



# Great Plains Generating Station

Project Summary  
Submitted Under the *Canadian Environmental Assessment Act, 2012*

SUBMITTED TO:

Canadian Environmental Assessment Agency

SUBMITTED BY

ATCO Power Canada Ltd.

February 2016

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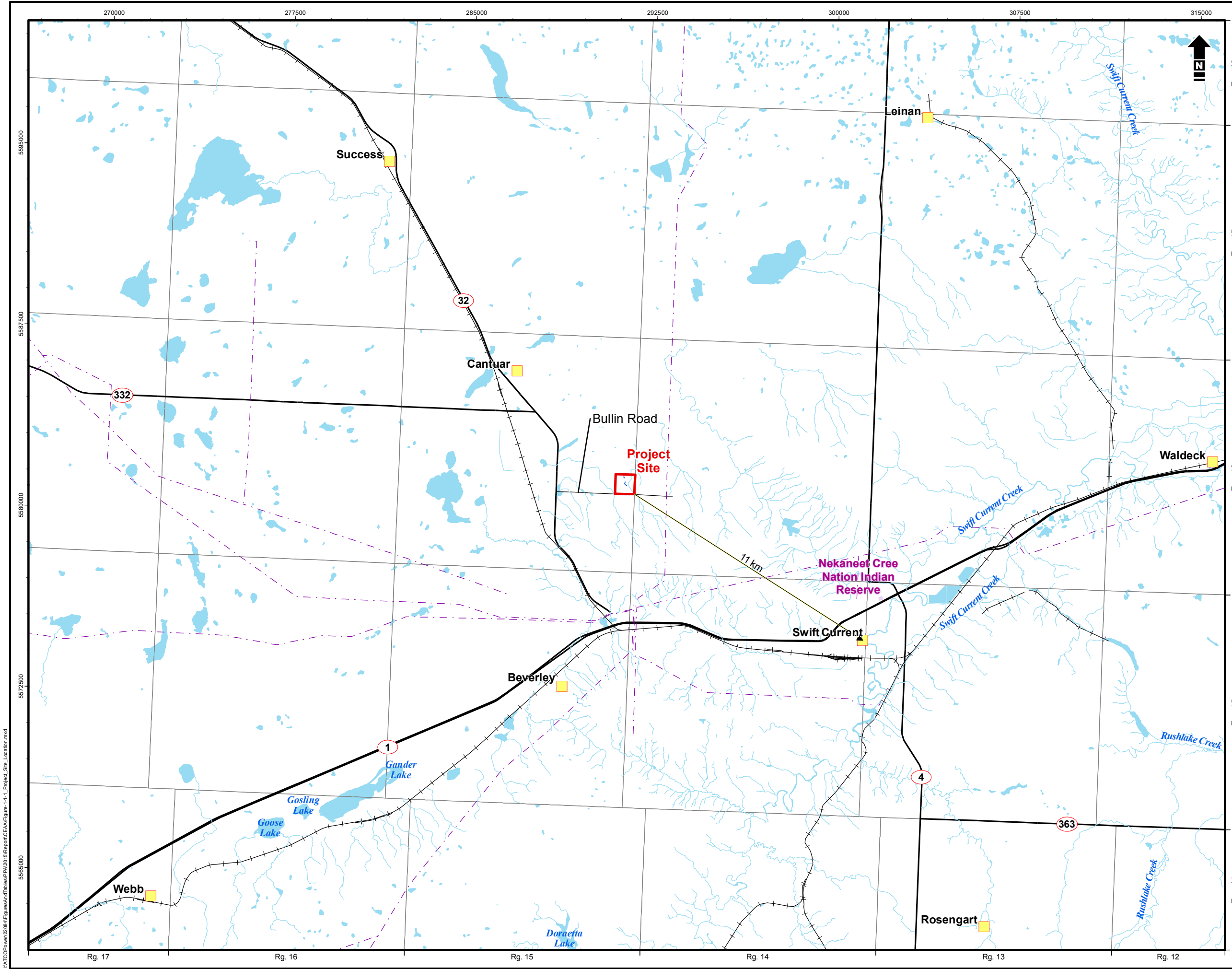
## **1.0 General Information**

### **1.1 Name, Nature and Proposed Location of Project**

ATCO Power Canada Ltd. is an experienced, industry-leading expert in developing, building and operating power generation facilities. We are known for our strong safety record and the reliability of our generating units with an ownership position in 13 power generation stations in Alberta, British Columbia, Saskatchewan, and Ontario. ATCO Power has entered a bid process initiated by Saskatchewan Power Corporation (SaskPower) to design, build and operate a 350 megawatt (MW) natural gas-fired combined cycle gas turbine power plant that will be called the Great Plains Generating Station (the Project). SaskPower is expected to award the Project in July 2016, which is planned to start operating by October 2019. As part of its evaluation of assessment and permitting requirements for the Project, ATCO Power is submitting this Project Description to determine if an environmental assessment is required under the *Canadian Environmental Assessment Act, 2012* (CEAA 2012).

The Project will be located approximately 11 km northwest of Swift Current, Saskatchewan, on a 64 ha or 158 acre land parcel privately owned by SaskPower at SE 13-016-15 W3M (the Project site). The Project will be entirely within the Rural Municipality of Swift Current No. 137 (RM of Swift Current No. 137). Once constructed, the Project will occupy a maximum of 16 ha (the Project footprint). A regional map showing the Project site is presented on Figure 1.1-1.

The Project will be designed to use state-of-the-art gas turbine, heat recovery steam generator (HRSG), steam turbine, and air cooled condenser technology to achieve high energy efficiency while producing low air emissions, and with minimal water usage for the amount of electricity produced. The Project is located near the major utilities required for large power plants: high voltage transmission lines with available capacity, high pressure natural gas pipelines with available capacity, and a raw water supply from the City of Swift Current.



- Project Site
- Community
- Indian Reserve
- GeoBase Mapped Location of Water Body
- GeoBase Mapped Location of Seasonal Water Drainage/Watercourse
- - - Observed Location of Seasonal Water Drainage
- + Railway
- Highway
- - - Powerline

Reference: Data obtained from GeoBase® and GeoGratis © Department of Natural Resources Canada (all rights reserved) used under license. GDM transportation infrastructure data provided by IHS © 2015 used under license.

1:150,000

Kilometres

NAD 1983 UTM Zone 13N



Great Plains Generating Station

## Project Site Location

Date: 11 Feb 2016		Project: 22084	
Technical: N. Huq	Reviewer: B. Fuchs	Drawn: J. Sturk	
Disclaimer: Prepared solely for the use of ATCO Power as specified in the accompanying report. No representation of any kind is made to other parties with which ATCO Power has not entered into contract.			Figure 1.1-1

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## 1.2 Proponent Contact Information

**Name of the proponent:** ATCO Power Canada Ltd.

**Address of the proponent:** 400, 919 - 11 Ave. SW  
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## 1.3 Consultations Undertaken with Stakeholders and Jurisdictions

### 1.3.1 Identified Stakeholders

The jurisdictions and other parties that ATCO Power has consulted with regarding the Project are listed in Table 1.3-1.

**Table 1.3-1 Jurisdictions and Other Parties Consulted for the Project**

Federal Government	Canadian Environmental Assessment Agency
Provincial Government	Saskatchewan Ministry of Environment Saskatchewan Ministry of Economy Saskatchewan Water Security Agency (WSA)
Municipal Government	RM of Swift Current No. 137 City of Swift Current
Aboriginal Groups	Carry the Kettle Nakoda First Nation

In addition, ATCO Power has attempted to contact the Nekaneet Cree Nation, the Métis Nation of Saskatchewan and the File Hills Qu'Appelle Tribal Council regarding the Project but has not yet been successful in scheduling a meeting to introduce the Project. As described in Section 1.1, SaskPower is conducting a bid process for the design, construction, and operation of the Project. ATCO Power will continue to engage with the identified stakeholders if SaskPower selects ATCO Power to develop the Project.

### 1.3.2 *Overview of Stakeholder Consultation to Date*

#### 1.3.2.1 Aboriginal Consultation

The Project is located within the boundaries of the Treaty No. 4, which covers much of southern Saskatchewan. The two closest First Nation reserves to the Project are the Nekaneet Cree Nation and the Carry the Kettle Nakoda Nation.

The Nekaneet Cree Nation reserve is located approximately 113 km southwest of the Project, near Maple Creek, Saskatchewan. The First Nation also has an “urban reserve” near the City of Swift Current, 11 km east of the Project, which is used to operate the Living Sky Casino. The closest is Carry the Kettle Nakoda First Nation Reserve located approximately 66 km northwest of the Project.

The Project is also located within the boundaries of Western Region III, as defined by the Métis Nation of Saskatchewan (Deloitte 2013). Within this region, the Métis Locals in Swift Current and Maple Creek are not identified as being active. The closest active Métis Local is the Prairie Dog Métis Local 123, approximately 50 km south of the Project.

ATCO Power has contacted the Nekaneet Cree Nation and the Carry the Kettle Nakoda First Nation (as well as the File Hills Qu’Appelle Tribal Council) and the Métis Nation of Saskatchewan Western Region III to introduce the Project and to identify their interests in the Project area. No comments or concerns have been expressed by Aboriginal groups to date. If awarded the Project, ATCO Power will continue to work with Aboriginal communities to identify and address comments and concerns expressed for the Project. ATCO Power has developed an Aboriginal Consultation Plan to support these ongoing activities.

#### 1.3.2.2 Non-Aboriginal Consultation

SaskPower undertook an extensive Saskatchewan-wide site selection process that began in 2012 (City of Swift Current 2015). SaskPower engaged municipalities throughout Saskatchewan to select the most appropriate location for the Project. The Project location was chosen based on a number of factors, including proximity to existing transmission infrastructure and natural gas supply, as well as the growing demand for electricity in southwest Saskatchewan.

ATCO Power’s early consultation activities included discussions with municipal, provincial, and federal government officials. Meetings were held with representatives from City of Swift Current, the RM of Swift Current No. 137, Saskatchewan ECON, Saskatchewan WSA, Saskatchewan Environment (Saskatchewan ENV), and the CEA Agency, who are responsible for administering legislation potentially applicable to the Project. The purposes of these meetings were to:

- introduce and inform these parties of the Project scope, need, benefits and schedule
- seek clarification regarding regulatory processes applicable to the Project
- obtain updates and seek clarification with respect to recent changes to regulatory application requirements

Comments received from the RM of Swift Current No. 137 and the City of Swift Current during ATCO Power’s engagement activities to date have expressed support for the Project and the development opportunities within the region. To date, ATCO Power has not received any Project-specific stakeholder concerns.



ATCO Power will continue to work with local landowners and stakeholders to communicate changes and/or updates to the Project. If required, ATCO Power will also work with SaskPower on the design and/or public consultation efforts associated with the transmission line route and configuration required to interconnect the Project to the provincial power grid.

Feedback obtained through the stakeholder engagement plan will play an important role in continued Project planning. For example, personal consultations with participants will generate new information that will be used to identify additional mitigation measures during subsequent engineering design analysis.

## 1.4 Environmental Assessment and Regulatory Requirements

The provincial environmental assessment requirements and regulatory review process for the Project are under the jurisdiction of Saskatchewan ENV – Environmental Assessment Branch. ATCO Power is planning to submit a Technical Proposal under the *Saskatchewan Environmental Assessment Act* in February 2016. The Technical Proposal is similar to the CEAA Project Description in that it provides information to Saskatchewan ENV to obtain Ministerial Determination of whether the Project is considered a “development” and requires a provincial environmental impact assessment.

ATCO Power will also obtain the required federal, provincial, and municipal permits for construction and operation of the Project, as outlined in Table 1.4-1.

**Table 1.4-1 Anticipated Project Permit and Regulatory Requirements**

Project Component	Owner / Operator / Permit Holder	Permit/ Licence Required	Jurisdiction	Legislation	Permitting Requirements
Air emissions from operation of the Project	ATCO Power	Environmental Protection Plan	Province of Saskatchewan, Ministry of Environment	<i>Environmental Management and Protection Act</i>	ATCO Power will complete additional dispersion modelling, following detailed engineering design, to demonstrate compliance with the applicable <i>Saskatchewan Ambient Air Quality Standards</i> and emission standards (Government of Saskatchewan n.d.). ATCO Power will prepare and submit a certified Environmental Protection Plan for the Minister’s approval.
Construction of the exhaust stack	ATCO Power	Approval from Transport Canada	Transport Canada	Canadian Aviation Regulations	ATCO Power will submit an Assessment Request for Obstruction Marking and Lighting to Transport Canada. The exhaust stack height will not exceed any of the criteria constituting an obstacle to navigation listed in Canadian Aviation Regulations 2012-1 <i>Division III – Marking and Lighting of Obstacles to Air Navigation, Section 601.23.</i>

<b>Project Component</b>	<b>Owner / Operator / Permit Holder</b>	<b>Permit/ Licence Required</b>	<b>Jurisdiction</b>	<b>Legislation</b>	<b>Permitting Requirements</b>
Construction of the exhaust stack	ATCO Power	Approval from NAV CANADA	NAV CANADA	Canadian Aviation Regulations	NAV CANADA must assess and approve all proposals for land use near airports and air navigation infrastructure to ensure that air navigation system safety is not compromised. ATCO Power will submit a Land Use Application to NAV CANADA.
Removing Class II wetland during construction. Pumping to remove water, if necessary	ATCO Power	Provincial Aquatic Habitat Protection Permit (AHPP)	Province of Saskatchewan, WSA	<i>Environmental Management and Protection (General) Regulations, 2010</i>	An AHPP will be obtained before construction in the area of the Class II wetland that is within the Project footprint.
Modifying seasonal waterway during construction	ATCO Power	Provincial AHPP	Province of Saskatchewan, WSA	<i>Environmental Management and Protection (General) Regulations, 2010</i>	An AHPP will be obtained for the modification of the seasonal waterway.
Use of water from the City of Swift Current for the purposes of the Project	ATCO Power	Water Licence	Province of Saskatchewan, WSA	<i>Water Security Agency Act</i>	A Water Licence Application will be filed to the Saskatchewan WSA to supply water from the Swift Current water treatment plant.
Pipelines to supply water to the Project and to transport wastewater from the Project	ATCO Power	Permit	Province of Saskatchewan, Ministry of Environment	<i>The Waterworks and Sewage Works Regulations</i>	Regulatory applications will be filed to Saskatchewan ENV for approval to construct and operate the water supply and wastewater disposal infrastructure.
Construction and operation of the Project	ATCO Power	Development and Building Permit	RM of Swift Current No. 137		Application for development and building permits will be filed to RM of Swift Current No. 137.

Natural gas and utility infrastructure services for the Project will be provided by third party suppliers (i.e., SaskPower, TransGas Limited, respectively). Approvals for these services will be sought separately, as required. A list of applicable regulatory permitting requirements that will be required for third party suppliers is provided in Table 1.4-2.

**Table 1.4-2 Anticipated Third-party Permit and Regulatory Requirements**

<b>Project Component</b>	<b>Owner / Operator / Permit Holder</b>	<b>Permit/ Licence Required</b>	<b>Jurisdiction</b>	<b>Legislation</b>	<b>Permitting Requirements</b>
Infrastructure to supply natural gas to the Project, including a gas meter station and connecting pipeline	TransGas	Pipeline License	Province of Saskatchewan, Ministry of Economy	Pipelines Act	Permit applications for this component will be filed to Saskatchewan Ministry of Economy for the natural gas pipeline that connects the Project to existing gas supply lines.
Transmission interconnection to export electricity from the Project	SaskPower	Application	Government of Saskatchewan	The Power Corporation Act	Applications for this component will be filed by SaskPower who will design, permit, construct, and operate the transmission interconnection system that connects the Project to existing transmission lines. As a Crown Corporation, SaskPower is responsible for supplying electricity to most of the province.
Telecommunications	SaskTel and/or SaskPower	n/a/	n/a	n/a	Telecommunications infrastructure is not regulated by provincial or federal regulators. It is expected that SaskTel and /or SaskPower will negotiate with private landowners or the RM of Swift Current No. 137 (as required) for surface access or easements to develop the required infrastructure.

**1.4.1 Regional Environmental Studies**

The Project is not taking place in a region that has been the subject of a regional environmental study as defined by the CEA Agency.

## 2.0 Project Information

### 2.1 Project Context and Objectives

The Project will be a highly efficient, operationally flexible, natural gas-fired combined cycle electricity generating station with a maximum capacity of 350 MW (net). The Project is not a component of a larger project that is not listed in the *Regulations Designating Physical Activities*. Additional details of the context and objectives of the Project are presented below.

The objectives of the Project are:

- To supply electricity to meet future electricity needs in Saskatchewan and support Saskatchewan's transition to a lower-carbon electrical grid with less contribution from coal-fired power plants.
- To effectively develop the Project on land owned and selected by SaskPower for this specific purpose.
- To configure and design the Project for maximum efficiency to reduce air emissions and water usage per unit of power produced and to maximize power produced per unit of natural gas consumed.
- To configure and design the Project for flexible operation to allow Project electricity output to vary and offset changes in the supply of power in the Saskatchewan electrical system from both renewable and non-renewable generation sources that produce electricity intermittently and at variable rates. Saskatchewan has targeted an increase in the supply of intermittent renewable generation over the next 15 years.

### 2.2 Provisions Under the Regulations Designating Physical Activities

The *Canadian Environmental Assessment Act, 2012 (CEAA 2012 Regulations Designating Physical Activities)* includes in Schedule 1, Section 2a the following provision that describes the Project as a designated activity:

*The construction, operation, decommissioning and abandonment of a new fossil fuel-fired electrical generating facility with a production capacity of 200 MW or more (CEAA 2012, amended December 2014).*

### 2.3 Description of Physical Works

The Project includes the power plant, the water source infrastructure, and the wastewater disposal infrastructure. If successful, ATCO Power would be responsible for the development, permitting, construction, and operation of the Project on a portion of the quarter section of land located at SE 13-016-15 W3M. Diagrams of the Project footprint and plant facility layout are provided in Figures 2.3-1 and 2.3-2, respectively.

