Heartland Generating Station
Project Description submitted under the Canadian Environmental Assessment Act

Submitted to:

Canadian Environmental Assessment Agency
March 2014

ATCO POWER CANADA LTD.
400, 919 - 11 Ave SW
Calgary, Alberta
T2R IP3

Canadian Environmental Assessment Agency Project Description Heartland Generating Station

March 2014

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1.0 GENERAL INFORMATION AND CONTACT(S)

This Project Description has been prepared in accordance with the *Prescribed Information for the Description of a Designated Project Regulations* (SOR/2012-148) and the *Guide to Preparing a Description of a Designated Project under the Canadian Environmental Assessment Act, 2012* (the Guide).

This Project Description has been organized to follow the topic headings as described in the Guide. Major headings and numbering in this document are the same as those provided in the Guide. Content requested by the Guide is shown in text boxes, in blue italics.

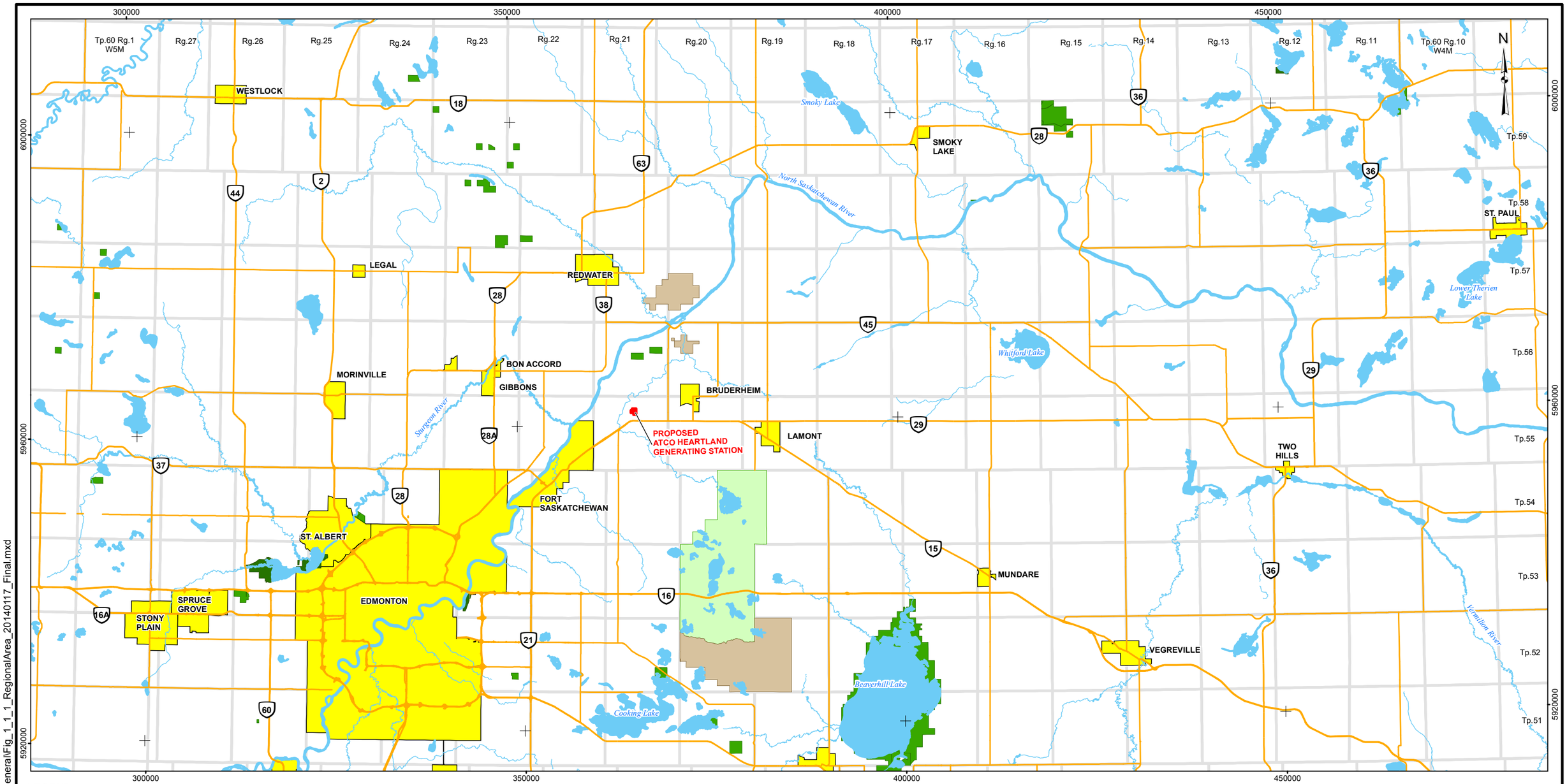
1.1 Nature and Proposed Location of Project

Describe the nature of the designated project, and proposed location (2–3 paragraphs; note that additional location details are to be provided in section 3).

ATCO Power Canada Ltd. (ATCO Power) is proposing to construct and operate a nominal 400 megawatt (MW) natural gas-fired combined cycle gas turbine power plant called the Heartland Generating Station (the Project) at a location near Fort Saskatchewan, Alberta. The Project will be located on a 56.7-hectare (140-acre) land parcel privately owned by ATCO Real Estate Holdings at NW 27-55-21 West of the Fourth Meridian (W4M; the Project site) and leased to ATCO Power long term for the purposes of the Project. Once constructed, the Project will occupy a 9.4 ha footprint.

Figure 1.1.1 is a map of the regional area showing the Project site. The Project is located in Alberta's Industrial Heartland (AIH), an area of the Province that has been designated for industrial uses. The AIH is characterized as having a strong industrial base of oil refineries, chemical manufacturing, and power generation. Future industrial activity in the region is also expected to include bitumen upgrading and additional chemical manufacturing facilities.

The Project has been designed to use state-of-the-art gas and steam turbine technology to achieve high energy efficiency while producing low air emissions 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 existing cooling water source and infrastructure.



LEGEND

- PROJECT SITE
- **PARK / PROTECTED AREA**
  - NATURAL AREA (NA)
  - NATIONAL PARK (NP)
  - PROVINCIAL PARK (PP)
  - PROVINCIAL RECREATION AREA (PRA)
- PRIMARY HIGHWAY
- SECONDARY HIGHWAY
- WATERCOURSE
- POPULATED PLACE
- WATERBODY

10 0 10

SCALE 1:500,000 KILOMETRES

REFERENCE

PRIMARY AND SECONDARY HIGHWAYS OBTAINED FROM GEOBASE®. HYDROLOGY AND POPULATED PLACES OBTAINED FROM IHS ENERGY INC. PARKS AND PROTECTED AREAS OBTAINED FROM ALBERTA TOURISM, PARKS AND RECREATION, GOVERNMENT OF ALBERTA.
DATUM: NAD 83 PROJECTION: UTM ZONE 12

PROJECT: ATCO Power — HEARTLAND GENERATING STATION

TITLE: **REGIONAL AREA**

Golder Associates

PROJECT NO. 12-1334-0068			FILE No.	
DESIGN	SM	16 Jan. 2014	SCALE AS SHOWN	REV. 1
GIS	MP	16 Jan. 2014		
CHECK	CS	17 Jan. 2014	**FIGURE: 1.1.1**	
REVIEW	RR	17 Jan. 2014		

I:\CLIENTS\ATCO\12-1334-0068\Mapping\MXD\General\Fig_1_1_1_RegionalArea_20140117_Final.mxd

1.2 Proponent Contact Information

Provide proponent contact information:

a) ***Name of the designated project:*** Heartland Generating Station

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

c) ***Address of the proponent:***
ATCO Power Canada Ltd.
400, 919 - 11 Ave SW
Calgary, Alberta
T2R IP3

d) ***Chief Executive Officer***:
John Ell
President ATCO Power
400, 919 – 11th Ave SW
Calgary, Alberta T2R 1P3

e) ***Principal contact person:***
Kelly Scott
Manager, Environment
ATCO Power
Toll Free Project Feedback Number: 1.855.509.6996 or 403.209.6996
Fax: 403.802.7516
Email: heartland@atcopower.com
Kelly.Scott@atcopower.com

1.3 List of Jurisdictions and Other Parties Consulted

Provide a list of any jurisdictions and other parties including Aboriginal groups and the public that were consulted during the preparation of the project description. (A description of the result of any consultations undertaken is to be provided in Sections 6 and 7).

The jurisdictions and other parties, including Aboriginal Groups and members of the public, that ATCO Power consulted regarding the Project are listed in Table 1.3.1.

Table 1.3.1 Jurisdictions and Other Parties (including Aboriginal Groups and the Public) that were consulted regarding the Heartland Generating Station

Federal Government	Canadian Environmental Assessment Agency (CEA Agency) Transport Canada Navigation Canada (NAV Canada)
Provincial Government	Alberta Environment and Sustainable Resource Development (ESRD) Alberta Utilities Commission (AUC)
Municipal Government	Strathcona County Sturgeon County Lamont County City of Fort Saskatchewan Town of Bruderheim
Local Landowners (consultation per AUC Rule 007)	All Landowners, occupants and residents within 800 m of the Project site boundary All residents and occupants within 2 km of the Project site boundary
Regional Associations	Northeast Capital Industrial Association (NCIA) Alberta Industrial Heartland Association (AIHA) AIHA Land Trust Society
Aboriginal Groups	Alexander First Nation Saddle Lake Cree Nation Enoch Cree Nation Paul First Nation Montana First Nation Samson Cree Nation Ermineskin Tribe Louis Bull Tribe Metis Nation of Alberta Metis Region 2 Metis Region 4

1.4 Other Relevant Information

1.4.1 Environmental Assessment and Regulatory Requirements of Other Jurisdictions

a. Provide information on whether the designated project is subject to the environmental assessment and/or regulatory requirements of another jurisdiction(s).

The environmental assessment requirements and regulatory review process for the Project are primarily under the jurisdiction of Alberta Environment and Sustainable Resources Development (ESRD) and the Alberta Utilities Commission (AUC). Applications have been submitted to both

provincial agencies for approval to construct and operate the Project. The Project is also subject to secondary legislation administered by other municipal, provincial and federal agencies.

