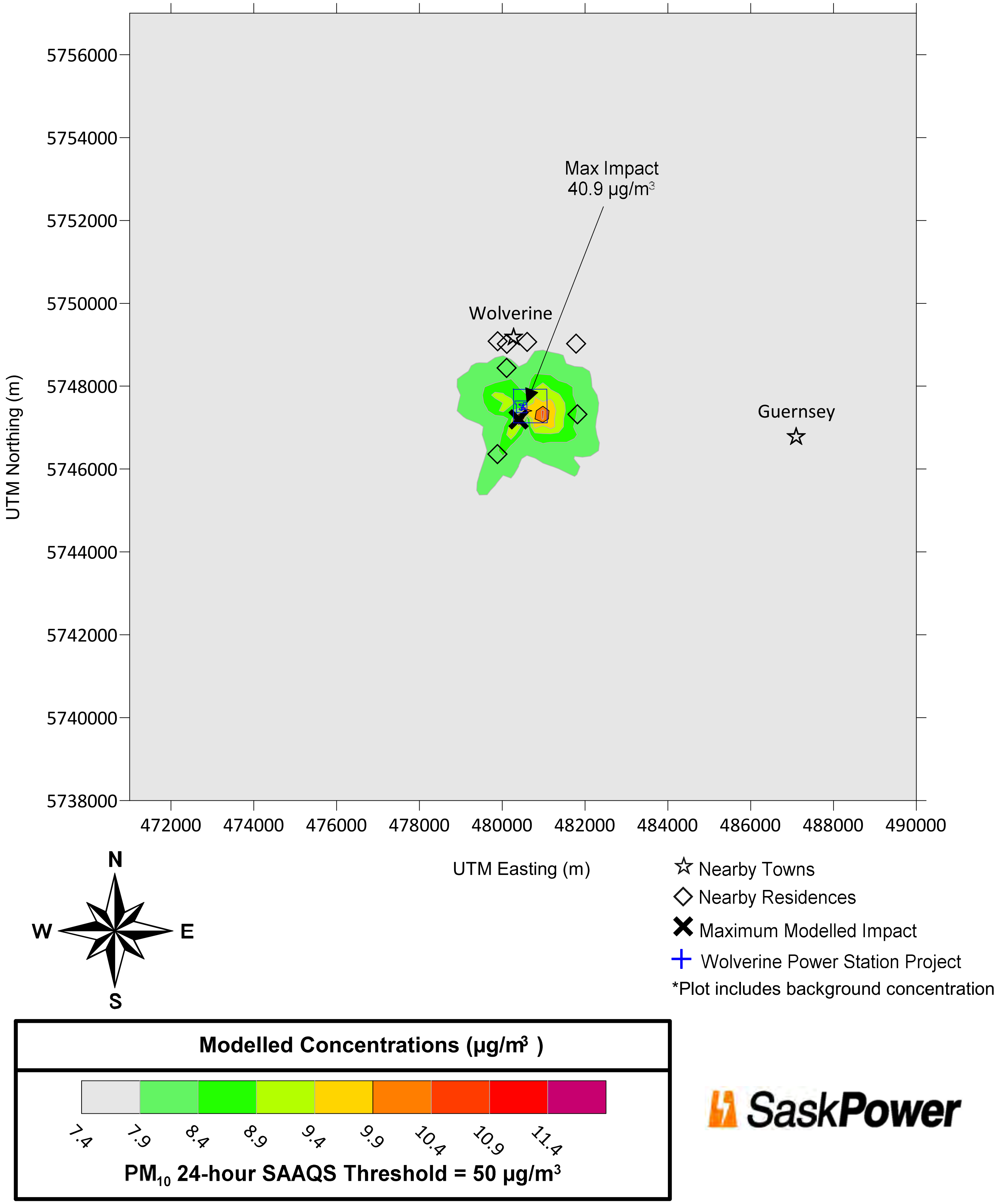

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Figure C-13: PM 24-hour Concentration Plot
Worst-Case Operating Load Impacts: Minimum Emissions Compliant Load Operation

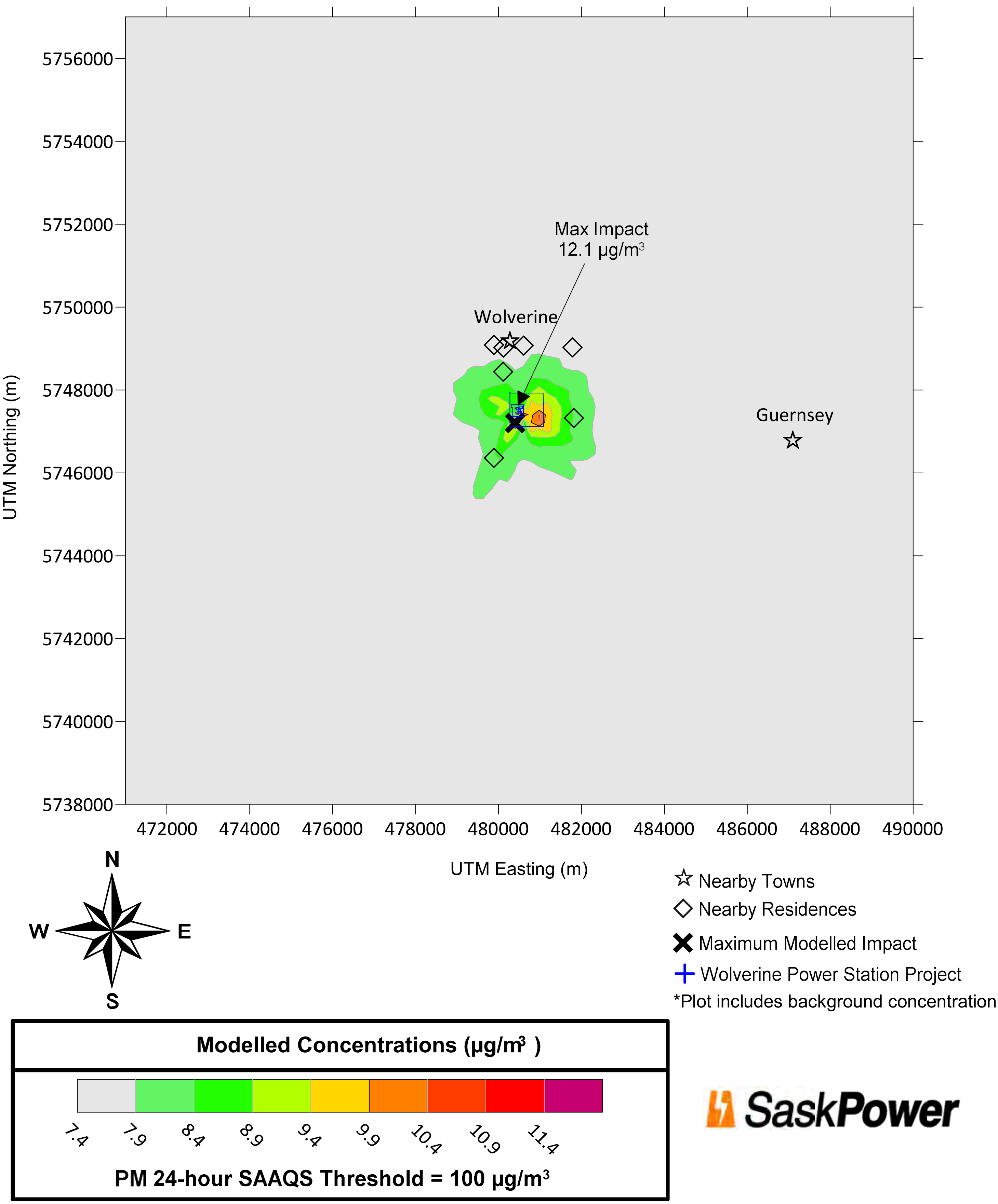

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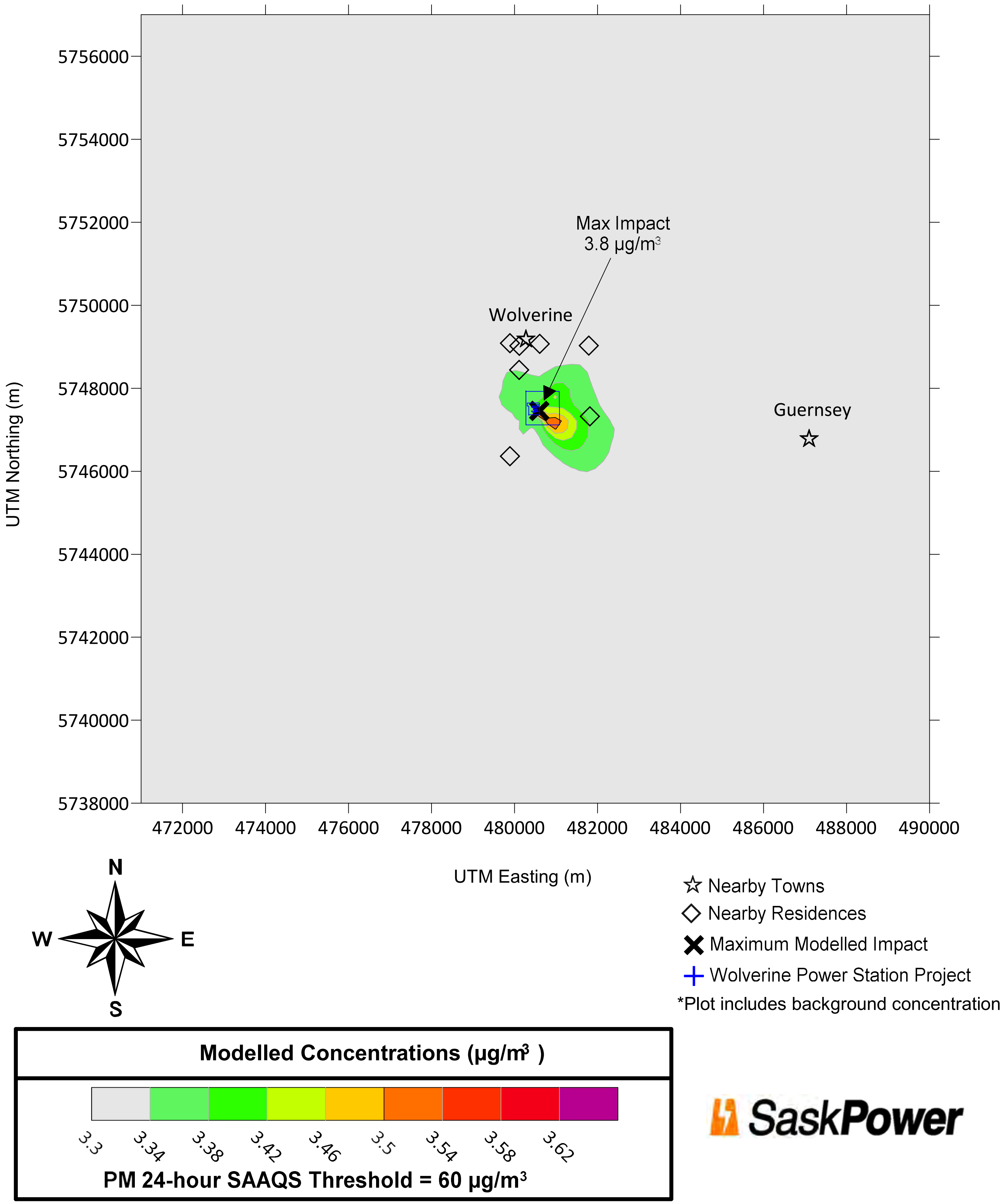
Figure C-14: PM Annual Concentration Plot
Worst-Case Operating Load Impacts: Minimum Emissions Compliant Load Operation



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Appendix F Noise Impact Assessment

Noise Impact Assessment

SaskPower

Wolverine Power Station
Project No. 146929

Revision 0
11/4/2022

Noise Impact Assessment

prepared for

SaskPower
Wolverine Power Station
Wolverine, Saskatchewan

Project No. 146929

Revision 0
11/4/2022

prepared by

Burns & McDonnell
Kansas City, Missouri

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LIST OF ABBREVIATIONS

Abbreviation	**Term/Phrase/Name**
ACC	air-cooled condenser
AUC	Alberta Utilities Commission
AUC Rule 012	Alberta Utilities Commission Rule 012
BSL	basic sound level
CadnaA	Computer Aided Noise Abatement
CTG	combustion turbine generator
dB	decibels
dBA	decibels A-weighted
dBC	decibels C-weighted
dBC-dBA	difference between dBC and dBA
HRSG	heat recovery steam generator
Hz	Hertz
ISO	International Organization of Standardization
LFN	low-frequency noise
L_{eq}	equivalent sound level
L_p	sound pressure level
L_w	sound power level
NIA	noise impact assessment
Project	Wolverine Power Station
PSL	permissible sound level
Rec	noise-sensitive receiver

Abbreviation	**Term/Phrase/Name**
STC	sound transmission class
STG	steam turbine generator

1.0 EXECUTIVE SUMMARY

Burns & McDonnell has conducted a noise impact assessment (NIA) for SaskPower's proposed Wolverine Power Station (Project) located near Wolverine, Saskatchewan. Major equipment to be installed at the 1x1 combined-cycle power plant consists of one combustion turbine generator (CTG), one heat recovery steam generator (HRSG), one steam turbine generator (STG) and an air-cooled condenser (ACC). The purpose of this NIA is to determine the design goal and predict the expected sound levels emanating from the Project as measured 15 meters from the most impacted dwelling(s) during normal steady state operations. Upset conditions such as startup, shutdown, and bypass operations are not evaluated within this NIA.

Burns & McDonnell reviewed noise regulations to determine sound level limits applicable to the Project. The Province of Saskatchewan does not have a numerical noise limit applicable to the Project. At the request of the SaskPower, and for consistency with other power-generation projects in Saskatchewan, the Project's sound level design goal is to meet the permissible sound level (PSL) as determined by Alberta Utilities Commission (AUC) Rule 012 (AUC Rule 012).

Burns & McDonnell has not collected ambient sound level data at this time. Therefore, an ambient nighttime sound level of 35 decibels A-weighted (dBA) and daytime sound level of 45 dBA were assumed in this analysis per AUC guidance. The calculated PSLs for the dwellings near the proposed Project are 40 dBA equivalent sound level (L_{eq}) during nighttime hours and 50 dBA L_{eq} during daytime hours. The more restrictive nighttime sound level limit will be used as the design goal for the Project, as the Project is designed to operate during both daytime and nighttime hours.

To quantify the noise emitted by the Project, a noise model was developed based on historical and vendor-supplied sound level data. Sound sources were modeled at noise-sensitive receivers in the surrounding community. Receivers were located a minimum of 15 meters from the dwelling in the direction of the Project.

The cumulative, predicted sound levels (logarithmic sum of Project emitted noise and assumed ambient noise) are expected to be at or below the PSLs at all nearby dwellings, and low-frequency noise is not expected to be an issue.

2.0 ACOUSTIC TERMINOLOGY

The terms “noise level” and “sound level” are often used interchangeably to describe two different sound characteristics called sound power and sound pressure. Every source that produces sound has a sound power level. The sound power level (L_w) is the acoustical energy emitted by a sound source and is an absolute number that is not affected by the environment. The acoustical energy produced by a source propagates through the air as air pressure fluctuations. These pressure fluctuations, also called sound pressure (L_p), are what human ears hear and microphones measure.

Sound energy is physically characterized by amplitude and frequency. Sound amplitude is measured in decibels (dB) as the logarithmic ratio of a sound pressure to a reference sound pressure (20 microPascals). The reference sound pressure corresponds to the typical threshold of human hearing. A 3-dB change in a continuous broadband sound level is generally considered “just barely perceptible” to the average listener. A 6-dB change is generally considered “clearly noticeable,” and a 10-dB change is generally considered a doubling (or halving, if the sound is decreasing) of the apparent loudness.

Frequency is measured in Hertz (Hz), which is the number of cycles per second. The typical human ear can hear frequencies ranging from approximately 20 to 20,000 Hz. Normally, the human ear is most sensitive to sounds in the middle frequencies (1,000 to 8,000 Hz) and is less sensitive to sounds in the low and high frequencies. As such, the A-weighted scale was developed to simulate the frequency response of the human ear to sounds at typical environmental levels. The A-weighted scale emphasizes sounds in the middle frequencies and de-emphasizes sounds in the low and high frequencies. Any sound level to which the A-weighted scale has been applied is expressed in dBA. Although the A-Weighted scale is used for most applications, the C-Weighted scale (dBC) is also commonly used to estimate peak sound levels and low-frequency noise. For reference, the sound pressure level and subjective loudness associated with some common sound sources are listed in Table 2-1.

Sound in the environment is constantly fluctuating, for example, when a car drives by, a dog barks, or a plane passes overhead. Although an instantaneous sound level measured in dBA may indicate the level of noise experienced by an observer at that point in time, environmental noise levels vary continuously. Most ambient environmental noise includes a mixture of noise from some identifiable sources plus a relatively steady background noise where no particular source is identifiable. A single descriptor called the equivalent sound level (L_{eq}) is used to describe sound that is constant or changing in level. The L_{eq} is the average sound level for a specific time period.

Table 2-1: Typical Sound Pressure Levels Associated with Common Sound Sources

Sound Pressure Level (dBA)	Subjective Evaluation	Environment	
		Outdoor	Indoor
140	Deafening	Jet aircraft at 75 ft.	--
130	Threshold of pain	Jet aircraft during takeoff at a distance of 300 ft.	--
120	Threshold of feeling	Elevated train	Hard rock band
110	--	Jet flyover at 1,000 ft.	Inside propeller plane
100	Very loud	Power mower, motorcycle at 25 ft., auto horn at 10 ft., crowd noise at football game	--
90	--	Propeller plane flyover at 1,000 ft., noisy urban street	Full symphony or band, food blender, noisy factory
80	Moderately loud	Diesel truck (40 mph) at 50 ft.	Inside auto at high speed, garbage disposal
70	Loud	B-757 cabin during flight	Close conversation, vacuum cleaner
60	Moderate	Air-conditioner condenser at 15 ft., near highway traffic	General office
50	Quiet	--	Private office
40	--	Farm field with light breeze, birdcalls	Soft stereo music in residence
30	Very quiet	Quiet residential neighborhood	Bedroom, average residence (without TV and stereo)
20	--	Rustling leaves	Quiet theater, whisper
10	Just audible	--	Human breathing
0	Threshold of hearing	--	--

Sources:
(1) Adapted from *Architectural Acoustics*, M. David Egan, 1988
(2) *Architectural Graphic Standards*, Ramsey and Sleeper, 1994

3.0 APPLICABLE REGULATIONS AND PROJECT DESIGN GOAL

Burns & McDonnell reviewed noise regulations to determine sound level limits applicable to the Project. The Project will be located near Wolverine, Saskatchewan. The province of Saskatchewan does not establish numerical noise limits which would be applicable to the Project. At the request of the SaskPower, and to remain consistent with other power-generation projects within Saskatchewan, the Project's designed goal is to meet the PSLs as determined by AUC Rule 012.

3.1 AUC Rule 012

The purpose of AUC Rule 012 is to provide a procedure to verify that the noise from a facility, measured cumulatively with noise from other energy-related facilities, will not exceed the PSL calculated in accordance with the AUC Rule 012 methodology. The PSL is the maximum daytime or nighttime sound level at a point 15 meters from a dwelling in the direction of a facility. AUC Rule 012 defines a dwelling to be "any permanently or seasonally occupied structure used for habitation for the purpose of human rest; including a nursing home or hospital with the exception of an employee or worker residence, dormitory, or construction camp located within an energy-related industrial plant boundary. Trailer parks and campgrounds may qualify as a dwelling if it can be demonstrated that they are in regular and consistent use."

The cumulative sound level includes the assumed or measured ambient sound level; any existing and approved but not yet constructed energy-related facilities; and the predicted sound level from the applicant's proposed facility.

Ambient sound level measurements may be taken to quantify the existing sound levels in the area and, in conjunction with the basic sound level (BSL), refine the cumulative PSL. This ambient data would include existing transportation, industrial, extraneous sources in the area, and potentially existing energy-related facilities.