The total land area to be leased by ATCO Power from SaskPower for the explicit purpose of developing the Project is 16 ha (400 m × 400 m). The actual disturbance associated with the Project is expected to be less than the leased area; however, for a conservative approach to this Project Description, the Project footprint is assumed to be the maximum allotted area (16 ha). The Project footprint map (Figure 2.3-1) identifies the location of the 16 ha Project footprint within the SE 13-016-15 W3M and presents aerial imagery of current conditions at the site in October 2015. The plant facility layout (Figure 2.3-2) identifies the individual components of the power plant facility and other services within the 16 ha footprint. For ease of reading, the legend identifying each of the numbered facility components on Figure 2.3-2 is presented in Table 2.3-1.

Within the plant facility, the powerhouse buildings will enclose the gas turbine generator (GTG); HRSG; steam turbine generator (STG); water and wastewater treatment systems; auxiliary boiler; and medium- and low-voltage electrical systems. Enclosing these components inside a building will reduce noise emitted from the plant facility. The powerhouse buildings will comprise an overall footprint of approximately 110 m × 95 m, and the average height of the roofs will be approximately 32 m. The maximum roof height will be approximately 38 m.

An air cooled condenser structure, which is a large heat exchanger, will condense steam from the outlet of the steam turbine and return condensate to the process system. The structure will be approximately 85 m × 30 m with a height of 25 m, and will be located adjacent to the powerhouse.

Administration, control, maintenance, and warehouse building(s) will be located adjacent to the main powerhouse building to house the facility administration offices, plant control room, maintenance shop, and spare parts warehouse. The Project will include several other small buildings or sheds to enclose pumps and motors and to store supplies required for plant facility operation. The purpose of these small buildings is to provide protection from the elements and reduce the transmission of noise produced by the equipment contained within the buildings.

During construction, temporary structures will be required for construction offices, equipment storage, and workforce muster points. The temporary structures will be similar to those typically used on large construction sites, such as integrated workforce trailer systems. All temporary structures will be removed from the site once construction is complete.

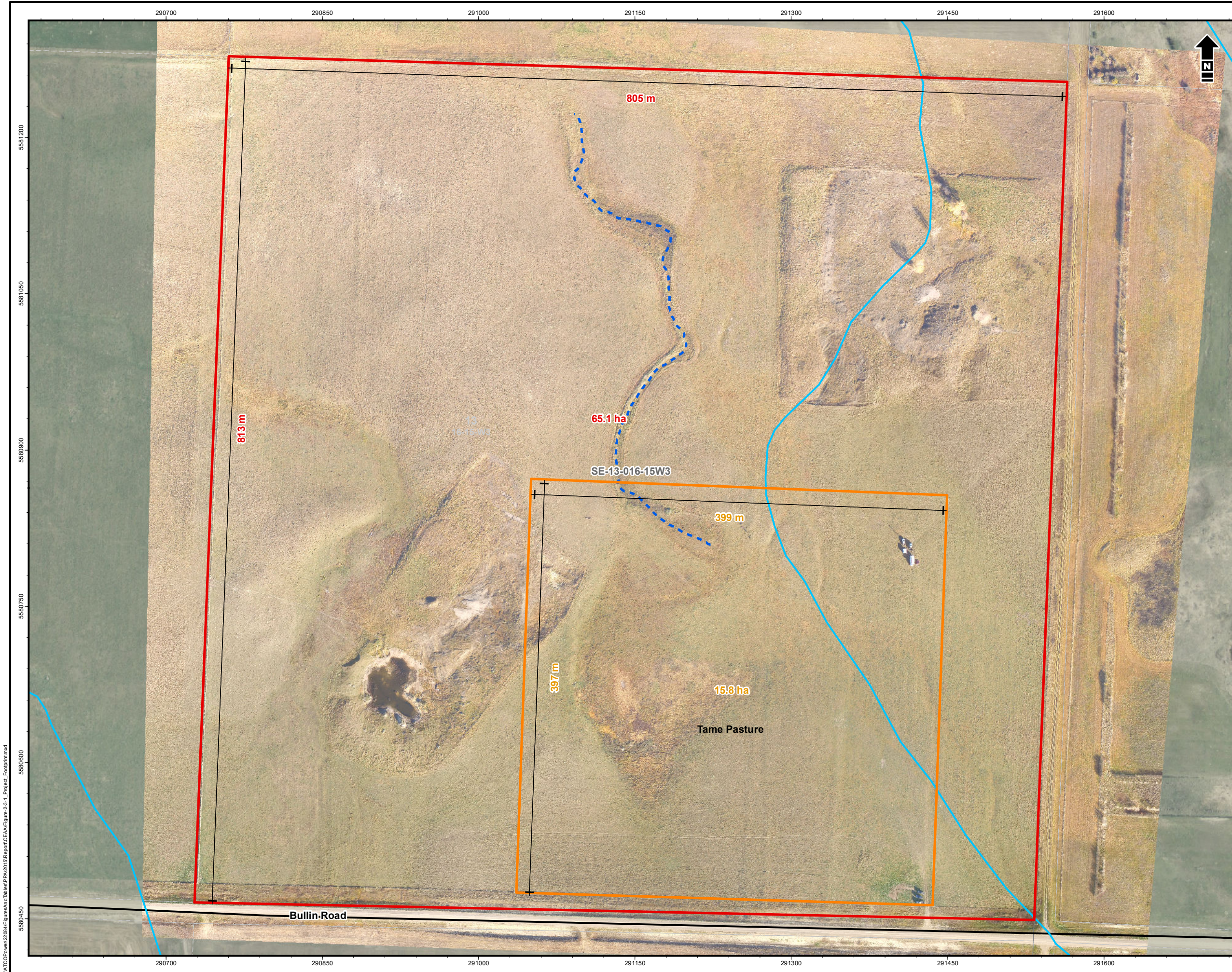
The plant facility will also include a raw water storage tank to provide the necessary operational reserves in the event of interruption of supply water and to provide sufficient quantities to extinguish a potential fire. Other tanks at the site (as presented on Figure 2.3-2) include a blowdown tank, a condensate collection tank, a demineralized water tank, and two wastewater tanks.

Stormwater at the Project will be routed to the onsite stormwater pond and then discharged to the ditches that surround it. The berms and ditches surrounding the plant facility will be designed to maintain the natural surface water drainage as much as practicable.

Access to the Project will be off the existing range road named Bullin Road south of the Project, which connects to Highway 32 approximately 2 km west of the Project (Figure 1.1-1). At this time, there are no permanent upgrades planned to Bullin Road to support development of the Project. ATCO Power will implement dust control measures on Bullin Road (as required) to minimize nuisance dust during the construction phase of the Project.

ATCO Power plans to source raw water for the Project from the City of Swift Current. The raw water will be pumped to the Project through an underground pipeline installed by ATCO Power. The specific routing for this water pipeline has not been determined. ATCO Power will work with the RM of Swift Current No. 137, the City of Swift Current, and any private landowners (as required) to obtain the required surface access (easements) to develop the water pipeline. The water pipeline will connect directly from the Project to the City of Swift Current water reservoir in the southwest portion of the city (18-015-13 W3M) approximately 13 km southeast of the Project.

ATCO Power plans to pipeline the wastewater to the City of Swift Current and connect to the wastewater treatment facility in the northeast portion of the city (32-015-13 W3M). ATCO Power will enter into an agreement with the City of Swift Current that will specify acceptable water quality criteria for effluent receipt. It is anticipated that this agreement will be based on the wastewater quality criteria specified in the City of Swift Current Water and Wastewater Utility Bylaw (Bylaw 17-2001). If required, ATCO Power would implement supplemental onsite wastewater treatment along with wastewater testing measures required to meet the effluent receipt criteria specified by the City of Swift Current. ATCO Power's wastewater stream would be treated with the rest of the inlet stream to the City of Swift Current wastewater treatment facility and discharged. The City of Swift Current would be responsible for maintaining its effluent water quality in accordance with the discharge guidelines dictated by the Saskatchewan WSA. Physical activities will include an underground wastewater pipeline that would connect directly from the plant facility to the selected City of Swift Current wastewater treatment facility. The specific routing for this buried wastewater pipeline has not been determined. ATCO Power will work with the RM of Swift Current No. 137, the City of Swift Current and any private landowners (as required) to obtain the required surface access (easements) to develop the water pipeline.



- ▭ Project Footprint
- ▭ Project Site
- GeoBase Mapped Location of Seasonal Water Drainage
- - - Observed Location of Seasonal Water Drainage
- Road

Reference: Data obtained from GeoBase® used under license. GDM midstream and transportation infrastructure data provided by IHS © 2015 used under license. UAV imagery (Oct 2015) obtained by ATCO Power and Matrix Solutions Inc. used under license.

1:3,500

NAD 1983 UTM Zone 13N



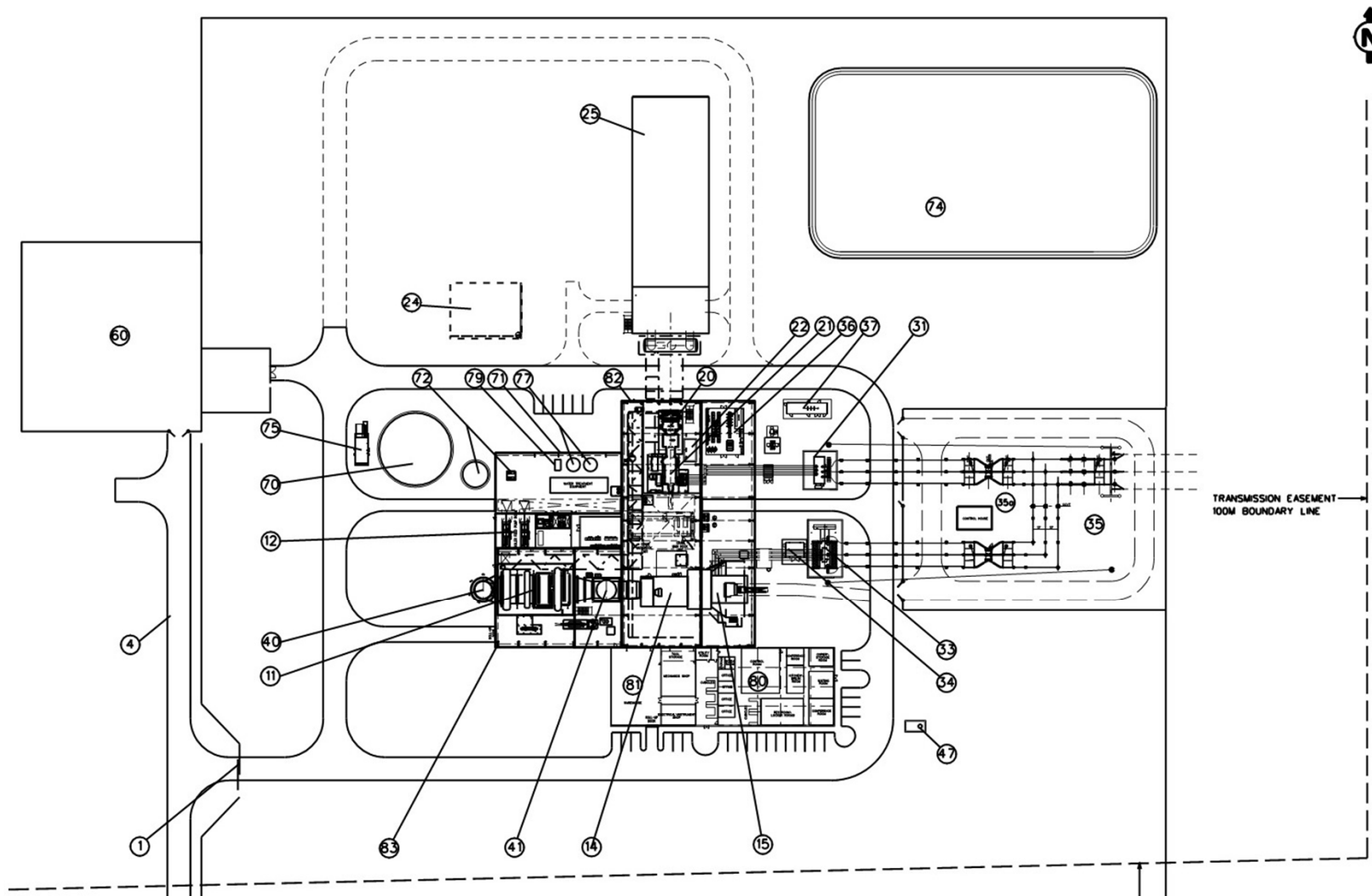
Great Plains Generating Station

### Project Footprint

Date: 11 Feb 2016	Project: 22084
Technical: N. Huq	Reviewer: B. Fuchs
	Drawn: M. Pfeifer

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I:\ATCO Power\22084\Figures\Aerial\PA\2015\Report\CEAA\Figure 2.3-1\_Project\_Footprint.mxd



Note: Figure legend presented in Table 2.3-1



Great Plains Generating Station

### Plant Facility Layout

Date:	Project:	Technical:	Reviewer:	Drawn:
Jan 2016	ATCO Power	GP	AB	GP

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Figure  
**2.3-2**



**Table 2.3-1 Facility Plot Plan Legend**

Number	Facility Component
1	Sliding gate
2	Security fence
3	Plant access road
4	Gas metering access road
11	Heat recovery steam generator (HRSG)
12	Boiler feedwater pumps
14	Gas turbine (GT)
15	Gas turbine generator (GTG)
19	Generator circuit breaker
20	Steam turbine (ST)
21	Steam turbine generator (STG)
22	Steam turbine lube oil skid
24	Fin fan cooler
25	Air cooled condenser (ACC)
31	STG Generator step-up transformer
33	CTG Generator step-up transformer
34	Unit auxiliary transformer (UAT)
35	Switchyard
35a	Switchyard control building
36	ST switchgear building
37	Diesel generator
40	Main stack
41	Bypass stack
47	Sanitary waste collection tank
60	Fuel gas metering
70	Service/fire water storage tank
71	Water treatment building
72	Demineralized water tank and transfer pumps
74	Storm water management pond (if required)
75	Electric and diesel fire water pumps
77	Waste water collection tanks
79	Oil water separator
80	Administration/control building
81	Warehouse/maintenance
82	Turbine building
83	HRSG building

### 2.3.1 *Anticipated Production Capacity and Production Process*

The Project will have a maximum capacity of 350 MW (net), which is above the 200 MW threshold for new thermal power projects as defined in the *Regulations Designating Physical Activities*. The proposed plant will be a natural gas-fired combined cycle power generating facility consisting of one GTG, one HRSG, and one STG.

A general description of the generation process is outlined below.

ATCO Power will purchase approximately 50 tonnes/hour of natural gas from TransGas that will be burned in the GTG. The GTG will be equipped with a low nitrogen oxides (NO<sub>x</sub>) combustion system that will optimize the mixing and combustion of the natural gas and air to maximize combustion efficiency while reducing the formation of NO<sub>x</sub> in the exhaust gases. The electricity generated by the GTG will be sent to the transmission system (operated by SaskPower). The waste heat generated by operation of the GTG will be transferred to the HRSG, where it will be used to boil the raw water sourced to the site and generate steam. The produced steam will be sent to the STG to generate additional electricity and increase the overall efficiency of the plant facility. The electricity from the STG will also be sent to the transmission system (operated by SaskPower). The emissions produced by the GTG from combustion of natural gas will be released to the atmosphere through either the HRSG exhaust (during combined cycle operation) or through the GTG exhaust stack (during single cycle operation). These stacks are anticipated to be between 35 to 50 m in height (above grade). Specific stack heights will be determined during detailed design.

The raw water supply will be obtained from the City of Swift Current water reservoir in the southwest portion of the city. The incoming raw water from the city will be treated before being sent to the STG, GTG, or the HRSG to remove minerals that could otherwise result in fouling. The plant facility will also be equipped with an air cooled condenser that will be connected to the STG to regulate the temperature of the condensate.

Both the raw water treatment system and the steam blowdown system are expected to generate wastewater. The steam blowdown wastewater stream will be removed from the process cycle to avoid a buildup of minerals or dissolved solids within the steam generation system. Wastewater generated from the Project will be sent to the City of Swift Current wastewater treatment facility through a buried pipeline. Any solid waste (sludge) that accumulates in the water and wastewater treatment storage system will be removed periodically and disposed of at an accredited offsite landfill.

Other systems at the plant facility will include fire suppression systems, instrumentation and control systems, gas turbine water wash system, and a system to manage domestic (septic) waste. The septic waste will be stored in a self-contained septic system and will periodically be hauled to the Swift Current wastewater treatment facility for disposal. ATCO Power will also import electricity from SaskPower to start up and allow for safe shutdown of the plant facility.

Permanent and temporary structures required for the Project are described above in Section 2.3.

### *2.3.2 Description of Activities Performed in Relation to the Project*

Activities that will be performed in relation to the Project will include the provision of natural gas to supply the GTG, the development of electrical transmission lines to export the generated electricity, and the installation of a telecommunications network.

High pressure natural gas will be provided to the Project via a buried pipeline interconnection between the plant facility and the TransGas high pressure natural gas pipeline to the west of the Project. TransGas will be responsible for permitting, constructing, and operating the natural gas pipeline infrastructure. The interconnection point is expected to be on the western edge of the Project footprint, at a location to be determined by TransGas.

Electrical transmission lines will be constructed to export generated electricity from the Project to the provincial power grid, or import sufficient electricity to support the facility when the generators are not operating. SaskPower will be responsible for permitting, constructing, and operating the electrical transmission infrastructure. The interconnection point is expected to be on the eastern edge of the Project footprint, at a location to be determined by SaskPower.