In June, 2013, ESRD advised ATCO Power that an Environmental Impact Assessment under the *Environmental Protection and Enhancement Act* (RSA 2000, c. E-12) (EPEA) was not required for the Project (see Appendix B) and accordingly, ATCO Power could proceed with preparing an industrial approval application under EPEA. On November 20, 2013, ATCO Power submitted an industrial approval application to ESRD for the construction and operation of the Project. The industrial approval application was developed according to the *Guide to Content for Industrial Approval Applications: Part 1, New Plants and Facilities* (Alberta Government 2013).

ATCO Power submitted two applications to ESRD under the *Water Act* (RSA 2000, c. W-3) for approval of the following:

- diversion of water from an existing intake owned and operated by a third-party on the North Saskatchewan River (NSR) and surface water diversion into a stormwater pond on the Project site; and
- removal of wetlands that are located entirely within the Project site.

In early 2014, ATCO Power will file a third *Water Act* application requesting approval to remove a wetland that is located partially on the Project site land parcel, and partially on the adjacent land parcel owned by a different party.

ATCO Power submitted an application to the AUC on December 10, 2013 pursuant to Section 11 of the Alberta *Hydro and Electric Energy Act* (HEEA: RSA 2000, c. H-16) for approval to construct and operate the Project. The application was prepared in accordance with *AUC Rule 007: Applications for Power Plants, Substations, Transmission Lines, and Industrial System Designations* (2013).

On November 22, 2013, a Statement of Justification (SoJ) was submitted to Alberta Culture for review under the *Historical Resources Act*. Given that no significant historical resource sites have been identified in the area in 60 previously prepared Historical Resource Impact Assessments, and the extensive previous disruption of the site for agricultural purposes, the SoJ recommended that the Project site be granted *Historical Resources Act* clearance. ATCO Power was advised on February 6, 2014 that *Historical Resources Act* clearance has been granted for the Project.

As the Project will require the installation of an exhaust stack approximately 50 m in height, aeronautical clearance from Transport Canada and land use clearance from NAV Canada may be required. On November 8, 2013, a land use application was submitted to NAV Canada and an assessment application for obstruction lighting was submitted to Transport Canada.

ATCO Power will require a Development Permit and Building Permit from Strathcona County. Preliminary discussions with Strathcona County have occurred regarding the development permit requirements and schedule, ATCO Power will file a development permit application in Q2 2014.

No other federal or provincial approvals are anticipated as required for the Project.

Raw water, wastewater and utility infrastructure services for the Project will be provided to ATCO Power by various third parties. Each of these infrastructure-related services is under the jurisdiction of various provincial or federal agencies, and approvals for these services will be sought independently by the third-party providers. These services, and their associated regulatory requirements, are described in Section 2.1.

1.4.2 Regional Environmental Studies

b. Provide information on whether the designated project will be taking place in a region that has been the subject of a regional environmental study. Proponents are advised to contact the Agency during the preparation of the project description for information regarding any regional environmental studies that may be relevant.

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.

Under the Alberta *Land Stewardship Act*, a formal regional management plan has not been developed for the region of the NSR watershed where the Project is located. ESRD has developed several regional frameworks for this area as part of the Cumulative Effects Management System (see Section 3.1 for an overview).

2.0 PROJECT INFORMATION

Provide the following information to the extent that it is available or applicable.

1. Provide a general description of the project, including the context and objectives of the project.

The Project will be a highly efficient, operationally flexible, natural gas-fired combined cycle generating station with a nominal capacity of 400 MW. Additional details of the Project configuration and technology are presented below.

The objectives of the Project are:

- to supply electricity to meet future electricity needs in Alberta and provide an early contributor to the transition from coal-fired to natural gas-fired electricity generation in Alberta as Alberta's coal generating units start to retire in 2019;
- to locate the Project in an industrial setting close to large industrial electricity customers - situating generation close to load improves the efficiency of the Alberta Interconnected Electrical System (AIES) by reducing electricity losses on the high voltage transmission system;
- to minimize the Project's environmental footprint by situating the Project near existing utilities required for the Project — a source of cooling water, a source of high pressure natural gas and a high voltage transmission line;
- to configure and design the Project for maximum efficiency to minimize air emissions per unit of power produced and to maximize power produced per unit of natural gas consumed; and
- 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 AIES from renewable generation sources that produce electricity intermittently, since it is anticipated that the supply of intermittent renewable generation will increase in Alberta.

2. Indicate the provisions in the Regulations Designating Physical Activities setting out the designated activities that describe the project in whole or in part.

The *Canadian Environmental Assessment Act (CEAA) 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 April, 2013).

2.1 Components and Activities

2.1.1 Physical Works Associated with the Designated Project

a. Physical works associated with the designated project (e.g., large buildings, other structures, such as bridges, culverts, dams, marine transport facilities, mines, pipelines, power plants, railways, roads, and transmission lines) including their purpose, approximate dimensions, and capacity. Include existing structures or related activities that will form part of or are required to accommodate or support the designated project.

ATCO Power is responsible for the development, permitting, construction and operation of the Heartland Project power plant. The associated water, natural gas supply and transmission infrastructure required for the Project will be provided by third parties. The following section breaks down the Project's required physical works according to ownership.

Power Plant

ATCO Power is responsible for the development, permitting, construction and operation of the Heartland Generating Station on a portion of the quarter section of land located at NW 27-55-21 W4M.

Scaled diagrams of the Project site layout and general arrangement are provided in Figures 2.1.1 and 2.1.2, respectively. An artist's rendition of the plant is provided in Figure 2.1.3. A powerhouse building will enclose the gas turbine generator (GTG); heat recovery steam generator (HRSG); steam turbine generator (STG); raw water, demineralized 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 Project. The powerhouse will be approximately 100 metres (m) by 80 m and the majority of the roof will be 29 m high. The maximum roof height will be 38 m.

An administration, control, maintenance and warehouse building will be located adjacent to the main powerhouse 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 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.

The cooling tower structure is a large heat exchanger that will provide cooled water to condense steam at the outlet of the steam turbine. The structure will be approximately 82 m long by 15 m wide with a height of 12 m, and will be located adjacent to the powerhouse.

ATCO Power is also responsible for the treatment of wastewater generated from the Project, and it is expected that the EPEA Approval for the Project will include provision for the discharge of treated wastewater to the NSR including sampling and monitoring requirements. The pipeline and outfall required to convey the wastewater to the NSR will be provided by a third party.

The Government of Alberta requires that end users directly apply for (and hold) authorizations for the use of surface water. Therefore, ATCO Power has applied for a *Water Act* Diversion License to use water from the NSR for the purpose of generating power. The services supporting the withdrawal of water from the NSR and the conveyance of that water to the Project site will be provided through a multi-user water system that is licensed, owned and operated by ATCO Energy Solutions Ltd. (AESL). Before water is delivered to the Project site it will meet suspended solid (turbidity) specifications required by the Heartland equipment and stipulated in the AESL water services agreement.

The total land area owned by ATCO Real Estate Holdings Ltd. (AREHL), a sister company of ATCO Power, for the explicit purpose of developing the Project is 56.7 hectares (140 acres). During construction, the maximum area that will be disturbed is approximately 42.7 hectares. Once completed, the Project will occupy approximately 9.4 hectares. During operations, the portion of land not used by the Project will be maintained as cultivated farmland to the extent possible.

The Project site will include a stormwater management system, including a stormwater retention pond. The system will be designed and operated according to requirements administered by ESRD under the EPEA Approval, and by Strathcona County. Water collected in the stormwater pond will be recycled by diverting it into the cooling water supply for the Project. The stormwater pond itself will not be part of the cooling system.

Site and construction access will primarily utilize the existing Range Road 213, which provides access to the west side of the Project site. The Project site is within one kilometer of both Highway 15 and a Canadian National Railway line which will facilitate transportation of major components to the site for construction. ATCO Power is working with Strathcona County to assess the existing road suitability for the construction of the Project.

Third Party Provided Infrastructure

ATCO Power's philosophy is to utilize existing service infrastructure where possible and practicable. Where this is not possible, ATCO Power will contribute to the development of multi-user utility corridors to minimize the impact of associated infrastructure required for the Project. A multi-user infrastructure model in the AIH region will help to optimize use of existing infrastructure, develop new infrastructure, minimize pipeline congestion in the region, and minimize the requirement for new infrastructure on the bed and bank of the NSR. Consistent with this overall philosophy, infrastructure to supply the Project with water, wastewater, natural gas and electrical transmission services will be provided by third parties. This infrastructure will use a combination of existing, expanded and new infrastructure to minimize the Project's environmental footprint. The third party suppliers will be responsible for permitting, constructing and operating these facilities in accordance with applicable federal, provincial and municipal regulations.

The infrastructure that will be used to convey water to and wastewater from the Project will be owned and operated by AESL. ATCO Power and AESL are both members of the ATCO Group of Companies and are wholly owned subsidiaries of Canadian Utilities Limited; the two companies are individually incorporated and operated as separate business entities. AESL builds, owns and operates energy and water-related infrastructure and provides a wide range of services to the energy industry. The water conveyance infrastructure for the Project will be provided through AESL's existing Heartland Industrial Water System, which serves a growing number of facilities in the AIH. AESL has signed contracts with the developers of three new large industrial facilities in the AIH: the North West Redwater Partnership Sturgeon Refinery, BA Energy and Air Products Canada. In consideration of the increased demand for water in the AIH posed by these three third party facilities and the Project, AESL is planning the expansion of the Heartland Industrial

Water System, including the pipeline and a clarification pond that will serve the Project and these other customers.

The ATCO Group of companies has a long history of involvement in the AIH region starting in 1948, when ATCO Gas started providing natural gas service to the area. Details of this involvement can be found on ATCO's website at: http://www.atco.com/News/Feature-Stories/Industrial-Heartland.

Information on the structure of the ATCO Group of Companies including ATCO Power, AESL, ATCO Pipelines Ltd. and Canadian Utilities Limited can be found on the ATCO website at: http://www.atco.com/Our-Companies/. Canadian Utilities Limited is a principal subsidiary of ATCO Ltd. and is a holding company for a number of principle operating subsidiaries including ATCO Power, ATCO Midstream, and ATCO Energy Solutions. These subsidiaries are wholly-owned, separately incorporated, independently managed companies, engaged in power generation, natural gas gathering, processing, storage and liquids extraction. Details on the operating structure of Canadian Utilities Limited can be found at: http://www.canadianutilities.com/About-Us/Corporate-Profile/Business-Groups.