There is one existing energy-related facility in the area of the proposed Project (i.e., within 3000 meters). There is an existing substation located approximately 1,700 meters west of the proposed Project. The location of this facility is provided in Figure 3-1.

Path: G:\Projects\Air-Noise Dept\Project Files\SaskPower\Wolverine ECI\GIS\Sask Wolverine GIS Project\Sask Wolverine GIS Project.aprx gweger 11/2/2022
Service Layer Credits: World Boundaries and Places: Esri, HERE, Garmin, GeoTechnologies, Inc., NRCan

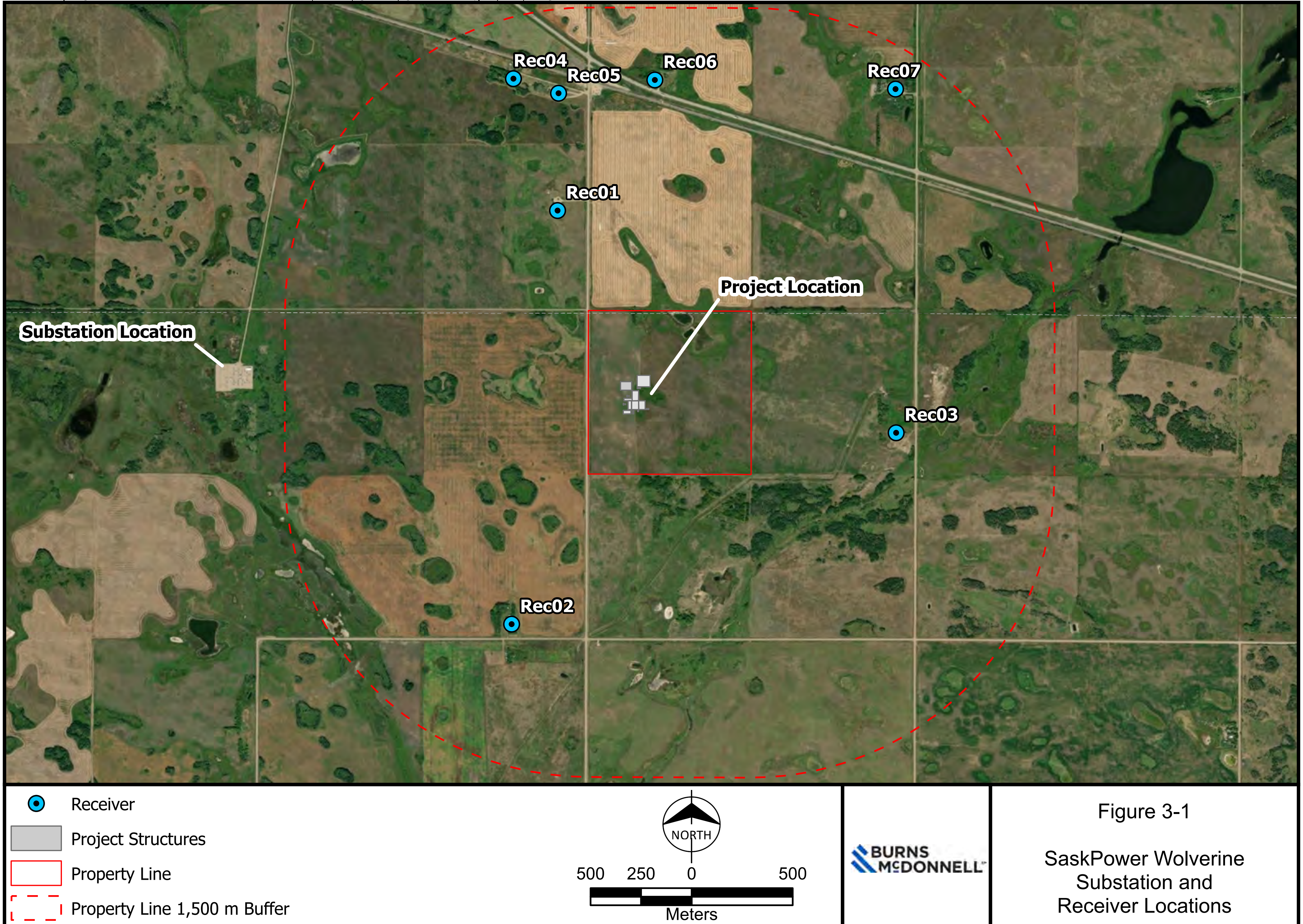

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Figure 3-1

SaskPower Wolverine Substation and Receiver Locations

Source: ESRI, Burns & McDonnell

Issued: 11/2/2022

Within the noise measurement section of AUC Rule 012, low-frequency noise is addressed. The rule provides two conditions that must both be exceeded to indicate the presence of problematic low-frequency noise at a dwelling. The first condition is if the difference of the dBC and dBA (dBC-dBA) levels is 20 dB or greater. The second condition requires an analysis of one-third octave bands between 20 and 250 Hz. The data necessary to perform the one-third octave band analysis is not readily available during the design phase of a project.

3.2 Permissible Sound Levels

Per the AUC Rule 012, the PSL at a dwelling is the sum of the BSL, daytime adjustment, Class A adjustments, Class B adjustments, and/or Class C adjustments. Based on desktop review, three nearby dwellings have been identified within 1,500 meters of the proposed Project boundary and will be evaluated within this NIA. The Project location and nearby dwellings, labeled Receiver (Rec) 01 through 03 are shown in Figure 3-1.

3.2.1 Basic Sound Level and Assumed Ambient Sound Levels

Per the AUC Rule 012, the nighttime BSL is determined by the number of dwellings per quarter section of land and the distance from the dwelling to transportation noise sources such as a heavily traveled road, railway, or frequent aircraft flyovers. The BSLs based on these factors are provided in Table 3-1. Assumed ambient nighttime sound levels are 5 dBA less than the basic sound level and assumed ambient daytime levels are 5 dBA greater than the basic sound levels in accordance with the AUC Rule 012 methodology.

Table 3-1: Nighttime Basic Sound Levels (dBA L_{eq})

Proximity to Transportation Noise Source	Dwellings per Quarter Section of Land		
	1 to 8 Dwellings	**9 to 160 Dwellings**	**> 160 Dwellings**
Category 1[a]	40	43	46
Category 2[b]	45	48	51
Category 3[c]	50	53	56

a) Category 1 dwellings are located more than 500 meters from transportation noise sources such as heavily traveled roads, railways, and are not subject to regular aircraft overflight.
b) Category 2 dwellings are located more than 30 meters but less than 500 meters from transportation noise sources such as heavily traveled roads, railways, and are not subject to regular aircraft overflight.
c) Category 3 dwellings are located less than 30 meters from transportation noise sources such as heavily traveled roads, railways, or are subject to regular aircraft overflight.

The lowest BSL for the identified receivers is based on a desktop review showing there are between 1 and 8 dwellings per quarter section of land, and the dwellings nearest the proposed Project are more than 500 meters from the heavily traveled roadways, rails, and are not subject to regular aircraft overflight in the area. As a conservative measure, this BSL is assumed for all receivers in the area. Therefore, the nighttime BSLs for dwellings in proximity to the Project is 40 dBA L_{eq}. Per AUC Rule 012, the assumed ambient daytime and nighttime sound levels are 45 and 35 dBA, respectively.

3.2.2 Daytime Adjustment

Per the AUC Rule 012, the daytime adjustment factor is 10 dBA for the hours of 7:00 A.M to 10:00 P.M.

3.2.3 Class A Adjustments

There are two types of Class A adjustments defined within AUC Rule 012: A1 and A2. An A1 adjustment is a +5-dBA seasonal adjustment for measurements during wintertime conditions. This adjustment is not applicable during the design phase of the Project.

An A2 adjustment is an ambient noise monitoring adjustment, applicable if the measured ambient sound level differs from the assumed ambient sound level. The adjustment can range between -10 to +10 dBA. At this time, ambient noise monitoring has not been completed and the assumed ambient sound levels will be used for this analysis with no further adjustment. Ambient sound level measurements may be taken to quantify the existing sound levels in the area and used to refine the cumulative PSL. This ambient data will include existing transportation, industrial, extraneous sources in the area, and any existing energy-related facilities in the area.

3.2.4 Class B Adjustments

Class B adjustments increase the BSL for temporary noise generating activities. Temporary noise generating activities are those lasting up to 60 days and not expected to occur more than once every 12 months. In order to use this adjustment, the Project must inform the potentially-impacted residence of the duration and character of the temporary noise. This analysis focuses on the normal, steady-state operation of the Project and does not utilize any Class B adjustment for temporary noise activities.

3.2.5 Class C Adjustments

Class C adjustments are specific to wind energy projects and are not applicable to this Project.

3.2.6 Calculated Permissible Sound Levels and Project Design Goal

The PSLs for dwellings near the proposed Project are calculated by taking the sum of the BSL and each of the applicable adjustments. Dwellings Rec01, Rec02, and Rec03 are considered Category 1, as they are more than 500 meters from heavily traveled roads and railways. Dwellings Rec04, Rec05, Rec06, and Rec07 are considered Category 2, as they are each within 500 meters of heavily traveled roads and railways. Category 2 residences are considered to have a nighttime BSL that is 5 dBA higher than

Category 1 (the calculated PSL would also be 5 dBA higher). As a conservative estimate it was assumed all seven dwellings are Category 1. The calculations of the PSLs are provided in Table 3-2.

Table 3-2: Permissible Sound Levels (dBA L_{eq}) at Nearby Dwellings

Time of Day	Basic Sound Level	Sound Level Adjustments					Permissible Sound Level
		Daytime	Class A1	Class A2	Class B	Class C	
Nighttime[a]	40	0	0	0	0	0	40
Daytime[b]	40	10	0	0	0	0	50

a) Nighttime hours are from 10:00 P.M. to 7:00 A.M.
b) Daytime hours are from 7:00 A.M. to 10:00 P.M.

The calculated PSLs for the dwellings near the proposed Project are 40 dBA L_{eq} during nighttime hours and 50 dBA L_{eq} during daytime hours. These values will be used as a design goal for the proposed Project. The receiver names, location, receptor height, distance to the Project and PSL design goal are listed below in Table 3-3. Dwellings that are 1 story have receivers placed at 1.5 meters above ground level and dwellings that are 2 story have receivers placed at 4.5 meters above ground level.

Table 3-3: Nearby Dwellings

Receiver Location	Coordinates (UTM Meters Zone 13)		Receptor Height[a] (m)	Distance to Project (m)	Nighttime Permissible Sound Level (dBA)
	Easting	Northing			
Rec01	480,120	5,748,423	1.5	930	40
Rec02	479,892	5,746,375	1.5	1,180	40
Rec03	481,795	5,747,323	1.5	1,260	40
Rec04	479,901	5,749,075	4.5	1,580	40
Rec05	480,125	5,749,003	4.5	1,440	40
Rec06	480,600	5,749,045	4.5	1,430	40
Rec07	481,784	5,749,005	4.5	1,880	40

a) Single-story homes had receptors set to 1.5 meters and two-story homes had receptors placed at 4.5 meters.

4.0 CUMULATIVE SOUND LEVELS

The sound levels for the existing substation were estimated and added to the assumed ambient sound levels to determine the cumulative sound levels at each critical receiver. To quantify the noise emitted by the Project, a noise model was developed based on historical and vendor-supplied sound-level data. The noise emitted from the existing substation was estimated based on common transformer sound levels, but they are only an estimate as substation sound level data was not available. It is not expected that the existing substation sound levels are a major source of noise at the receivers due to the distance between the substation and respective receivers. However, the potential noise contribution was accounted for.

4.1 Existing Energy-Related Sound Sources

4.1.1 Substation

There is no measured sound level data available for the existing substation. To estimate the sound emitted from the substation, it was conservatively assumed that the large transmission transformer was approximately 85 dBA sound pressure level at three feet, which is a common sound level for transmission substation transformers. The two smaller distribution transformers were set to 80 dBA at 3 feet. The nearest dwelling is located approximately 1790 meters northeast of the substation. The substation-generated sound was modeled at each of the seven receivers analyzed within this report. The distance from the center of the substation to the receiver locations in this study and estimated substation sound levels are provided in Table 4-1. Topography effects on sound propagation resulted in sound levels at Rec02 being the loudest impacts from the substation.

Table 4-1: Estimated Sound Levels for Existing Substation

Receiver Location	Distance to Center of Substation (meters)	Estimated Sound Level (dBA)
Rec01	1,790	22.8
Rec02	1,795	23.3
Rec03	3,290	15.3
Rec04	2,020	21.4
Rec05	2,130	20.8
Rec06	2,530	18.6
Rec07	3,550	14.4

4.2 Proposed Wolverine Power Station

To quantify the noise emitted by the Project, a noise model was developed based on historical and vendor-supplied sound level data.

4.2.1 Sound Modeling Methodology

Sound modeling was performed using industry-accepted sound modeling software Computer Aided Noise Abatement (CadnaA), version 2022. The software is a scaled, three-dimensional program, which accounts for air absorption, terrain, ground absorption, and reflections and shielding for each piece of noise-emitting equipment and predicts sound pressure levels. The model calculates sound propagation based on International Organization of Standardization (ISO) 9613-2:1996, General Method of Calculation. ISO 9613-2 assesses the sound level propagation based on the octave band center frequency range from 31.5 to 8,000 Hz.

The ISO standard considers sound propagation and directivity. The sound-modeling software calculates sound propagation using omnidirectional, downwind sound propagation and worst-case directivity factors. In other words, the model assumes that each piece of equipment propagates its maximum sound level in all directions at all times. Empirical studies accepted within the industry have demonstrated that modeling may over-predict sound levels in certain directions, and as a result, modeling results are generally considered conservative. The modeled atmospheric conditions were assumed to be calm, and the temperature and relative humidity were left at the program’s default values. Reflections and shielding were considered for sound waves encountering physical structures. General modeling parameters used in the model are provided in Table 4-2.

Table 4-2: Sound Model Input Parameters

Model Input	Parameter Value
Ground Absorption - Offsite	G = 0.5
Ground Absorption - Onsite	G = 0.2
Foliage	Not Included
Number of Reflections	2
Receptor Height	1.5 meters above grade
Temperature	50 °F

4.2.2 Sound Sources and Sound Mitigation

To estimate the sound levels emitted by the Project, each major piece of equipment associated with the proposed Project was modeled with its expected sound power levels, L_w. Vendor-provided sound data for all equipment was not available; therefore, historical data was used when required. The historical data was taken from projects of similar scope and size. Appendix A provides the octave-band sound power level inputs for the model. A site layout of the major equipment is provided in Figure 4-1.

To meet the PSLs at nearby dwellings, some of the equipment will require noise mitigation measures in their design. Actual mitigation will be selected during detailed design of the Project. Typical mitigation measures that can be implemented for the equipment may consist of some combination of the following:

- Silencer,
- Acoustical barriers,
- Enclosures or wraps,
- Relocation of equipment,
- Use of low-noise equipment,
- Acoustical building elements, and/or
- Acoustical louvers or silencers for building ventilation.

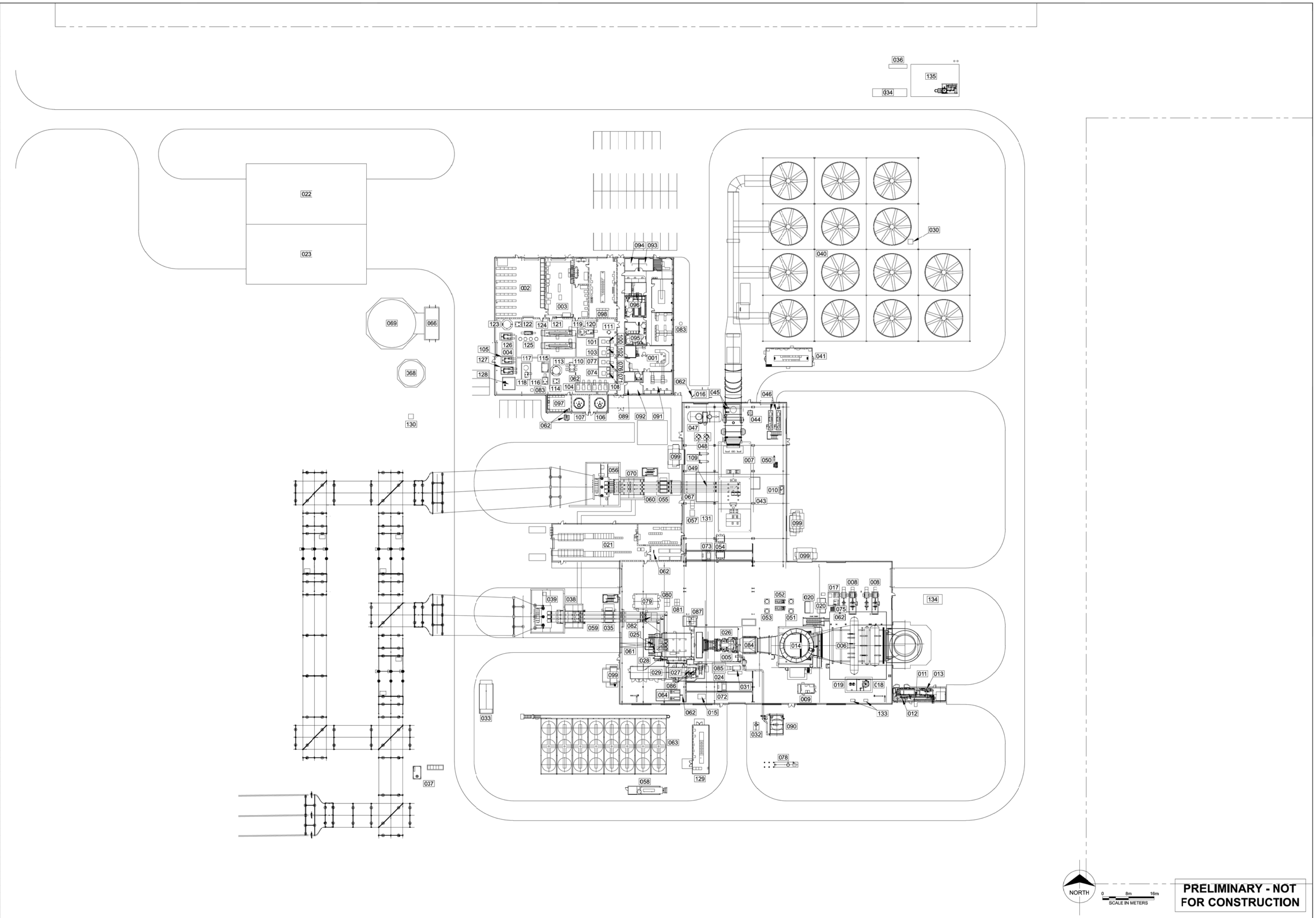
A summary of the major equipment sound levels in either L_w or L_p at distance, are provided in Table 4-3. The required sound transmission class (STC) of the combustion- and steam-turbine buildings are also provided in the table.

Table 4-3: Sound Mitigation for Major Sound Sources and Buildings

Sound Source	Sound Metric[a]	Equipment Sound Level (dBA)[b]	Measurement Location	Typical Form of Mitigation[c]
ACC	L_p	52	400 feet	Low Noise Fans / Fan Deck Barrier
Air-Cooled Heat Exchanger	L_w	51	400 feet	Low Noise Fans
HRSG Stack Exit	L_w (w/o directivity)	97	--	Stack Silencer
Simple-Cycle Stack Exit	L_w (w/o directivity)	108	--	Stack Silencer
CTG Inlet Face	L_w	100	--	Inlet Silencer / Acoustical Hood
GSU Transformers	L_p	80	3 feet	Low Noise Transformer
BOP Equipment	L_p	85	3 feet	Varies
Turbine Hall Walls	STC	39[b]	--	Insulated Wall Assembly
Turbine Hall Roofs	STC	39[b]	--	Steel Roof with Insulation
Turbine Hall Louvers	NR	10[b]	--	6-inch standard louver

a) L_p – sound pressure level, L_w – sound power level, STC – sound transmission class, NR – noise reduction
b) Modeled sound power levels per individual frequency bands are provided for each noise source in Appendix A.
c) Common forms of mitigation provided. Actual mitigation will be selected during detailed design of the Project.