Telecommunications service will likely be provided by SaskTel and/or SaskPower. The selected contractor(s) for this service will be responsible for permitting, constructing, and operating the telecommunications infrastructure required to service the Project. The interconnection point for this service is currently unknown.

## **2.4 Emissions, Discharges and Wastes**

### *2.4.1 Atmospheric Emissions*

Sources of air emissions during both Project construction and Project decommissioning and reclamation will be the operation of heavy industrial equipment (e.g., bulldozers, graders, cranes, trucks). Although specific equipment has not yet been identified, it is expected that this equipment will include diesel-fired engines. The emission sources will be mobile, but operation of the majority of this equipment will be confined to the Project site. There will also be smaller emission sources associated with the equipment used to install the raw water and wastewater pipelines. Major emissions from the diesel-fired engines are expected to include carbon monoxide (CO), NO<sub>x</sub>, fine particulates (particulates smaller than 2.5 microns [PM<sub>2.5</sub>]) and greenhouse gasses (GHGs). Air emissions will be reduced by adopting standard mitigation and management practices such as regular maintenance of construction vehicles and equipment to reduce combustion emissions and maximize fuel efficiency, and minimum vehicle idling. Under dry, windy conditions, fugitive dust will be controlled using appropriate methods such as water sprinkling.

The main source of air emissions during Project operation will be the combustion of natural gas in the GTG. Emissions will be from a single stack connected to the powerhouse building and are expected to include CO, NO<sub>x</sub>, PM<sub>2.5</sub>, and GHGs. Because of the low sulphur content of the pipeline quality natural gas to be supplied by TransGas, the Project is not expected to emit measureable amounts of sulphur dioxide (SO<sub>2</sub>). Similarly, because of the natural gas fuel and design of combined cycle power plants, the Project is not expected to have measureable emissions of volatile organic compounds (VOCs). The Project will also include two intermittent emission sources: a standby diesel-fired electrical generator and a standby

diesel-fired fire pump, rated at 2 MW and 250 kW, respectively. These pieces of equipment will have dedicated stacks and will emit NO<sub>x</sub>, CO, and PM<sub>2.5</sub> only when they are operating during emergencies (fire pump), power outages, testing, or to support the safe shutdown of equipment during electrical system outages.

As NO<sub>x</sub> represents the largest proportion of the air emissions from the Project, ATCO Power will procure the GTG with a low NO<sub>x</sub> combustion system to reduce formation of NO<sub>x</sub> during combustion. The GTG will be designed to achieve NO<sub>x</sub> emissions less than 15 parts per million by volume (ppmv) at full load and ambient temperatures in excess of -17°C. The Project will meet the applicable NO<sub>x</sub> and CO emission requirements outlined in the *National Emission Guidelines for New Stationary Combustion Turbines* (CCME 1992).

Preliminary air dispersion modelling results indicate that the predicted concentrations of NO<sub>2</sub>, CO, and PM<sub>2.5</sub> are below their respective *Canadian National Ambient Air Quality Objectives* (NAAQOs; CCME 1999) and *Saskatchewan Ambient Air Quality Standards* (Government of Saskatchewan n.d.) for the range of operating scenarios considered. Potential adverse changes to the air quality from the Project under all operating scenarios are therefore expected to be minimal, and no air treatment and control beyond the design considerations described earlier are proposed.

Once the specific equipment for the Project has been identified as part of detailed design, ATCO Power will complete additional air dispersion modelling of these parameters, and prepare and submit a certified Environmental Protection Plan to the Ministry of Environment for the Minister's approval, in accordance with the *Environmental Management and Protection Act, 2010*, by demonstrating compliance with the applicable *Saskatchewan Ambient Air Quality Standards* and emission standards. Dispersion modelling requirements are outlined in the *Saskatchewan Air Quality Modelling Guideline* (Saskatchewan ENV 2012) and are used to predict potential impacts of operations under a worst case scenario.

The proposed federal Criteria Air Contaminants (CAC) requirements under the *Multi-sector Air Pollutant Regulations* (MSAPR; Environment Canada 2014a), was released in 2014. The goal of the MSAPR is to achieve consistent performance standards for combustion equipment across all industrial sectors, and to limit oxides of nitrogen and SO<sub>2</sub> emissions. The MSAPR have not yet been released for gas turbines; however, ATCO Power will ensure that the Project will meet the applicable federal and provincial emission standards and guidelines. Continuous Emissions Monitoring System (CEMS) equipment will be installed on the HRSG stack to monitor the NO<sub>x</sub> and CO emissions. The CEMS will comply with the applicable CEMS code, which describes requirements related to the installation, operation, maintenance and certification.

The emission of GHGs has been identified as an important issue by regulators. The Project will be designed to have a GHG emission intensity less than 420 kg CO<sub>2</sub> equivalent per megawatt hour (MWh). The GHG emissions for the Project will be a maximum of 1,303 kt CO<sub>2</sub> equivalent/year; however, the actual GHG emissions for the Project will depend upon actual MWh of generation required based upon load and run-times. The selected technology (i.e., natural gas-fired combined cycle) represents the best available technology for the purpose of generating on-demand, reliable power which results in the least CACs and GHGs emissions per MWh based on life cycle analysis, compared to any other currently available fossil fuel based power generation technology (SENES 2005). The Project is designed to allow flexible operation and provide electricity output to offset changes in the supply of power in the Saskatchewan electrical system from renewable generation that produces electricity intermittently and at

variable rates. Saskatchewan has targeted an increase in the supply of intermittent renewable generation over the next 15 years. This Project will help support Saskatchewan's transition to a lower GHG emission intensity for the Saskatchewan electrical system.

ATCO Power will minimize the emission of GHGs by:

- using an efficient GTG with a natural gas fuel source that will result in more complete hydrocarbon combustion (as compared to other solid fuel sources)
- using a HRSG and STG to recover waste heat from the GTG and produce additional electricity without additional natural gas consumption

In Saskatchewan, facilities that emit more than 50 kt/y of GHGs are considered to be regulated emitters under the *Management and Reduction of Greenhouse Gases Act*. Based on this threshold, the Project would be considered a regulated emitter in Saskatchewan. Regulated emitters will be required to reduce annual GHGs to meet provincial targets; however, the framework by which GHG reductions from individual facilities will be aligned with identified provincial targets is still under development. Similarly, there is currently no federal GHG management framework in effect; however a national framework for combatting climate change has been proposed (Government of Canada 2015). ATCO Power will work with provincial and federal regulators to align operation of the Project with pending GHG regulations as they are introduced.

#### 2.4.2 *Liquid Discharges*

Both the raw water treatment system and the steam blowdown system are expected to generate wastewater. The steam blowdown wastewater stream will be removed from the process cycle to avoid a buildup of minerals or dissolved solids within the steam generation system. Total wastewater effluent rates are expected to be a maximum of 310 m<sup>3</sup>/day when the Project is operating at full load.

ATCO Power plans to pipeline the wastewater to the City of Swift Current and connect to the wastewater treatment facility in the northeast portion of the city (32-015-13 W3M). A description of the anticipated agreement with the City of Swift Current to manage Project wastewater is presented in Section 2.3.

Other liquid discharges generated by the Project will include facility drainage, water collection from containment areas, gas turbine wash water, used oil and other solvents and sewage. Additional details regarding wastewater and liquid discharges are provided in Table 2.4-1.

**Table 2.4-1 Wastewater and Liquid Discharges Generated by the Great Plains Generating Station**

Liquid Waste	Description	Volume		Containment	Disposal Method	Potential Effects on the Environment
		Normal	Maximum			
Waste effluent from HRSG blowdown	Waste effluent generated as a result of avoiding concentration of impurities during continuing evaporation of steam	2.7 m <sup>3</sup> /hour	5.6 m <sup>3</sup> /hour	Wastewater collection tank	Flows will be routed to the wastewater collection tanks to be discharged to the City of Swift Current wastewater treatment facility.	None; wastewater effluent will be treated at the City of Swift Current wastewater treatment facility before discharge
Waste effluent from demineralized water treatment plant	Waste effluent from the water treatment plant	1.9 m <sup>3</sup> /hour	3.3 m <sup>3</sup> /hour	Wastewater collection tank	Flows will be routed to the wastewater collection tanks to be discharged to the City of Swift Current wastewater treatment facility.	None; wastewater effluent will be treated at the City of Swift Current wastewater treatment facility before discharge
Sampling discharge	Drains from the analytical sampling system	1.6 m <sup>3</sup> /hour	n/a	Wastewater collection tank	Flows will be routed to the wastewater collection tanks to be discharged to the City of Swift Current wastewater treatment facility.	None; wastewater effluent will be treated at the City of Swift Current wastewater treatment facility before discharge
Drainage within powerhouse building	Wastewater from floor wash and miscellaneous floor drains including water from containment areas	2.3 m <sup>3</sup> /hour	n/a	Drain to oil/water separator	Flows will be routed to an oil/water separator. Separated water will be stored in the wastewater collection tanks to be discharged to the City of Swift Current wastewater treatment facility. Oily sumps will be cleaned out on a regular basis and oil will be shipped offsite through an approved carrier.	None; wastewater effluent will be treated at the City of Swift Current wastewater treatment facility before discharge
Gas turbine wash water	Gas turbine wash water will be treated as hazardous waste and collected and contained onsite	7 m <sup>3</sup> per wash. Approximately two washes per year	n/a	Gas turbine water wash collection sump	A qualified carrier will be used to dispose of gas turbine wash water.	None; water will be disposed offsite at an accredited facility
Air cooled condenser wash water	Air cooled condenser wash water	200 m <sup>3</sup> per wash. Approximately two washes per year (at 15.9 m <sup>3</sup> /hour)	n/a	n/a	Wash water is service water that drains to plant site stormwater systems; similar to rain water.	None; no sources of contamination present in this wash water stream
Used oil and other solvents (hazardous waste)	Used lube and seal oil, glycol for inlet air heating system, chemical and other solvents from the plant	TBD	TBD	Barrels located in designated areas of powerhouse building or power plant site	Removal by a qualified carrier for disposal or recycling on an as-needed basis.	None; waste fluids will be disposed offsite at an accredited facility
Sewage	Sanitary waste from the administration building and water treatment building plumbing systems	12 m <sup>3</sup> /day	n/a	Facilities holding tank	Periodic removal by a qualified carrier.	None; sewage will be disposed offsite at an accredited facility

Note:

- Information provided is approximate for initial screening evaluations. These values will be finalized and updated in applicable permit applications.

### 2.4.3 Solid Wastes

The Project will generate both recyclable and non-recyclable solid waste. Recyclable material will be separated into containers and removed from site for recycling by a qualified carrier. Non-recyclable domestic waste will be collected onsite and sent to the municipal landfill through a qualified carrier. Onsite, solid waste materials will be properly labelled and stored in a waste storage area with secondary containment or liner. Potentially flammable or incompatible waste streams will be segregated. Any hazardous wastes generated onsite will be properly manifested and removed by a qualified carrier for recycling or disposal at an approved facility on an as-needed basis. Additional details regarding the solid wastes generated by the Project are provided in Table 2.4-2.

**Table 2.4-2 Solid Wastes Generated by the Project**

Waste Stream	Description	Containment	Disposal Method	Estimated Annual Quantity	Potential Effects on the Environment
Metal and recyclables (cardboard, air filters)	Metal and recyclables such as cardboard and paper from plant	Metal dumpsters with liner	Will be recycled through a qualified carrier	13 to 18 t	None
Domestic waste	Normal disposal waste from offices	Metal dumpsters with liner	Will be collected and sent through a qualified carrier to municipal landfill	7 to 10 t	None
Oil filters (hazardous waste)	Filters from equipment	Oil containment area with surrounding berm	Will be removed by a qualified carrier for disposal or recycling on an as-needed basis	4 to 6 t	None
Batteries	Batteries from plant uses	Plastic containers	Will be sent to a facility for recycling or disposal	80 to 100 L	None

Corporate and Project policy, procedure, and training will be in place to ensure that all regulations associated with the classification and characterization of waste are in place before Project operation commences. Roles and responsibilities for waste handling will be defined and key information will be summarized in the Project site policy documents.

## 2.5 Schedule of Project Phases

The scheduling, duration, and staging of key Project phases is presented in Table 2.5-1. The facility is designed for an approximate 35 year design life, followed by the decommissioning of the facility. ATCO Power is currently planning for construction to proceed on a 5 days/week and 8 hours/day schedule. During operations, the facility is expected to operate as a base load facility which will require operation 7 days per week, 24 hours/day year-round except for planned and unplanned outages. Additional details for Project activities are provided in the subsections below.

**Table 2.5-1 Project Schedule**

<b>Construction Activity</b>	<b>Schedule</b>
Notification of award	July 07, 2016
Site preparation (e.g., clearing, grading)	Q3 2016 to Q1 2017
Foundation excavation/construction	Q2 2017 to Q3 2018
Building erection and equipment installation	Q1 2018 to Q2 2019
Equipment commissioning and testing	Q3 2019
Start of operation	September 01, 2019 to October 01, 2019
Decommissioning (after 35 year Project life)	2054 to 2057

### 2.5.1 Pre-Construction

Before construction, ATCO Power will complete environmental site assessments (ESAs) if areas of potential concern are identified (e.g., areas that could have potentially been affected by previous activities at the site). If these ESAs indicate that historical contamination is present on the Project site (or along the selected underground water and wastewater pipeline rights-of-way (RoWs)), ATCO Power will work with the land owner (SaskPower for the plant facility or other private landowners for the pipeline RoWs) to remediate, where required, the areas to achieve soil/groundwater quality endpoints for parameters in compliance with provincial guidelines and CCME guidelines, as updated.

A site-specific emergency response plan (ERP) will be prepared and implemented to detail steps in responding to all conceivable emergencies to facilitate a coordinated and organized approach that can be used to manage most emergencies. The ERP will provide a management plan which addresses preparedness, response, notification, and recovery from an emergency. The ERP's primary purpose will be to protect the lives, safety and health of neighbours, contractors, and employees. Also an ERP will help in protecting environmental damage, as well as facility, property, and equipment loss. The ERP will cover emergencies (including but not limited to) such as fire, spills/releases, flood, severe weather, explosion or natural gas leak.

### 2.5.2 Construction

The construction phase includes the major work and activities required for construction of the Project, including site preparation, excavation and foundation construction, building erection, installation of equipment, and equipment commissioning. The construction of the Project is not expected to result in direct contamination of the soil, groundwater, or surface water within the Project site. The primary source of potential contamination during the construction phase is accidental spills. Before construction, ATCO Power will develop a spill prevention and response plan that will outline responsibilities for the construction contractor and ATCO Power around contamination prevention.

An environmental management plan for the construction phase will be prepared and implemented before commencement of construction. No equipment or physical infrastructure is planned for environmental monitoring during construction; however, an environmental monitor will be onsite throughout the construction phase to record and report any environmental spills/releases that may occur during construction. Due to the nature of the Project and the use of standard construction practices and equipment, ambient air monitoring would not be required during Project construction.



A brief description of construction activities is presented in the subsections below.

#### 2.5.2.1 Site Preparation

The Project site will be cleared and graded as required in accordance with the Project site surface water drainage plan, which will be developed during detailed design. Site clearing will be conducted between September 1, 2016 and April 14, 2017 to avoid clearing during the migratory bird nesting period for the area (April 15 to August 31). Topsoil and subsoil will be salvaged and stockpiled before site grading, placement of fill, and/or site development. Salvaged topsoil and subsoil will be maintained as stable and vegetated stockpiles throughout the life of the Project.

Berms and ditches surrounding the Project plant facility will be designed to direct stormwater and maintain natural surface water drainage. Erosion control measures will be implemented during construction, and exposed soil will be vegetated to minimize erosion potential. As a component of site preparation, the onsite Class II wetland and the portion of the seasonal waterway that intersects the Project footprint will be drained and graded. The draining and grading activities will be conducted in accordance with the conditions of the AHPP to be obtained from the Saskatchewan WSA (described further in Section 5.1.2).

#### 2.5.2.2 Foundation Excavation and Construction

Excavations will be constructed to install subsurface infrastructure (e.g., cooling water piping, natural gas piping, water piping, and electrical cables).

It is anticipated that foundation piles may be installed to bear the loads of major equipment and for the powerhouse, transformers, and air cooled condenser. Once piles have been installed, they will be tied together with concrete foundation elements to complete the foundations. Once concrete slabs have been poured, backfill will be placed against the foundations to complete the surface works.

#### 2.5.2.3 Building Erection and Equipment Installation

Structural steel will be erected on the foundations for the powerhouse and the administration buildings. Some modularization and pre-assembly work will occur where practical to speed building erection. Simultaneously with building erection, the HRSG, GTG, STG and other major equipment will be located or installed in the powerhouse.

The air cooled condenser will be assembled in parallel with work on the powerhouse. Construction will include casting a concrete foundation. It is anticipated that considerable pre-assembly of condenser modules will take place, with final assembly and tie in carried out onsite. The generator step-up power transformers and other ancillary equipment will be assembled and installed outside the powerhouse during this period.

#### 2.5.2.4 Equipment Commissioning and Testing

Before start-up of the facility, ATCO Power will test and commission equipment and systems. It is expected that the testing and commissioning phase of the Project will span the final 8 to 10 months of construction. The Project will then be ready for commercial operation.