The interconnections for both the raw water and wastewater are expected to be on the northern edge of the Project site, although the exact location has not yet been defined. AESL will also operate a clarification pond to reduce the levels of suspended solids in the raw river water and provide water delivery certainty in case of an interruption or maintenance on the intake facility. The clarification pond will be located on land owned by AESL[1]. The size and location of the clarification pond has not been finalized, since AESL has not yet finalized the water volume requirements of users for this facility. Based on ATCO Power's last discussion with AESL, the pond capacity range under consideration is from 100,000 m^3 to 300,000 m^3. AESL is currently considering a number of potential locations in the AIH for the clarification pond. All of the potential locations discussed thus far with AESL are within two km of the Project site, on privately owned land previously used for agriculture. Consequently, it is anticipated that the clarification pond is unlikely to have any adverse environmental effects on fish or fish habitat, or aquatic species at risk, and the pond will not be built on federal lands. The pond will be filled with water from the NSR. The addition of the pond will not affect the agricultural nature of the area, so no negative impacts on migratory birds are expected.

AESL is currently developing a detailed plan for expansion of their existing energy storage and water services facilities in the AIH. They have provided ATCO Power with assurances that following finalization of their plans, AESL will proceed with the required regulatory applications for their expansion projects. The permitting and construction activities for AESL's facilities are expected to have a much shorter timeline than required for the Project; therefore, at this time AESL has had only preliminary discussions with the responsible provincial and federal regulatory agencies. ATCO Power reviewed the above water infrastructure concept with ESRD and received confirmation to proceed with submitting the Heartland Project Industrial Approval

[1] Note: The clarification pond is not shown on figures presented in this Project Description, as it is not considered a component of the current Project, and will be located off the Project site on land owned by AESL. The pond shown on the various Project site layout figures in this Project Description is the stormwater pond for the Project.

Application with the inclusion of the water and wastewater strategy outlined in this Project Description.

High-pressure natural gas will be provided to the Project via an interconnection to the ATCO Pipelines Ltd. high-pressure natural gas pipeline located on the eastern edge of the Project site. This interconnection will be facilitated by ATCO Pipelines Ltd. and will include a gas meter station to be constructed at the Project site boundary.

In April 2013, ATCO Power filed a transmission interconnection application to the Alberta Electric System Operator (AESO). ATCO Power is currently in discussions with both the AESO and AltaLink regarding the interconnection between the Project and the AIES, with several options under consideration. Once the final configuration is determined, AltaLink will file a Facility Application with the AUC for the required switching station and supporting transmission facilities.

A list of the interconnections, third-party suppliers and existing permit holders, and applicable regulatory permitting requirements is provided in Table 2.1.1.

Table 2.1.1 Heartland Generating Station Interconnections

Project Component	Owner / Operator / Permit Holder	Permitting Requirements
Water Supply		
Use of water from the NSR for the purposes of the Project	ATCO Power	ATCO Power has applied to ESRD for a *Water Act* License to use water from the NSR for the purpose of generating power.
Existing river intake structure to withdraw water from the NSR	AESL	Water will be withdrawn through an existing water intake on the NSR owned and operated by AESL. AESL holds a *Water Act* approval for the existing water intake structure.
Infrastructure to supply water to the Project, including a clarification pond and water pipeline	AESL	Regulatory applications for this infrastructure upgrade will be filed by AESL. AESL currently owns and operates a water pipeline from the NSR intake to AESL's Heartland Industrial Water Centre. AESL will loop a 4 km stretch of the raw water pipeline to accommodate water flow needs for a number of facilities, including the Project. AESL will also design, permit, construct, own, and operate a water retention and clarification pond and a short (less than 2 km) water pipeline to deliver water to a water metering station to be built at the Project site boundary.

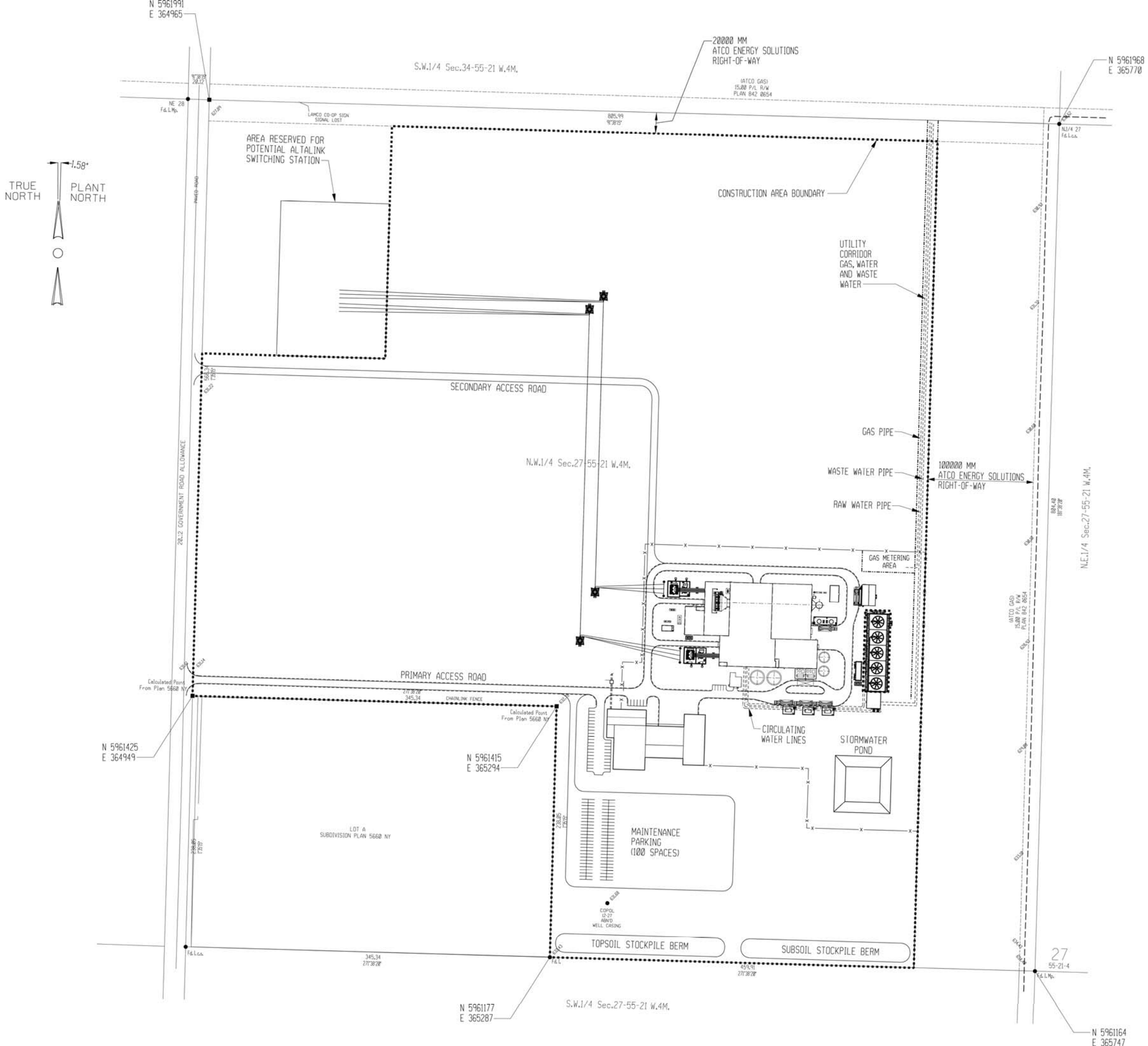
Table 2.1.1 Heartland Generating Station Interconnections (continued)

Project Component	Owner / Operator / Permit Holder	Permitting Requirements
Wastewater		
Discharge of treated wastewater from the Project to the NSR	ATCO Power	Wastewater discharge limits will form part of the EPEA approval, and discharge monitoring requirements will be established. An environmental assessment, along with control and mitigation measures and a proposed wastewater monitoring program were provided in the industrial approval application filed with ESRD in November 2013. The anticipated wastewater discharge flow volumes are 67 m^3/h maximum and 40 m^3/h average
Wastewater pipeline infrastructure for transportation of wastewater from the Project to the point of discharge	AESL	AESL will design, permit, construct and operate the wastewater pipeline. Regulatory applications for the wastewater pipeline will be filed by AESL. AESL has reached commercial agreement on a new right-of-way for a water pipeline to be permitted, built, owned and operated by AESL for another party. AESL plans to utilize this right-of-way as a shared utility corridor to install both a raw water pipeline for the other party and a wastewater pipeline for the Project.
Outfall infrastructure for discharge of wastewater to the NSR	AESL	AESL will design, permit, construct and operate the outfall. AESL will submit a Letter of Inquiry to ESRD under the *Water Act* requesting review of the wastewater outfall design and AESL will design, construct and operate the outfall in accordance with the Alberta *Code of Practice for Outfall Structures on Water Bodies* (Government of Alberta 2013). An outfall does not require an EPEA Approval as defined in the *Activities Designation Regulation* (276/2003). The outfall structure is being designed and will be built in accordance with the Fisheries and Oceans Canada (DFO) Operational Statement for Alberta. Pursuant to the federal *Fisheries Act*. As per guidance received from DFO (December 9, 2013), AESL has conducted a self-evaluation for the construction of a new land-based stormwater management facility (outfall). Given no work will occur below the high water mark of the NSR and the outfall structure will be built in accordance with DFO's Operational Statement, no further review by DFO is required.

Table 2.1.1 Heartland Generating Station Interconnections (continued)

Project Component	Owner / Operator / Permit Holder	Permitting Requirements
Utilities		
Infrastructure to supply natural gas to the Project, including a gas meter station and connecting pipeline	ATCO Pipelines Limited (ATCO Pipelines)	Permit applications for this component will be filed by ATCO Pipelines. ATCO Pipelines will design, permit, construct and operate the gas meter station and the associated pipeline that connects the Project to existing gas supply lines.
Transmission interconnection	AltaLink Management Limited (AltaLink)	AltaLink will file a Facility Application with the AUC to construct and operate the transmission interconnection, including a switching station, to connect the Project to the existing Alberta Interconnected Electric System.