EQUIPMENT IDENTIFICATION AND LOCATION LIST	
DWG REF	DESCRIPTION NEW SITE EQUIPMENT
001	MAIN CONTROL ROOM / ADMINISTRATION ROOMS
002	WAREHOUSE
003	MAINTENANCE SHOP
004	WATER TREATMENT BUILDING
005	GAS TURBINE GENERATOR (GTG)
006	HEAT RECOVERY STEAM GENERATOR (HRSG)
007	STEAM TURBINE GENERATOR (STG)
008	BOILER FEEDWATER PUMP
009	CEMS ENCLOSURE
010	TEMPERING WATER SKID
011	FUEL GAS PERFORMANCE HEATER
012	FUEL GAS KNOCKOUT TANK / DRAINS TANK
013	FUEL GAS FILTER/SEPARATOR
014	BYPASS STACK
015	CLOSED COOLING WATER HEAD TANK
016	STG CHEMICAL FEED ENCLOSURE
017	HRSG CHEMICAL FEED SKID
018	HRSG BLOWDOWN TANK
019	HRSG BLOWDOWN SUMP & PUMPS
020	SAMPLE PANELS
021	MAIN ELECTRICAL ROOM
022	COLD STORAGE BUILDING
023	HEATED STORAGE BUILDING
024	GTG WASH WATER SKID
025	GTG TURNING GEAR
026	GTG TURBINE ENCLOSURE
027	GTG LUBE OIL PACKAGE
028	GTG AIR INLET FILTER
029	GTG ELECTRICAL PACKAGE
030	ACC CLEANING SYSTEM
031	GTG FIRE PROTECTION PACKAGE
032	GTG WASH WATER DRAIN TANK (UNDERGROUND)
033	EMERGENCY DIESEL GENERATOR
034	HIGH PRESSURE FUEL GAS REGULATING SKID
035	GENERATOR CIRCUIT BREAKER (GTG)
036	LOW PRESSURE FUEL GAS REGULATING SKID
037	CONSTRUCTION PCC AND XFMR VAULT
038	GTG AUXILIARY TRANSFORMER
039	GTG GSU TRANSFORMER
040	AIR COOLED CONDENSER (ACC)
041	ACC PCM
042	NOT USED
043	STG FLASH TANK
044	STG ATMOSPHERIC DRAINS TANK
045	DRAIN POT PUMPS
046	VACUUM PUMP SKID
047	CONDENSATE STORAGE TANK
048	CONDENSATE PUMPS
049	STEAM TURBINE CONTROL OIL SKID
050	GLAND STEAM CONDENSER
051	DRY AIR RECEIVERS
052	AIR DRYER SKIDS
053	WET AIR RECEIVERS
054	AIR COMPRESSORS
055	GENERATOR CIRCUIT BREAKER (STG)
056	STG GSU TRANSFORMER
057	STG EXCITATION TRANSFORMER
058	FUEL GAS DEW POINT HEATER
059	GTG ISOPHASE BUS
060	STG ISOPHASE BUS
061	GENERATOR ROTOR PULL
062	SAFETY SHOWER
063	CLOSED COOLING WATER HEAT EXCHANGER
064	CLOSED COOLING WATER PUMPS
065	NOT USED
066	FIRE PUMP ENCLOSURE
067	STG EXCITER
068	DEMINERALIZED WATER STORAGE TANK
069	SERVICE / FIRE WATER STORAGE TANK
070	STG AUXILIARY TRANSFORMER
071	SODIUM HYDROXIDE DOSING SKID
072	GTG CRANE
073	STG CRANE
074	SODIUM HYDROXIDE TOTE
075	NITROGEN BOTTLE RACK
076	BIOCIDE DOSING SKID
077	BIOCIDE TOTE
078	OIL / WATER SEPARATOR
079	SEE / SFC PACKAGE
080	SFC TRANSFORMER
081	SEE TRANSFORMER
082	VT & SURGE CUBICLE WITH SFC SWITCH
083	SANITARY LIFT STATION
084	EXHAUST TRANSITION DUCT
085	GTG AIR COMPRESSOR
086	GTG LUBE OIL COOLERS
087	GTG CONTROL OIL SKID
088	NOT USED
089	LIBRARY
090	ROTOR AIR COOLER
091	DCS ROOM
092	TELECOM ROOM
093	CONFERENCE ROOM
094	BREAKROOM
095	WOMEN LOCKER ROOM
096	MEN LOCKER ROOM
097	LAB
098	WT ELECTRICAL ROOM
099	AIR HANDLING UNIT
100	ANITSCALANT DOSING SKID
101	ANTISCALANT TOTE
102	SODIUM BISULFITE DOSING SKID
103	SODIUM BISULFITE TOTE
104	SULFURIC ACID DOSING SKIDS
105	WASTE WATER PUMP SKID
106	SODIUM HYPO TANK
107	SULFURIC ACID TANK
108	SODIUM HYPO DOSING SKIDS
109	CONDENSATE FILTERS
110	OILY WATER POLISHING SYSTEM
111	WTB AIR RECEIVER
112	NOT USED
113	UF PERMEATE/BACKWASH TANK
114	RO FEED PUMPS SKID
115	ULTRAFILTRATION SKID
116	AUTOMATIC BACKWASH STRAINER SKID
117	WASTE WATER TREATMENT SYSTEM TANK
118	WASTE WATER TREATMENT SYSTEM SKID
119	UF/RO CIP TANK
120	UF/RO CIP SKID
121	RO SKID
122	RO TRANSFER PUMP SKID
123	RO PERMEATE TANK
124	MIXED BED FACE PIPING SKID
125	OFF-SITE REGEN MIXED BED
126	DEMINERALIZED WATER PUMP SKID
127	SERVICE WATER SKID
128	RO/UF REJECT SUMP
129	HRSG PCM
130	REGULATOR CONTROL BUILDING
131	STG LUBE OIL SKID
132	NOT USED
133	BLOWDOWN COOLER HEAT EXCHANGER
134	FLAMMABLE MATERIAL ENCLOSURE
135	FUEL GAS YARD



PRELIMINARY - NOT FOR CONSTRUCTION

BURNS & McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
CERTIFICATE No. 27321
PROJECT No. 146929

Figure 4-1

SaskPower

GENERAL ARRANGEMENT
SITE PLAN

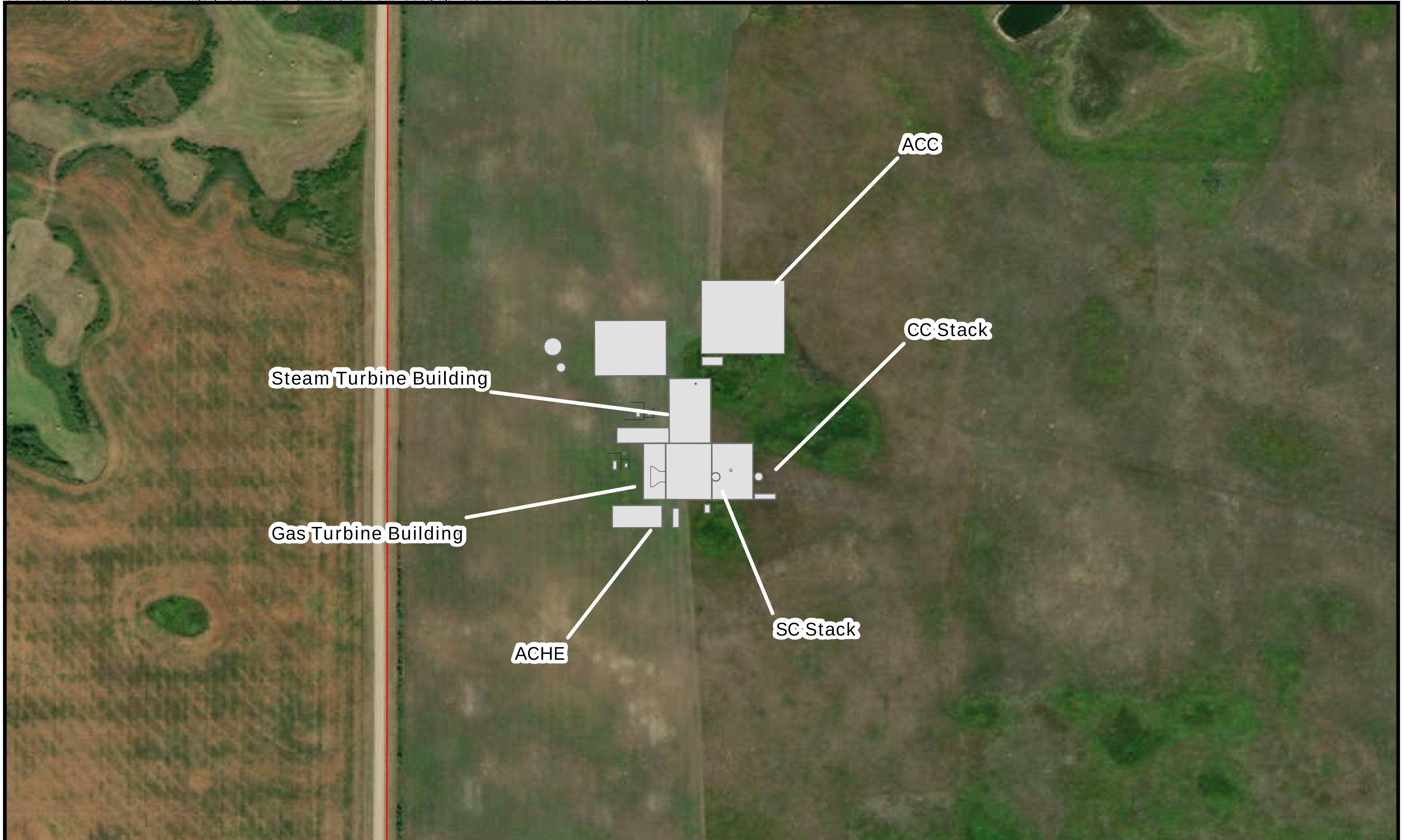
UNIT No. 00
WOLVERINE POWER STATION

DRAWN BY C. YODER
SCALE: AS SHOWN
DRAWING No. WVPS 00-R-GA.001
SHEET: 1
REV. A

B — REVISED BY C. YODER, DATE 07/06/21 — ISSUED FOR REVIEW

A — REVISED BY C. YODER, DATE 06/23/22 — ISSUED FOR REVIEW

Path: G:\Projects\Air-Noise Dept\Project Files\SaskPower\Wolverine ECI\GIS\Sask Wolverine GIS Project\Sask Wolverine GIS Project.aprx gweger 10/24/2022
Service Layer Credits: World Imagery: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community



Project Structures

Property line

NORTH

100 50 0 100

Meters

BURNS McDONNELL

Figure 4-2

SaskPower Wolverine Project Layout

Source: ESRI, Burns & McDonnell

Issued: 10/24/2022

4.3 Ambient Sound Levels

This analysis uses the assumed ambient sound levels of 45 dBA for daytime hours and 35 dBA for nighttime hours provided in AUC Rule 012. Ambient sound levels measurements may be taken to quantify the existing sound levels in the area and be used to refine the cumulative PSL. Burns & McDonnell has not collected ambient data at this time, so the assumed ambient sound levels were used for further analysis.

4.4 Estimated Cumulative Sound Levels

Sound sources were propagated out to the noise-sensitive receivers in the surrounding community, within 1,500 meters. Receivers were located a minimum of 15 meters from the dwelling in the direction of the Project. The predicted sound levels, assumed ambient sound levels, assumed sound level from nearby energy-related facilities, and cumulative sound levels are provided and compared to the nighttime PSL in Table 4-4 and Table 4-5. The cumulative sound levels are the logarithmic sum of the modeled and assumed ambient sound levels. The cumulative sound levels for the Project are expected to be at or below the PSL at all nearby dwellings.

Table 4-4: Estimated Cumulative Combined-Cycle Sound Levels (dBA L_{eq})

Receiver Location	Modeled Project Sound Level	Existing Substation Estimated Sound Level	Assumed Nighttime Ambient Sound Level	Cumulative Nighttime Sound Level	Nighttime Permissible Sound Level
Rec01	38.3	22.8	35	40	40
Rec02	37.3	23.3	35	39	40
Rec03	35.4	15.3	35	38	40
Rec04	33.4	21.4	35	37	40
Rec05	34.9	20.8	35	38	40
Rec06	34.6	18.6	35	38	40
Rec07	31.9	14.4	35	37	40

Table 4-5: Estimated Cumulative Simple-Cycle Sound Levels (dBA L_{eq})

Receiver Location	Modeled Project Sound Level	Existing Substation Estimated Sound Level	Assumed Nighttime Ambient Sound Level	Cumulative Nighttime Sound Level	Nighttime Permissible Sound Level
Rec01	37.8	22.8	35	40	40
Rec02	38.2	23.3	35	40	40
Rec03	35.6	15.3	35	38	40
Rec04	34.1	21.4	35	38	40
Rec05	34.8	20.8	35	38	40
Rec06	33.9	18.6	35	38	40
Rec07	32.6	14.4	35	37	40

The estimated sound levels emitted by the Project can be seen graphically in Figure 4-3 and Figure 4-4. The figures show sound generated from the Project, projected outward to nearby dwellings, represented in 5-dB contours. The contours represent the expected sound levels of the Project only.

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Service Layer Credits: World Boundaries and Places: Esri, HERE, Garmin, GeoTechnologies, Inc., NRCan

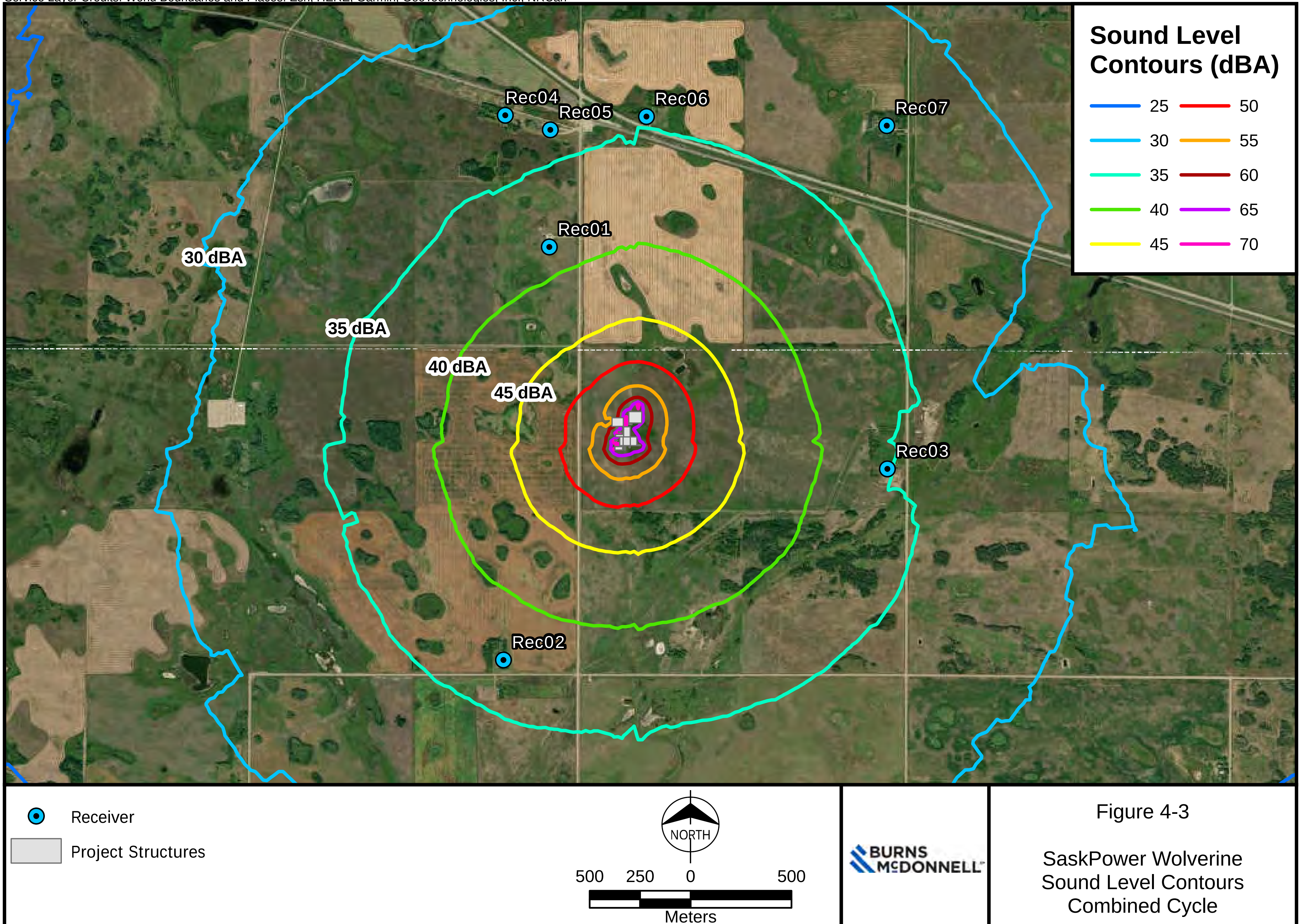

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Figure 4-3

SaskPower Wolverine
Sound Level Contours
Combined Cycle

Source: ESRI, Burns & McDonnell

Issued: 10/24/2022

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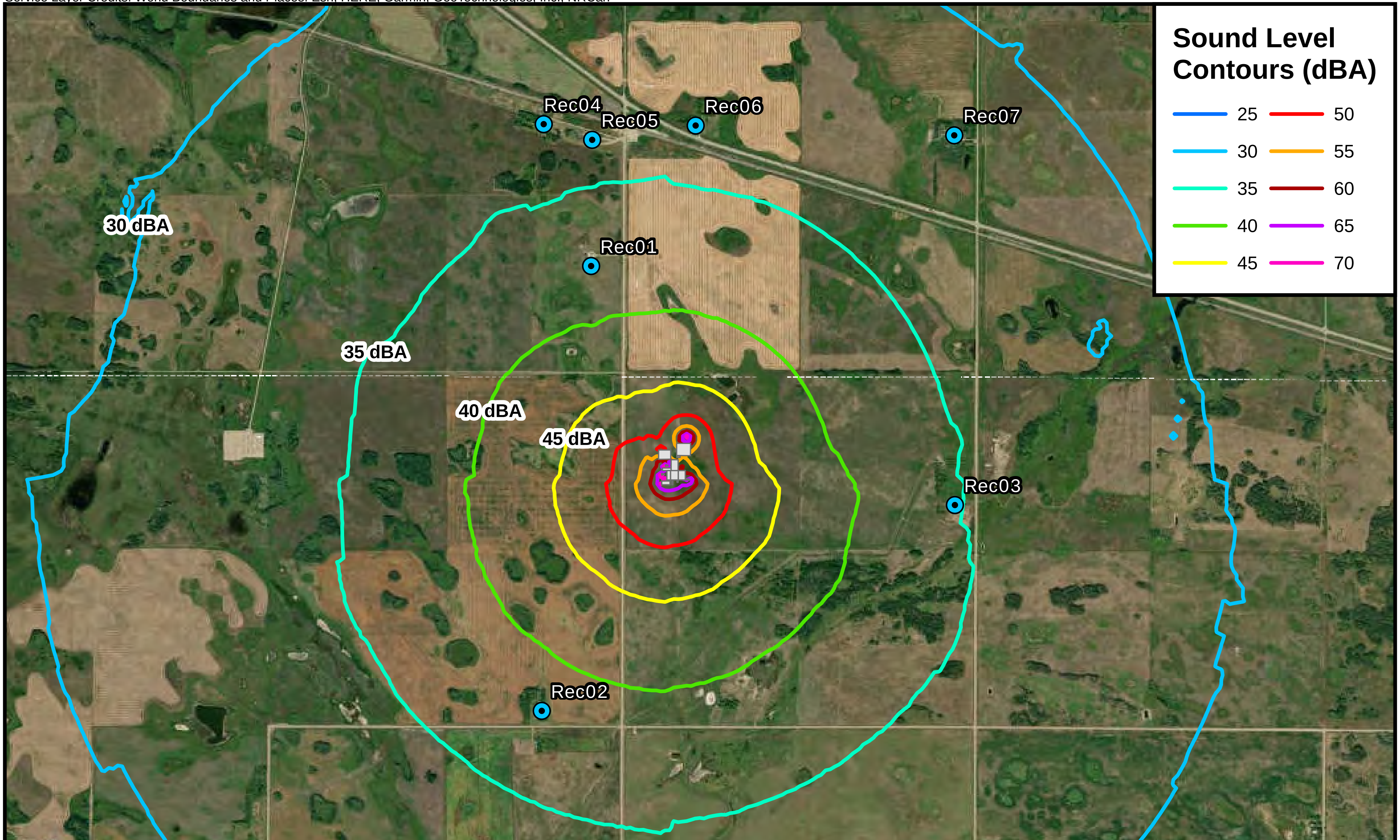
Service Layer Credits: World Boundaries and Places: Esri, HERE, Garmin, GeoTechnologies, Inc., NRCan



Receiver

Project Structures

NORTH

500 250 0 500

Meters

BURNS McDONNELL

Figure 4-4

SaskPower Wolverine
Sound Level Contours
Simple Cycle

Source: ESRI, Burns & McDonnell

Issued: 10/24/2022

4.5 Low-Frequency Noise Analysis

As part of the noise impact assessment requirements in AUC Rule 012, the potential for low-frequency noise (LFN) effects from a project should be considered. A-weighting measurements typically discount the lower frequencies. Therefore, when low frequency noise is an issue, the dBA value may not be sufficient to determine if low frequency noise is present. The dBC minus the dBA is to be calculated to identify the potential for low frequency noise impacts.