#### 2.5.2.5 Buried Pipeline Construction

An approximately 10 m wide RoW will be developed with 20 m of additional temporary workspace during construction to have adequate room for separating/piling the soils. Topsoil and underlying trench material within the pipeline RoWs will be salvaged separately and stored in a temporary workspace along the RoWs. If watercourse crossings are required, ATCO Power will work with the Saskatchewan WSA to obtain an AHPP before construction. Pipeline crossing installation would likely either occur under frozen conditions or using trenchless techniques. Specific details for pipeline watercourse crossings would be evaluated as part of detailed design. For each watercourse crossing identified (if any), ATCO Power would also complete a self-assessment based on the *Measures to Avoid Causing Hard to Fish and Fish Habitat* (Fisheries and Oceans Canada, 2013). Following construction, salvaged soils will be replaced. No long-term storage of soil material is planned. The pipeline RoWs will be seeded with a native seed mix and allowed to revegetate after construction. The pipeline RoWs will be monitored and maintained to control erosion.

#### 2.5.3 *Operation*

Normal operating modes of the Project are described below. The phrase “normal operating modes” applies to the Project once the GTG, HRSG, STG and the balance of plant components have been fully constructed, commissioned and are deemed suitable for commercial operation.

The Project will normally operate in various modes, as dictated by dispatches from SaskPower and described as follows:

- **Offline** – The Project is not operating (generating electricity), but is maintained in a condition to start and come online as required.
- **Start or Stop Ramp** – The Project is in a transient state between operating and offline modes. Operation in this mode will be of short duration.
- **Minimum Stable Generation Level** – The Project is online and operating but has been turned down to the minimum level at which it can operate while the STG is not offline.
- **Minimum Stable No STG Generation Level** – The Project is online and operating but has been turned down to the minimum level at which it can operate while the STG is offline.
- **Normal Operation Ramp** – In this mode the Project output is changing, either up or down, between normal operating output levels. Typically, ramps will occur over short periods of time.
- **Baseload Generation Level** – The Project is operating at the maximum GTG and STG output. In this mode, the Project operates at maximum efficiency.
- **Automatic Generation Control (AGC) Operation** – AGC mode; in this mode the Project output is changing, either up or down, based on the Grid Dispatch Operational demands.
- **No STG AGC Operation** – AGC operations in the absence of the STG.
- **Outage** – The Project is offline and not available to operate due to maintenance or inspection work that requires the plant to be in a non-operating state. Operation in this mode will either be scheduled in advance (planned outage) or unscheduled (forced outage).

The Project will be designed to operate at full output continuously. Throughout its operating life, the Project may be called upon at any time and for any duration to produce electricity in any amount up to its maximum capacity as dispatched by SaskPower.

A maintenance management system for the Project will be used to record and schedule preventive maintenance activities and produce maintenance activity reports that provide information on the frequency and maintenance history for pieces of equipment. Compliance audits will be used to evaluate the Project's compliance to legal requirements and other requirements to which the company subscribes.

#### *2.5.4 Decommissioning*

At the end of life of the Project, decommissioning will include removing all equipment and the associated piping and electrical systems from the site. ATCO Power will retain qualified contractors when removing equipment and structures (dismantling) and have a detailed plan in place to minimize the potential for spills and release of contaminants. Equipment, concrete, and gravel removed during decommissioning will be disposed of at appropriate locations offsite (e.g., landfills, recycling facilities, or other appropriate locations). Following decommissioning, ESAs will be completed at the plant facility to evaluate the presence of contamination associated with the operation of the Project. These ESAs will be completed in accordance with the guidelines and the regulations in place during decommissioning (anticipated being from 2054 to 2057). Where required, remediation will be completed with the endpoints for applicable parameters based on the remediation guidelines of the day.

After remediation, ATCO Power will reclaim the facility site. Reclamation will include recontouring the site to landform and drainage conditions consistent and integrated with the surrounding areas. ATCO Power will also alleviate soil compaction onsite under relatively dry soil conditions. After the Project site is recontoured, ATCO Power will replace salvaged subsoil, as applicable, and all topsoil materials onto the recontoured area. Consequently, the Project site will be reclaimed to an equivalent pre-disturbance agricultural land capability. The buried water and wastewater pipeline RoWs will be evaluated during decommissioning in consultation with the RM of Swift Current No. 137, the City of Swift Current, and any private landowners whose lands were used to develop the pipelines. It is anticipated that these pipelines will either be repurposed for other uses or decommissioned in place.

### 3.0 Project Location

The Project will be located on the following parcel: SE 13-016-15 W3M (Figure 2.3-1). The 64 ha land parcel is privately owned by SaskPower and will be leased to ATCO Power for the purposes of constructing and operating the Project.

The geographic coordinates for the Project site are:

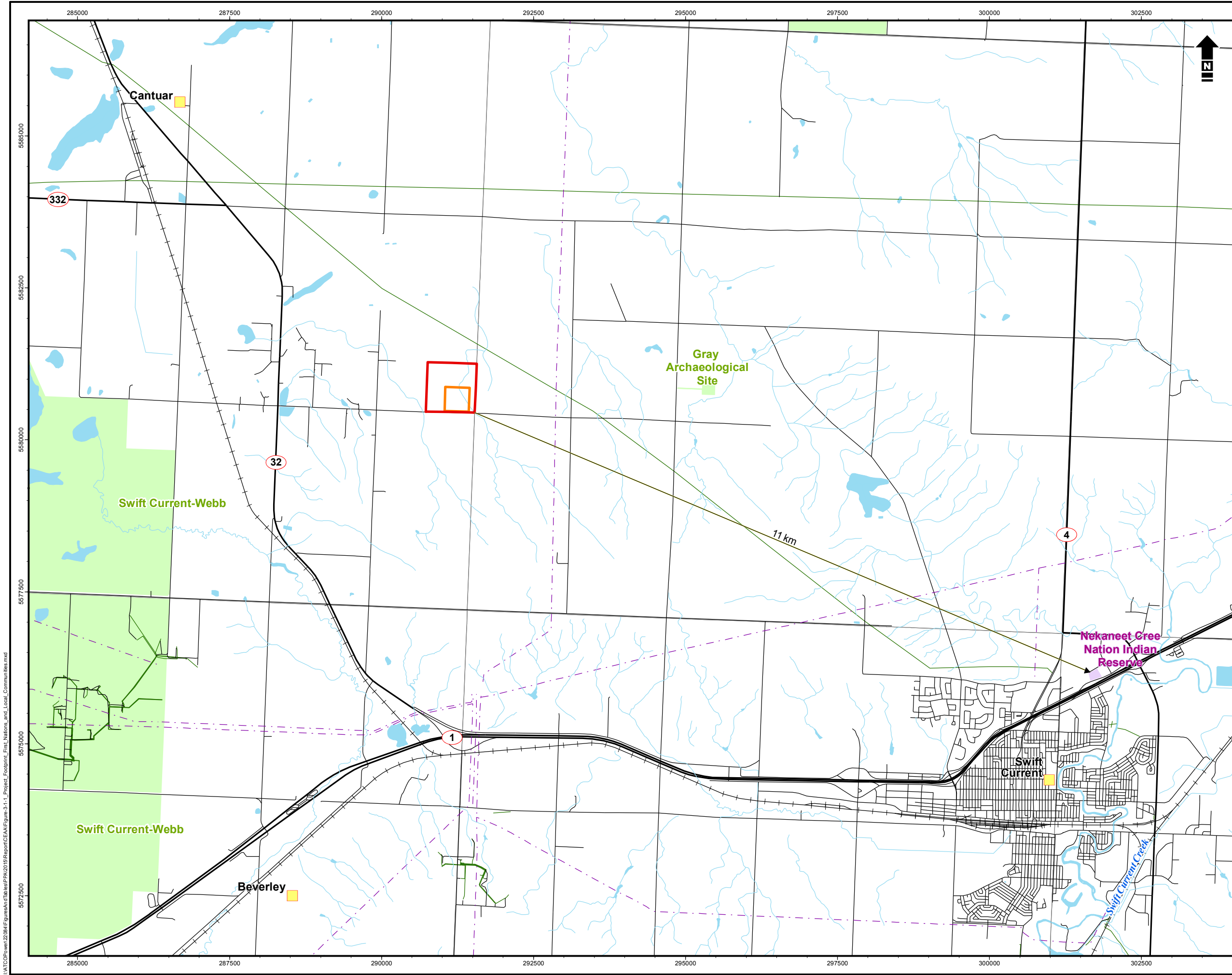
- SE 13-016-15 W3M
- 50° 20'27.2616 N 107° 55'57.2772 W

The area within the Project site that will be occupied by permanent facilities, defined as the Project footprint, include the powerhouse and other buildings, roads, a parking lot and transmission structures, as shown on Figure 2.3-2. Maps of the designated Project components and existing features are provided on Figures 3.1-1 to 3.1-4. A concordance table identifying the locations of specific requested landscape features is provided in Table 3.1-1.

**Table 3.1-1 Location of Existing Landscape Features**

Existing Features	Comments
Proximity to any permanent, seasonal or temporary residences	The closest local residence (1.8 km west of the Project site) is shown on Figure 3.1-3. There are no known seasonal or temporary residences identified in the vicinity of the Project.
Proximity to traditional territories, settlement land (under a land claim agreement), as well as lands and resources currently used for traditional purposes by Aboriginal peoples	<p>First Nation reserves are shown on a local scale on Figure 3.1-1 and on a regional scale on Figure 3.1-4. The Project area is located within Treaty 4 boundaries; however, the scale of the maps does not show the extent of this boundary. The closest First Nation Reserve to the Project is an “urban reserve” held by the Nekaneet Cree Nation located within the City of Swift Current, approximately 11 km southeast of the Project. This reserve is used to operate a private enterprise and it is understood that no members of the Nekaneet Cree Nation live on this reserve or use this reserve for traditional purposes. The Nekaneet Cree Nation also has reserve lands located approximately 113 km southwest of the Project. The Carry the Kettle Nakoda First Nation Reserve is located approximately 66 km northwest of the Project. The Project is also located within the boundaries of Western Region III, as defined by the Métis Nation of Saskatchewan. Within this region, the Métis Locals in Swift Current and Maple Creek are not identified as being active. The closest active Métis Local is the Prairie Dog Métis Local 123, approximately 50 km south of the Project.</p> <p>No asserted traditional territory boundaries or settlement lands have been identified within the vicinity of the Project.</p>
Proximity to any federal lands	The closest federal land is the Swift Current – Webb Community Pasture, which is located approximately 4.4 km west of the Project footprint (Figure 3.1-2).

There is currently one subsurface rights holder, Prairiesky Royalty Ltd., who owns the petroleum and natural gas (P&NG) rights within SE 13-016-15 W3M. The Project will not interact with Prairiesky's subsurface rights, as there is no subsurface development proposed as part of the Project. If Prairiesky chooses to develop its P&NG rights in future, it would consult with SaskPower (the landowner) regarding surface access.



- Project Footprint
- Project Site
- Community
- Indian Reserve
- Park, Protected or Natural Area
- GeoBase Mapped Location of Water Body
- GeoBase Mapped Location of Seasonal Water Drainage/Watercourse
- Railway
- Highway
- Road
- Powerline
- Pipeline

Reference: Data obtained from GeoBase® and GeoGratis® Department of Natural Resources Canada (all rights reserved) used under license. GDM midstream and transportation infrastructure data provided by IHS © 2015 used under license.

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Kilometres

NAD 1983 UTM Zone 13N

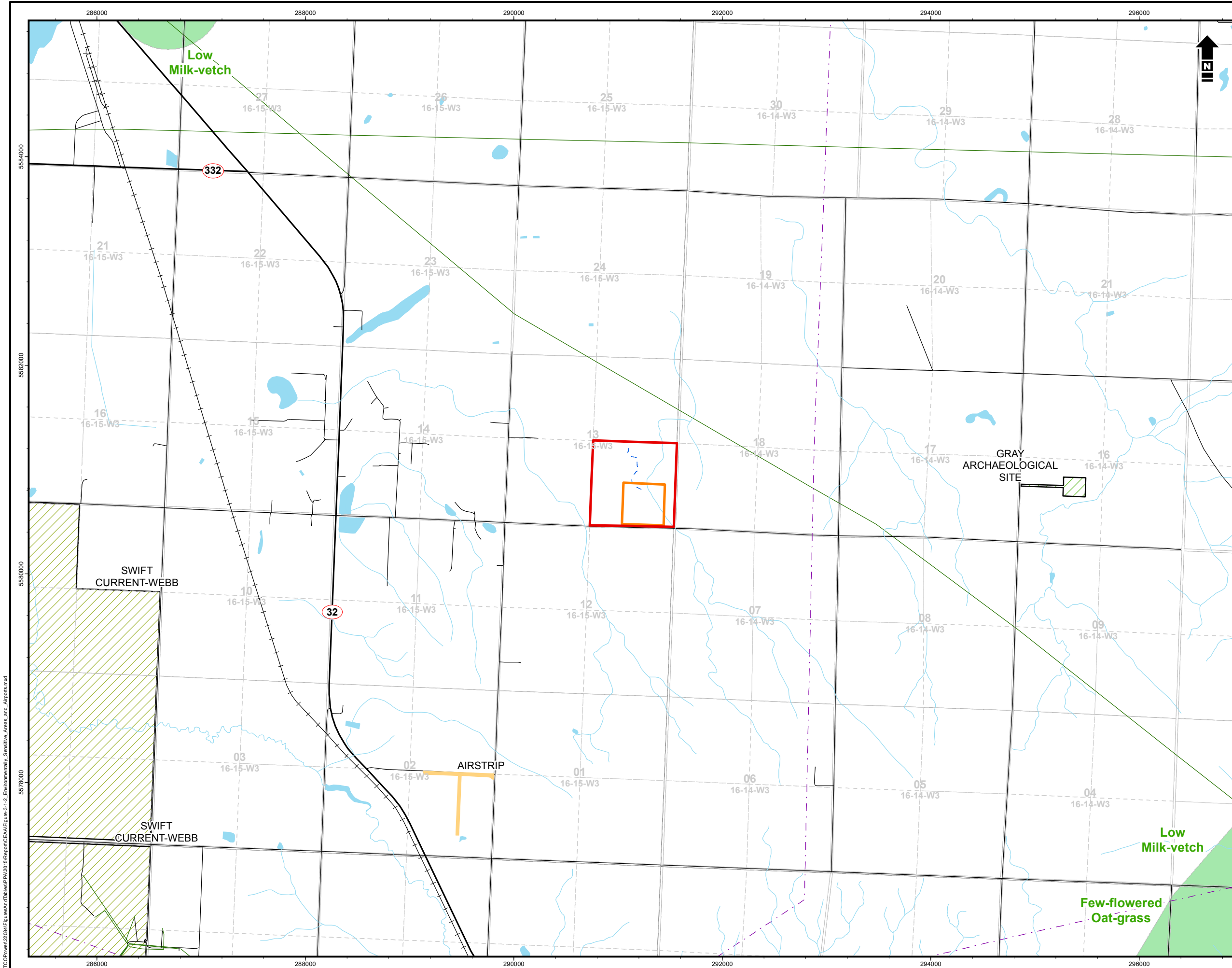
Great Plains Generating Station

### Project Footprint, First Nations and Local Communities

Date: 11 Feb 2016	Project: 22084	
Technical: N. Huq	Reviewer: B. Fuchs	Drawn: J. Sturk

Disclaimer: Prepared solely for the use of ATCO Power as specified in the accompanying report. No representation of any kind is made to other parties with which ATCO Power has not entered into contract.

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- Project Footprint
- Project Site
- Airstrip
- AESB Community Pasture
- Protected Area
- GeoBase Mapped Location of Water Body
- GeoBase Mapped Location of Seasonal Water Drainage/Watercourse
- Observed Location of Seasonal Water Drainage
- Railway
- Highway
- Road
- Powerline
- Pipeline
- Rare and Endangered Species**
- Plant

Reference: Data obtained from GeoBase®, GeoGratis © Department of Natural Resources Canada (all rights reserved) and © Saskatchewan Conservation Data Centre used under license. GDM midstream and transportation infrastructure data provided by IHS © 2015 used under license.

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 NAD 1983 UTM Zone 13N



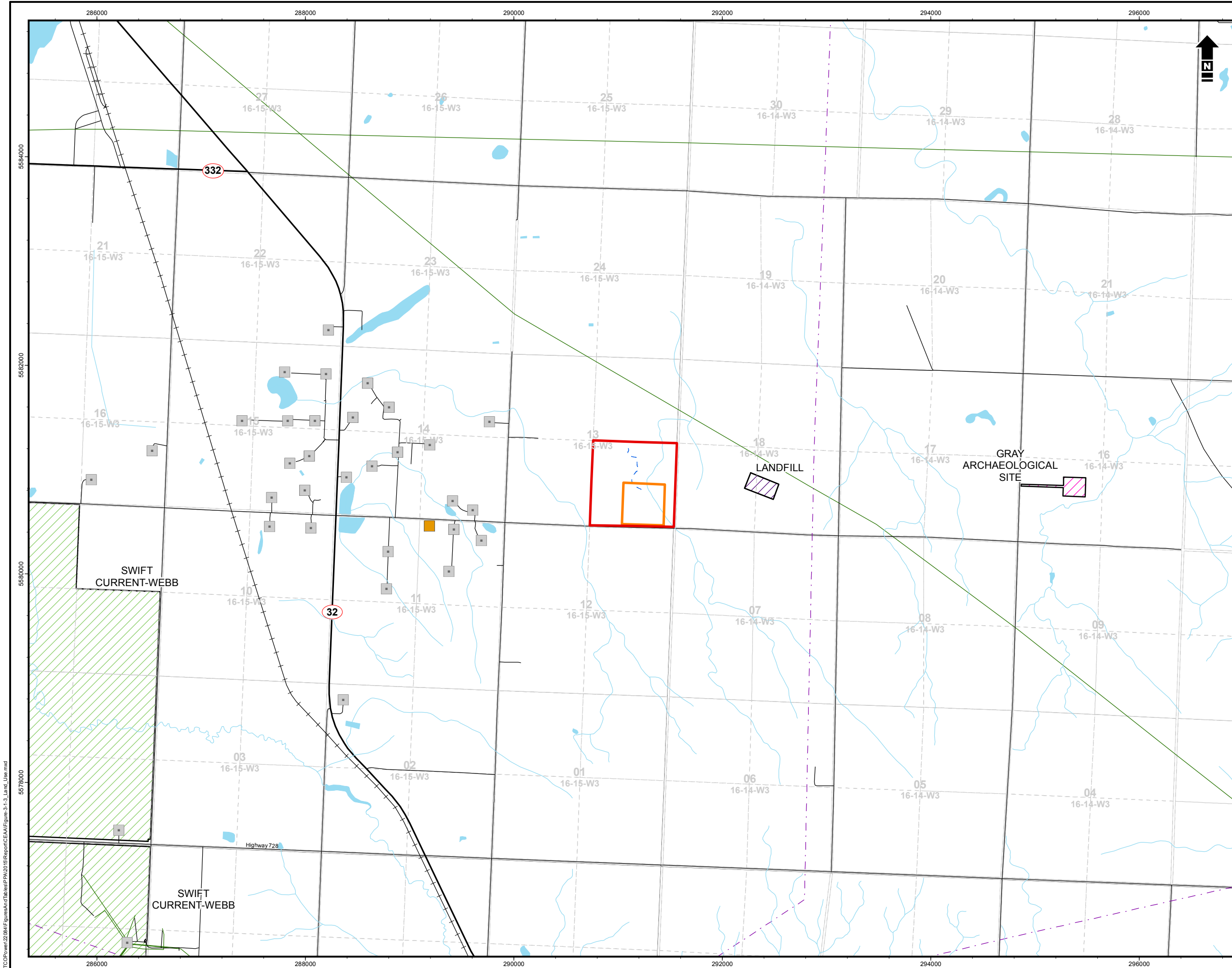
Great Plains Generating Station

**Environmentally Sensitive Areas and Airports**

Date: 11 Feb 2016 Project: 22084  
 Technical: N. Huq Reviewer: B. Fuchs Drawn: M. Wilkinson

Disclaimer: Prepared solely for the use of ATCO Power as specified in the accompanying report. No representation of any kind is made to other parties with which ATCO Power has not entered into contract.