AESL = ATCO Energy Solutions; NSR = North Saskatchewan River.


N 5961991
E 364965
S.W.1/4 Sec.34-55-21 W.4M.
20000 MM
ATCO ENERGY SOLUTIONS
RIGHT-OF-WAY
(ATCO GAS)
15.00 P/L R/W
PLAN 842 0654
N 5961968
E 365770
NE 28
Fd.I.Mo.
LAMCO CO-OP SIGN
SIGNAL LOST
805.99
91°38'15"
NW1/4 27
Fd.I.Ca.
1.58°
TRUE
NORTH
PLANT
NORTH
AREA RESERVED FOR
POTENTIAL ALTALINK
SWITCHING STATION
CONSTRUCTION AREA BOUNDARY
UTILITY
CORRIDOR
GAS, WATER
AND WASTE
WATER
PAVED ROAD
28.2 GOVERNMENT ROAD ALLOWANCE
SECONDARY ACCESS ROAD
GAS PIPE
N.W.1/4 Sec.27-55-21 W.4M.
WASTE WATER PIPE
100000 MM
ATCO ENERGY SOLUTIONS
RIGHT-OF-WAY
RAW WATER PIPE
GAS METERING
AREA
N.E.1/4 Sec.27-55-21 W.4M.
(ATCO GAS)
15.00 P/L R/W
PLAN 842 0654
PRIMARY ACCESS ROAD
Calculated Point
From Plan 5660 NY
271°38'20"
345.34
CHAINLINK FENCE
Calculated Point
From Plan 5660 NY
CIRCULATING
WATER LINES
STORMWATER
POND
N 5961425
E 364949
N 5961415
E 365294
LOT A
SUBDIVISION PLAN 5660 NY
MAINTENANCE
PARKING
(100 SPACES)
COPOL
12-27
ABVD
WELL CASING
TOPSOIL STOCKPILE BERM
SUBSOIL STOCKPILE BERM
Fd.I.Ca.
345.34
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Fd.I.
459.91
271°38'20"
27
55-21-4
Fd.I.Mo.
N 5961177
E 365287
S.W.1/4 Sec.27-55-21 W.4M.
N 5961164
E 365747

Figure 2.1.2 General Arrangement – Power Block Area

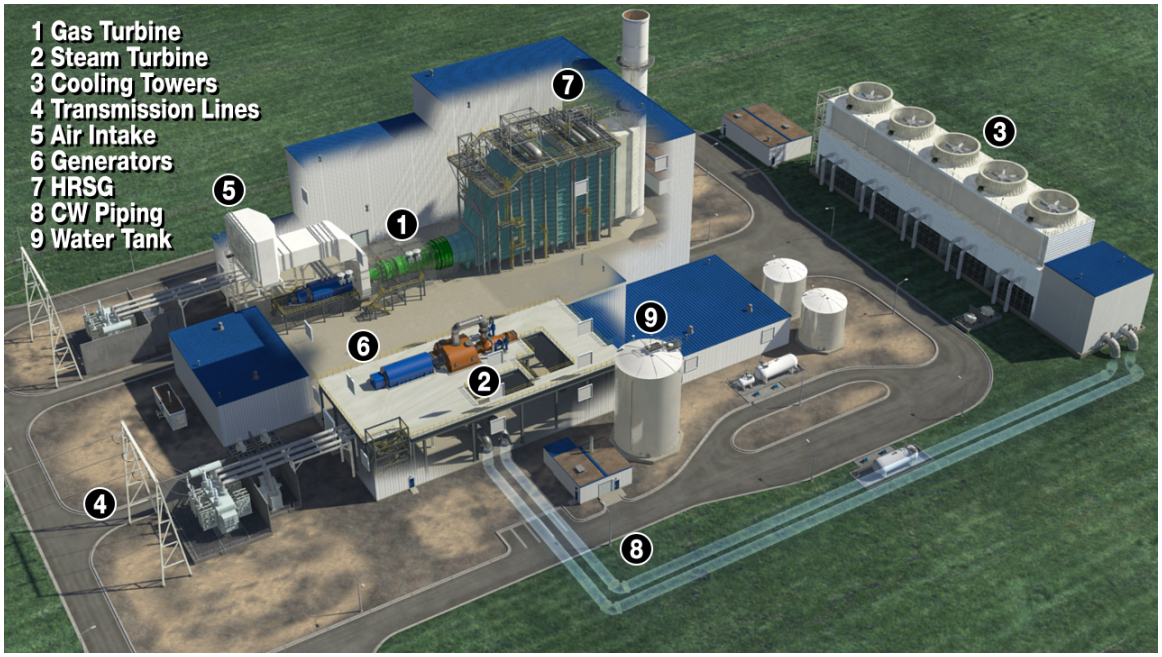


Figure 2.1.3 Artist's rendition of the Heartland Generating Station

2.1.2 Anticipated Size or Production Capacity with Reference to Thresholds set out in the *Regulations Designating Physical Activities*

b. Anticipated size or production capacity of the designated project, with reference to thresholds set out in the Regulations Designating Physical Activities, including a description of the production processes to be used, the associated infrastructure, and any permanent or temporary structures.

The Project will have a nominal capacity of 400 MW, which is above the 200 MW threshold for new thermal power projects as defined in the *Regulations Designating Physical Activities*. At maximum output on a day with -40°C ambient temperatures, the plant would be capable of generating its design capacity of 503 MW.

The proposed plant will be a natural gas-fired, combined cycle power generating facility consisting of one GTG, a HRSG, and a STG. A general description of the generation process is provided below and shown in Figure 2.1.4.

The Project will include a 274 MW GTG set consisting of a Siemens SGT6-8000H class gas turbine coupled with a Siemens SGen6-2000H electric generator, and a 126 MW STG that will operate in a combined cycle mode.

The GTG will be equipped with an ultra-low nitrogen oxides (NO_x) 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_x in the exhaust gases.

The HRSG will contain low NO_x duct burners. These burners, when fired, will increase the temperature of the exhaust gases entering the HRSG. This will increase steam production in the HRSG to enable increased power generation in the STG. The HRSG will also contain a Selective Catalytic Reduction (SCR) system. The SCR will be installed downstream of the duct burners and will be used to reduce the concentration of NO_x in the exhaust gases. The SCR system will consist of an ammonia spray and catalyst section inside the HRSG exhaust stream. The condition and quality of the cooled exhaust gasses will be monitored by a Continuous Emission Monitoring System on the exhaust stack.

Various other secondary systems will be required to treat freshwater and wastewater, circulate cooling water, generate auxiliary steam, manage wastewater and stormwater, control the Project equipment, automatically supress fires, and handle the electrical needs of and electricity produced by the Project.

NATURAL GAS

AIR

Meter

5. CONDENSATE, FEEDWATER, STEAM SYSTEM

2. HEAT RECOVERY STEAM GENERATOR

HP DRUM

IP DRUM

LP DRUM

12. ELECTRICAL SYSTEM

TRANSMISSION SYSTEM

HIGH VOLTAGE SUBSTATION

MAIN STEP-UP TRANSFORMER

GENERATOR BREAKER

AUXILIARY TRANSFORMER

POWER DISTRIBUTION CENTRE FOR POWER PLANT

ELECTRICAL GENERATOR

COMBUSTOR

COMPRESSOR

TURBINE

1. GAS TURBINE

2 a. DUCT BURNERS

2 b. SCR

HRSG STACK

LOW PRESSURE

HIGH PRESSURE

3. STEAM TURBINE

BOILER FEEDWATER PUMPS

TO PLANT PROCESS

8. AUXILIARY STEAM SYSTEM

STEAM TO PLANT PROCESS

AUXILIARY BOILER

CONDENSER

CONDENSATE PUMPS

COOLING TO OTHER EQUIPMENT:
- CLOSED COOLING WATER HEAT EXCHANGERS
- VACUUM SEAL SKID SEAL COOLER
- AIR COMPRESSORS
- SAMPLE COOLERS

4. COOLING TOWER

AIR

6. CONDENSER COOLING SYSTEM

11 STORM WATER MANAGEMENT SYSTEM

OVERFLOW TO EXISTING SURFACE DRAINAGE SYSTEM

STORM WATER COLLECTION

DEMINERALIZED WATER SUPPLY PUMPS

DEMINERALIZED WATER STORAGE TANK

WATER TREATMENT SYSTEM

7. DEMINERALIZED WATER SYSTEM

RAW WATER STORAGE

RAW WATER

9. RAW WATER DISTRIBUTION SYSTEM

TO AESL

SLUDGE TO APPROVED LANDFILL BY OTHERS

WASTE VATER STORAGE, PROCESSING, AND TESTING

10. WASTE WATER MANAGEMENT SYSTEM

NOTES:

1. *DRAWING IS NOT TO SCALE*
2. *NUMBERING CORRESPONDS TO PROCESS DESCRIPTIONS IN TEXT*
3. *SYSTEMS NOT SHOWN:*
   - *13. CONTROL SYSTEM*
   - *14. FIRE WATER PROTECTION SYSTEM*

ATCO HEARTLAND GENERATING STATION

FIGURE 2.1.4 - PROCESS FLOW DIAGRAM

AHGS-1-DW-012-305-001

During construction, temporary structures will be required for construction offices, equipment storage, workforce muster points and various other functions. 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.

2.1.3 Percentage Increase in Capacity

c. If the designated project or one component of the designated project is an expansion, the percent of increase in size or capacity from the existing project (relative to the thresholds set out in the Regulations Designating Physical Activities).

The Project and all of its components will be new; therefore this section is not applicable.

2.1.4 Description of Project Activities

d. A description of all activities to be performed in relation to the designated project.

The Project activities will include construction of the facility, commissioning, operation and maintenance of the facility. The facility is designed for an approximate 35 year design life, followed by the decommissioning of the facility. Additional details for Project activities are provided below.

Construction

The construction phase will 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 anticipated construction schedule is provided in Table 2.1.4. A brief description of construction activities follows the table.