In AUC Rule 012, a LFN effect is present at a receptor when a clear tone is present at or below 250 Hz and when the difference between the overall C-weighted sound level and the overall A-weighted sound level exceeds 20 dB. The presence of both conditions at a receptor indicates the potential for LFN concerns. The first LFN condition (i.e., clear tone is present at or below 250 Hz) can only be assessed by a post construction noise measurement study. Low frequency tonality information is typically not available from the manufacturer. Based on the Project preliminary sound model estimations, clear tones below 250 Hz are not expected. If there are no clear tones at a frequency below 250 Hz, then low-frequency noise would not be considered a concern, per AUC Rule 012.

The modeled sound levels for each dwelling were analyzed for low-frequency noise by comparing the dBC and dBA sound levels. The dBC, dBA, and the dBC-dBA values are provided and compared to the AUC Rule 012 thresholds in Table 4-6 and Table 4-7.

Table 4-6: Low-Frequency Sound Level Analysis – Combined Cycle

Receiver Location	Modeled Project dBC Sound Level	Modeled Project dBA Sound Level	Modeled dBC-dBA Value	AUC Rule 012 dBC-dBA Threshold
Rec01	59	38	21	20
Rec02	61	37	24	20
Rec03	60	35	25	20
Rec04	55	33	22	20
Rec05	56	35	21	20
Rec06	59	35	24	20
Rec07	57	32	25	20

Table 4-7: Low-Frequency Sound Level Analysis – Simple Cycle

Receiver Location	Modeled Project dBC Sound Level	Modeled Project dBA Sound Level	Modeled dBC-dBA Value	AUC Rule 012 dBC-dBA Threshold
Rec01	61	38	23	20
Rec02	62	38	24	20
Rec03	60	36	24	20
Rec04	58	34	24	20
Rec05	58	35	23	20
Rec06	58	34	24	20
Rec07	57	33	24	20

The dBC minus dBA values are above 20 dB at all of the nearest receptors for the combined- and simple-cycle operation, indicating one of the two conditions for LFN concern is met. It is not anticipated that the Project would emit a clear tone at a frequency below 250 Hz. Since there is not sufficient information to assess the clear tone at low frequency, Health Canada 2016 noise guidance for LFN was also used to assess potential LFN effect at receptors.

Health Canada (Health Canada, 2016) also provides guidance for assessment of LFN based on ANSI 12.9 2005. The guidance suggests that the sum of these three 16 Hz, 31.5 Hz, and 63 Hz octave band sound levels should be less than the rattle criterion of 70 dB. Assessment of the 16 Hz sound pressure level is not possible because no sound power data is available for the proposed equipment and this octave band is outside of the ISO 9613-2 calculation standard. Based on past project experience with sound level measurements of similar turbines, it is assumed that the 16 Hz octave band sound pressure level is the same as the 31.5 Hz octave band. The sum of the assumed 16-Hz, the-31.5 Hz and the 63-Hz octave band sound levels from the Project are below the “rattle criterion” of 70 dB at each of the neighboring receptors, indicating that the Health Canada guidance for LFN concerns are not exceeded.

5.0 CONSTRUCTION NOISE

Project construction will generate noise levels that have the potential to be periodically audible offsite. Construction of the proposed Project is expected to involve site clearing, excavation, placement of concrete, and the use of typical utility construction equipment. The primary sources of construction noise will be associated with equipment operation, use of heavy-duty vehicles, grading, and foundation work activities. Project construction is typically completed in stages, but various construction activities may overlap and with multiple construction crews operating simultaneously.

AUC Rule 012, Section 2.11 – Construction Noise, provides that the impacts of construction noise must be managed to reduce impacts to nearby dwellings. The Section states the following mitigating measures should be used:

1. Conduct construction activity between the hours of 7 a.m. and 10 p.m. to reduce the duration impact from construction noise
2. Advise nearby residents of significant noise-causing activities and schedule these events to reduce disruption to them
3. Ensure that all internal combustion engines are well maintained with muffler systems

Noise from construction equipment will be temporary during construction of the Project. The construction contractor selected is expected to implement, where appropriate, construction methods that limit construction noise levels to the extent practicable. There may also be times that work needs to be accomplished in part outside of typical working hours. Such work generally consists of activities that must occur continuously once begun (e.g., a concrete pour or transformer oil filling). However, significant noise emitting activities, such as pile driving, should be completed during daytime hours.

Noise levels resulting from construction equipment are dependent on several factors, including the number and type of equipment operating, the level of operation, and the distance between sources and receptors. The impacts that various construction-related activities might have will vary considerably based on the proximity to the Project fence line. During a typical day, equipment would not be operated continuously at peak levels. While the average noise levels would represent a noticeable temporary increase over the ambient noise levels near the construction sites, the noise would attenuate with increasing distance, fading into ambient noise background levels at distances over half a mile from the loudest equipment. Generic sound data ranges are available for various types of equipment at certain distances. Table 5-1 lists generic activities and their minimum and maximum instantaneous sound levels at 50 feet as provided in the Federal Highway Administration (FHWA), Highway Construction Noise handbook and the Federal Transit Administration (FTA), Transit Noise and Vibration Impact Assessment Manual.

Table 5-1: Range of Typical Construction Equipment Noise Levels[a,b]

Generic Construction Equipment	Minimum Noise at 50 feet (dBA)	Maximum Noise at 50 feet (dBA)
Backhoes	74	92
Compressors	73	86
Concrete Mixers	76	88
Cranes (movable)	70	94
Dozers	65	95
Front Loaders	77	96
Generators	71	83
Graders	72	91
Jack Hammers and Rock Drills	80	98
Pile Driver[b]	96	101
Pumps	69	71
Scrapers	76	95
Trucks	83	96

(a) Values taken from FHWA Highway Construction Noise handbook
(b) Values taken from Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, 2006

The types of equipment listed in the table above may be used at various times and for various periods of time. Typically, construction equipment has a usage factor ranging between 15 and 50 percent of the day, according to the FHWA roadway construction noise handbook. However, the actual amount of use for each type of equipment would vary day to day. Construction noise mitigation measures that could be implemented include the following actions:

1. Maximize the distance between stationary equipment and noise sensitive receptors to the extent practicable
2. Limit pile driving and impact activities to daytime hours
3. Route construction equipment away from noise sensitive receptors to the extent practicable
4. Turn off idling equipment when not in use
5. Utilize construction equipment with proper mufflers

5.1 Project Commissioning Noise (Steam Blow)

During Project commissioning, steam blows will be utilized to remove any debris which may be left inside the system during construction. Steam blowing is a critical activity during the commissioning of the Project. The steam system feeding the steam turbine must be steam blown to remove debris that could potentially damage the steam turbine blades during operation.

The steam blow piping will be routed outside the building and the noise generated from the steam exiting the discharge piping will be routed through a silencer to reduce noise emissions. Estimated sound power levels from steam blows vary, but the use of silencers can reduce noise emissions down to a level similar to typical construction activities. The number of steam blow vents, pipe diameter, pressure, and mass flow all factor into the noise generated by the steam blow operation.

6.0 CONCLUSION

Burns & McDonnell has conducted a NIA for the proposed Wolverine Power Station located near Wolverine, Saskatchewan. Saskatchewan does not have a numerical noise limit applicable to the Project. At the request of SaskPower, and to remain consistent with other power-generation projects in Saskatchewan, the Project is to be designed to meet the noise limits determined by the methodology defined in AUC Rule 012.

The cumulative sound levels (logarithmic sum of Project emitted noise, existing energy-related facility noises, and assumed ambient noise), are expected to be at or below the PSLs at all nearby dwellings, and low frequency noise is not expected to be an issue.

APPENDIX A - MODELED SOUND POWER LEVELS

Appendix A - Modeled Sound Power Levels

SaskPower

Wolverine

Source	Name	Number of Sources	Sound Power Level (dB)[1] Octave Band Frequency (Hz) 31.5	63.0	125	250	500	1000	2000	4000	8000	Overall (dBA)	Notes
BOP	LP Fuel Gas Skid	1	104	100	89	81	80	86	88	91	89	**96**	85 dBA at 3 feet
	HP Fuel Gas Skid	1	104	100	89	81	80	86	88	91	89	**96**	85 dBA at 3 feet
	Fuel Gas Yard	1	104	100	89	81	80	86	88	91	89	**96**	85 dBA at 3 feet
	Gas Heater Stack	1	119	101	93	88	89	95	93	92	91	**100**	BMCD Estimate
	Gas Turbine Vent	1	89	98	93	93	90	93	98	91	87	**101**	BMCD Estimate
	Make-Up Air Unit	4	96	96	100	95	91	80	70	70	70	**92**	BMCD Estimate
	Fin Fan Cooler	1	110	110	109	106	101	99	93	87	81	**104**	51 dBA at 400 ft
	DP Heater	1	108	100	99	92	88	89	87	84	79	**94**	85 dBA at 3 feet
	Rotor Air Cooler	1	107	109	95	92	98	92	90	88	81	**99**	85 dBA at 3 feet
	GT Transformer	1	98	98	102	102	102	86	81	74	69	**100**	80 dBA at 3 feet
	Auxiliary Transformer	2	89	89	93	93	93	77	72	65	60	**91**	75 dBA at 3 feet
Simple-Cycle Equipment	Turbine Building Roof Vent	8	107	101	98	93	86	82	80	77	74	**90**	BMCD Estimate
	Exhaust Stack Exit[2]	1	133	122	120	112	102	89	80	90	87	**108**	Mitigation Requirement
	Turbine Hall Inlet	1	128	121	110	92	76	64	57	52	49	**99**	Calculated
	Turbine Hall	1	129	122	111	94	79	66	59	54	51	**100**	Calculated
	GT Inlet Face	1	117	116	113	103	89	88	78	88	88	**100**	Mitigation Requirement
	GT Inlet Duct	2	120	119	116	106	92	91	81	91	91	**103**	BMCD Estimate
	Turbine Hall Building Louver[3]	2	77	70	65	59	52	47	45	42	38	**75**	With 10 dB reduction through Louver
Combined-Cycle Equipment	HRSG Roof Vent	6	109	103	100	95	88	84	82	79	76	**92**	BMCD Estimate
	Exhaust Stack Exit[2]	1	117	114	110	100	87	69	52	51	36	**97**	Mitigation Requirement
	HRSG Blowdown Vent	1	81	89	97	101	98	95	91	87	65	**100**	90 dBA at 3 feet
	ACC Steam Line	1	102	108	110	106	102	96	90	85	76	**103**	85 dBA at 3 feet at ST Exit
	STG Building	1	121	119	113	94	78	67	61	60	55	**99**	Calculated
	ST GSU Transformer	1	98	98	102	102	102	86	81	74	69	**100**	80 dBA at 3 feet
	ACC	1	122	115	113	108	104	102	94	90	86	**107**	52 dBA at 400 feet
	HRSG Building	1	133	128	109	94	79	73	69	63	52	**103**	Calculated
	HRSG Building Louver[3]	5	76	71	59	57	52	53	51	48	37	**78**	With 10 dB reduction through Louver
	STG Building Louver[3]	3	72	71	71	63	56	52	51	51	47	**75**	With 10 dB reduction through Louver

Notes:

1. All sound levels are inclusive of modeled attenuation.
2. Exhaust stack operation is either in simple-cycle or combined-cycle, not both.
3. Sound levels provided per square meter

BURNS & McDONNELL

CREATE AMAZING.

Burns & McDonnell World Headquarters
9400 Ward Parkway
Kansas City, MO 64114
O 816-333-9400
F 816-333-3690
www.burnsmcd.com

Appendix G Supplemental Wildlife and Vegetation Information

G.1 HABISask Project Screening Reports

Project Screening Report

Notes: SaskPower Aspen

Report Generated
02/10/2023

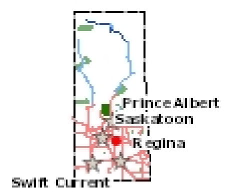
Map Information

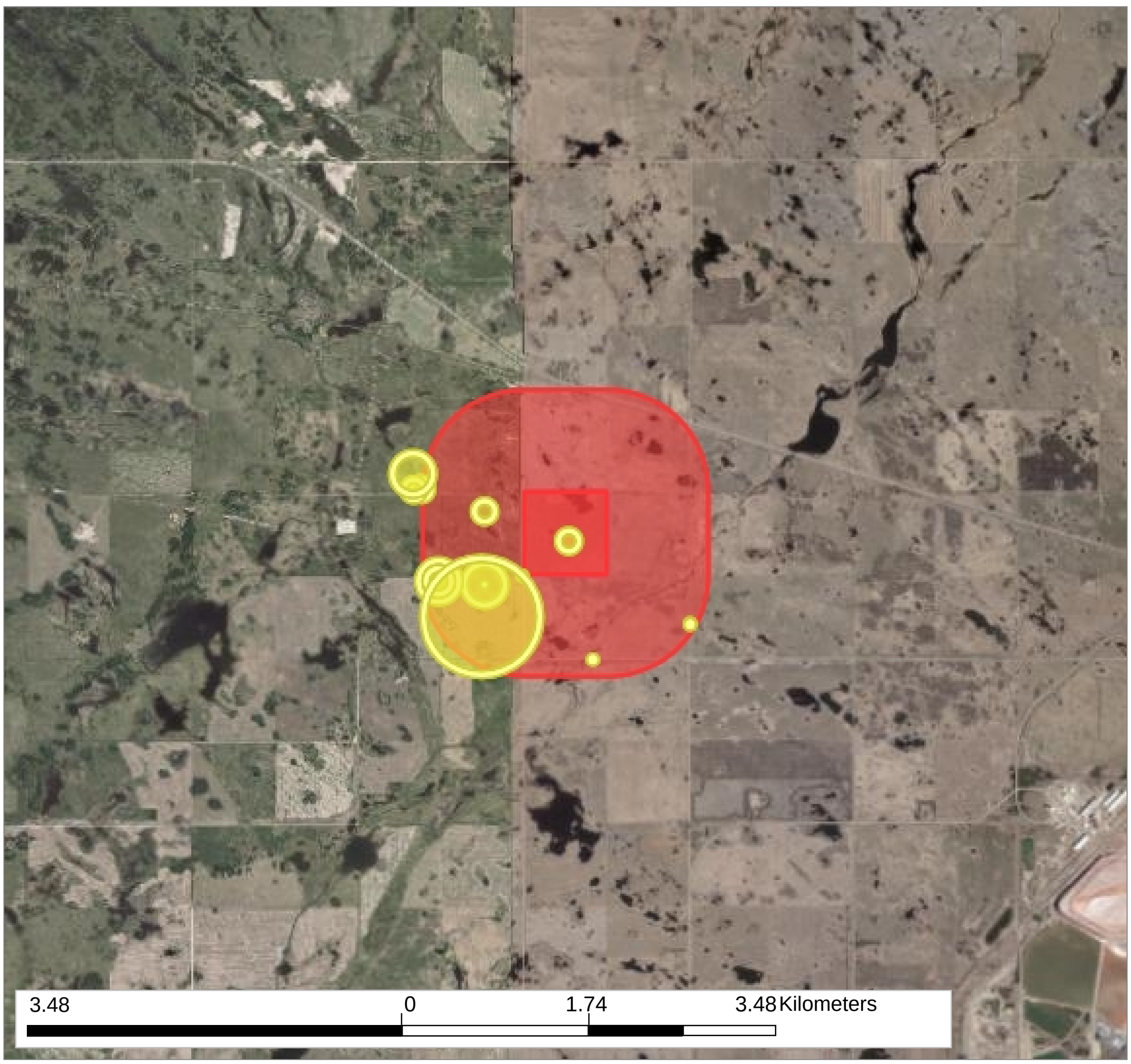
Buffer Size:

1 Kilometers

Coordinates:
Lat: 51.87815° N
Lon: -105.28068° W

Area of Interest





Screened Areas:

Ecological Management Specialist (EMS) District
Compliance & Field Service Area
Compliance & Field Service (CFS) Region
Area Fisheries Ecologists
Area Wildlife Ecologists
Rural Municipality
Indian Reserve
Rare and Endangered Species
Fish Species
Woodland Caribou Range
Species Predictive Models
Whooping Crane Corridor
Federal Critical Habitat
Emergency Protection Order
Wind Energy Avoidance Zones
Important Natural Areas
Provincial Parks
Recreation Sites
Game Preserves
National Wildlife Areas
Federal Pastures
Community Pastures
Wildlife Habitat Protection Act Lands
Fish & Wildlife Development Fund Lands
Migratory Bird Sanctuary
Wildlife Refuge
Conservation Easements
Crown Conservation Easements
Ecological Reserves
Ramsar Wetlands
Reservoir Development Areas
Representative Areas

Government of Saskatchewan

Project Screening Report

HABISask hunting | angling | biodiversity

Species Likely to be Present

Known Species

"Known" species are species that have known occurrences in the area from the Saskatchewan Conservation Data Centre's Rare and Endangered Species map layer. However, absence of species observation records does not preclude the existence of species in the area of interest. Observations may simply not have been recorded for the given area or may not have yet been entered into the ministry data holdings – new observation records are continuously being discovered. Information accessible through HABISask is not intended to be a definitive statement on the presence, absence or status of a species within a given area, nor as a substitute for onsite surveys.

Rare and Endangered Species

Category: Vertebrate Animal

Common Name	Scientific Name:	G Rank	N Rank	S Rank	COSEWIC	SARA Status	Wild Species at Risk Regulations
American Badger	*Taxidea taxus taxus*	G5T5	N4	S3	Special Concern	Special Concern	
Barn Swallow	*Hirundo rustica*	G5	N3N4B, N3N4M	S4B	Special Concern	Threatened	
Bobolink	*Dolichonyx oryzivorus*	G5	N5B, N4N5M	S5B	Special Concern	Threatened	
Horned Grebe	*Podiceps auritus*	G5	N5B,N5N, N5M	S5B	Special Concern	Special Concern	
Rusty Blackbird	*Euphagus carolinus*	G4	N4B,NUN, N4M	S3B,SUN	Special Concern	Special Concern	
Sprague's Pipit	*Anthus spragueii*	G3G4	N3N4B, N3N4M	S3B	Threatened	Threatened	

Fish Atlas

Common Name	Scientific Name:	G Rank	N Rank	S Rank	COSEWIC	SARA Status	Wild Species at Risk Regulations

Expected Species

"Expected" is based on a modelled prediction if a species might occur in areas based upon developed statistical relationships between local and landscape characteristics and species presence. Models utilized by this report have only been created in the prairie ecozone for a selection of species. The boreal plain, boreal shield and taiga shield will not return any expected species results. Models are not a substitute for on the ground surveys to determine species presence.