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- Project Footprint
- Project Site
- AESB Community Pasture
- Protected Area
- Landfill
- GeoBase Mapped Location of Water Body
- GeoBase Mapped Location of Seasonal Water Drainage/Watercourse
- Observed Location of Seasonal Water Drainage
- Railway
- Highway
- Road
- Powerline
- Pipeline
- Facility/Well
- Nearest Residence

Reference: Data obtained from GeoBase® and GeoGratis © Department of Natural Resources Canada (all rights reserved) used under license. GDM midstream and transportation infrastructure data provided by IHS © 2015 used under license. IHS well data provided by IHS © 2015 used under license.

1:35,000

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Metres

NAD 1983 UTM Zone 13N

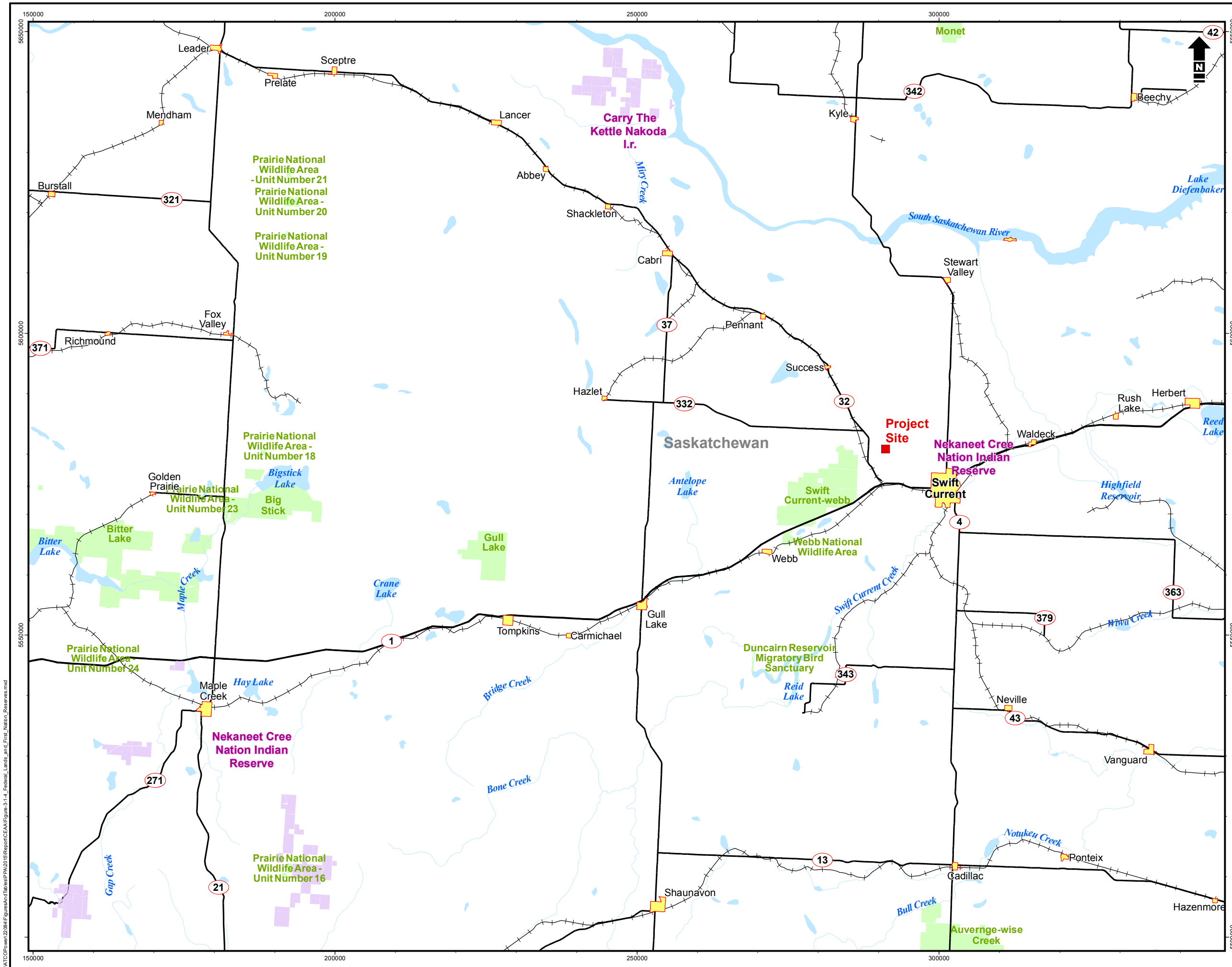
Great Plains Generating Station

Land Use

Date: 11 Feb 2016		Project: 22084
Technical: N. Huq	Reviewer: B. Fuchs	Drawn: M. Wilkinson

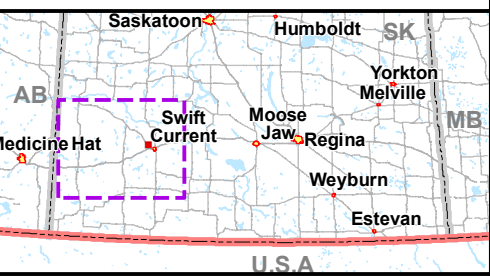
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- Project Site
- Community
- Indian Reserve
- National Park, Protected or Natural Area
- Provincial Boundary
- Federal Boundary
- GeoGratis Mapped Location of Water Body
- GeoGratis Mapped Location of Seasonal Water Drainage/ Watercourse
- +— Railway
- Highway

Distance from Proposed Development Area	
Swift Current-Webb	4.7 km
Nekaneet Cree (Swift Current)	110 km
Carry The Kettle Nakoda Reserve	65.8 km
Nekaneet Cree Reserve	112.6 km
Alberta Border	147.0 km
U.S.A. Border	148.9 km
Wood Mountain Reserve	151.8 km
Little Pine Reserve	156.9 km
Cowessess Reserve	157.6 km
Whitecap Reserve	186.6 km
Poundmaker Reserve	194.0 km
Manitoba Border	456.5 km



Reference: Data obtained from GeoGratis © Department of Natural Resources Canada (all rights reserved) and Saskatchewan Ministry of Environment used under license. GDM transportation infrastructure data provided by IHS © 2015 used under license.

1:600,000

15 0 15  
Kilometres

NAD 1983 UTM Zone 13N

Great Plains Generating Station

## Federal Lands and First Nation Reserves

Date: 11 Feb 2016      Project: 22084

Technical: N. Huq      Reviewer: L. Wright      Drawn: M. Wilkinson

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Figure  
3.1-4

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## **4.0 Federal Involvement**

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

The Project will not require the granting of any interest in federal land, including reserve land.

The Project will include two exhaust stacks approximately 35 to 50 m in height. As such, ATCO Power will submit an Assessment Request for Obstruction Marking and Lighting to Transport Canada, and a Land Use Application to NAV CANADA. The exhaust stacks will be the tallest obstruction on the Project site and will not exceed any of the criteria constituting an obstacle to navigation listed in Canadian Aviation Regulations 2012-1 *Division III – Marking and Lighting of Obstacles to Air Navigation, Section 601.23*.

There are no other federal permits, licences or other authorizations required to carry out the Project.

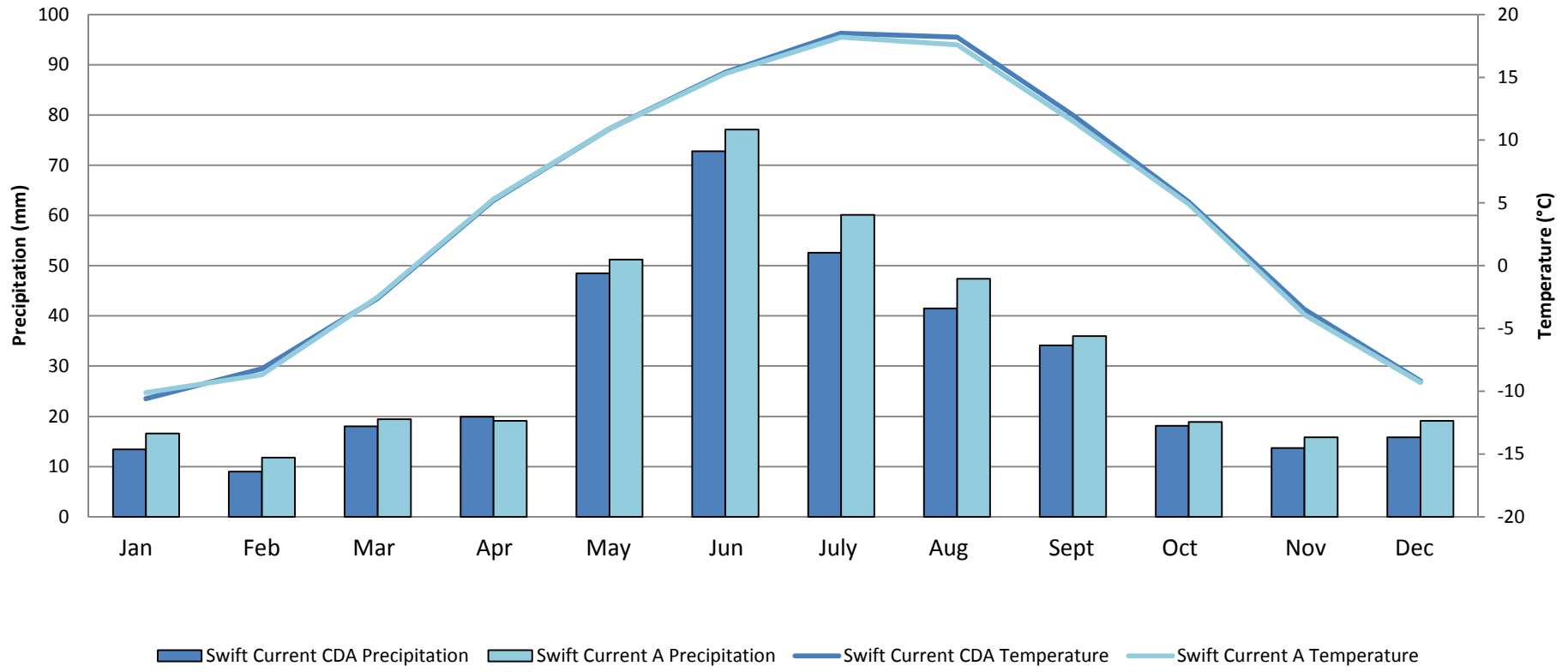
## **5.0 Physical and Biological Setting**

### **5.1 Physical and Biological Components that may be Adversely Affected by the Project**

#### *5.1.1 Climate*

Two climate stations: Swift Current CDA (ID: 4028060, 825 m above sea level [asl]) and Swift Current A (ID: 4028040, 817 masl), are located 20 km from the Project site and are the closest Environment Canada climate stations with long-term climate normals. Climate normals are based on a 30 year historical record from 1981 to 2010. Both climate stations provide similar monthly average temperatures and precipitation as outlined on Figure 5.1-1. The Swift Current CDA station is considered the best representation of climatic conditions in the area as it meets the United Nation's World Meteorological Organization standards.

Average monthly temperatures are highest in July (18.5°C) and lowest in January (-10.6°C). The average annual temperature at Swift Current is 4.3°C. Average monthly temperatures are generally above zero between April and October, indicating the general transitions between the snowfall and snow melt period. Precipitation is highest between May and September, with the highest precipitation occurring in June (73 mm). The lowest precipitation occurs in January (13.4 mm) and February (9.0 mm).



**1981-2010 Average Monthly Climate Normals  
Swift Current CDA and A Stations**



Great Plains Generating Station

**Average Monthly Climate Normals for  
Precipitation and Temperature at Swift Current**

Date:	Project:	Technical:	Reviewer:	Drawn:
Jan 2016	ATCO Power	GP	AB	GP

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Figure  
**5.1-1**

### 5.1.2 Soils and Terrain

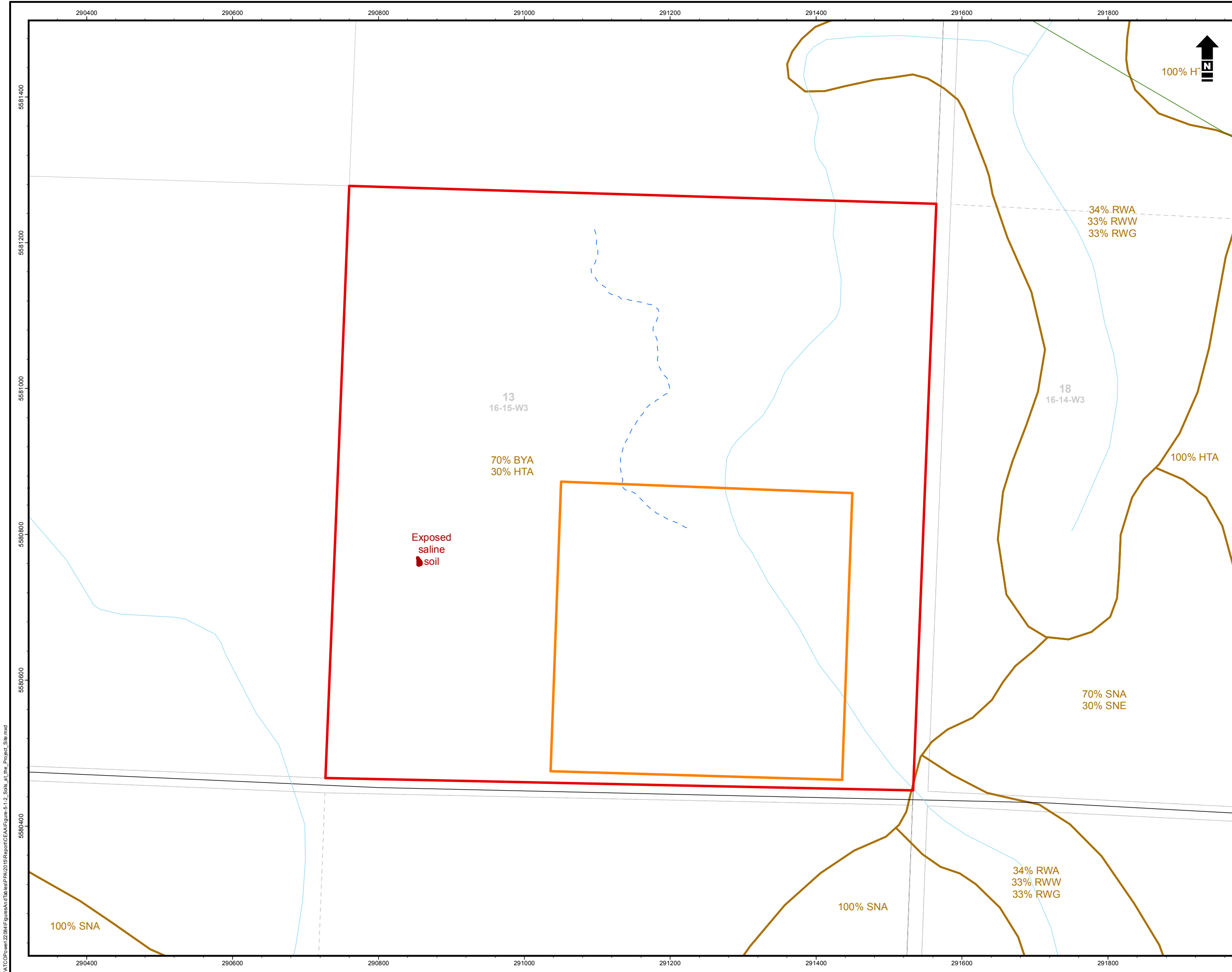
The terrain within the Project site has low relief and a level to undulating surface with slopes ranging from 0.5% to 5%, with approximately 6 m of elevation drop from south to north across the land parcel. The Project site is on a Birsay Hatton soil map unit (Figure 5.1-2). Birsay Hatton soils are brown soils formed on a mixture of mainly loamy lacustrine (Birsay) soils, with sandy fluvial (Hatton) soils on the upper slopes. Birsay soils are medium-textured, fine sandy loam to very fine sandy loam surface textures, while Hatton soils are moderately-coarse, sandy loam to loamy sand surface textures.