Table 2.1.4 Heartland Generating Station Construction Schedule

Construction Activity	Schedule
Site preparation (e.g., clearing, grading)	Q4 2014 to Q2 2015
Foundation excavation/construction	Q2 2015 to Q4 2015
Building erection and equipment installation	Q3 2015 to Q2 2017
Equipment commissioning and testing	March to August 2017
Start of operation	August 2017

Site Preparation

The Project site will be leveled and graded as required in accordance with the Project site surface water drainage plan. As a component of site preparation, onsite wetlands will be drained and graded in accordance with the applicable requirements under the Alberta *Water Act*. Topsoil and

subsoil will be salvaged and stockpiled prior to site grading, placement of fill, and/or site development. Soil will be stockpiled in the designated topsoil and subsoil stockpiles located along the southern border of the Project site.

The site will be fenced off and roadways into the site constructed to connect to existing roadway infrastructure. Site construction infrastructure (trailers, electricity, natural gas services) will be installed. Construction laydown, storage and fabrication areas will be established.

Foundation Excavation and Construction

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

Foundation piles will be installed to bear the loads of major equipment and for the powerhouse, administration and outlying buildings. 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.

Building Erection and Equipment Installation

Structural steel will be erected on the foundations for the powerhouse and the administration buildings. Some modularization and preassembly work will occur where practical to speed building erection. Simultaneously with building erection, the HRSG, GTG and STG and other major equipment will be located or installed in the powerhouse. The crane rails and bridge crane will be installed in the powerhouse to facilitate equipment assembly. Roof cladding and wall cladding will then be installed to enclose the building while equipment installation continues indoors. Once the building is enclosed, the building can be heated to facilitate construction in cold weather. During powerhouse construction, external tanks will be installed for wastewater storage.

The cooling tower will be assembled in parallel with work on the powerhouse. Cooling tower construction will include casting a concrete foundation. It is anticipated that considerable preassembly of cooling tower modules will take place, with final assembly and tie in carried out on site.

The main power transformer, standby diesel generator, and other ancillary equipment will be assembled and installed outside the powerhouse during this period.

Equipment Commissioning and Testing

Prior to start-up of the facility, testing and commissioning various pieces of equipment and systems will occur. It is expected that the testing and commissioning phase of the Project will span the final six to eight months of construction. The Project will then be ready for commercial operation.

Operation

Normal operating modes of the Project are described in this section. 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, described as follows:

- **Off-line** – 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 off-line modes. Operation in this mode will be of short duration.
- **Minimum Stable Generation Level** – The Project is on-line and operating but has been turned down to the minimum level at which it can operate. The Project may operate in this mode for many reasons; for example, when electricity prices are below the Project's operating costs but are expected to increase soon, or when there are concerns relating to the stable operation of the electricity system.
- **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 output. In this mode, the Project operates at maximum efficiency.
- **Supplementary Firing Level** – The Project is operating at the maximum GTG output and the HRSG duct burners are operating at full output to produce additional steam for conversion to electricity by the STG. Operation in this mode may be in response to high market prices that may not be sustained over long periods of time.
- **Outage** – The Project is off-line 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 to support the integrity of Alberta's electricity system.

Decommissioning

The decommissioning phase will include removing all major equipment and the associated piping and electrical systems from the site. Following decommissioning of the Project, the Project site will be reclaimed to an equivalent pre-disturbance agricultural land capability.

2.2 Emissions, Discharges and Wastes

Provide a description of any solid, liquid, gaseous or hazardous wastes likely to be generated during any phase of the designated project and of plans to manage those wastes, including the following:

a. Sources of atmospheric contaminant emissions during the designated project phases (focusing on criteria air contaminants and greenhouse gases, or other non-criteria contaminants that are of potential concern) and location of emissions.

b. Sources and location of liquid discharges.

c. Types of wastes and plans for their disposal (e.g., landfill, licensed waste management facility, marine waters, or tailings containment facility).

2.2.1 Atmospheric Emissions

The Project has been designed to incorporate some of the cleanest fuel sources and technologies currently commercially available to generate electricity from natural gas and steam. The Project is being designed to meet the Clean Air Strategic Alliance air emission performance standards for the Alberta electricity sector.

Air emissions during Project operation will include carbon monoxide (CO), nitrogen oxides (NO_x, fine particulates (particulates smaller than 2.5 microns or $PM_{2.5}$) and ammonia (NH_3). Because of the low sulphur content of the feed gas, the Project is not expected to emit measureable amounts of sulphur dioxide (SO_2). 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 GTG will be equipped with an ultra-low NO_x combustion system to reduce formation of NO_x during combustion. Once GTG emissions enter the HRSG, a SCR system will be used to reduce NO_x in the exhaust gases. The SCR system will be installed downstream of the duct burners and will consist of ammonia injection and storage equipment, a control system and a catalyst section. Small quantities of ammonia will be injected into the exhaust gas stream ahead of the catalyst section to reduce NO_x (NO and NO_2) to nitrogen (N_2) and water (H_2O). Low emission natural gas-fired duct burners will also be used.

Additional details regarding air emissions are provided in Table 2.2.1. Emissions information for the design case assumes normal operation of the GTG; the start-up case considers Project emissions during GTG start-up; and the upset case assumes the SCR is offline.

Table 2.2.1 Gas Turbine Heat Recovery Steam Generator and Auxiliary Boiler Emissions

Source Description	Design Case		Start-up Case		Upset Case	
	Gas Turbine	Auxiliary Boiler	Gas Turbine	Auxiliary Boiler	Gas Turbine	Auxiliary Boiler
NO_x Emission Rate (t/d)	0.576	0.044	2.448	0.044	2.952	0.044
CO Emission Rate (t/d)	0.737	0.210	14.081	0.210	0.672	0.210
$PM_{2.5}$ Emission Rate (t/d)	0.218	0.005	0.218	0.005	0.211	0.005
NH_3 Emission Rate (t/d)	0.262	0.000	0.000	0.000	0.000	0.000

2.2.2 Liquid Discharges

The wastewater stream for the Project will primarily consist of cooling tower blowdown and will be discharged into the NSR after treatment via a wastewater pipeline and a new outfall to be owned and operated by AESL. Total water discharges to the NSR are expected to be 40 to 70 m^3 per hour, or 350,400 to 586,920 m^3 per year. Wastewater quality monitoring criteria and compliance limits will be defined by ESRD in the EPEA Project Approval; these criteria are anticipated to include testing requirements for toxicity, pH, temperature, total phosphorus and metals.

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 2.2.2.

Table 2.2.2 Wastewater and Liquid Discharges Generated by the Heartland Generating Station

Liquid Waste	Description	Volume		Containment	Disposal Method	Potential Effects on the Environment
		Normal	Maximum			
Surface run-off water	Surface water run-off from the power plant will be collected and routed to the stormwater pond	2-Year Event – 2,520 m^3	25-Year Event – 5,320 m^3	Stormwater pond	Recycled back into cooling tower as cooling tower makeup	None
Cooling tower blowdown	Circulating water from the cooling tower will be periodically discharged to control the concentration of major ions in the water	40 m^3/hr	67 m^3/hr	Wastewater equalization tanks	Cooling tower blowdown will be stored and then treated in the wastewater treatment facility. After treatment, it will be held, tested and then discharged in a controlled manner via AESL pipeline to a new outfall on the NSR	Wastewater to the NSR is expected to result in negligible changes in concentrations of parameters of concern in the NSR (nutrients, metals) and therefore have no measurable effect on the environment.
Drainage within powerhouse building	Drainage within powerhouse building includes wastewater from floor wash and miscellaneous floor drains including water from containment areas	5 m^3/hr	10 m^3/hr	Drain to oil/water separator	Flows will be routed to an oil/water separator. Separated water will be stored in the wastewater equalization tanks to be treated and then held, tested and then discharged in a controlled manner to the NSR. Oily sumps will be cleaned out on a regular basis and oil will be shipped off-site through an approved carrier	None
Waste effluent from demineralized water treatment plant	Waste effluent from the treatment plant	TBD	TBD	Not stored	Recycled back into cooling tower as cooling tower makeup	None
Gas turbine wash water	Gas turbine wash water will be treated as hazardous waste and collected and contained on site	2.5 m^3 per wash. Approximately 2 washes per year	n/a	Gas turbine water wash drains tank	A qualified carrier will be used to dispose of gas turbine wash water.	None
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 area of powerhouse building	Removal by a qualified carrier for disposal or recycling on an as-needed basis	None
Sewage	Includes sanitary waste from the administration building and water treatment building plumbing systems	25 m^3/day	n/a	Facilities holding tank	Periodic removal by a qualified carrier	None

Note: n/a = not applicable; TBD = to be determined; NSR = North Saskatchewan River.

2.2.3 Solid Wastes

The Project will produce between 0.7 to 1 tonne per day of sludge from the cooling tower basin and the wastewater treatment system. All sludge will be stored onsite in dedicated storage tanks before being disposed of at a licensed disposal facility.

The Project will also 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 on site and will then be sent to county landfill through a qualified carrier.

Additional details regarding the sludge and solid wastes generated by the Project are provided in Table 2.2.3.

Table 2.2.3 Solid Wastes Generated by the Heartland Generating Station

Waste Stream	Description	Containment	Disposal Method	Potential Effects on the Environment
Sludge	Sludge from Cooling Tower Basin	Dedicated Storage Tanks	Licensed Disposal Facility	None
Metal and recyclables (cardboard, air filters)	Metal and recyclables such as cardboard and paper from plant	Containers	Will be recycled through a qualified carrier	None
Domestic waste	Normal disposal waste from offices	Containers	Will be collected and sent through a qualified carrier to county landfill	None
Oil filters (hazardous waste)	Filters from various equipment	Oil containment area with surrounding berm	Removal by a qualified carrier for disposal or recycling on an as-needed basis	None
SCR Catalyst	Catalyst for SCR system	To be determined in detailed engineering design phase	Will be sent to a facility for recycling or disposal	None
Batteries	Batteries from various plant uses	Plastic containers	Will be sent to a facility for recycling or disposal	None

2.3 Construction, Operation, and Decommissioning and Abandonment Phases and Scheduling

Provide a description of the timeframe in which the development is to occur and the key project phases, including the following:

a. Anticipated scheduling, duration and staging of key project phases, including preparation of the site, construction, operation, and decommissioning and abandonment.

b. Main activities in each phase of the designated project that are expected to be required to carry out the proposed development (e.g., activities during site preparation or construction might include, but are not limited to, land clearing, excavating, grading, de-watering, directional drilling, dredging and disposal of dredged sediments, infilling, and installing structures).