Species Predictive Models

Category: Invertebrate Animal

Common Name	Scientific Name:	G Rank	N Rank	S Rank	COSEWIC	SARA Status	Wild Species at Risk Regulations
Monarch	*Danaus plexippus plexippus*	G4T3	N3B,NNRM	S2B,SNRM	Endangered	Special Concern	

Category: Vertebrate Animal

Common Name	Scientific Name:	G Rank	N Rank	S Rank	COSEWIC	SARA Status	Wild Species at Risk Regulations
American Badger	*Taxidea taxus taxus*	G5T5	N4	S3	Special Concern	Special Concern	
Baird's Sparrow	*Centronyx bairdii*	G4	N4B,N4M	S4B	Special Concern	Special Concern	
Bank Swallow	*Riparia riparia*	G5	N5B,N5M	S4B,S5M	Threatened	Threatened	
Bobolink	*Dolichonyx oryzivorus*	G5	N5B, N4N5M	S5B	Special Concern	Threatened	
Common Nighthawk	*Chordeiles minor*	G5	N4B,N3M	S4B	Special Concern	Threatened	
Ferruginous Hawk	*Buteo regalis*	G4	N3B,N3N, NUM	S3B	Special Concern	Threatened	
Horned Grebe	*Podiceps auritus*	G5	N5B,N5N, N5M	S5B	Special Concern	Special Concern	
Northern Harrier	*Circus hudsonius*	G5	N5B,N4N	S4B	Not at Risk		
Short-eared Owl	*Asio flammeus*	G5	N4B,N3N, N4M	S3B,S2N	Threatened	Special Concern	
Sprague's Pipit	*Anthus spragueii*	G3G4	N3N4B, N3N4M	S3B	Threatened	Threatened	

Whooping Crane Corridor 95% Core Area

Whooping Crane Corridor 75% Core Area

Woodland Caribou Habitat

Detailed information concerning woodland caribou habitat, administration units and Caribou Habitat Management areas is provided below.

Currently, information on woodland caribou habitat potential is not available in this report, but users are encouraged to view the dataset "Woodland Caribou Habitat Potential" to determine whether your project falls within high, moderate or low caribou habitat potential areas.

Woodland Caribou Conservation Unit(s): Nothing found

Woodland Caribou Administrative Unit(s): Nothing found

Woodland Caribou Habitat Management Area Tier category: Nothing found

Species with Critical Habitat Present

This dataset displays the geographic areas within which federal Critical Habitat for species at risk listed on Schedule 1 of the federal Species at Risk Act (SARA) occurs in Saskatchewan. Please be aware that not all of the area within these boundaries is necessarily Critical Habitat. To determine if a specific area is Critical Habitat and if your activity might be considered "destruction" of Critical Habitat, other information available in each individual species' Recovery documents (http://www.sararegistry.gc.ca) need to be considered, including biophysical attributes and activities likely to result in destruction of Critical Habitat.

Note that recovery documents (and therefore Critical Habitat) may be amended from time to time. Species are added as the data becomes ready, which may occur after the recovery document has been posted on the SAR Public Registry. Although HABISask will try to provide the latest data, the SAR Public Registry should always be considered as the official source for Critical Habitat information.

Common Name	Scientific Name:	G Rank	N Rank	S Rank	COSEWIC	SARA Status	Wild Species at Risk Regulations

No Critical Habitat found

Emergency Protection Order

This dataset is comprised of areas under the federal Emergency Order for the Protection of the Greater Sage-Grouse in Canada. The exterior extent polygons are derived from the detailed dataset of the Government of Canada Emergency Order dataset. For specific information regarding the order and the prohibitions set out in the Emergency Order please consult the official documents on the Species at Risk Registry (sararegistry.gc.ca)

Common Name	Scientific Name

No species found

Important Natural Areas

Important Natural Areas are sites in Saskatchewan that are considered to have conservation significance, but are not necessarily legally protected.

Name	Type

Nothing Found

Wind Turbine Avoidance Zones Present

The Wind Energy Avoidance Zones were designed to enhance environmental protection and provide more certainty to future wind energy developments. These guidelines clearly identify environmentally sensitive areas that should be avoided for projects that include the siting of wind turbines but can be helpful in siting any development project. The complete report entitled, Wildlife Siting Guidelines for Saskatchewan Wind Energy Projects, can be found on the Government of Saskatchewan website or by selecting the following link: https://publications.saskatchewan.ca/#/categories/78

Land Type
Conservation Easement Lands

Managed Areas

Managed areas are a diverse collection of lands and waters on which the conservation of biodiversity and ecosystem function are among the goals of the land management programs. Each of the unique or sensitive landscapes, within the network of managed areas, have some level of protection or activity restrictions placed on them by legislation, agreement or policy. These lands include provincial and national parks, ecological reserves, wildlife lands, game preserves, conservation easements and other privately held stewardship lands.

Conservation Easement

Nothing Found

Crown Conservation Easement

Nothing Found

Ecological Reserve

Nothing Found

Fish & Wildlife Development Fund (FWDF)

Nothing Found

Former Federal Pasture

Nothing Found

Game Preserve

Nothing Found

Migratory Bird Sanctuary

Nothing Found

National Wildlife Area

Nothing Found

Provincial Park

Nothing Found

Provincial Pasture

Nothing Found

Ramsar Wetland

Nothing Found

Recreation Site

Nothing Found

Representative Area Ecological Reserve

Nothing Found

Reservoir Development Area

Nothing Found

Wildlife Habitat Protection Act (WHPA)

Nothing Found

Wildlife Refuge

Nothing Found

Rare and Endangered Species Occurrences

The absence of information provided by the Saskatchewan Conservation Data Centre (SKCDC) does not categorically mean the absence of sensitive species or features. The quantity and quality for data collected by the SKCDC are dependent on the research and observations of many individuals and organizations. SKCDC reports summarize the existing natural heritage information, known to the SKCDC, at the time of the request.

SKCDC data should never be regarded as final statements on the elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. The user therefore acknowledges that the absence of data may indicate that the project area has not been surveyed, rather than confirm that the area lacks natural heritage resources.

Occurrence ID: 999954449
First Observation: 2014-06-06
Occurrence Class: Vertebrate Animal
Last Observation: 2014-06-06
Scientific Name: Anthus spragueii
Common Name: Sprague's Pipit
Occurrence Rank:
General Description: 1 individual(s), (2014)
Occurrence Data:
Directions:

Occurrence ID: 999954455
First Observation: 2014-06-03
Occurrence Class: Vertebrate Animal
Last Observation: 2014-06-03
Scientific Name: Anthus spragueii
Common Name: Sprague's Pipit
Occurrence Rank:
General Description: 1 individual(s), (2014)
Occurrence Data:
Directions:

Occurrence ID: 999941539
First Observation: 2012-06-28
Occurrence Class: Vertebrate Animal
Last Observation: 2012-06-28
Scientific Name: Dolichonyx oryzivorus
Common Name: Bobolink
Occurrence Rank:
General Description: sighting (2012)
Occurrence Data:
Directions:

Occurrence ID: 999954466
First Observation: 2014-06-03
Occurrence Class: Vertebrate Animal
Last Observation: 2014-06-03
Scientific Name: Dolichonyx oryzivorus
Common Name: Bobolink
Occurrence Rank:
General Description: 1 individual(s), (2014)
Occurrence Data:
Directions:

Occurrence ID: 999954467
First Observation: 2014-06-03
Occurrence Class: Vertebrate Animal
Last Observation: 2014-06-03
Scientific Name: Dolichonyx oryzivorus
Common Name: Bobolink
Occurrence Rank:
General Description: 1 individual(s), (2014)
Occurrence Data:
Directions:

Occurrence ID: 999954481 **First Observation:** 2014-06-03
Occurrence Class: Vertebrate Animal **Last Observation:** 2014-06-03
Scientific Name: Dolichonyx oryzivorus
Common Name: Bobolink
Occurrence Rank:
General Description: 1 individual(s), (2014)
Occurrence Data:
Directions:

Occurrence ID: 999981078 **First Observation:** 2009-05-22
Occurrence Class: Vertebrate Animal **Last Observation:** 2009-05-22
Scientific Name: Dolichonyx oryzivorus
Common Name: Bobolink
Occurrence Rank:
General Description: 1 Unknown Sex/Age; (2009)
Occurrence Data:
Directions:

Occurrence ID: 999981097 **First Observation:** 2008-05-29
Occurrence Class: Vertebrate Animal **Last Observation:** 2012-06-16
Scientific Name: Dolichonyx oryzivorus
Common Name: Bobolink
Occurrence Rank:
General Description: Species detected (2008, 2012)
Occurrence Data:
Directions:

Occurrence ID: 999981082 **First Observation:** 2008-06-17
Occurrence Class: Vertebrate Animal **Last Observation:** 2008-06-17
Scientific Name: Euphagus carolinus
Common Name: Rusty Blackbird
Occurrence Rank:
General Description: Species detected (2008)
Occurrence Data:
Directions:

Occurrence ID: 999941275 **First Observation:** 2012-06-29
Occurrence Class: Vertebrate Animal **Last Observation:** 2012-06-29
Scientific Name: Hirundo rustica
Common Name: Barn Swallow
Occurrence Rank:
General Description: Sighting (2012)
Occurrence Data:
Directions: SW 31-33-23 W2M

Occurrence ID: 999941282 **First Observation:** 2012-06-28
Occurrence Class: Vertebrate Animal **Last Observation:** 2012-06-28
Scientific Name: Hirundo rustica
Common Name: Barn Swallow
Occurrence Rank:
General Description: Sighting (2012)
Occurrence Data:
Directions:

Occurrence ID: 999941283
First Observation: 2012-06-29
Occurrence Class: Vertebrate Animal
Last Observation: 2012-06-29
Scientific Name: Hirundo rustica
Common Name: Barn Swallow
Occurrence Rank:
General Description: Sighting (2012)
Occurrence Data:
Directions:

Occurrence ID: 999981077
First Observation: 2008-06-02
Occurrence Class: Vertebrate Animal
Last Observation: 2011-06-07
Scientific Name: Hirundo rustica
Common Name: Barn Swallow
Occurrence Rank:
General Description: Species detected (2008, 2011)
Occurrence Data:
Directions:

Occurrence ID: 999981080
First Observation: 2008-05-29
Occurrence Class: Vertebrate Animal
Last Observation: 2008-05-29
Scientific Name: Hirundo rustica
Common Name: Barn Swallow
Occurrence Rank:
General Description: Species detected (2008)
Occurrence Data:
Directions:

Occurrence ID: 999981079
First Observation: 2011-06-07
Occurrence Class: Vertebrate Animal
Last Observation: 2012-05-13
Scientific Name: Podiceps auritus
Common Name: Horned Grebe
Occurrence Rank:
General Description: Species detected (2011, 2012)
Occurrence Data:
Directions:

Occurrence ID: 999981081
First Observation: 2008-06-09
Occurrence Class: Vertebrate Animal
Last Observation: 2012-05-13
Scientific Name: Podiceps auritus
Common Name: Horned Grebe
Occurrence Rank:
General Description: Species detected (2008, 2012)
Occurrence Data:
Directions:

Occurrence ID: 9999115760

Occurrence Class: Vertebrate Animal

Scientific Name: Taxidea taxus taxus

Common Name: American Badger

Occurrence Rank:

General Description: Species detected (2008)

Occurrence Data:

Directions:

First Observation: 2008-07-09

Last Observation: 2008-07-09

Wild Species Research Permitting

A Research Permit is required to detect or observe plants or wildlife for commercial purposes, such as pre-screening surveys to collect baseline data or other activities, or to conduct academic research. Research Permits are not required if you are doing surveys for personal, recreational, educational or other non-commercial purposes. Revisions were made to Section 21 of The Wildlife Act in 2015 and to Section 6.2 of The Wildlife Regulations in 2016.

See the Government of Saskatchewan Wild Species Research Permitting page for more information.

All forms and related information pertaining to Research Permits can be found in the Publications Centre. Be sure to check out the Conservation Standards Terms and Conditions for Research Permits for general, wildlife and research-specific and information submission conditions that pertain to all research permits.

Subscribe to our Mail-out List Subscriptions for updates regarding Species Detection Permits, SKCDC Lists and Ranks, Legislation and Policy and HABISask.

Species Detection Survey Protocols

The Species Detection Survey Protocols are used to detect rare and sensitive species so Activity Restriction Guidelines can be applied. Their use is required by industry/ environmental consultants for proposed or existing commercial activities.

Activity Restriction Guidelines for Sensitive Species

The Activity Restriction Guidelines for Sensitive Species outline restricted activity periods and distance setbacks for rare and sensitive species to assist proponents in minimizing impacts to rare and sensitive species and habitats.

Administrative Areas

6	Ecological Management Specialist (EMS) District(s)
Humboldt	Compliance and Field Services Area(s)
Saskatoon	Compliance and Field Services Region(s)
Saskatoon	Area Fisheries Ecologist Area(s)
PARKLAND REGION	Area Wildlife Ecologist(s)
340 - WOLVERINE	Rural Municipality
310 - USBORNE	Rural Municipality
Nothing Found	First Nation Reserve

Contact Us

For more information, please contact our Client Service Office:
Email: centre.inquiry@gov.sk.ca
Tel (toll free in North America): 1-800-567-4224
Tel (Regina): 306-787-2584

Project Screening Report

Notes: Aspen Incidental Study Area

Report Generated
02/03/2023

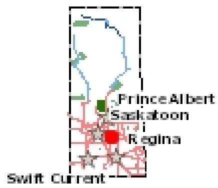
Map Information

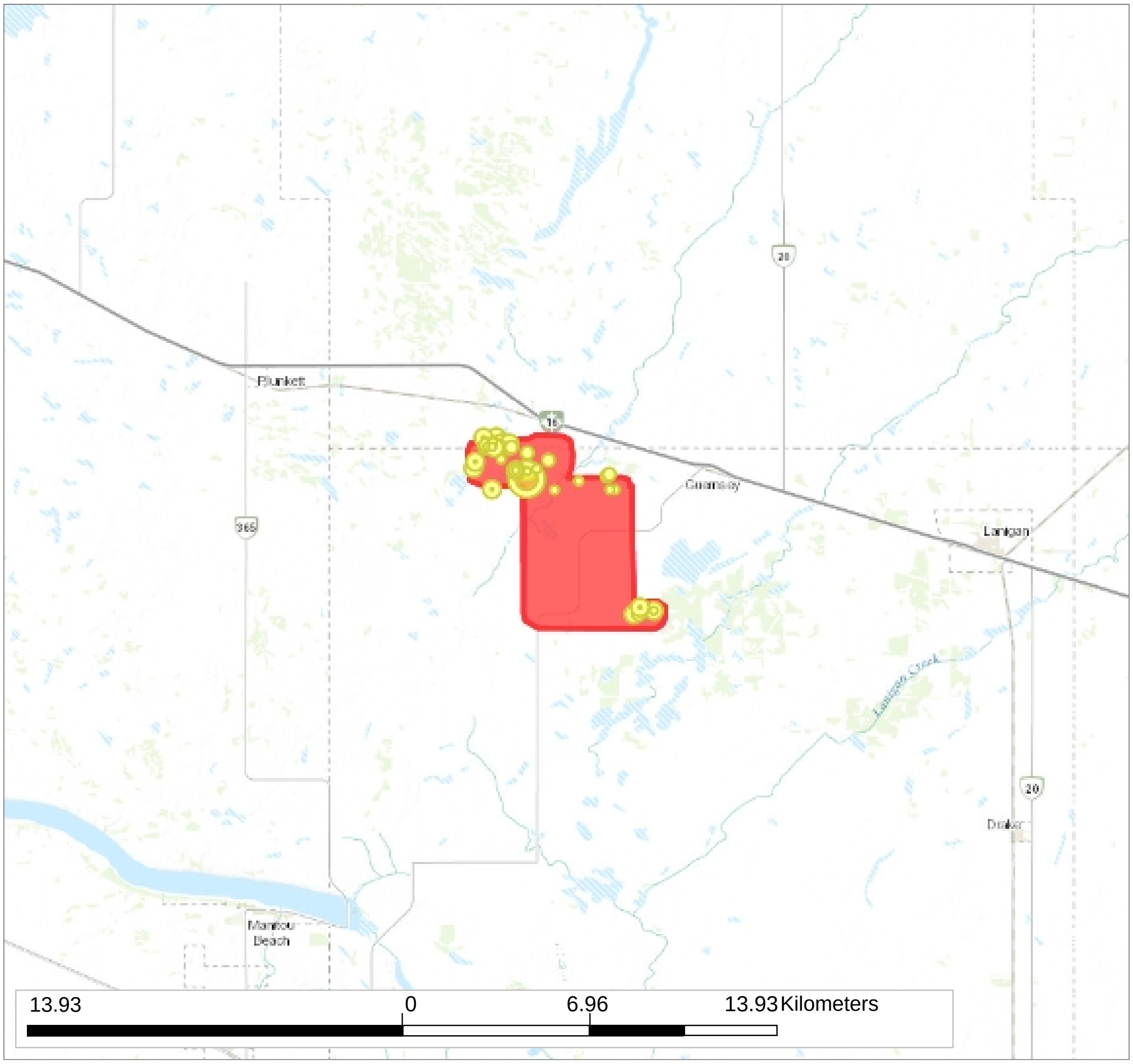
Buffer Size:

30 Meters

Coordinates:
Lat: 51.85076° N
Lon: -105.26864° W

Area of Interest





Screened Areas:

Ecological Management Specialist (EMS) District
Compliance & Field Service Area
Compliance & Field Service (CFS) Region
Area Fisheries Ecologists
Area Wildlife Ecologists
Rural Municipality
Indian Reserve
Rare and Endangered Species
Fish Species
Woodland Caribou Range
Species Predictive Models
Whooping Crane Corridor
Federal Critical Habitat
Emergency Protection Order
Wind Energy Avoidance Zones
Important Natural Areas
Provincial Parks
Recreation Sites
Game Preserves
National Wildlife Areas
Federal Pastures
Community Pastures
Wildlife Habitat Protection Act Lands
Fish & Wildlife Development Fund Lands
Migratory Bird Sanctuary
Wildlife Refuge
Conservation Easements
Crown Conservation Easements
Ecological Reserves
Ramsar Wetlands
Reservoir Development Areas
Representative Areas

Species Likely to be Present

Known Species

“Known” species are species that have known occurrences in the area from the Saskatchewan Conservation Data Centre’s Rare and Endangered Species map layer. However, absence of species observation records does not preclude the existence of species in the area of interest. Observations may simply not have been recorded for the given area or may not have yet been entered into the ministry data holdings – new observation records are continuously being discovered. Information accessible through HABISask is not intended to be a definitive statement on the presence, absence or status of a species within a given area, nor as a substitute for onsite surveys.

Rare and Endangered Species

Category: Vascular Plant

Common Name	Scientific Name:	G Rank	N Rank	S Rank	COSEWIC	SARA Status	Wild Species at Risk Regulations
Large Yellow Lady's-slipper	*Cypripedium parviflorum var. pubescens*	G5T5	N5	S2			
Pale Bulrush	*Scirpus pallidus*	G5	N4	S3			

Category: Vertebrate Animal

Common Name	Scientific Name:	G Rank	N Rank	S Rank	COSEWIC	SARA Status	Wild Species at Risk Regulations
American Badger	*Taxidea taxus taxus*	G5T5	N4	S3	Special Concern	Special Concern	
Baird's Sparrow	*Centronyx bairdii*	G4	N4B,N4M	S4B	Special Concern	Special Concern	
Bank Swallow	*Riparia riparia*	G5	N5B,N5M	S4B,S5M	Threatened	Threatened	
Barn Swallow	*Hirundo rustica*	G5	N3N4B, N3N4M	S4B	Special Concern	Threatened	
Bobolink	*Dolichonyx oryzivorus*	G5	N5B, N4N5M	S5B	Special Concern	Threatened	
Horned Grebe	*Podiceps auritus*	G5	N5B,N5N, N5M	S5B	Special Concern	Special Concern	
Loggerhead Shrike	*Lanius ludovicianus excubitorides*	G4T4	N3B	S3B	Threatened	Threatened	
Red-necked Phalarope	*Phalaropus lobatus*	G4G5	N4N5B, N3N4N, N4N5M	S4B,S3M	Special Concern	Special Concern	
Rusty Blackbird	*Euphagus carolinus*	G4	N4B,NUN, N4M	S3B,SUN	Special Concern	Special Concern	
Sprague's Pipit	*Anthus spragueii*	G3G4	N3N4B, N3N4M	S3B	Threatened	Threatened	
Whooping Crane	*Grus americana*	G1	N1B	SXB,S1M	Endangered	Endangered	Endangered

Fish Atlas

Common Name	Scientific Name:	G Rank	N Rank	S Rank	COSEWIC	SARA Status	Wild Species at Risk Regulations

Expected Species

“Expected” is based on a modelled prediction if a species might occur in areas based upon developed statistical relationships between local and landscape characteristics and species presence. Models utilized by this report have only been created in the prairie ecozone for a selection of species. The boreal plain, boreal shield and taiga shield will not return any expected species results. Models are not a substitute for on the ground surveys to determine species presence.