The agricultural capabilities are listed as 80% class 4 soil with a severe limitation of insufficient water-holding capacity, and 20% class 5 soil with very severe limitations, including natural soil salinity and wind erosion risk. Potential Project effects on soils include soil compaction, admixing of soil materials and soil degradation through wind erosion.

Before construction begins, ATCO Power will complete a pre-disturbance assessment to confirm the thicknesses of topsoil and subsoil horizons. During construction, ATCO Power will monitor soil handling activities and implement key mitigation measures, including:

- use three lift soil handling in saline/wetland or stony areas; strip topsoil, upper, and lower subsoil materials separately according to Pettapiece and Dell (1996)
- salvage and handle soil under dry or frozen conditions whenever possible
- avoid driving on stockpiled topsoil
- monitor stockpiled soil for sufficient vegetation cover and signs of erosion
- use soil tackifier where soils are susceptible to wind erosion
- re-seed all disturbed areas as soon as possible to prevent further soil loss

Once operations commence, and to the extent possible, portions of the Project footprint that are no longer required for operations will be restored using the stored soil materials. When the Project is decommissioned at the end of its operational life and depending on plans for subsequent land use, soils that were within areas of the facility footprint can be restored to an equivalent land capability using the stored topsoil and subsoil. As a result, the potential adverse environmental effects on soils will be localized to the Project site and limited to the duration of the Project



- Project Footprint
- Project Site
- Soil Map Unit
- Exposed Saline Soil
- GeoBase Mapped Location of Seasonal Water Drainage
- Observed Location of Seasonal Water Drainage
- Road
- Pipeline

**Soil Names**

<b>BYA</b>	BIRSAY O.BC
<b>HTA</b>	HATTON O.BC
<b>RWA</b>	RUNWAY CHERNOZEMIC
<b>RWG</b>	RUNWAY GLEYSOLIC
<b>RWW</b>	RUNWAY REGOSOLIC
<b>SNA</b>	SWINTON E.BC
<b>SNE</b>	SWINTON O.BC

Reference: Data obtained from GeoBase® and Agriculture and Agri-Food Canada used under license. GDM midstream and transportation infrastructure data provided by IHS © 2015 used under license.

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100 0 100  
Metres

NAD 1983 UTM Zone 13N



Great Plains Generating Station

**Soils at the Project Site**

Date: 11 Feb 2016	Project: 22084
Technical: N. Huq	Reviewer: B. Fuchs
	Drawn: J. Sturk

Disclaimer: Prepared solely for the use of ATCO Power as specified in the accompanying report. No representation of any kind is made to other parties with which ATCO Power has not entered into contract.

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### 5.1.3 *Vegetation and Wetlands*

The Project is situated in the mixed grassland ecoregion of Saskatchewan. Vegetation surveys, listed plant surveys and a wetlands inventory and classification were conducted within the Project site on October 23, 2015, to evaluate site-specific vegetation conditions. The surrounding landscape is dominated by cultivated cropland. The current vegetation make-up of the Project site is primarily tame grasses and foxtail barley, which is a species tolerant of soil salinity. Canada thistle, a noxious weed species, was observed throughout the Project site. One ephemeral wetland and one seasonal waterway are present at the Project site and overlap the proposed facility footprint.

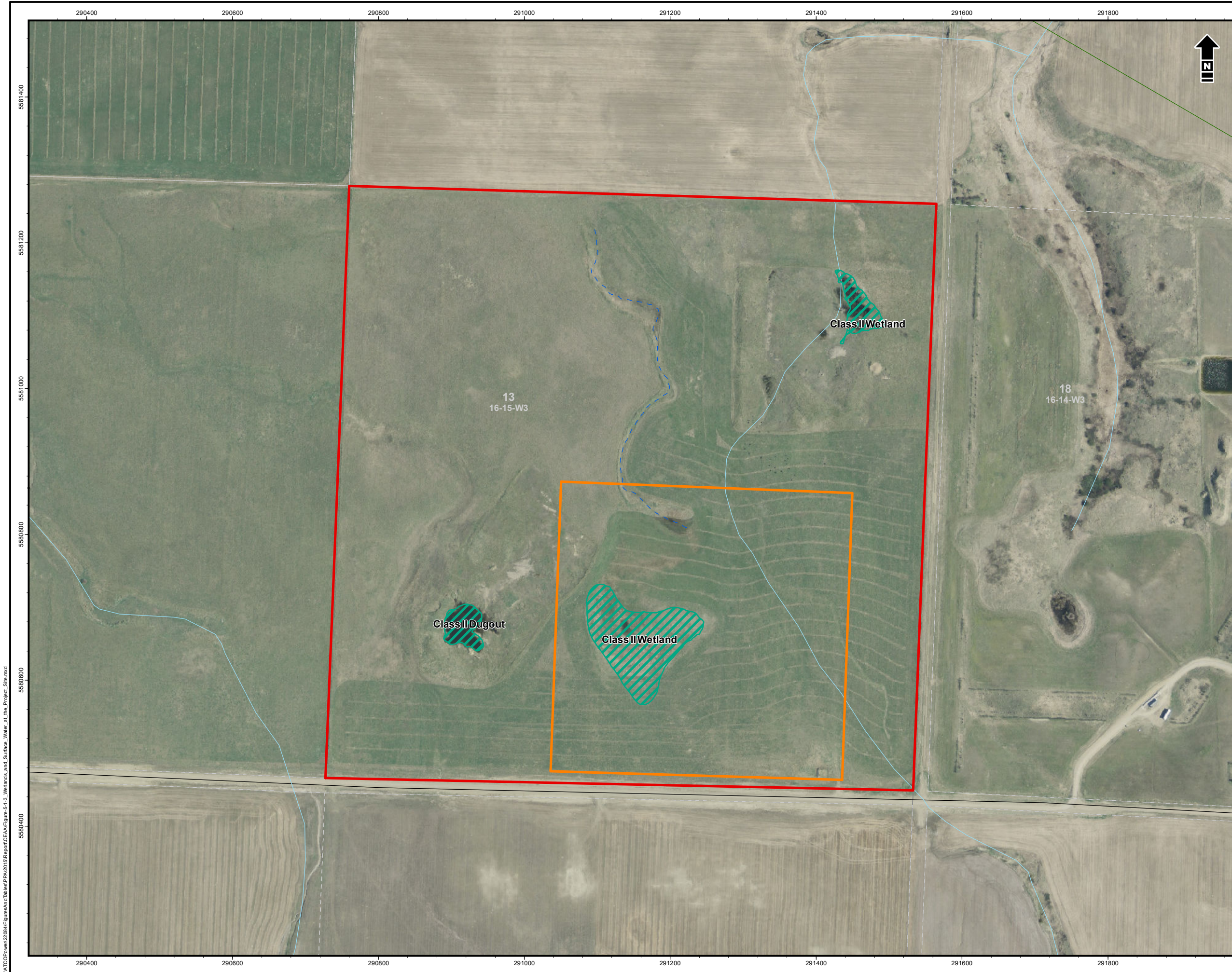
The ephemeral wetland that overlaps the proposed facility footprint was determined to be a Class II wetland (Stewart and Kantrud 1971). This wetland is dominated by sedges and thistles. It appears that the wetland holds water briefly in the spring and during heavy rain events that generate runoff, but based on a review of historical aerial imagery it is dry the majority of normal years. The wetland is currently not cultivated. This 1.35 ha Class II wetland will be drained and graded during construction, which will result in habitat loss for the duration of the Project life. Class II wetlands typically only contain water for several weeks throughout the course of a year; as a result, the habitat value of this wetland is expected to be limited and no adverse impacts are expected to the natural hydrology of the landscape.

A seasonal waterway was observed that meanders north-northwest from the southeast corner of the Project site. The GeoBase National Hydro Network dataset shows this watercourse slightly east of the observed location, as presented on Figure 5.1-3. The seasonal waterway is currently cultivated and appears to have been modified by a landowner to enhance natural drainage. This waterway will be filled and graded during construction. There is seasonal flow through the waterway, so there is a risk that natural flow of water could be impacted by construction. Mitigation (berms and ditches) will be put in place to maintain seasonal water flows around the Project footprint.

A search of federally and provincially listed plant species of concern did not identify any species within 2 km of the Project site. Additionally, no federally or provincially listed plant species were observed during the October 2015 vegetation survey.

ATCO Power will obtain AHPPs from the Saskatchewan WSA for construction in the area of the Class II wetland that is within the facility footprint and for modification of the seasonal waterway. The AHPPs will include guidance regarding dewatering (if required), compensation (if required), and mitigation measures to be employed during construction. Construction will be done in accordance with the conditions in the AHPP. If practical, construction will occur under dry or frozen conditions. Silt fences may also be used if deemed necessary at time of construction to mitigate soil erosion.

As described in Section 5.1.2, ATCO Power will complete a pre-disturbance assessment before construction begins, which will include an evaluation of seasonal changes in vegetation cover and the identification of additional mitigation measures (as required). With the proposed mitigation measures, the potential adverse environmental effects on vegetation and wetlands will be localized to the Project site and limited to the duration of the Project.



- ▭ Project Footprint
- ▭ Project Site
- ▨ Wetland
- GeoBase Mapped Location of Seasonal Water Drainage
- - - Observed Location of Seasonal Water Drainage
- Road
- Pipeline



I:\ATCO\Power\22084\Figures\GIS\Wetlands\PA\2015\Report\CEAA\Figures-5.1-3\_Wetlands\_and\_Surface\_Water\_at\_the\_Project\_Site.mxd

Reference: Data obtained from GeoBase® used under license. GDM midstream and transportation infrastructure data provided by IHS © 2015 used under license. Imagery (2011) obtained from Valtus © (2015) used under license.  
 1:5,000  
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 Metres  
 NAD 1983 UTM Zone 13N



Great Plains Generating Station

### Wetlands and Surface Water at the Project Site

Date: 11 Feb 2016	Project: 22084
Technical: N. Huq	Reviewer: B. Fuchs
	Drawn: J. Sturk

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#### 5.1.4 *Wildlife and Wildlife Habitat*

The Project site is located in the mixed grassland ecoregion of Saskatchewan. This ecoregion provides a diverse range of habitats for birds, deer, coyote, fox, hare, and squirrels, among other species, and is a part of the North American waterfowl migration flyway (Acton et al. 1998). No provincially recognized wildlife protection zones overlap with the Project site. A field survey was conducted on October 23, 2015, by foot within the Project site. The objectives of the field survey scope were to record evidence of habitat for migratory birds, raptors, and other provincially or federally mandated amphibians, birds, or mammals within the Project site, and to determine if setbacks on important areas or timing restrictions would be recommended for regulatory compliance. The surrounding landscape is dominated by cultivated cropland. The current vegetation make-up of the Project site is primarily tame grasses and foxtail barley, which is a species tolerant of soil salinity. Species habitat and ranges were identified from the Saskatchewan Conservation Data Centre (SKCDC; SKCDC 2015), the Committee on the Status of Endangered Wildlife in Canada (COSEWIC; COSEWIC 2015), Acton et al. (1998) and Sibley (2003). The status of wildlife has been ranked federally by COSEWIC (COSEWIC 2015) and the *Species at Risk Act* (SARA; Government of Canada 2016), and provincially by the SKCDC.

The background review indicated that approximately 103 wildlife species potentially occur in the region, including 3 amphibians, 2 reptiles, 89 birds, and 9 mammals. No potential Species at Risk (SAR) or wildlife species sensitive to human disturbance have historically been observed within the Project site or a surrounding 2 km radius. SAR that have ranges overlapping the Project site and that are listed provincially or federally are included in Appendix A1. A long-billed curlew observation was recorded approximately 3.7 km south of the Project site, and a ferruginous hawk nest observation was recorded 4.9 km southeast of the Project site. Migratory birds that may be present near the Project are provided in Appendix A2.

During the October 23, 2015 site visit, field personnel visually scanned the area, using binoculars, and looked for signs of wildlife (important habitat features such as dens and nests and incidental wildlife observations). No wildlife species were observed within the Project site. The lack of wildlife observations does not preclude the potential wildlife use of the site, as many wildlife species would typically migrate to their wintering grounds by late October.

Strategies to mitigate the potential effects of the Project on wildlife will be implemented as outlined in Table 5.1-1. With the implementation of mitigation measures, potential Project effects on wildlife and wildlife habitat are expected to be limited to the removal of the 1.35 ha Class II wetland that provides minimal seasonal habitat.



**Table 5.1-1 Mitigation Strategies for Potential Effects on Wildlife and Wildlife Habitat**

<b>Effect</b>	<b>Affected Species or Species Groups</b>	<b>Mitigation</b>
<b>Habitat Loss and Alteration</b>	All potential SAR and other migratory birds	<ul style="list-style-type: none"> <li>• minimize new surface disturbance to the extent practical</li> <li>• complete cleanup as soon as feasible following construction</li> <li>• reclaim disturbances to an equivalent land capability</li> </ul>
<b>Sensory Disturbance</b>	<ul style="list-style-type: none"> <li>• raptors</li> <li>• owls</li> <li>• songbirds</li> <li>• other migratory birds</li> </ul>	<ul style="list-style-type: none"> <li>• avoid clearing (or conduct pre-clearing nesting/raptor surveys) between April 15 and August 31 (Environment Canada 2014b, 2009) to avoid raptors, migratory birds, and active nests</li> <li>• ensure noise abatement equipment (e.g., mufflers) on machinery is in working order to control noise levels</li> </ul>
<b>Direct Mortality</b>	<ul style="list-style-type: none"> <li>• amphibians</li> <li>• reptiles</li> <li>• raptors</li> <li>• owls</li> <li>• songbirds</li> <li>• other migratory birds</li> <li>• antelope</li> </ul>	<ul style="list-style-type: none"> <li>• avoid clearing (or conduct pre-clearing nesting/raptor surveys) between April 15 and August 31 (Environment Canada 2014b, 2009) to avoid raptors, migratory birds, and active nests</li> <li>• implement spill contingency and response plans</li> <li>• require personnel to observe local traffic laws to improve road safety and reduce risks of wildlife mortality</li> <li>• prohibit employee-owned dogs onsite during construction and operations</li> <li>• prohibit workers from feeding or harassing wildlife</li> </ul>

### 5.1.5 Groundwater

The subsurface stratigraphy beneath the site consists of unconsolidated Holocene and Quaternary deposits overlying Cretaceous bedrock. The thickness of unconsolidated deposits is interpreted to be less than 20 m. As discussed by the Saskatchewan Research Council (SRC; 2007a), groundwater flow directions in the surficial aquifer are anticipated to be strongly influenced by overlying surface topography. At the site, ground surface slopes from south-southeast to the north-northwest from elevations of 750 m to 740 m asl. This is consistent with regional topography which is generally sloping towards the South Saskatchewan River valley that is located approximately 30 km north of the site. Water levels in this aquifer are likely variable seasonally, with the water well data indicating a depth of 2 m to 8 m to water in the aquifer.

A deeper, confined Quaternary aquifer known as the Saskatoon Group Aquifer has been mapped to occur west-northwest of the site at depths ranging from 14 to 37 m below ground surface (bgs; SRC 2007b). The Saskatoon Group Aquifer unit may have been encountered in well 065927 at a depth of 13 to 18 m and is overlain by 0.6 m of till at this location. Another regionally significant confined Quaternary aquifer, the Empress Aquifer, occurs in the west-east trending Swift Current buried valley that is located approximately 6 km south of the site in Township 015-15 W3M. The Empress Aquifer is not interpreted to be present locally at the Project site (SRC 2007a).

Three water wells in the Saskatchewan water well database (ISC – GeoSask 2014) were reported to be potentially located within 2 km of the Project and are summarized in Table 5.1-2. The locations of these wells (Figure 5.1-4) have not been field verified and are constrained to the reported quarter section or section.