A high-level Project schedule is provided in Table 2.3.1. Additional details regarding construction activities and public consultation are provided in Sections 2.1.4 and 6.1, respectively.

Table 2.3.1 Heartland Generating Station Project Schedule

Project Task	Proposed Project Schedule
Site Preparation (site grading, leveling and site dewatering)	September to November 2014
Construction	November 2014 to June 2017
Commissioning	June 2017 to August 2017
Operation	August 2017 to July 2047
Decommissioning	August 2047

3.0 PROJECT LOCATION

Provide a description of the designated project's location including:

1. Coordinates (i.e. longitude/latitude using international standard representation in degrees, minutes, seconds) for the centre of the facility or, for a linear project, provide the beginning and end points.

The Project will be located on the following parcel: NW Section 27-55-21 W4M (Figure 3.0.1). The 57 ha land parcel is privately owned by AREHL and leased long term to ATCO Power for the purposes of constructing and operating the Project.

The Project coordinates for the power plant are:

- LSD NW Section 27-55-21 W4M; and
- 53° 47' 2.09" N; 113° 2' 58.95" W.

The area within the Project site that will be occupied by permanent facilities, defined as the Project footprint, include the power block and other buildings, roads, a parking lot and transmission structures, as shown in Figure 3.0.1.

2. Site map/plan(s) depicting location of the designated project components and activities. The map/plan(s) should be at an appropriate scale to help determine the relative size of the proposed components and activities.

A site plan of the Project is provided in Figures 2.3.2 and 2.3.3.

3. Map(s) at an appropriate scale showing the location of the designated project components and activities relative to existing features, including but not limited to:

a. watercourses and waterbodies with names where they are known;

b. linear and other transportation components (e.g., airports, ports, railways, roads, electrical power transmission lines and pipelines);

c. other features of existing or past land use (e.g., archaeological sites, commercial development, houses, industrial facilities, residential areas and any waterborne structures);

d. location of Aboriginal groups, settlement land (under a land claim agreement) and, if available, traditional territory;

e. federal lands including, but not limited to National parks, National historic sites, and reserve lands;

f. nearby communities;

g. permanent, seasonal or temporary residences;

h. fisheries and fishing areas (i.e., Aboriginal, commercial and recreational);

i. environmentally sensitive areas (e.g., wetlands, and protected areas, including migratory bird sanctuary reserves, marine protected areas, and National Wildlife areas); and

j. provincial and international boundaries.

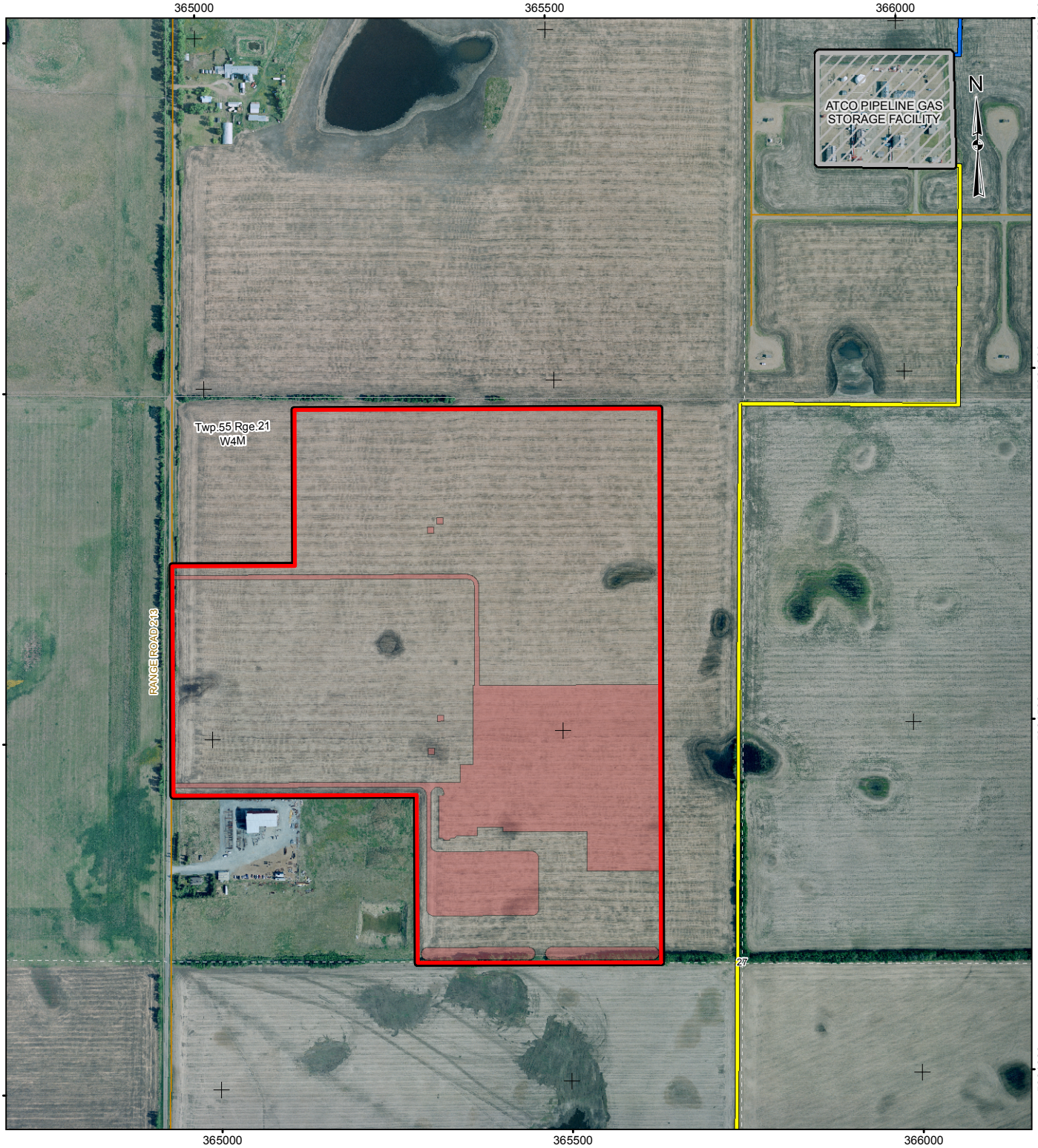
Maps of the designated Project components and existing features are provided in Figure 3.0.2, Figure 3.0.3, Figure 3.0.4 and Figure 3.0.5.

4. Photographs of work locations to the extent possible.

Photographs of the Project site are provided in Photos 1 through 5.

5. Legal description of land to be used for the designated project, including the title, deed or document and any authorization relating to a water lot.

The Project site is located on NW 27-55-21 W4M. See Appendix C for a copy of the legal title for the land parcel. The land parcel is owned by AREHL and will be leased to ATCO Power long term for the Project.



LEGEND

- PROJECT FOOTPRINT (9.4 ha)
- PROJECT SITE (42.7 ha)

EXISTING INFRASTRUCTURE

- LOCAL ROAD
- NATURAL GAS PIPELINE
- RAW WATER PIPELINE
- INDUSTRIAL SITE

250 0 250

SCALE 1:8,000 METRES

NOTE

*STEWART AND KANTRUD (1971) WETLAND CLASSIFICATION SYSTEM

REFERENCE

ROADS OBTAINED FROM GEOBASE®. IMAGERY OBTAINED FROM AESRD AIR PHOTO SERVICES. IMAGERY DATE: 2011. IMAGERY IS NOT TO SCALE.
DATUM: NAD 83 PROJECTION: UTM ZONE 12

PROJECT

ATCO Power

HEARTLAND GENERATING STATION

TITLE

PROJECT SITE

Golder Associates

PROJECT NO. 12-1334-0068			FILE No.	
DESIGN	CS	11 Oct. 2013	SCALE AS SHOWN	REV. 0
GIS	AB	17 Jan. 2014		
CHECK	CS	17 Jan. 2014		
REVIEW	RR	17 Jan. 2014		

FIGURE: 3.0.1

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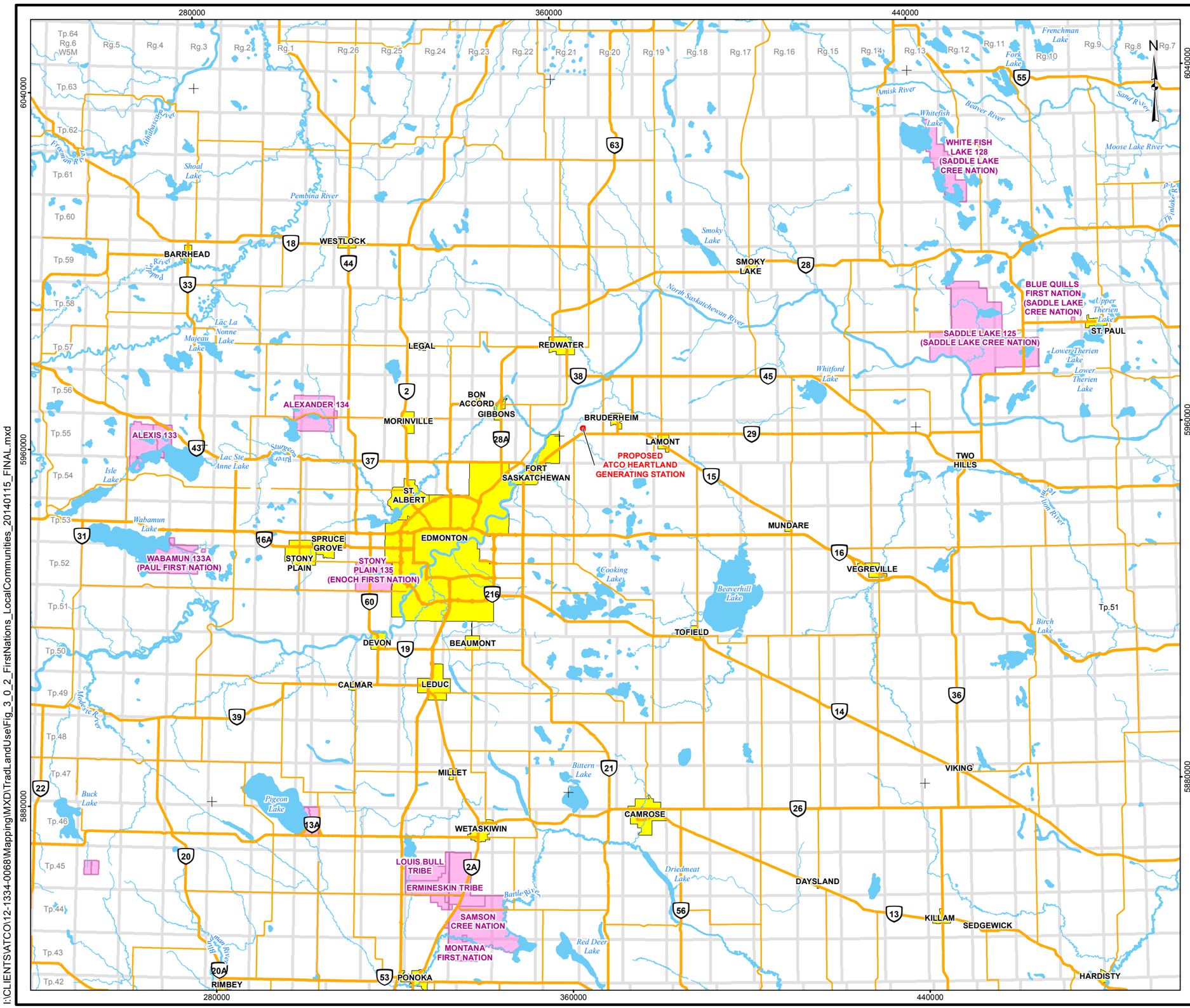