Species Predictive Models

Category: Invertebrate Animal

Common Name	Scientific Name:	G Rank	N Rank	S Rank	COSEWIC	SARA Status	Wild Species at Risk Regulations
Monarch	*Danaus plexippus plexippus*	G4T3	N3B,NNRM	S2B,SNRM	Endangered	Special Concern	

Category: Vertebrate Animal

Common Name	Scientific Name:	G Rank	N Rank	S Rank	COSEWIC	SARA Status	Wild Species at Risk Regulations
American Badger	*Taxidea taxus taxus*	G5T5	N4	S3	Special Concern	Special Concern	
Baird's Sparrow	*Centronyx bairdii*	G4	N4B,N4M	S4B	Special Concern	Special Concern	
Bank Swallow	*Riparia riparia*	G5	N5B,N5M	S4B,S5M	Threatened	Threatened	
Bobolink	*Dolichonyx oryzivorus*	G5	N5B, N4N5M	S5B	Special Concern	Threatened	

Common Nighthawk	*Chordeiles minor*	G5	N4B,N3M	S4B	Special Concern	Threatened	
Ferruginous Hawk	*Buteo regalis*	G4	N3B,N3N, NUM	S3B	Special Concern	Threatened	
Horned Grebe	*Podiceps auritus*	G5	N5B,N5N, N5M	S5B	Special Concern	Special Concern	
Loggerhead Shrike	*Lanius ludovicianus excubitorides*	G4T4	N3B	S3B	Threatened	Threatened	
Northern Harrier	*Circus hudsonius*	G5	N5B,N4N	S4B	Not at Risk		
Northern Leopard Frog	*Lithobates pipiens*	G5	N5	S3	Special Concern	Special Concern	
Piping Plover	*Charadrius melodus circumcinctus*	G3T3	N3B	S3B	Endangered	Endangered	Endangered
Red Knot	*Calidris canutus rufa*	G4T2	N1B, N3N4N, N3M	S2M	Endangered	Endangered	
Short-eared Owl	*Asio flammeus*	G5	N4B,N3N, N4M	S3B,S2N	Threatened	Special Concern	
Sprague's Pipit	*Anthus spragueii*	G3G4	N3N4B, N3N4M	S3B	Threatened	Threatened	

Whooping Crane Corridor 95% Core Area

Whooping Crane Corridor 75% Core Area

Woodland Caribou Habitat

Detailed information concerning woodland caribou habitat, administration units and Caribou Habitat Management areas is provided below.

Currently, information on woodland caribou habitat potential is not available in this report, but users are encouraged to view the dataset "Woodland Caribou Habitat Potential" to determine whether your project falls within high, moderate or low caribou habitat potential areas.

Woodland Caribou Conservation Unit(s): Nothing found

Woodland Caribou Administrative Unit(s): Nothing found

Woodland Caribou Habitat Management Area Tier category: Nothing found

Species with Critical Habitat Present

This dataset displays the geographic areas within which federal Critical Habitat for species at risk listed on Schedule 1 of the federal Species at Risk Act (SARA) occurs in Saskatchewan. Please be aware that not all of the area within these boundaries is necessarily Critical Habitat. To determine if a specific area is Critical Habitat and if your activity might be considered "destruction" of Critical Habitat, other information available in each individual species' Recovery documents (http://www.sararegistry.gc.ca) need to be considered, including biophysical attributes and activities likely to result in destruction of Critical Habitat.

Note that recovery documents (and therefore Critical Habitat) may be amended from time to time. Species are added as the data becomes ready, which may occur after the recovery document has been posted on the SAR Public Registry. Although HABISask will try to provide the latest data, the SAR Public Registry should always be considered as the official source for Critical Habitat information.

Common Name	Scientific Name:	G Rank	N Rank	S Rank	COSEWIC	SARA Status	Wild Species at Risk Regulations
No Critical Habitat found							

Emergency Protection Order

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Common Name	Scientific Name
No species found	

Important Natural Areas

Important Natural Areas are sites in Saskatchewan that are considered to have conservation significance, but are not necessarily legally protected.

Name	Type
Nothing Found	

Wind Turbine Avoidance Zones Present

The Wind Energy Avoidance Zones were designed to enhance environmental protection and provide more certainty to future wind energy developments. These guidelines clearly identify environmentally sensitive areas that should be avoided for projects that include the siting of wind turbines but can be helpful in siting any development project. The complete report entitled, Wildlife Siting Guidelines for Saskatchewan Wind Energy Projects, can be found on the Government of Saskatchewan website or by selecting the following link: https://publications.saskatchewan.ca/#/categories/78

Land Type

Conservation Easement Lands

Wildlife Habitat Protection Act Lands

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Conservation Easement

Nothing Found

Crown Conservation Easement

Nothing Found

Ecological Reserve

Nothing Found

Fish & Wildlife Development Fund (FWDF)

Nothing Found

Former Federal Pasture

Nothing Found

Game Preserve

Nothing Found

Migratory Bird Sanctuary

Nothing Found

National Wildlife Area

Nothing Found

Provincial Park

Nothing Found

Provincial Pasture

Nothing Found

Ramsar Wetland

Nothing Found

Recreation Site

Nothing Found

Representative Area Ecological Reserve

Nothing Found

Reservoir Development Area

Nothing Found

Wildlife Habitat Protection Act (WHPA)

Yes

Wildlife Refuge

Nothing Found

Rare and Endangered Species Occurrences

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Occurrence ID: 9999114716 **First Observation:** 2019-06-20

Occurrence Class: Vascular Plant **Last Observation:** 2019-06-20

Scientific Name: Cypripedium parviflorum var. pubescens

Common Name: Large Yellow Lady's-slipper

Occurrence Rank:

General Description: 50 Individual(s); (2019)

Occurrence Data:

Directions:

Occurrence ID: 9999114715 **First Observation:** 2019-06-20

Occurrence Class: Vascular Plant **Last Observation:** 2019-06-20

Scientific Name: Cypripedium parviflorum var. pubescens

Common Name: Large Yellow Lady's-slipper

Occurrence Rank:

General Description: 50 Individual(s); (2019)

Occurrence Data:

Directions:

Occurrence ID: 999973003 **First Observation:** 2013-10-24

Occurrence Class: Vascular Plant **Last Observation:** 2013-10-24

Scientific Name: Scirpus pallidus

Common Name: Pale Bulrush

Occurrence Rank:

General Description: species observed (2013)

Occurrence Data:

Directions: SE-3-34-24 WL2

Occurrence ID: 999973002 **First Observation:** 2013-10-24

Occurrence Class: Vascular Plant **Last Observation:** 2013-10-24

Scientific Name: Scirpus pallidus

Common Name: Pale Bulrush

Occurrence Rank:

General Description: species observed (2013)

Occurrence Data:

Directions: SE-3-34-24 WL1

Occurrence ID: 999954455 **First Observation:** 2014-06-03

Occurrence Class: Vertebrate Animal **Last Observation:** 2014-06-03

Scientific Name: Anthus spragueii

Common Name: Sprague's Pipit

Occurrence Rank:

General Description: 1 individual(s), (2014)

Occurrence Data:

Directions:

Occurrence ID: 999981103
First Observation: 2009-06-02
Occurrence Class: Vertebrate Animal
Last Observation: 2009-06-02
Scientific Name: Anthus spragueii
Common Name: Sprague's Pipit
Occurrence Rank:
General Description: 2 Unknown Sex/Age; (2009)
Occurrence Data:
Directions:

Occurrence ID: 9999107339
First Observation: 2019-05-29
Occurrence Class: Vertebrate Animal
Last Observation: 2019-05-29
Scientific Name: Anthus spragueii
Common Name: Sprague's Pipit
Occurrence Rank:
General Description: 1 Unknown Sex/Age; Breeding Bird Status: S; (2019)
Occurrence Data:
Directions: SE-03-34-24-2

Occurrence ID: 9999107350
First Observation: 2019-06-17
Occurrence Class: Vertebrate Animal
Last Observation: 2019-06-17
Scientific Name: Anthus spragueii
Common Name: Sprague's Pipit
Occurrence Rank:
General Description: 1 Unknown Sex/Age; Breeding Bird Status: S; (2019)
Occurrence Data:
Directions: SE-03-34-24-2

Occurrence ID: 999954449
First Observation: 2014-06-06
Occurrence Class: Vertebrate Animal
Last Observation: 2014-06-06
Scientific Name: Anthus spragueii
Common Name: Sprague's Pipit
Occurrence Rank:
General Description: 1 individual(s), (2014)
Occurrence Data:
Directions:

Occurrence ID: 999981095
First Observation: 2009-06-02
Occurrence Class: Vertebrate Animal
Last Observation: 2009-06-02
Scientific Name: Anthus spragueii
Common Name: Sprague's Pipit
Occurrence Rank:
General Description: 2 Unknown Sex/Age; (2009)
Occurrence Data:
Directions:

Occurrence ID: 999981099
First Observation: 2009-05-29
Occurrence Class: Vertebrate Animal
Last Observation: 2009-05-29
Scientific Name: Anthus spragueii
Common Name: Sprague's Pipit
Occurrence Rank:
General Description: 2 Unknown Sex/Age; (2009)
Occurrence Data:
Directions:

Occurrence ID: 999986960 **First Observation:** 2017-05-15
Occurrence Class: Vertebrate Animal **Last Observation:** 2017-05-15
Scientific Name: Anthus spragueii
Common Name: Sprague's Pipit
Occurrence Rank:
General Description: 1 Adult Male(s); (2017)
Occurrence Data:
Directions:

Occurrence ID: 999995258 **First Observation:** 2016-05-26
Occurrence Class: Vertebrate Animal **Last Observation:** 2016-05-26
Scientific Name: Anthus spragueii
Common Name: Sprague's Pipit
Occurrence Rank:
General Description: Species detected (2016)
Occurrence Data:
Directions:

Occurrence ID: 9999107351 **First Observation:** 2019-06-17
Occurrence Class: Vertebrate Animal **Last Observation:** 2019-06-17
Scientific Name: Anthus spragueii
Common Name: Sprague's Pipit
Occurrence Rank:
General Description: 1 Unknown Sex/Age; Breeding Bird Status: S; (2019)
Occurrence Data:
Directions: SE-03-34-24-2

Occurrence ID: 999981106 **First Observation:** 2009-06-02
Occurrence Class: Vertebrate Animal **Last Observation:** 2009-06-02
Scientific Name: Anthus spragueii
Common Name: Sprague's Pipit
Occurrence Rank:
General Description: 1 Unknown Sex/Age; (2009)
Occurrence Data:
Directions:

Occurrence ID: 999981093 **First Observation:** 2008-07-03
Occurrence Class: Vertebrate Animal **Last Observation:** 2008-07-03
Scientific Name: Centronyx bairdii
Common Name: Baird's Sparrow
Occurrence Rank:
General Description: Species detected (2008)
Occurrence Data:
Directions:

Occurrence ID: 999954463 **First Observation:** 2014-06-03
Occurrence Class: Vertebrate Animal **Last Observation:** 2014-06-03
Scientific Name: Dolichonyx oryzivorus
Common Name: Bobolink
Occurrence Rank:
General Description: 1 individual(s), (2014)
Occurrence Data:
Directions:

Occurrence ID: 999995256 **First Observation:** 2016-05-26
Occurrence Class: Vertebrate Animal **Last Observation:** 2016-05-26
Scientific Name: Dolichonyx oryzivorus
Common Name: Bobolink
Occurrence Rank:
General Description: Species detected (2016)
Occurrence Data:
Directions:

Occurrence ID: 999981101 **First Observation:** 2008-06-17
Occurrence Class: Vertebrate Animal **Last Observation:** 2011-06-13
Scientific Name: Dolichonyx oryzivorus
Common Name: Bobolink
Occurrence Rank:
General Description: Species detected (2008, 2011)
Occurrence Data:
Directions:

Occurrence ID: 999981078 **First Observation:** 2009-05-22
Occurrence Class: Vertebrate Animal **Last Observation:** 2009-05-22
Scientific Name: Dolichonyx oryzivorus
Common Name: Bobolink
Occurrence Rank:
General Description: 1 Unknown Sex/Age; (2009)
Occurrence Data:
Directions:

Occurrence ID: 999954467 **First Observation:** 2014-06-03
Occurrence Class: Vertebrate Animal **Last Observation:** 2014-06-03
Scientific Name: Dolichonyx oryzivorus
Common Name: Bobolink
Occurrence Rank:
General Description: 1 individual(s), (2014)
Occurrence Data:
Directions:

Occurrence ID: 999981105 **First Observation:** 2008-06-08
Occurrence Class: Vertebrate Animal **Last Observation:** 2011-06-07
Scientific Name: Dolichonyx oryzivorus
Common Name: Bobolink
Occurrence Rank:
General Description: Species detected (2008, 2011)
Occurrence Data:
Directions:

Occurrence ID: 999981083 **First Observation:** 2008-06-15
Occurrence Class: Vertebrate Animal **Last Observation:** 2009-05-29
Scientific Name: Dolichonyx oryzivorus
Common Name: Bobolink
Occurrence Rank:
General Description: Species detected (2008, 2009)
Occurrence Data:
Directions:

Occurrence ID: 999981086 **First Observation:** 2008-06-09
Occurrence Class: Vertebrate Animal **Last Observation:** 2009-06-18
Scientific Name: Dolichonyx oryzivorus
Common Name: Bobolink
Occurrence Rank:
General Description: Species detected (2008, 2009)
Occurrence Data:
Directions:

Occurrence ID: 999954481 **First Observation:** 2014-06-03
Occurrence Class: Vertebrate Animal **Last Observation:** 2014-06-03
Scientific Name: Dolichonyx oryzivorus
Common Name: Bobolink
Occurrence Rank:
General Description: 1 individual(s), (2014)
Occurrence Data:
Directions:

Occurrence ID: 999954460 **First Observation:** 2014-06-06
Occurrence Class: Vertebrate Animal **Last Observation:** 2014-06-06
Scientific Name: Dolichonyx oryzivorus
Common Name: Bobolink
Occurrence Rank:
General Description: 1 individual(s), (2014)
Occurrence Data:
Directions:

Occurrence ID: 999941538 **First Observation:** 2012-09-19
Occurrence Class: Vertebrate Animal **Last Observation:** 2012-09-19
Scientific Name: Dolichonyx oryzivorus
Common Name: Bobolink
Occurrence Rank:
General Description: 2 birds (2012)
Occurrence Data:
Directions:

Occurrence ID: 999981097 **First Observation:** 2008-05-29
Occurrence Class: Vertebrate Animal **Last Observation:** 2012-06-16
Scientific Name: Dolichonyx oryzivorus
Common Name: Bobolink
Occurrence Rank:
General Description: Species detected (2008, 2012)
Occurrence Data:
Directions:

Occurrence ID: 999981098 **First Observation:** 2008-06-02
Occurrence Class: Vertebrate Animal **Last Observation:** 2012-06-16
Scientific Name: Dolichonyx oryzivorus
Common Name: Bobolink
Occurrence Rank:
General Description: Species detected (2008, 2012)
Occurrence Data:
Directions:

Occurrence ID: 999954475
First Observation: 2014-06-03
Occurrence Class: Vertebrate Animal
Last Observation: 2014-06-03
Scientific Name: Dolichonyx oryzivorus
Common Name: Bobolink
Occurrence Rank:
General Description: 1 individual(s), (2014)
Occurrence Data:
Directions:

Occurrence ID: 999981109
First Observation: 2008-06-15
Occurrence Class: Vertebrate Animal
Last Observation: 2011-06-07
Scientific Name: Dolichonyx oryzivorus
Common Name: Bobolink
Occurrence Rank:
General Description: Species detected (2008, 2011)
Occurrence Data:
Directions:

Occurrence ID: 999981074
First Observation: 2008-06-15
Occurrence Class: Vertebrate Animal
Last Observation: 2010-05-19
Scientific Name: Dolichonyx oryzivorus
Common Name: Bobolink
Occurrence Rank:
General Description: Species detected (2008, 2010)
Occurrence Data:
Directions:

Occurrence ID: 999981094
First Observation: 2008-06-08
Occurrence Class: Vertebrate Animal
Last Observation: 2008-06-08
Scientific Name: Dolichonyx oryzivorus
Common Name: Bobolink
Occurrence Rank:
General Description: Species detected (2008)
Occurrence Data:
Directions:

Occurrence ID: 999954466
First Observation: 2014-06-03
Occurrence Class: Vertebrate Animal
Last Observation: 2014-06-03
Scientific Name: Dolichonyx oryzivorus
Common Name: Bobolink
Occurrence Rank:
General Description: 1 individual(s), (2014)
Occurrence Data:
Directions:

Occurrence ID: 999954459
First Observation: 2014-06-06
Occurrence Class: Vertebrate Animal
Last Observation: 2014-06-06
Scientific Name: Dolichonyx oryzivorus
Common Name: Bobolink
Occurrence Rank:
General Description: 1 individual(s), (2014)
Occurrence Data:
Directions:

Occurrence ID: 999941539
First Observation: 2012-06-28
Occurrence Class: Vertebrate Animal
Last Observation: 2012-06-28
Scientific Name: Dolichonyx oryzivorus
Common Name: Bobolink
Occurrence Rank:
General Description: sighting (2012)
Occurrence Data:
Directions:

Occurrence ID: 999981082
First Observation: 2008-06-17
Occurrence Class: Vertebrate Animal
Last Observation: 2008-06-17
Scientific Name: Euphagus carolinus
Common Name: Rusty Blackbird
Occurrence Rank:
General Description: Species detected (2008)
Occurrence Data:
Directions:

Occurrence ID: 9999103849
First Observation: 2014-09-24
Occurrence Class: Vertebrate Animal
Last Observation: 2014-09-24
Scientific Name: Grus americana
Common Name: Whooping Crane
Occurrence Rank:
General Description: 2 Adult(s) (Unknown Sex); 0 Juvenile(s); Breeding Bird Status: Migrant; (2014)
Occurrence Data:
Directions: S OF HWY 16 NEAR LANIGAN

Occurrence ID: 999954492
First Observation: 2014-05-27
Occurrence Class: Vertebrate Animal
Last Observation: 2014-05-27
Scientific Name: Hirundo rustica
Common Name: Barn Swallow
Occurrence Rank:
General Description: 2 individual(s), (2014)
Occurrence Data:
Directions:

Occurrence ID: 999941275
First Observation: 2012-06-29
Occurrence Class: Vertebrate Animal
Last Observation: 2012-06-29
Scientific Name: Hirundo rustica
Common Name: Barn Swallow
Occurrence Rank:
General Description: Sighting (2012)
Occurrence Data:
Directions: SW 31-33-23 W2M

Occurrence ID: 999981096
First Observation: 2010-06-13
Occurrence Class: Vertebrate Animal
Last Observation: 2010-06-13
Scientific Name: Hirundo rustica
Common Name: Barn Swallow
Occurrence Rank:
General Description: 1 Unknown Sex/Age; (2010)
Occurrence Data:
Directions:

Occurrence ID: 999981108
First Observation: 2008-07-03
Occurrence Class: Vertebrate Animal
Last Observation: 2010-05-19
Scientific Name: Hirundo rustica
Common Name: Barn Swallow
Occurrence Rank:
General Description: Species detected (2008, 2010)
Occurrence Data:
Directions:

Occurrence ID: 999981100
First Observation: 2011-06-07
Occurrence Class: Vertebrate Animal
Last Observation: 2011-06-07
Scientific Name: Hirundo rustica
Common Name: Barn Swallow
Occurrence Rank:
General Description: 1 Unknown Sex/Age; (2011)
Occurrence Data:
Directions:

Occurrence ID: 999981073
First Observation: 2008-06-09
Occurrence Class: Vertebrate Animal
Last Observation: 2010-05-19
Scientific Name: Hirundo rustica
Common Name: Barn Swallow
Occurrence Rank:
General Description: Species detected (2008, 2010)
Occurrence Data:
Directions:

Occurrence ID: 999941282
First Observation: 2012-06-28
Occurrence Class: Vertebrate Animal
Last Observation: 2012-06-28
Scientific Name: Hirundo rustica
Common Name: Barn Swallow
Occurrence Rank:
General Description: Sighting (2012)
Occurrence Data:
Directions:

Occurrence ID: 999981080
First Observation: 2008-05-29
Occurrence Class: Vertebrate Animal
Last Observation: 2008-05-29
Scientific Name: Hirundo rustica
Common Name: Barn Swallow
Occurrence Rank:
General Description: Species detected (2008)
Occurrence Data:
Directions:

Occurrence ID: 999981077
First Observation: 2008-06-02
Occurrence Class: Vertebrate Animal
Last Observation: 2011-06-07
Scientific Name: Hirundo rustica
Common Name: Barn Swallow
Occurrence Rank:
General Description: Species detected (2008, 2011)
Occurrence Data:
Directions:

Occurrence ID: 999941281
First Observation: 2012-06-29
Occurrence Class: Vertebrate Animal
Last Observation: 2012-06-29
Scientific Name: Hirundo rustica
Common Name: Barn Swallow
Occurrence Rank:
General Description: Sighting (2012)
Occurrence Data:
Directions: NW 35-33-24 W2M

Occurrence ID: 999941283
First Observation: 2012-06-29
Occurrence Class: Vertebrate Animal
Last Observation: 2012-06-29
Scientific Name: Hirundo rustica
Common Name: Barn Swallow
Occurrence Rank:
General Description: Sighting (2012)
Occurrence Data:
Directions:

Occurrence ID: 999941367
First Observation: 2012-06-28
Occurrence Class: Vertebrate Animal
Last Observation: 2012-06-28
Scientific Name: Hirundo rustica
Common Name: Barn Swallow
Occurrence Rank:
General Description: Sighting (2012)
Occurrence Data:
Directions:

Occurrence ID: 999981107
First Observation: 2010-06-13
Occurrence Class: Vertebrate Animal
Last Observation: 2010-06-13
Scientific Name: Hirundo rustica
Common Name: Barn Swallow
Occurrence Rank:
General Description: Species detected (2010)
Occurrence Data:
Directions:

Occurrence ID: 999954483
First Observation: 2014-05-27
Occurrence Class: Vertebrate Animal
Last Observation: 2014-05-27
Scientific Name: Hirundo rustica
Common Name: Barn Swallow
Occurrence Rank:
General Description: 2 individual(s), (2014)
Occurrence Data:
Directions:

Occurrence ID: 999981104
First Observation: 2010-06-19
Occurrence Class: Vertebrate Animal
Last Observation: 2011-06-13
Scientific Name: Hirundo rustica
Common Name: Barn Swallow
Occurrence Rank:
General Description: Species detected (2010, 2011)
Occurrence Data:
Directions:

Occurrence ID: 999995257 **First Observation:** 2016-05-26
Occurrence Class: Vertebrate Animal **Last Observation:** 2016-05-26
Scientific Name: Lanius ludovicianus excubitorides
Common Name: Loggerhead Shrike
Occurrence Rank:
General Description: Species detected (2016)
Occurrence Data:
Directions:

Occurrence ID: 9999107494 **First Observation:** 2019-05-29
Occurrence Class: Vertebrate Animal **Last Observation:** 2019-05-29
Scientific Name: Phalaropus lobatus
Common Name: Red-necked Phalarope
Occurrence Rank:
General Description: 1 Unknown Sex/Age; Breeding Bird Status: H; (2019)
Occurrence Data:
Directions:

Occurrence ID: 999981079 **First Observation:** 2011-06-07
Occurrence Class: Vertebrate Animal **Last Observation:** 2012-05-13
Scientific Name: Podiceps auritus
Common Name: Horned Grebe
Occurrence Rank:
General Description: Species detected (2011, 2012)
Occurrence Data:
Directions:

Occurrence ID: 999981081 **First Observation:** 2008-06-09
Occurrence Class: Vertebrate Animal **Last Observation:** 2012-05-13
Scientific Name: Podiceps auritus
Common Name: Horned Grebe
Occurrence Rank:
General Description: Species detected (2008, 2012)
Occurrence Data:
Directions:

Occurrence ID: 9999107496 **First Observation:** 2019-05-29
Occurrence Class: Vertebrate Animal **Last Observation:** 2019-05-29
Scientific Name: Riparia riparia
Common Name: Bank Swallow
Occurrence Rank:
General Description: 1 Unknown Sex/Age; Breeding Bird Status: H; (2019)
Occurrence Data:
Directions:

Occurrence ID: 9999115760 **First Observation:** 2008-07-09
Occurrence Class: Vertebrate Animal **Last Observation:** 2008-07-09
Scientific Name: Taxidea taxus taxus
Common Name: American Badger
Occurrence Rank:
General Description: Species detected (2008)
Occurrence Data:
Directions:

Wild Species Research Permitting

A Research Permit is required to detect or observe plants or wildlife for commercial purposes, such as pre-screening surveys to collect baseline data or other activities, or to conduct academic research. Research Permits are not required if you are doing surveys for personal, recreational, educational or other non-commercial purposes. Revisions were made to Section 21 of The Wildlife Act in 2015 and to Section 6.2 of The Wildlife Regulations in 2016.

See the Government of Saskatchewan Wild Species Research Permitting page for more information.

All forms and related information pertaining to Research Permits can be found in the Publications Centre. Be sure to check out the Conservation Standards Terms and Conditions for Research Permits for general, wildlife and research-specific and information submission conditions that pertain to all research permits.

Subscribe to our Mail-out List Subscriptions for updates regarding Species Detection Permits, SKCDC Lists and Ranks, Legislation and Policy and HABISask.

Species Detection Survey Protocols

The Species Detection Survey Protocols are used to detect rare and sensitive species so Activity Restriction Guidelines can be applied. Their use is required by industry/ environmental consultants for proposed or existing commercial activities.

Activity Restriction Guidelines for Sensitive Species

The Activity Restriction Guidelines for Sensitive Species outline restricted activity periods and distance setbacks for rare and sensitive species to assist proponents in minimizing impacts to rare and sensitive species and habitats.

Administrative Areas

6	Ecological Management Specialist (EMS) District(s)
Humboldt	Compliance and Field Services Area(s)
Saskatoon	Compliance and Field Services Region(s)
Saskatoon	Area Fisheries Ecologist Area(s)
PARKLAND REGION	Area Wildlife Ecologist(s)
340 - WOLVERINE	Rural Municipality
310 - USBORNE	Rural Municipality
Nothing Found	First Nation Reserve

Contact Us

For more information, please contact our Client Service Office:
Email: centre.inquiry@gov.sk.ca
Tel (toll free in North America): 1-800-567-4224
Tel (Regina): 306-787-2584

G.2 Potential Plant SOCC in the Quill Lake Plain Landscape Area

Scientific Name	Common Name	Provincial S Rank	COSEWIC	SARA Schedule 1 Status	SK Wild Species at Risk Regulations	Family
Achnatherum nelsonii ssp. *dorei*	Columbia needlegrass	S3	-	-	-	Poaceae
Alisma gramineum	narrow-leaved Water Plantain	S3	-	-	-	Alismataceae
Amphiscirpus nevadensis	Nevada bulrush	S3	-	-	-	Cyperaceae
Artemisia campestris ssp. *canadensis*	Canada sagewort	S3	-	-	-	Asteraceae
Botrychium campestre	prairie dunewort	S3	-	-	-	Ophioglossaceae
Carex buxbaumii	brown sedge	S3	-	-	-	Cyperaceae
Cirsium drummondii	short-stemmed thistle	S3	-	-	-	Asteraceae
Cladium mariscoides	twig-rush	S1	-	-	-	Cyperaceae
Corallorhiza striata var. *striata*	striped coral-root	S3	-	-	-	Orchidaceae
Cypripedium parviflorum var. *pubescens*	large yellow lady's-slipper	S2	-	-	-	Orchidaceae
Elatine triandra	longstem water-wort	S2	-	-	-	Elatinaceae
Eleocharis coloradoensis	dwarf spike-rush	S2	-	-	-	Cyperaceae
Festuca hallii	plains rough fescue	S3	-	-	-	Poaceae
Hypoxis hirsuta	eastern yellow stargrass	S2	-	-	-	Liliaceae
Lilium philadelphicum var. *andinum f immaculata*	immaculate lily	S1	-	-	-	Liliaceae
Liparis loeselii	yellow twayblade	S3	-	-	-	Orchidaceae
Lomatogonium rotatum var. *fontanum*	marsh felwort	S3	-	-	-	Gentianaceae
Pedicularis parviflora	purple lousewort	S3	-	-	-	Scrophulariaceae
Potentilla hudsonii	Hudson's cinquefoil	S2	-	-	-	Rosaceae
Potentilla lasiodonta	sandhills cinquefoil	S2	-	-	-	Rosaceae
Potentilla rubricaulis	red-stemmed cinquefoil	S3	-	-	-	Rosaceae

Scientific Name	Common Name	Provincial S Rank	COSEWIC	SARA Schedule 1 Status	SK Wild Species at Risk Regulations	Family
Potentilla supina ssp. *paradoxa*	bushy cinquefoil	S3	-	-	-	Rosaceae
Ribes oxyacanthoides var. *setosum*	bristly gooseberry	S2	-	-	-	Grossulariaceae
Ruppia cirrhosa	widgeon-grass	S3	-	-	-	Ruppiaceae
Ruppia maritima	beaked ditch-grass	S3	-	-	-	Ruppiaceae
Salix lucida	shining willow	S3	-	-	-	Salicaceae
Scirpus pallidus	pale bulrush	S3	-	-	-	Cyperaceae
Sisyrinchium septentrionale	northern blue-eyed-grass	S3	-	-	-	Iridaceae
Sporobolus heterolepis	northern dropseed	S3	-	-	-	Poaceae
Teucrium canadense var. *occidentale*	hairy germander	S3	-	-	-	Lamiaceae
Viola pedatifida	crowfoot violet	S3	-	-	-	Violaceae

G.3 Potential Wildlife SOCC to Occur in the Wildlife and Wildlife Habitat LAA

Scientific Name	Common Name	Provincial Rank[1]	Wild Species at Risk Regulations Act[2]	SARA[3]	COSEWIC[3]	HABISask[4]	SKCDC[1]	Birds Canada[5]	Field Survey
Mammals									
Taxidea taxus	American badger	S3	Not Listed	Special Concern	Special Concern	ü	ü	-	-
Lontra canadensis	north American river otter	S3	Not Listed	Not Listed	Not Listed	-	ü	-	-
Birds									
Accipiter cooperii	cooper's hawk	S4B,S2N, S2M	Not Listed	Not Listed	Not at Risk	-	ü	-	-
Aechmophorus occidentalis	western grebe	S3B	Not Listed	Special Concern	Special Concern	-	ü	-	-
Aegolius funereus	boreal owl	S3	Not Listed	Not Listed	Not at Risk	-	ü	-	-
Anthus spragueii	Sprague's pipit	S3B	Not Listed	Threatened	Threatened	ü	ü	ü	ü
Antrostomus vociferus	eastern whip-poor-will	S1B	Not Listed	Threatened	Threatened	-	ü	-	-
Aquila chrysaetos	golden eagle	S3B,S3N, S4M	Not Listed	Not Listed	Not at Risk	-	ü	-	-
Asio flammeus	short-eared owl	S3B, S2N	Not Listed	Special Concern	Threatened	ü	ü	-	-
Buteo platypterus	broad-winged hawk	S4B,S3M	Not Listed	Not Listed	Not Listed	-	ü	-	-
Buteo regalis	ferruginous hawk	S3B	Not Listed	Threatened	Special Concern	ü	ü	-	-
Buteo regalis	ferruginous hawk	S3B	Not Listed	Threatened	Special Concern	-	ü	ü	-
Calamospiza melanocorys	lark bunting	S2B	Not Listed	Threatened	Threatened	-	ü	-	-

Scientific Name	Common Name	Provincial Rank[1]	Wild Species at Risk Regulations Act[2]	SARA[3]	COSEWIC[3]	HABISask[4]	SKCDC[1]	Birds Canada[5]	Field Survey
Calcarius ornatus	chestnut-collared longspur	S3B	Not Listed	Threatened	Endangered	-	ü	ü	-
Calidris canutus	red knot	S2M	Not Listed	Endangered	Endangered	ü	ü	-	-
Cardellina canadensis	Canada warbler	S4B,S3M	Not Listed	Threatened	Special Concern	-	ü	-	-
Cathartes aura	turkey vulture	S3B	Not Listed	Not Listed	Not Listed	-	ü	ü	-
Centronyx bairdii	Baird's sparrow	S4B	Not Listed	Special Concern	Special Concern	ü	ü	ü	ü
Chaetura pelagica	chimney swift	S2B	Not Listed	Threatened	Threatened	-	ü	-	-
Charadrius melodus	piping plover	S3B	Endangered	Endangered	Endangered	ü	ü	-	-
Chordeiles minor	common nighthawk	S4B	Not Listed	Threatened	Special Concern	ü	ü	-	-
Contopus cooperi	olive-sided flycatcher	S4B	Not Listed	Threatened	Special Concern	-	ü	-	-
Coturnicops noveboracensis	yellow rail	S3B	Not Listed	Special Concern	Special Concern	-	ü	-	-
Dolichonyx oryzivorus	bobolink	S5B	Not Listed	Threatened	Special Concern	ü	ü	ü	-
Dryocopus pileatus	pileated woodpecker	S3	Not Listed	Not Listed	Not Listed	-	ü	-	-
Euphagus carolinus	rusty blackbird	S3B, SUN	Not Listed	Special Concern	Special Concern	ü	ü	-	-
Euphagus carolinus	rusty blackbird	S3B,SUN	Not Listed	Special Concern	Special Concern	-	ü	-	-
Grus americana	whooping crane	SXB, S1M	Endangered	Endangered	Endangered	ü	ü	-	-
Hirundo rustica	barn swallow	S4B	Not Listed	Threatened	Special Concern	ü	ü	ü	-

Scientific Name	Common Name	Provincial Rank[1]	Wild Species at Risk Regulations Act[2]	SARA[3]	COSEWIC[3]	HABISask[4]	SKCDC[1]	Birds Canada[5]	Field Survey
Hydroprogne caspia	caspian tern	S2B	Not Listed	Not Listed	Not at Risk	-	ü	-	-
Lanius borealis	northern shrike	S1B,S4N, S4M	Not Listed	Not Listed	Not Listed	-	ü	-	-
Lanius ludovicianus	loggerhead shrike	S3B	Not Listed	Threatened	Threatened	ü	ü	ü	-
Lanius ludovicianus	loggerhead shrike	S3B	Not Listed	Threatened	Threatened	-	ü	-	-
Melanerpes erythrocephalus	red-headed woodpecker	S1B	Not Listed	Endangered	Endangered	-	ü	-	-
Pandion haliaetus	osprey	S3B	Not Listed	Not Listed	Not Listed	-	ü	-	-
Phalaropus lobatus	red-necked phalarope	S4B, S3M	Not Listed	Special Concern	Special Concern	ü	ü	-	-
Pinicola enucleator	pine grosbeak	S2B,S4N	Not Listed	Not Listed	Not Listed	-	ü	-	-
Podiceps auritus	horned grebe	S5B	Not Listed	Special Concern	Special Concern	ü	ü	ü	-
Riparia riparia	bank swallow	S4B, S5B	Not Listed	Threatened	Threatened	ü	ü	ü	-
Sialia sialis	eastern bluebird	S3B	Not Listed	Not Listed	Not at Risk	-	ü	-	-
Strix nebulosa	great grey owl	S3	Not Listed	Not Listed	Not at Risk	-	ü	-	-
Strix varia	barred owl	S3	Not Listed	Not Listed	Not Listed	-	ü	-	-
Surnia ulula	northern hawk owl	S3B,S5N	Not Listed	Not Listed	Not at Risk	-	ü	-	-
Vireo flavifrons	Yellow throated vireo	S3B	Not Listed	Not Listed	Not Listed	-	ü	-	-

Scientific Name	Common Name	Provincial Rank[1]	Wild Species at Risk Regulations Act[2]	SARA[3]	COSEWIC[3]	HABISask[4]	SKCDC[1]	Birds Canada[5]	Field Survey
Amphibians									
Ambystoma mavortium	western tiger salamander	S4	Not Listed	Special Concern	Special Concern	-	ü	-	ü
Lithobates pipiens	northern leopard frog	S3	Not Listed	Special Concern	Special Concern	-	ü	-	-

Notes:
[1] SKCDC 2022
[2] GOS 1999
[3] GOC 2022c
[4] SK ENV 2022
[5] Birds Canada 2022a, 2022b
S1: critically imperiled
S2: imperiled
S3: vulnerable
S4: apparently secure
S5: secure
B: breeding population
M: migrant population
U: status is uncertain
N: non-breeding population
X: believed to be extinct or extirpated

G.4 Wildlife Species Observed in the Wildlife and Wildlife Habitat LAA

Wildlife Species Inventory

Scientific Name	Common Name	Provincial Rank
Ammodramus savannarum	grasshopper sparrow	S4B
Ammospiza leconteii	Leconte's sparrow	S5B
Anas platyrhynchos	mallard	S5B
Anthus spragueii	Sprague's pipit	S3B
Branta canadensis	Canada goose	S5B
Buteo jamaicensis	red-tailed hawk	S5B, S1N
Centronyx bairdii	Baird's sparrow	S4B
Charadrius vociferus	killdeer	S5B
Colaptes auratus	northern flicker	S5B, SUN
Corvus brachyrhynchos	American crow	S5B, S4N
Empidonax minimus	least flycatcher	S5B
Euphagus cyanocephalus	brewer's blackbird	S5B, SUN
Gallinago delicata	Wilson's snipe	S5B
Larus delawarensis	ring-billed gull	S5B
Molothrus ater	brown-headed cowbird	S5B, SUN
Passerculus sandwichensis	savannah sparrow	S5B
Phalaropus tricolor	Wilson's phalarope	S5B
Pooecetes gramineus	vesper sparrow	S5B
Porzana carolina	sora	S5B
Setophaga petechia	yellow warbler	S5B
Spatula clypeata	northern shoveler	S5B
Spatula discors	blue-winged teal	S5B
Spizella pallida	clay-colored sparrow	S5B
Sturnella neglecta	western meadowlark	S5B
Tringa semipalmata	willet	S4B
Troglodytes aedon	house wren	S5B
Zenaida macroura	mourning dove	S5B
Ambystoma mavortium	western tiger salamander	S4
Canis latrans	coyote	S5

Appendix H Heritage Resource Impact Assessment - Overview

Appendix

Heritage Resource Impact Assessment - Overview

Prepared by

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Environmental Assessment

Environment Department
SaskPower

Nov 22nd, 2022

SaskPower
Powering the future

1. Introduction

1.1 The Heritage Screening Process

As part of the internal project development process, an *Overview* level heritage resource impact assessment (HRIA) was undertaken for the proposed Project. “An *Overview* is a preliminary statement of the archaeological resource potential of an area or region in which a development is proposed. The *Overview* should identify where conflicts between archaeological resources and development are likely to occur and recommend where and perhaps how subsequent investigations should be undertaken” (Ministry of Parks, Culture and Sport, 2010:8)

The first part of this overview HRIA involved overlaying the proposed development study area with a map of all known heritage resources in the province (Figure 1). It also involved predicting (by means of a predictive GIS model built for this purpose, as well relying on the professional judgment of the professional archaeological screener) where any as-of-yet undiscovered heritage resources may be present within the study area.