**Table 5.1-2 Water Wells Potentially Located Within 2 km of the Project**

Well ID	Legal Location	Type of Well	Total Depth (m bgs)	Top of Screen (m bgs)	Bottom of Screen (m bgs)	Depth to Water (m bgs)	Depth to Bedrock (m bgs)
055405	NW-19-016-14W3	Domestic Withdrawal	15.2	6.1	12.8	1.8	10.7
062015	SW-19-016-14W3	Domestic Withdrawal	8.5	6.4	8.2	6.4	n/a
065927	23-016-15W3	Domestic Withdrawal	19.5	7.6	18.3	7.6	n/a

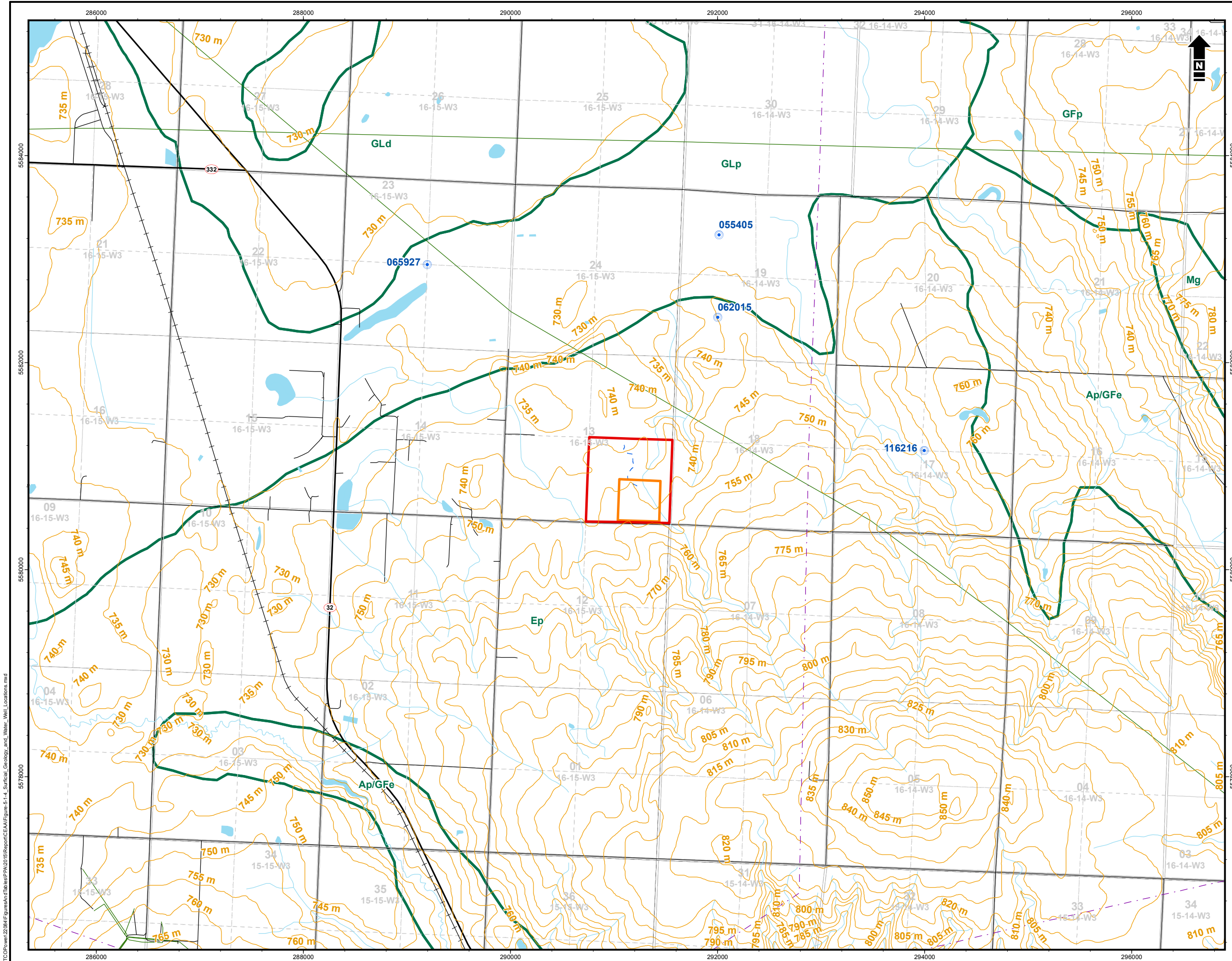
There were no industrial water source or disposal wells reported in geoSCOUT within 2 km of the Project site.

As discussed in SRC 2007a, 2007b, because of the absence of a confining layer, all surficial aquifers in the Swift Current area are vulnerable to contamination from the ground surface. All other aquifers below this unit near the Project have low to extremely low vulnerability to contamination (SRC 2007a, 2007b). The risk of impacts to shallow groundwater quality would be dependent on several factors including:

- having an accidental release of fluids onsite
- groundwater flow direction and hydraulic gradients in the surficial aquifer
- hydraulic conductivity of the surficial aquifer

Releases of materials to the environment at surface will be prevented through the use of appropriate secondary containment and disposal methods. Specifically, ATCO Power will equip dangerous goods storage areas with secondary containment that is impermeable and constructed of a compatible material.

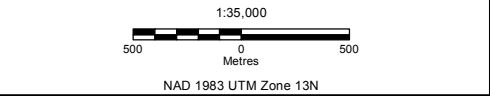
Overall, the Project has a low risk of potential spills that could cause groundwater impacts as onsite chemical and solvent quantities are either small or not deleterious. Therefore, adverse effects to groundwater quality are not anticipated from the Project.



- ▭ Project Footprint
- ▭ Project Site
- Surficial Geology Boundary
- GeoBase Mapped Location of Water Body
- GeoBase Mapped Location of Seasonal Water Drainage/Watercourse
- Observed Location of Seasonal Water Drainage
- Railway
- Highway
- Road
- Powerline
- Pipeline
- Contour (5 m)
- Water Well Location

**Surficial Geology Environment**  
 GLp - Glacilacustrine plain  
 GFp - Glaciofluvial outwash plain  
 GLd - Glacilacustrine delta  
 Ep - Eolian plain  
 Mg - Morainal  
 Ap/GFe - Alluvial floodplain

Reference: Data obtained from Geological Atlas of Saskatchewan, GeoBase® and GeoGratis® Department of Natural Resources Canada (all rights reserved) used under license. GDM midstream and transportation infrastructure data provided by IHS © 2015 used under license.



Great Plains Generating Station

## Surficial Geology and Water Well Locations

Date: 11 Feb 2016	Project: 22084	
Technical: N. Huq	Reviewer: B. Fuchs	Drawn: J. Sturk

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### 5.1.6 Surface Hydrology

The Project is located approximately 35 km south of the South Saskatchewan River; however, drainage from the Project site does not flow directly to the river. Instead, drainage from the Project site flows north through a series of coulees, disconnected watercourses, and drainage ditches. An unconfined surficial shallow groundwater aquifer with water levels that likely vary seasonally is strongly influenced by the local surface topography (Section 5.1.5).

A seasonal waterway was observed that meanders north-northwest from the southeast corner of the Project site. The GeoBase National Hydro Network dataset shows this watercourse slightly east of the observed location, as presented on Figure 5.1-3. The seasonal waterway is currently cultivated and appears to have been modified by a landowner to enhance natural drainage. This waterway will be filled and graded during construction.

Local drainage features surrounding the Project includes wetlands and seasonal drainages interspersed amongst cultivated land. The seasonal drainages were dry during a field visit conducted in October 2015. It is expected that the seasonal drainages convey flow during precipitation events in the summer months and during snowmelt in the spring. From the Project site, the seasonal drainages flow in a northerly direction through a series of disconnected seasonal drainages. There are no surface water bodies or watercourses present on the Project site aside from the prairie wetlands overlapping the Project footprint (Section 5.1.3) and the seasonal drainage on the east side of the Project (Figure 5.1-3).

ATCO Power is proposing to source raw water from the City of Swift Current reservoir. The Project is estimated to require a maximum water allocation volume of 350 m<sup>3</sup>/day (127,750 m<sup>3</sup>/year), for the purpose of boiler water makeup. The City of Swift Current water reservoir is Reid Lake, which is regulated by Duncairn Dam on Swift Current Creek (SRC 2007b). The water licence for the City of Swift Current allocates an annual water volume of 5,726,000 m<sup>3</sup>.

Water use from the Project decreases the volume of available surface water that can be withdrawn by the City of Swift Current. In 2014, the City of Swift Current used 46.1% of the total allocation volume, which leaves 3,086,000 m<sup>3</sup> available based on the licence (Dahl 2015, Pers. Comm.). The annual proposed volume required for the Project represents 4% of the City of Swift Current's unused allocation in 2014. Further, the daily proposed volume required for the Project is 0.49% of the mean annual flow at the Water Survey of Canada Swift Current near Leinan hydrometric station between 1974 and 2014. ATCO Power will work with the Saskatchewan WSA and the City of Swift Current to obtain a water license for the Project, with the objective of maintaining the total allocation volume from Swift Current Creek unchanged from baseline conditions. As a result, there will be no incremental environmental effects on Swift Current Creek beyond what has already been permitted as part of the City of Swift Current's existing water license.

Furthermore, ATCO Power expects that the wastewater generated at the Project will be sent to the City of Swift Current wastewater treatment facility and discharged back into Swift Current Creek after treatment. As a result, the surface water required for the Project will not represent a consumptive use (i.e., the majority of the surface water withdrawn will be treated and returned to Swift Current Creek further downstream). As a result, detectable changes to environmental base flows within Swift Current Creek are not anticipated due to the Project.

Potential impacts due to wastewater disposal are limited, as the treated effluent from the City of Swift Current wastewater treatment facility is returned to Swift Current Creek and is available for other uses including environmental flows.

Potential impacts due to construction of the Project may also include increases in surface runoff due to alterations of site drainage. The Project will affect an existing seasonal waterway within the facility footprint that is currently modified by agricultural practices. There is seasonal flow through the waterway, so there is a risk that natural flow of water could be impacted by construction. Effects to downstream watercourses and water bodies from changes in runoff are not anticipated because ditches and berms will be used to direct flow around the Project and back to the seasonal drainage. Additionally, mitigation measures and best management practices will be used to control runoff from the plant during construction activities and through the operational life of the Project.

### *5.1.7 Surface Water Quality and Fish and Fish Habitat*

Baseline hydrologic conditions for the Project site and the surrounding area are described in Section 5.1.6. The Project site contains two ephemeral wetlands and a seasonal waterway (Section 5.1.3). These ephemeral water bodies were dry during the site visit in October 2015 and expected to only contain water seasonally. As a result, the water bodies present within the Project site provide no fish habitat. The closest named water body to the Project is Swift Current Creek, approximately 13 km from the site. Key fish species known to be present in Swift Current Creek include fathead minnow and white sucker (SCCWS 2016b).

ATCO Power is proposing to source raw water from the City of Swift Current. As described in Section 5.1.6, detectable changes to environmental base flows within Swift Current Creek are not anticipated due to the Project's source water withdrawals. Accordingly, adverse effects on water quality or fish and fish habitat are not anticipated due to source water withdrawals.

ATCO Power is proposing to dispose of generated wastewater from the Project at the City of Swift Current wastewater treatment facility. As described in Section 5.1.6, ATCO Power's wastewater stream would be treated with the rest of the inlet stream to the City of Swift Current wastewater treatment facility and discharged. The City of Swift Current would be responsible for maintaining its effluent water quality in accordance with the discharge guidelines dictated by the Saskatchewan WSA. As a result, no adverse effects on water quality or fish and fish habitat are anticipated due to wastewater disposal.

Potential impacts due to construction of the Project may also include increases in surface runoff due to alterations of site drainage. As described in Section 5.1.6, effects to downstream watercourses and water bodies from changes in runoff are not anticipated because ditches and berms will be used to direct flow around the Project and back to the seasonal drainage. As no changes in downstream flow are anticipated, no adverse effects on water quality or fish and fish habitat are anticipated due to alterations of site drainage.

If water is present in either of the ephemeral water bodies during site clearing, or if watercourse crossings are required to develop the raw water and wastewater pipelines, ATCO Power will complete a self-assessment based on the *Measures to Avoid Causing Hard to Fish and Fish Habitat* (Fisheries and Oceans Canada, 2013) and obtain the appropriate authorizations (as required).

### 5.1.8 Air Quality

A site-specific evaluation of baseline air quality conditions will be completed as part of the air dispersion modelling required under the provincial *Environmental Management and Protection Act*. Saskatchewan ENV provides Regional Background Concentrations that are sufficient to describe baseline conditions in most cases. Southwest region baseline data combined with any industrial emissions sources within 5 km of the Project will be utilized to represent baseline air quality as specified in the *Saskatchewan Air Quality Modelling Guideline* (Saskatchewan ENV 2012) to evaluate cumulative effects on air quality.

The main source of air emissions during Project operation will be the combustion of natural gas in the GTG. Emissions will be from a single stack connected to the powerhouse building and are expected to include CO, NO<sub>x</sub>, PM<sub>2.5</sub>, and GHGs. Because of the low sulphur content of the pipeline quality natural gas to be supplied by TransGas, the Project is not expected to emit measureable amounts of SO<sub>2</sub>. Similarly, because of the natural gas fuel and design of combined cycle power plant, the Project is not expected to have measureable emissions of VOCs. Based on the lack of SO<sub>2</sub> and VOC emissions, the Project is not expected to result in offsite odours. However, ATCO Power recognizes that odour is subjective, and will work with individual landowners and stakeholders to identify the source of the odours and propose reasonable mitigation measures if required.

Preliminary air dispersion modelling results indicate that the predicted concentrations of NO<sub>2</sub>, CO, and PM<sub>2.5</sub> are below their respective NAAQOs (CCME 1999) and *Saskatchewan Ambient Air Quality Standards* (Government of Saskatchewan n.d.) for the range of operating scenarios considered. Potential adverse changes to the air quality from the Project under all operating scenarios are therefore expected to be minimal, and no air treatment and control beyond the design considerations described earlier are proposed.

### 5.1.9 Noise

Currently, there are no legislated noise requirements in Saskatchewan. In recent experience with other project applications, Saskatchewan ENV has indicated to follow the noise guidelines provided in *Rule 012: Noise Control* (AUC 2013). As outlined in Rule 012, rural areas (such as the Project site) are considered to have a baseline sound level of 35 dBA Leq (nighttime).

The main source of noise at the Project will be the operation of the GTG, HRSG, and STG. Rule 012 (AUC 2013) indicates that the Project must meet a permissible sound level (PSL) of 40 dBA Leq (nighttime) at 1.5 km from the facility fenceline (as the closest dwelling is greater than 1.5 km from the Project site). ATCO Power has conducted preliminary acoustic modelling and the noise assessment results indicate that the Project will be compliant with the most stringent PSLs specified in AUC Rule 012. As a result, the Project is not expected to result in disruptive noise for landowners and stakeholders. However, ATCO Power recognizes that noise sensitivity is subjective, and will work with individual landowners and stakeholders to identify the source of the noise and propose reasonable mitigation measures if required.

### *5.1.10 Historical Resources*

A heritage sensitivity search was completed on October 15, 2015 using the Saskatchewan Parks, Culture and Sport website (Government of Saskatchewan 2012). The Project quarter section is deemed not heritage sensitive. As a result, clearance from the Heritage Conservation Branch is not required before Project construction and the Project is not anticipated to result in adverse effects on historical resources.

## **5.2 Changes that may be Caused by the Project to Fish and Fish Habitat, Listed Aquatic Species and Migratory Birds**

### *5.2.1 Fish and Fish Habitat, as Defined in the Fisheries Act*

As described in Section 5.1.7, no adverse effects on fish and fish habitat are anticipated due to the Project.

### *5.2.2 Marine Plants, as Defined in the Species at Risk Act*

The Project will not affect marine plants as there will be no interactions with an ocean environment.

### *5.2.3 Migratory Birds, as Defined in the Migratory Birds Convention Act*

The majority of the Project site is tame pasture and therefore could provide suitable nesting habitat for some songbirds, as described in Section 5.1.4. Site clearing activities are scheduled to take place between September 1, 2016, and April 14, 2017, which is outside of Environment Canada's restricted activity period (RAP), which is April 15 to August 31 (Environment Canada 2014b).

If clearing activities must be completed during this RAP, a pre-construction survey will be conducted by an avian biologist before activities to demonstrate compliance with the *Migratory Birds Convention Act*. During the pre-construction survey, if nests are found or suspected to be present based on bird behavior in areas to be cleared, a temporary setback buffer will be applied to ensure construction activities will not disturb the nesting birds. Setback distances may vary depending on the time of year and level of disturbance (Environment Canada 2009). Temporary setback buffers will be removed once the nest is confirmed inactive and the area is re-swept and no new nests are found. If no new nests are identified during the survey then clearing can occur within 7 days. Additionally, wetlands will also be swept, before construction, to determine the presence of flightless waterfowl and any residual nesting birds in wetlands up to August 31 (Environment Canada 2014b).

Given the current scheduled clearing timing for the Project (between September 1, 2016 and April 14, 2017) and the implementation of mitigation measures that are consistent with the approach recommended by Environment and Climate Change Canada, the Project is not expected to result in adverse environmental effects on migratory birds, as defined under the *Migratory Birds Convention Act*.

### **5.3 Changes that may be Caused by the Project to Federal Lands or Lands Outside of Saskatchewan**

Given that the Project is not expected to result in any adverse environmental effects within the region, adverse environmental effects on lands outside Saskatchewan or Canada are similarly not expected.

### **5.4 Changes that may be Caused by the Project to Aboriginal Peoples Resulting from Changes to the Environment**

The Project is located within the boundaries of Treaty No. 4. The closest First Nation Reserve to the Project is an “urban reserve” held by the Nekaneet Cree Nation located within the City of Swift Current, approximately 11 km southeast of the Project. This reserve is used to operate the Living Sky Casino. It is understood that no members of the Nekaneet Cree Nation live on this reserve (Statistics Canada 2015) or use this reserve for traditional purposes. The Nekaneet Cree Nation also has reserve lands located approximately 113 km southwest of the Project.

The Carry the Kettle Nakoda First Nation Reserve is located approximately 66 km northwest of the Project. ATCO Power has contacted the Nekaneet Cree Nation and the Carry the Kettle Nakoda First Nation (as well as the File Hills Qu’Appelle Tribal Council) to introduce the Project and to identify their interests in the Project area. The Project is also located within the boundaries of Western Region III, as defined by the Métis Nation of Saskatchewan (Deloitte 2013). Within this region, the Métis locals in Swift Current and Maple Creek are not identified as being active. The closest active Métis Local is the Prairie Dog Métis Local 123, approximately 50 km south of the Project. ATCO Power has contacted the Métis Nation of Saskatchewan to introduce the Project and to request their assistance in identifying potential Métis communities or Métis Locals that may be interested in the Project. ATCO Power will continue to consult with the Métis Nation of Saskatchewan and any identified Métis Local(s) if it is the successful bidder for the Project.

The Project site has been privately owned since 1951 and no current traditional usage of the land by Aboriginal peoples has been noted. The land use before 1951 is unknown. To evaluate potential effects on physical and cultural heritage, a heritage sensitivity search was completed on October 15, 2015, using the Saskatchewan Parks, Culture, and Sport website (Government of Saskatchewan 2012a). The Project quarter section is deemed not heritage sensitive.