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LEGEND

- PROJECT SITE
- PRIMARY HIGHWAY
- SECONDARY HIGHWAY
- WATERCOURSE
- FIRST NATIONS RESERVE
- POPULATED PLACE
- WATERBODY

REFERENCE

PRIMARY AND SECONDARY HIGHWAYS OBTAINED FROM GEOBASE®. FIRST NATION RESERVES, HYDROLOGY AND POPULATED PLACES OBTAINED FROM IHS ENERGY INC.
DATUM: NAD 83 PROJECTION: UTM ZONE 12

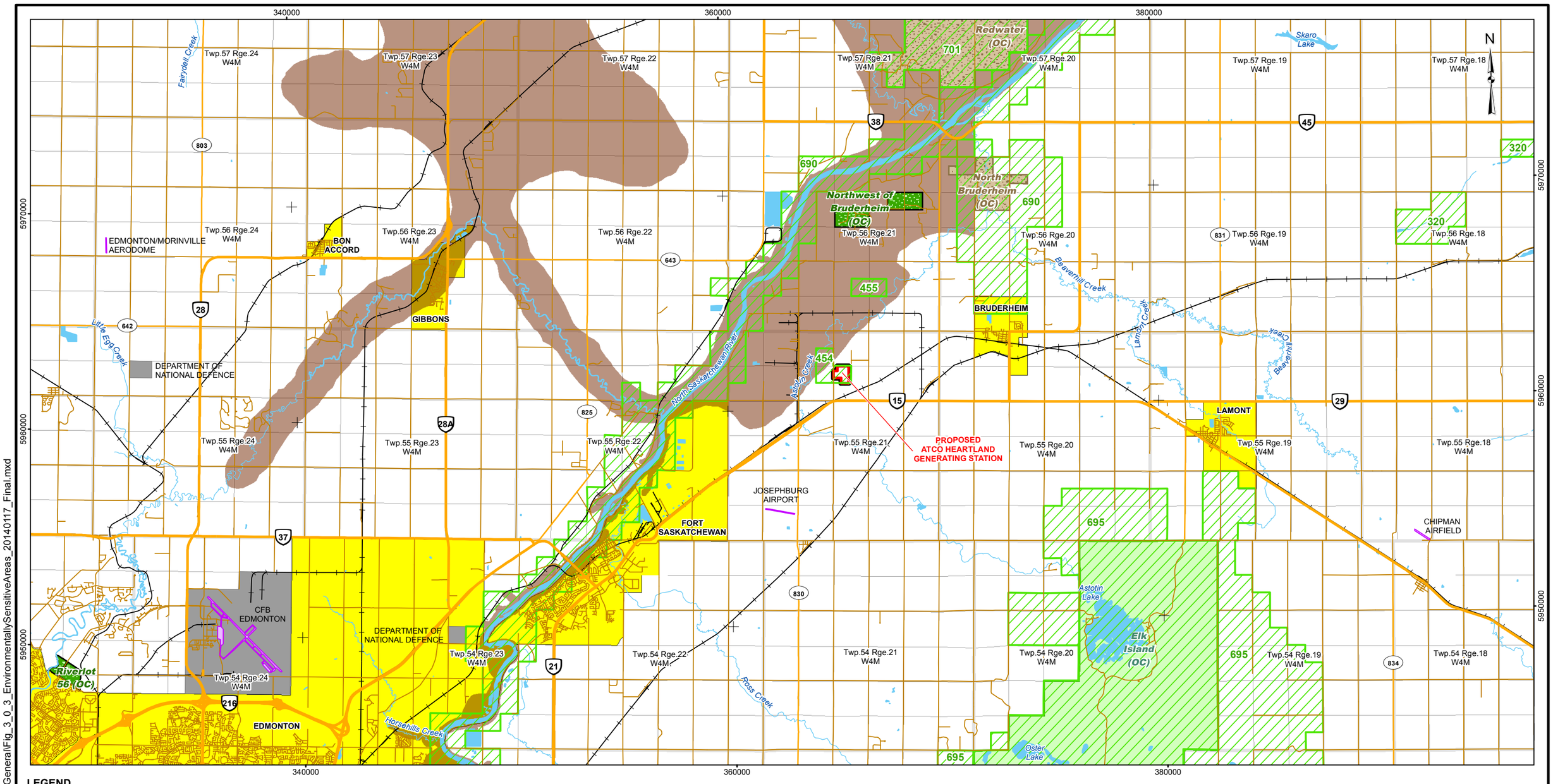
25 0 25
SCALE 1:850,000 KILOMETRES

PROJECT
ATCO Power
HEARTLAND GENERATING STATION

TITLE
FIRST NATIONS AND LOCAL COMMUNITIES

Golder Associates

PROJECT NO. 12-1334-0068			FILE No.	
DESIGN	SM	15 Jan. 2014	SCALE AS SHOWN	REV. 0
GIS	MP	15 Jan. 2014		
CHECK	CS	16 Jan. 2014	FIGURE: 3.0.2	
REVIEW	SM	16 Jan. 2014		



LEGEND

- PROJECT SITE
- PRIMARY HIGHWAY
- SECONDARY HIGHWAY
- LOCAL ROAD
- RAILWAY
- RUNWAY
- WATERCOURSE
- AIRPORT
- CITY / TOWN
- ENVIRONMENTALLY SIGNIFICANT AREA
- FEDERAL MILITARY LAND
- KEY WILDLIFE AND BIODIVERSITY ZONE
- NATIONAL PARK
- PROVINCIAL NATURAL AREA
- PROVINCIAL RECREATION AREA
- WATERBODY

REFERENCE

ROADS OBTAINED FROM GEOBASE ®. HYDROLOGY AND RAILWAY OBTAINED FROM CANVEC © DEPARTMENT OF NATURAL RESOURCES CANADA. AIRFIELDS OBTAINED FROM IHS ENERGY INC. MILITARY BOUNDARIES DIGITIZED BY GOLDER ASSOCIATES LTD. PARKS AND PROTECTED AREAS OBTAINED FROM ALBERTA TOURISM, PARKS AND RECREATION, GOVERNMENT OF ALBERTA.ENVIRONMENTALLY SIGNIFICANT AREAS OBTAINED FROM ALBERTA TOURISM, PARKS AND RECREATION. PREPARED BY FIERA BIOLOGICAL CONSULTING, 2014.
DATUM: NAD 83 PROJECTION: UTM ZONE 12

5 0 5
SCALE 1:175,000 KILOMETRES

PROJECT
ATCO Power
HEARTLAND GENERATING STATION

TITLE
ENVIRONMENTALLY SENSITIVE AREAS, FEDERAL LANDS AND AIRPORTS

Golder Associates

PROJECT NO. 12-1334-0068			FILE No.	
DESIGN	CS	11 Oct. 2013	SCALE AS SHOWN	REV. 0
GIS	AB	17 Jan. 2014		
CHECK	CS	17 Jan. 2014		
REVIEW	RR	17 Jan. 2014		

FIGURE: 3.0.3

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362000
364000
366000
368000
5964000
5962000
5960000

North Saskatchewan River

BA ENERGY FACILITY

Twp.56 Rge.21. W4M

SHELL SCOTFORD

ATCO PIPELINE GAS STORAGE FACILITY

Twp.55 Rge.21. W4M

15
830

N

LEGEND

- EXISTING ARCHAEOLOGICAL SITE
- OCCUPIED RESIDENCE WITHIN 2,000 m OF PROJECT SITE
- OIL AND GAS FACILITY
- OIL AND GAS WELL
- HIGH PRESSURE PIPELINE
- LOW PRESSURE PIEPLINE
- PRIMARY HIGHWAY
- SECONDARY HIGHWAY
- LOCAL ROAD
- RAILWAY
- WATERCOURSE
- INDUSTRIAL SITE
- PROJECT SITE
- WATERBODY

TRANSMISSION AND DISTRIBUTION LINE TYPES

- 240 kV
- 138 kV
- 13.8 kV or 25 kV

REFERENCE

SURFACE WELLS, OIL AND GAS FACILITIES, PIPELINES AND WATERCOURSES OBTAINED FROM IHS ENERGY INC. ROADS AND RAILWAYS OBTAINED FROM GEOBASE®. PARCEL TITLES BOUNDARIES AND DISTRIBUTION LINES OBTAINED FROM ALTALIS