Using these tools, SaskPower’s Archeologist was able to identify where potential conflicts between the proposed project and known heritage resources. SaskPower’s Archeologist was also able to make recommendations as to which areas within the study area will require field assessments to determine if any heritage resources are present prior to any development taking place. The field studies will largely be contracted out to a qualified third-party archaeological consultant. This consultant will obtain an Archaeological Research Permit from the provincial regulator (the Saskatchewan Heritage Conservation Branch). Their field studies will consist of a visual inspection of the archaeologically sensitive areas that SaskPower’s Archeology group has prescribed. The consultant will also conduct ‘shovel testing’ in areas were buried archaeological deposits are suspected. SaskPower’s Archeologists support the idea of members of the local indigenous community accompanying the consultant field crew and contributing to the discussions about the heritage resources of the area.

The consultant will submit a report to the provincial regulator following the conclusion of their field assessment. This report will make recommendations as to what (if any) further studies or mitigations SaskPower should undertake. SaskPower will have the ability to comment upon the report before and after it is submitted. Once the regulator has approved the report, they will issue us a letter detailing what (if any) further mitigation SaskPower will be required to undertake prior to allowing us to proceed with the development. SaskPower commits to fulfilling the obligations set forth by the provincial regulator.

1.2 Culture History of Saskatchewan.

The information presented in the overview was acquired from the provincial inventory of Saskatchewan archaeological sites. The Heritage Conservation Branch of the Provincial Ministry of Parks, Culture, and Sport maintains a database of all the archaeological sites that have been officially recorded (typically either by professional archaeologists or amateur enthusiasts) within Saskatchewan. Currently, there are approximately 24,000 recorded archaeological sites in the province spanning the last 12,000 years or so of human history. This is by no means a complete inventory, and on average 200-300 archaeological sites are added to the inventory every year as heritage resource impact assessments get completed within the province.

Archaeologists have divided this history into two main periods: The Pre-Contact Period (everything that happened before indigenous groups encountered Europeans) and the Post-Contact Period (everything that happened after contact was made). The Pre-Contact Period is further subdivided into three broad time periods: The Early Plains Period, the Middle Plains Period, and the Late Plains period. These periods roughly correspond to a shift in material culture and corresponding subsistence strategies. The material culture of the Early Plains Period (From approximately 12,000 to 8,000 years before present) is defined by the presence of large spear points. It is believed that the hunter-gatherers of this time period relied on mammoth and other large megafauna as part of their subsistence. The Middle Plains Period (8,000 to 2,000 years before present) saw the introduction of the innovative atlatl, a javelin-like spear thrower. The projectile points from this period are smaller than the spear points of the previous era. The people of this era hunted bison as their main subsistence strategy. The Late Plains Period (2,000 years ago until the time of contact with Europeans) saw the introduction of the bow and arrow as well as pottery into the material culture. The people of this era practiced communal bison hunting in addition to the hunting practices of past eras.

The material culture of the early, middle and late pre-contact periods can be further subdivided into archaeological cultures based on distinctive stylistic attributes of the projectile points they manufactured. Each style or 'typology' of projectile point can be attributed to a specific age range largely based on sites where these artifacts have been found alongside materials which were then radiocarbon dated. When these diagnostic artifacts are found at an archaeological site, they can be used to effectively determine the age of the site even in the absence of materials that could be radiocarbon dated.

The types of archaeological sites found within Saskatchewan can also be classified into categories. Broadly speaking, they are classified by the number of artifacts found at the site and if there are any archaeological features found on the surface (such as stone rings or cairns). In general, sites with a dense intact layer of artifacts lying undisturbed beneath the ground are considered more significant and worthier of further investigation than sites where the artifacts have been found in an already disturbed context (such as lying on the surface of a cultivated field or recovered form the ploughzone of a cultivated field). All sites with intact archaeological features on the ground surface are assumed to have an intact sub-surface component as well, until it can be proven otherwise. Archaeological sites with multiple intact archaeological components from different eras of history are generally considered more significant than sites with a single component.

Table 1. Culture History of the Saskatchewan

Period	Diagnostic Artifact / Name of Archaeological Material Culture	Date Range (in radiocarbon years before present)
Early Plains Period	Clovis	~12,000 - 10,800
	Folsom	10,900 - 10,200
	Agate Basin	10,500 - 9,600
	Cody Complex	9,600 - 8,600
	Late Paleo- Lanceolate	8,800 – 7,500
Middle Plains Period	Mummy Cave Complex	8,000 - 5,000
	Oxbow	5,000 - 3,000
	McKean Lanceolate	4,200 - 3,200
	McKean - Duncan/Hanna	3,900 - 3,200
	Pelican Lake	3,600 -2,800
Late Plains Period	Besant	2,500 - 1,350
	Avonlea	1,350- 1,100
	Prairie Side-notched	1,100 - 600
	Plains Side-notched	600 - 250
Post -Contact Period	Fur Trade Era	1750 AD - 1875 AD (Calendar Years)
	Early European Settlement	1875 AD – 1914 AD (Calendar Years)
	Modern Era	1914 - Present

1.3 Significant Archaeological Sites and Sites of a Special Nature

The significance of an archaeological site can be measured in a variety of ways:

- **Historical Significance:** Associated with events, places, peoples, organizations or institutions that have made a lasting contribution to the development of Saskatchewan.
- **Cultural/Spiritual Significance**: Sites that contribute to a community's identity or directly connected to a community's traditional way of life
- **Scientific Significance:** Sites that contain or have contributed original material which has furthered (or has the potential to further) our understanding of the past.

When archaeologists refer to a site as being significant, it is often in terms of the *scientific significance* or the site's potential to contribute material which can serve to illuminate past lifeways. Archaeologists often apply the term "significant site" to an archaeological resource when the site represents a sizable and intact collection of information that could potentially further our understanding of past lifeways. Typically, these are large archaeological sites or sites that have been used repeatedly by multiple groups of people over the course of thousands of years. These determinations are typically made by the archaeological practitioner. The indigenous communities and their traditional knowledge keepers may well have their own, equally valid, criteria for determining what makes an archaeological site significant.

In Saskatchewan, there is also the designation of "**Site of a Special Nature (SSN)**" that gets applied to some significant sites where there is evidence of a ceremonial or ritual aspect. These sites include all sites with a "pictograph, petroglyph, human skeletal material, burial object, burial place or mound, boulder effigy, or medicine wheel". This classification is a legal definition as specified under the Saskatchewan *Heritage Property Act (1980)* which affords these types of sites special protections. The provincial regulator has zero appetite to entertain potential impacts to these kinds of sites. All SSNs are considered culturally significant sites, but not all significant sites can be classified as SSN's.

Avoidance of these SSN sites is highly recommended and even approaching the limits of a Site of a Special Nature will trigger the need for a detailed field inspection of the project area surrounding the SSN. Should an SSN be discovered during the field investigation phase of the heritage resource impact assessment, changing the development footprint so that it avoids the site area will be most likely required. Discovering an SSN fortuitously during the construction phase of the project will most likely result in a stop work order being issued while the site is investigated and consultation with the local indigenous groups is conducted.

2.0 Heritage Resource Overview of the Project Area

2.1 Heritage Inventory of the Study Area

The study area was designed to include the proposed CCGT plant site, the Wolverine Station, and all possible sources for the waterline and distribution level power that will feed the plant. Though not defined at the time of the overview, the transmission line between the CCGT plant and Wolverine station, and any potential infrastructure upgrades are assumed to be contained within this study area as well. Please note that the natural gas line which will be evaluated, permitted, and constructed by TransGas is outside of the care and control of SaskPower (though, it too will be within this study area).

There are several heritage resources contained within the study area (Figure 1). The inventory of heritage resources is summarized in Table 2. Few sites within the study area have produced culturally diagnostic materials that could determine the age of the cultural occupation (Table 4).

In addition to the known heritage resources, portions of the study area are considered "archaeologically sensitive", meaning that there is an increased likelihood that additional unrecorded heritage resources are present within these defined areas. In general, these areas are defined by proximity to a significant waterbody or distinct landform feature such as elevated ridges or knolls.

The quarter section (NW ¼ of section 36-33-23-W2M) encompassing the proposed CCGT project plant site does not contain any known archaeological resources and is not considered to be an archaeologically sensitive area. Unlike areas to the northwest and south of the proposed site, the quarter section in question is not adjacent to a significant waterbody, nor does the parcel of land contain any distinct, prominent landforms. There are archaeologically sensitive areas in the land parcels adjacent to the proposed Project. Any incidental development that proposes to intersect these archaeologically sensitive areas adjacent to the project, will trigger a field investigation HRIA by a third-party consultant. This area of archaeological sensitivity is illustrated on the heritage inventory map (Figure 1).

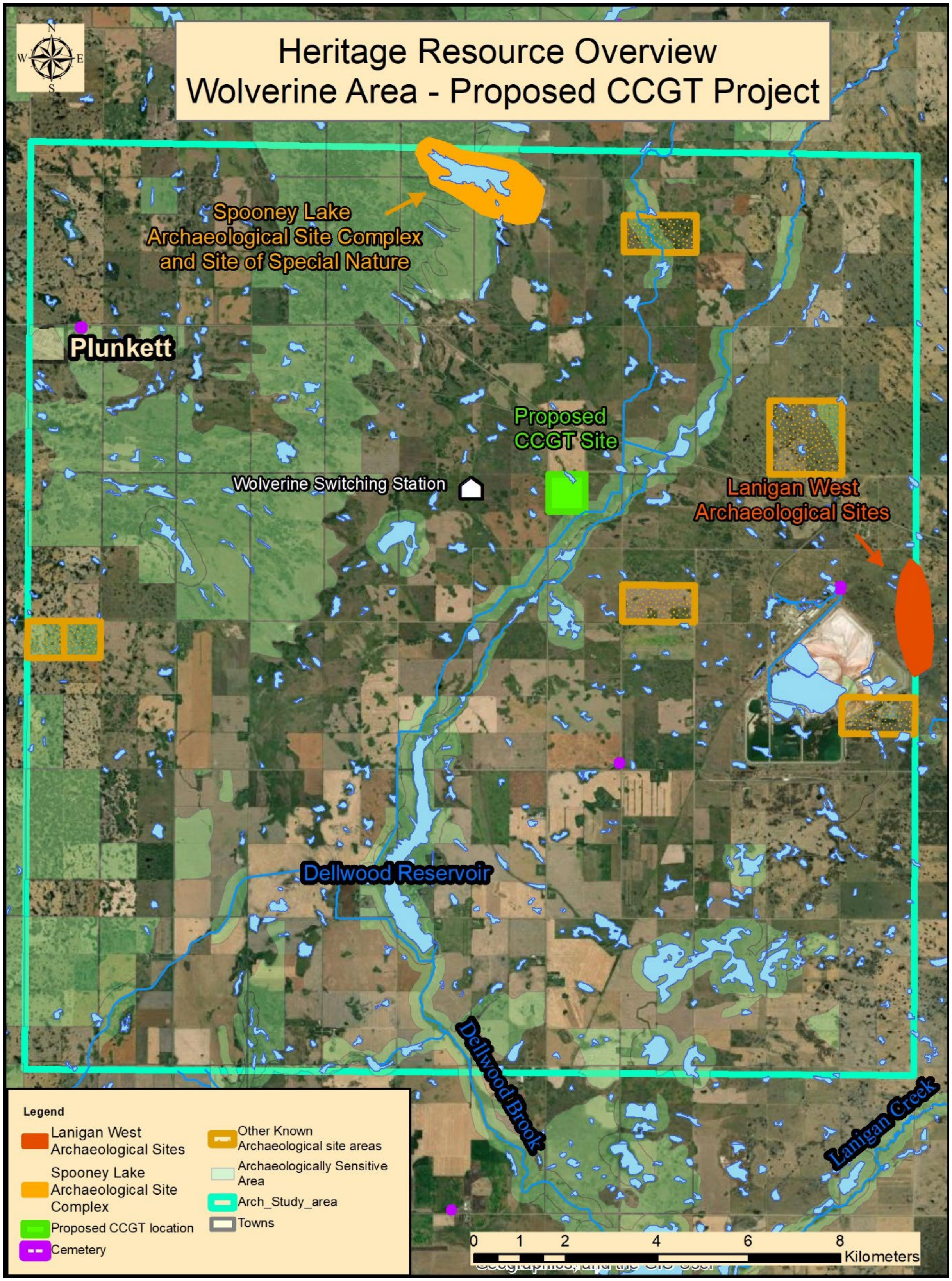

Figure 1: Heritage Resource Inventory of the Study Area

Table 2. Heritage Resources within the Study Area

Resource Type	Number
Site of a Special Nature	1
Archaeological Sites	15
Registered Cemeteries	3

Table 3 Types of archaeological sites within the study area.

Type	Number
Artifact Find (5 or fewer artifacts)	2
Artifact Scatter (6 or more artifacts)	7
Artifact / Feature Combination	1
Single Surface Feature	2
Recurrent Surface Features	2
Stone Alignment / Configuration	1
Medicine Wheel	1

Table 4 Culture History of the Study Area

Period	Diagnostic Artifact (Date Range in RCYBP)	Number of Components at Sites Within study area
Late Plains Period	Plains Side-notched (550 - 200)	1
Post -Contact Period	Early European Settlement (1875 AD - 1914AD)	1

2.1.1 Significant Archaeological Sites and Sites of a Special Nature

There are two clusters of significant archaeological sites within the study area. One cluster (refereed to here as the Spooney Lake Archaeological Site Complex) consists of a series of archaeological sites associated with Spooney Lake on the northern boundary of the study area. The other (Lanigan West Archaeological sites) is a pair of sites on the eastern edge of the study area. Neither of these site areas fall within the proposed development areas of the proposed CCGT plant and its incidental projects.

Spooney Lake Archaeological Site Complex is a cluster of eight archaeological sites in situated on the hilltops and other landforms surrounding Spooney Lake. These eight sites comprise a variety of archaeological features including a series of tipi rings, some uniquely shaped stone cairns, a medicine wheel, and a couple of linear stone features that have been interpreted as drive lines for a bison jump/pound.

The site containing the medicine wheel is considered a Site of a Special Nature under the Heritage Property Act and no development in and around that site is likely to be permitted. Taken as a whole, these eight sites represent evidence of a significant and repeated pre-contact occupation of the area surrounding Spooney Lake. In addition, these have largely been left undisturbed and important cultural materials are presumed to be intact underneath the ground surface

Lanigan West Sites: These sites consist of large scatters of artifacts collected from the cultivated fields by local individuals back in the late 1930's. These sites are noteworthy due to the diverse and plentiful nature of the artifacts recovered from the fields. In addition to the high number of stone tools, a carved atlatl weight was also recovered. These sorts of decorated items are rarely found at archaeological sites and are considered significant cultural artifacts. Unfortunately, subsequent visits to these fields have proved to be unsuccessful in relocating the site, though the area has not been thoroughly investigated through subsurface shovel testing and the possibility of an intact component beneath the ploughzone remains.

2.1.2 Other Archaeological Sites

There are a total of six other archaeological sites within the study area. Unfortunately, these sites were recorded some number of decades ago and the exact location of the finds is imprecise. They each represent a small artifact scatter that was collected by local enthusiasts and eventually reported to the regulator. Very little is know about the nature of these sites and, should a proposed development intersect the site area, an HRIA would be warranted.

2.1.3 Registered Cemeteries

There are three registered cemeteries within the study area (Figure 1.). These sites will be avoided by the proposed plant and its incidental projects. Should one of the incidental projects impact the area immediately adjacent to one of the cemeteries, a field inspection will be conducted to determine the likelihood of burials being present within our proposed impact zone. Further mitigation may be recommended pending the outcome of this assessment.

2.2 Reconnaissance HRIA of NW ¼ of section 36-33-23-W2M

No HRIA was initially planned for 2022, however WLCS identified two cultural features within the quarter section in question at the end of October 2022. Since these features could have regulatory implications at the provincial level as well, SaskPower engaged a third-party archaeological consultant to assess the quarter section for archaeological resources. The goals of this study were threefold: to investigate (through passive, non-invasive means) the cultural features identified by WLCS to determine if they were archaeological in nature, to conduct subsurface testing within the proposed plant site to determine if a cultural component is present beneath the ploughzone, and to evaluate the archaeological potential of the areas within the quarter section but outside the proposed plant footprint.

The reconnaissance HRIA was conducted on Nov 1st, 2022, under archaeological resource investigation permit # 22-149 (on file with the provincial regulator). The final report has not been submitted at the time of this project description submission. A summary of the assessment findings was communicated with SaskPower on Nov 2nd. The investigating archaeologist concluded that the two cultural sites identified by WLCS did not meet the definition of an archaeological site, and thus did not need to be recorded as archaeological resources and reported to the provincial regulator. No further archaeological work was recommended at these two sites.

Similarly, subsurface testing at within the proposed footprint of the plant site did not reveal any buried archaeological deposits. Nor was the area within NW quarter of section 36 outside of the project footprint considered to be archaeologically sensitive.

The remnants of an old homestead established by Mr. Frank Fach and family in 1906 (situated along the northern boundary of the quarter section, outside of the proposed Project footprint) were documented in the field and their historical context was researched at the provincial archives. The archival research did not indicate an association between this site and any significant contribution to the development of Saskatchewan. In addition, the condition of the site is considered poor, as only a few foundations/floors remain visible. As such, the archaeological significance of this site is considered low. Nonetheless, the site will be recorded and registered as an archaeological site with the provincial regulator as a matter of due diligence. The archaeological consultant did not recommend any further archaeological investigations at the homestead site.

In short, the investigating archaeologists are not recommending further work within this quarter section. It is worth noting that the provincial regulator has not yet reviewed the findings of their report. In addition, having no regulatory requirements for additional archaeological work at the gas plant site does not preclude us from conducting additional archaeological surveys in conjunction with WLCS or other interested indigenous rights-holders.

2.3 Next Steps

2.2.1 The CCGT plant site:

At this time there are no plans for additional archaeological investigations at the plant site or within the NW 36 quarter section. The reconnaissance HRIA is considered a thorough archaeological investigation and the likelihood of undiscovered archaeological sites being present within this quarter is extremely low. No further work is being recommended by the archaeological consultant, though additional studies may be undertaken in conjunction with indigenous rights-holders to address any concerns they have.

The former homestead site just to the north of the plant site was recorded as an archaeological site, based on the few architectural features still present on the ground and the archival research. No further archaeological investigations are being recommended for the homestead site, though it is possible the provincial regulator may impose some conditions on working in proximity to the homestead.

2.2.2 The Proposed CCGT – Wolverine Switching Station 230kV interconnection

The proposed route for the transmission line between the plant site and the Wolverine Switching Station was not known at the time of this overview. SaskPower's Archeologist is working on the assumption that the transmission line will follow a fairly direct route between the two facilities. There are no known heritage resources within the area between the two facilities and the potential for the area to contain archaeological sites is considered to be low. However, an HRIA may be required should the proposed route intersect an area of undisturbed native parkland. SaskPower will strive to include the participation of indigenous rights-holders in any archaeological investigations.

2.2.3 Incidental Distribution Power Line

The route for the distribution (25kV or less) power line required for the operation of the CCGT plant is not known at this time. However, it is possible that the route may intersect one or more of the site areas for the poorly defined/recorded archaeological sites (described in section 2.1.2) present within the study area. If the route of the distribution power line intersects one of these site areas, an HRIA will be conducted to evaluate if the resource is at risk of being impacted. SaskPower will strive to include the participation of indigenous rights-holders in any archaeological investigations.

2.2.4 Other Incidental projects (Road, fibre, Distribution line)

SaskPower's Archaeologist is working with Project team to understand the final plans for these additional incidental projects (roads, fibre and waterline). As a guideline, should the footprint for any of these projects approach any of the recorded locations of heritage resources in the study area, then an inventory HRIA will be conducted to evaluate if the resource is at risk of being impacted. Similarly, should the incidental projects infringe upon any of the archaeologically sensitive areas, then they will likewise be subjected to an inventory HRIA. SaskPower's archeologist will conduct a full overview of all incidental projects to determine next steps, once their locations are known.

References Cited

Saskatchewan Ministry of Parks, Culture and Sport

2010 Permit Policy. Electronic document. http://publications.gov.sk.ca/documents/96/97824-PermitPolicy.pdf. Accessed Feb 1st, 2019