ATCO Power has searched publicly available information and no traditional use specific to the area surrounding the Project has been identified; however, ATCO Power recognizes that this does not mean that there has been no traditional use of the land in the past. No asserted traditional territory boundaries or settlement lands have been identified near the Project. The closest documented traditional use is noted in the Great Sand Hills region (Peters et. al. 2006), which is located approximately 70 km west of the Project. The Great Sand Hills is a significant topographical and physiological landmark within the area and was used for First Nations in terms of medicines, culture and spiritual practices.

Potential adverse effects are not anticipated to water quality (Section 5.1.7), air quality (Section 5.1.8), odours (Section 5.1.8) or noise (Section 5.1.9); as a result, adverse effects on human health are also not anticipated. Potential adverse effects to wildlife (including migratory birds) will be mitigated (Section 5.1.4) and potential adverse effects to fish and fish habitat are not anticipated (Section 5.1.7). The Project will



result in employment opportunities and potential economic benefits for the entire region, including Aboriginal people. With regards to aesthetics, the HRSG exhaust stack and the GT exhaust stack at the plant facility will be visible in the surrounding area. ATCO Power will apply best management practices to minimize nuisance lighting and will use neutral colours for buildings and stacks to reduce aesthetic effects.

ATCO Power understands the uncertainty around identifying traditional and historical use and will continue to consult with identified Aboriginal groups if they are the successful bidder for the Project. If further information regarding regional traditional land uses becomes available, ATCO Power will incorporate this information and identified mitigation measures into subsequent assessment and permitting for the Project.

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## **6.1 Personal Communications**

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## 7.0 Acronyms

ATCO Power	ATCO Power Canada Ltd.
asl	above sea level
AHPP	Aquatic Habitat Protection Permit
AVI	Aquifer Vulnerability Index
bgs	below ground surface
CAC	Criteria Air Contaminants
CEA	Canadian Environmental Assessment
CEAA, 2012	Canadian Environmental Assessment Act, 2012
ERP	Emergency Response Plan
ESA	environmental site assessments
GHG	greenhouse gases
GTG	gas turbine generator
HRSG	heat recovery steam generator
MSAPR	Multi-sector Air Pollutant Regulations
MW	megawatt
MWh	megawatt hour
NAAQO	National Ambient Air Quality Objectives
NAV	NAV CANADA
P&NG	petroleum and natural gas
ppmv	parts per million by volume
PSL	permissible sound levels
RAP	Restricted Activity Period (
RM	Rural Municipality
ROW	rights-of-way
SAR	Species at Risk
SARA	<i>Species at Risk Act</i>
Saskatchewan ECON	Saskatchewan Ministry of Economy
Saskatchewan ENV	Saskatchewan Ministry of Environment
SaskPower	Saskatchewan Power Corporation
SRC	Saskatchewan Research Council
STG	Steam turbine generator
the Project	Great Plains Generating Station
TransGas	TransGas Limited
VOC	Volatile organic compounds
WSA	Water Security Agency

## **Appendix A1**

Species at Risk Potentially Occurring in the Vicinity of the Project

**Table A1 Species at Risk Potentially Occurring in the Vicinity of the Project, Including Provincial and Federal Status**

Common Name	Scientific Name	Status		
		COSEWIC <sup>1</sup>	SARA <sup>2</sup>	SKCDC <sup>3</sup>
<b>Amphibians and Reptiles</b>				
Northern leopard frog	<i>Lithobates pipiens</i>	Special Concern	Schedule 1	S3
Red-bellied snake	<i>Storeria occipitomaculata</i>	-	-	S3
<b>Birds</b>				
Greater sage-grouse	<i>Centrocercus urophasianus</i>	Endangered	Schedule 1	S1B, S1N
Ferruginous hawk	<i>Buteo regalis</i>	Threatened	Schedule 1	S4B, S4M
Golden eagle	<i>Aquila chrysaetos</i>	-	-	S3B, S4M, S3N
Turkey vulture	<i>Cathartes aura</i>	-	-	S2B, S2M, S2N
Yellow rail	<i>Coturnicops noveboracensis</i>	Special Concern	Schedule 1	S3B, S2M
Piping plover	<i>Charadrius melodus circumcinctus</i>	Endangered	Schedule 1	S3B
Long-billed curlew	<i>Numenius americanus</i>	Special Concern	Schedule 1	S3B, S4M
Horned grebe	<i>Podiceps auritus</i>	Special Concern	No schedule	SFB
Western grebe	<i>Aechmophorus occidentalis</i>	Special Concern	No schedule	S5B
American white pelican	<i>Pelecanus erythrorhynchos</i>	Not at Risk	-	S3B
Great blue heron	<i>Ardea herodias</i>	-	-	S3B
Sandhill crane	<i>Grus canadensis</i>	-	-	S2B, S4M
Burrowing owl	<i>Athene cunicularia</i>	Endangered	Schedule 1	S1
Short-eared owl	<i>Asio flammeus</i>	Special Concern	Schedule 1	S3B, S2N
Common nighthawk	<i>Chordeiles minor</i>	Threatened	Schedule 1	S4S5B, S4S5M
Loggerhead shrike	<i>Lanius ludovicianus excubitorides</i>	Threatened	Schedule 1	S3B
Barn swallow	<i>Hirundo rustica</i>	Threatened	No schedule	S5B, S5M
Bank swallow	<i>Riparia riparia</i>	Threatened	No schedule	S5B, S5M
Sprague's pipit	<i>Anthus spragueii</i>	Threatened	Schedule 1	S3B
Chestnut-collared longspur	<i>Calcarius ornatus</i>	Threatened	Schedule 1	S5B
McCown's longspur	<i>Rhynchophanes mccownii</i>	Special Concern	Schedule 1	S3S4B
Baird's sparrow	<i>Ammodramus bairdii</i>	Special Concern	No schedule	S4B
Rusty blackbird	<i>Euphagus carolinus</i>	Special Concern	Schedule 1	S3
Bobolink	<i>Dolichonyx oryzivorus</i>	Threatened	No schedule	S5B
<b>Mammals</b>				
Pronghorn	<i>Antilocapra americana</i>	-	-	S3
American badger	<i>Taxidea taxus taxus</i>	Special Concern	No schedule	No Status

Notes:

1. COSEWIC 2015
2. Government of Canada 2016
3. SKCDC 2015

## **Appendix A2**

Migratory Birds Potentially Occurring in the Vicinity of the Project



**Table A2 Migratory Birds Potentially Occurring in the Vicinity of the Project, Including Provincial and Federal Status**

Common Name	Scientific Name	Status		
		COSEWIC <sup>1</sup>	SARA <sup>2</sup>	SKDC <sup>3</sup>
Canada goose	<i>Branta canadensis</i>	-	-	S5B,S5M,S2N
Osprey	<i>Pandion haliaetus</i>	-	-	S4B,S3M
Bald eagle	<i>Haliaeetus leucocephalus</i>	Not at Risk	-	S5B,S4M,S4N
Northern harrier	<i>Circus cyaneus</i>	Not at Risk	-	S5B,S4M,S2N
Northern goshawk	<i>Accipiter gentilis atricapillus</i>	-	-	S4B,S4M,S3N
Cooper's hawk	<i>Accipiter cooperii</i>	Not at Risk	-	S4B,S2M,S2N
Swainson's hawk	<i>Buteo swainsoni</i>	-	-	S4B
Red-tailed hawk	<i>Buteo jamaicensis</i>	Not at Risk	-	S5B,S5M,S1N
<b>Ferruginous hawk</b>	<b><i>Buteo regalis</i></b>	<b>Threatened</b>	<b>Schedule 1</b>	<b>S4B,S4M</b>
<b>Golden eagle</b>	<b><i>Aquila chrysaetos</i></b>	-	-	<b>S3B, S4M, S3N</b>
<b>Turkey vulture</b>	<b><i>Cathartes aura</i></b>	-	-	<b>S2B, S2M, S2N</b>
Gadwall	<i>Anas strepera</i>	-	-	S5B,S5M,S2N
American wigeon	<i>Anas americana</i>	-	-	S5B,S5M,S2N
Mallard	<i>Anas platyrhynchos</i>	-	-	S5
Blue-winged teal	<i>Anas discors</i>	-	-	S5B,S5M
Cinnamon teal	<i>Anas cyanoptera</i>	-	-	S4B,S4M
Northern shoveler	<i>Anas clypeata</i>	-	-	S5B,S5M
Northern pintail	<i>Anas acuta</i>	-	-	S5B,S5M,S4N
Green-winged teal	<i>Anas crecca</i>	-	-	S5B,S5M,S2N
Canvasback	<i>Aythya valisineria</i>	-	-	S5B,S5M,S2N
Redhead	<i>Aythya americana</i>	-	-	S5B,S5M,S2N
Lesser scaup	<i>Aythya affinis</i>	-	-	S5B,S5M,S3N
<b>White-winged scoter</b>	<b><i>Melanitta fusca</i></b>	-	-	<b>S5B,S3M</b>
Ruddy duck	<i>Oxyura jamaicensis</i>	-	-	S5B
Gray partridge	<i>Perdix perdix</i>	-	-	SNA
Ring-necked pheasant	<i>Phasianus colchicus</i>	-	-	SNA
Sharp-tailed grouse	<i>Tympanuchus phasianellus</i>	-	-	S5
<b>American white pelican</b>	<b><i>Pelecanus erythrorhynchos</i></b>	<b>Not at Risk</b>	-	<b>S3B</b>
<b>Great blue heron</b>	<b><i>Ardea herodias</i></b>	-	-	<b>S3B</b>
<b>Sandhill crane</b>	<b><i>Grus canadensis</i></b>	-	-	<b>S2B, S4M</b>
<b>Greater sage-grouse</b>	<b><i>Centrocercus urophasianus urophasianus</i></b>	<b>Endangered</b>	<b>Schedule 1</b>	<b>S1B,S1N</b>
Pied-billed grebe	<i>Podilymbus podiceps</i>	-	-	S5B
<b>Western grebe</b>	<b><i>Aechmophorus occidentalis</i></b>	<b>Special Concern</b>	<b>No Schedule</b>	<b>S5B</b>
<b>Horned grebe</b>	<b><i>Podiceps auritus</i></b>	<b>Special Concern</b>	<b>No Schedule</b>	<b>SFB</b>
Red-necked grebe	<i>Podiceps grisegena</i>	Not at Risk	-	S5B
Eared grebe	<i>Podiceps nigricollis</i>	-	-	S5B
American bittern	<i>Botaurus lentiginosus</i>	-	-	S4B
Black-crowned night heron	<i>Nycticorax nycticorax</i>	-	-	S5B
<b>Yellow rail</b>	<b><i>Coturnicops noveboracensis</i></b>	<b>Special Concern</b>	<b>Schedule 1</b>	<b>S3B,S2M</b>
Piping plover	<i>Charadrius melodus circumcinctus</i>	Endangered	Schedule 1	S3B
Sora	<i>Porzana carolina</i>	-	-	S5B
American coot	<i>Fulica americana</i>	Not at Risk	-	S5B
Killdeer	<i>Charadrius vociferus</i>	-	-	S5B

Common Name	Scientific Name	Status		
		COSEWIC <sup>1</sup>	SARA <sup>2</sup>	SKDC <sup>3</sup>
American avocet	<i>Recurvirostra americana</i>	-	-	S5B,S5M
Lesser yellowlegs	<i>Tringa flavipes</i>	-	-	S5B,S5M
Willet	<i>Tringa semipalmata</i>	-	-	S5B,S4M
Upland sandpiper	<i>Bartramia longicauda</i>	-	-	S5B,S5M
<b>Long-billed curlew</b>	<b><i>Numenius americanus</i></b>	<b>Special Concern</b>	<b>Schedule 1</b>	<b>S3B,S4M</b>
Marbled godwit	<i>Limosa fedoa</i>	-	-	S5B,S5M
Spotted sandpiper	<i>Actitis macularius</i>	-	-	S5B,S5M
Wilson's phalarope	<i>Phalaropus tricolor</i>	-	-	S5B,S5M
Wilson's snipe	<i>Gallinago delicata</i>	-	-	S5B
Franklin's gull	<i>Leucophaeus pipixcan</i>	-	-	S4B,S4M
Black tern	<i>Chlidonias niger</i>	-	-	S4B,S4M
Common tern	<i>Sterna hirundo</i>	Not at Risk	-	S5B,S5M
Forster's tern	<i>Sterna forsteri</i>	-	-	S4B
Rock pigeon	<i>Columba livia</i>	-	-	SNA
Mourning dove	<i>Zenaida macroura</i>	-	-	S5B
Black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>	-	-	S5B
Great horned owl	<i>Bubo virginianus</i>	Not at Risk	-	S5
<b>Burrowing owl</b>	<b><i>Athene cunicularia</i></b>	<b>Endangered</b>	<b>Schedule 1</b>	<b>S1</b>
<b>Short-eared owl</b>	<b><i>Asio flammeus</i></b>	<b>Special Concern</b>	<b>Schedule 1</b>	<b>S3B,S2N</b>
<b>Common nighthawk</b>	<b><i>Chordeiles minor</i></b>	<b>Threatened</b>	<b>Schedule 1</b>	<b>S4S5B,S4S5M</b>
Downy woodpecker	<i>Picoides pubescens</i>	-	-	n/a
Hairy woodpecker	<i>Picoides villosus</i>	-	-	n/a
Northern flicker	<i>Colaptes auratus</i>	-	-	n/a
American kestrel		-	-	S5B,S5M,S1N
Merlin	<i>Falco columbarius</i>	-	-	n/a
Least flycatcher	<i>Empidonax minimus</i>	-	-	n/a
Western kingbird	<i>Tyrannus verticalis</i>	-	-	n/a
Eastern kingbird	<i>Tyrannus tyrannus</i>	-	-	n/a
<b>Loggerhead shrike</b>	<b><i>Lanius ludovicianus excubitorides</i></b>	<b>Threatened</b>	<b>Schedule 1</b>	<b>S3B</b>
Black-billed magpie	<i>Pica hudsonia</i>	-	-	<b>S5</b>
Warbling vireo	<i>Vireo gilvus</i>	-	-	n/a
Horned lark	<i>Eremophila alpestris</i>	-	-	n/a
Tree swallow	<i>Tachycineta bicolor</i>	-	-	n/a
<b>Barn swallow</b>	<b><i>Hirundo rustica</i></b>	<b>Threatened</b>	<b>No Schedule</b>	<b>S5B,S5M</b>
<b>Bank Swallow</b>	<b><i>Riparia riparia</i></b>	<b>Threatened</b>	<b>No Schedule</b>	<b>S5B, S5M</b>
House wren	<i>Troglodytes aedon</i>	-	-	SF
Marsh wren	<i>Cistothorus palustris</i>	-	-	S5B
Mountain bluebird	<i>Sialia currucoides</i>	-	-	S5B
American robin	<i>Turdus migratorius</i>	-	-	S5B
Gray catbird	<i>Dumetella carolinensis</i>	-	-	S5B
Brown thrasher	<i>Toxostoma rufum</i>	-	-	S5B
European starling	<i>Sturnus vulgaris</i>	-	-	SNA
Yellow warbler	<i>Setophaga petechia</i>	-	-	S5B
Cedar waxwing	<i>Bombycilla cedrorum</i>	-	-	S5B
Common yellowthroat	<i>Geothlypis trichas</i>	-	-	S5B
Spotted towhee	<i>Pipilo maculatus</i>	-	-	S5B
Yellow-breasted chat	<i>Icteria virens auricollis</i>	-	-	S4B

Common Name	Scientific Name	Status		
		COSEWIC <sup>1</sup>	SARA <sup>2</sup>	SKCDC <sup>3</sup>
<b>Sprague's pipit</b>	<i>Anthus spragueii</i>	Threatened	Schedule 1	S3B
<b>Chestnut-collared Longspur</b>	<i>Calcarius ornatus</i>	Threatened	Schedule 1	S5B
<b>McCown's Longspur</b>	<i>Rhynchophanes mccownii</i>	Special Concern	Schedule 1	S3S4B
Clay-colored sparrow	<i>Spizella pallida</i>	-	-	S5B
Vesper sparrow	<i>Poocetes gramineus</i>	-	-	S5B
Lark sparrow	<i>Chondestes grammacus</i>	-	-	S5B
Lark bunting	<i>Calamospiza melanocorys</i>	-	-	S4B
Savannah sparrow	<i>Passerculus sandwichensis</i>	-	-	S5B
Grasshopper sparrow	<i>Ammodramus savannarum</i>	-	-	S4B
<b>Baird's Sparrow</b>	<i>Ammodramus bairdii</i>	Special Concern	No Schedule	S4B
Song sparrow	<i>Melospiza melodia</i>	-	-	S5B
Sharp-tailed sparrow	<i>Ammodramus nelson</i>	-	-	S5B
le Conte's sparrow	<i>Ammodramus leconteii</i>	-	-	S4B
<b>Bobolink</b>	<i>Dolichonyx oryzivorus</i>	Threatened	No Schedule	S5B
red-winged blackbird	<i>Agelaius phoeniceus</i>	-	-	S5B
western meadowlark	<i>Sturnella neglecta</i>	-	-	S5B
yellow-headed blackbird	<i>Xanthocephalus xanthocephalus</i>	-	-	n/a
brewer's blackbird	<i>Euphagus cyanocephalus</i>	-	-	n/a
common grackle	<i>Quiscalus quiscula</i>	-	-	S5B
<b>rusty blackbird</b>	<i>Euphagus carolinus</i>	Special Concern	Schedule 1	S3
brown-headed cowbird	<i>Molothrus ater</i>	-	-	S5B
baltimore oriole	<i>Icterus galbula</i>	-	-	S5B
house sparrow	<i>Passer domesticus</i>	-	-	SNA
American goldfinch	<i>Spinus tristis</i>	-	-	S5B

Notes:

1. COSEWIC 2015
2. Government of Canada 2016
3. SKCDC 2015