© GOVERNMENT OF ALBERTA 2008. ALL RIGHTS RESERVED. TRANSMISSION LINES DIGITIZED USING ABMI HUMAN FOOTPRINT DATA, AND ESRI AND GOOGLE EARTH IMAGERY. ARCHAEOLOGICAL SITES OBTAINED FROM ALBERTA CULTURE.
DATUM: NAD83 PROJECTION: UTM ZONE 12

1 0 1
SCALE 1:25,000 KILOMETRES

PROJECT
ATCO Power
HEARTLAND GENERATING STATION

TITLE
ENERGY INFRASTRUCTURE, OCCUPIED RESIDENCES AND ARCHAEOLOGICAL SITES

Golder Associates

PROJECT NO. 12-1334-0068			FILE No.	
DESIGN	SM	22 Nov. 2013	SCALE AS SHOWN	REV. 0
GIS	AB	17 Jan. 2014		
CHECK	CS	17 Jan. 2014		
REVIEW	RR	17 Jan. 2014		

FIGURE: 3.0.4

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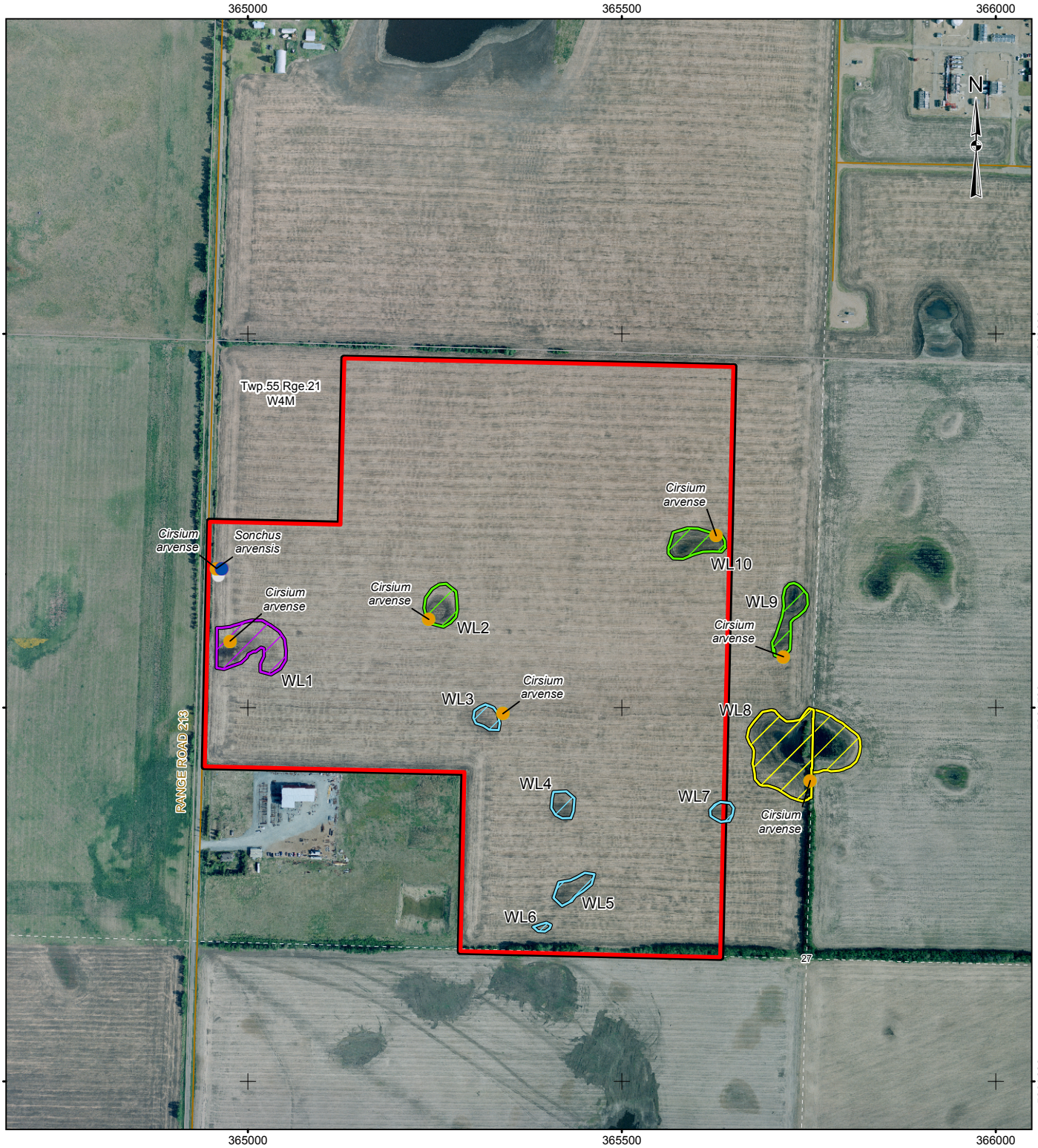

LEGEND

- PROJECT SITE
- LOCAL ROAD

WEED OBSERVATIONS*

- CANADA THISTLE *(CIRSIUM ARVENSE)*
- PERENNIAL SOW THISTLE *(SONCHUS ARVENSIS)*
- WHITE COCKLE *(SILENE PRATENSIS)*

WETLAND CLASS**

- WETLAND CLASS I
- WETLAND CLASS II
- WETLAND CLASS III
- WETLAND CLASS IV

250 0 250

SCALE 1:7,500 METRES

NOTE

*PROVINCE OF ALBERTA 2010. WEED CONTROL ACT
**STEWART AND KANTRUD (1971) WETLAND CLASSIFICATION SYSTEM

REFERENCE

ROADS OBTAINED FROM GEOBASE®. IMAGERY OBTAINED FROM AESRD AIR PHOTO SERVICES. IMAGERY DATE: 2011. IMAGERY IS NOT TO SCALE.
DATUM: NAD 83 PROJECTION: UTM ZONE 12

PROJECT
ATCO Power
HEARTLAND GENERATING STATION

TITLE
WETLAND DELINEATION AND WEED SPECIES OBSERVATIONS

Golder Associates

PROJECT NO. 12-1334-0068			FILE No.	
DESIGN	SG	05 Sep. 2013	SCALE AS SHOWN	REV. 0
GIS	AB	17 Jan. 2014		
CHECK	CS	17 Jan. 2014		
REVIEW	RR	17 Jan. 2014		

FIGURE: 3.0.5

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Photo 1: View across Project Site looking northwest. Industrial facilities including the Shell Scotford facility can be seen along the horizon.

Photo 2: View across the Project Site looking west. Industrial facilities in the Alberta Industrial Heartland can be seen along the horizon.

Photo 3: Canola (*Brassica* sp.) planted on the Project Site. Class I ephemeral wetland can be seen in centre top third of photo; wetland is heavily impacted by agricultural activity and was dry at time of photo (August 1, 2013).

Photo 4: Class I ephemeral wetland near the centre of the Project Site. The wetland is heavily impacted by agricultural activity.

Photo 5: Class III seasonal wetland located along the eastern edge of NW Section 27-55-21 W4M, on the east side of the Project Site. Wetland is heavily impacted by agricultural activity.

6. Proximity of the designated project to:

a. any permanent, seasonal or temporary residences;

There are eight currently occupied permanent residences within 1.5 kilometres (km) of the Project site (Figure 3.0.4).

b. traditional territories, settlement land (under a land claim agreement) as well as lands and resources currently used for traditional purposes by Aboriginal peoples; and

The nearest First Nation Reserves are the Alexander First Nation (Treaty Six) on Indian Reserves 134, 134A and 134 B (located west of Morinville, AB) located 51 km west of the Project, and the Saddle Lake Cree Nation (Treaty Six) is located 90 km east of the Project.

The Project site has been privately owned since the early 1900s, and no traditional usage of the land by Aboriginal peoples has been noted.

c. any federal lands.

The closest federal land is Elk Island National Park, approximately 13 km southeast of the Project and shown on the Regional Area Map, Figure 1.1.1.

3.1 Land and Water Use

To the extent that is known at this time, describe the ownership and zoning of land and water that may be affected by the project, including the following:

a. Zoning Designations

The Project site is currently on cultivated land within AIH region, 14 km northeast of Fort Saskatchewan and approximately 30 km northeast of Edmonton, as shown in Figure 3.0.2. The Project will utilize approximately 9.4 ha of the 57 ha land parcel located at NW 27-55-21 W4M. ATCO Power will work with local farmers to maximize the area of unused land post-construction that can remain under cultivation as productive farmland.

The Project site is within the Strathcona: Heavy Industrial Policy Area per the AIH Area Structure Plan Bylaw (Strathcona County 2001). The land parcel in NW 27-55-21 W4M is currently zoned as "Agricultural: General" as specified by the Strathcona County Land Use Bylaw 8-2001 (Strathcona County 2013). In early 2014, ATCO Power will file an application to rezone the land parcel to "Heavy Industry." Preliminary discussions with Strathcona County have occurred regarding rezoning the land parcel. Given that Strathcona County encourages industrial development in this region, ATCO Power does not anticipate concerns with rezoning the land parcel.

The AIH can be characterized as a region that has been heavily affected by human development. The region has been utilized for agricultural land since the early 1900s and over the past 40 years has gradually transitioned to an area dominated by industrial development. The area surrounding the Project site within the AIH region consists of a mix of industrial facilities, rural farms and residences, as well as public infrastructure including Highway 15 and various railway lines. The Project site is located near multiple industrial facilities, including Shell Canada's Scotford Manufacturing Centre and BA Energy's proposed but not constructed Heartland Upgrader (Figure 3.0.4).

Following an extensive review of potential locations across Alberta, ATCO Power identified the AIH region as an optimal location for a large natural gas fired combined cycle power station due to its heavy industry zoning designation, and close approximately to critical infrastructure such as transmission, gas pipelines, and water supply required to support the Project.

b. Current Land Ownership, including Sub-surface Rights

In 2013, the 56.7 hectare (140 acre) land parcel in NW 27-55-21 W4M was purchased by AREHL, a sister company of ATCO Power, for the explicit purpose of developing the Project by ATCO Power. AREHL has entered into a long-term lease agreement with ATCO Power for the purposes of construction and operation of the Project.

c. Any applicable land use, water use (including ground water), resource management or conservation plans within and near the project site.

Cumulative Effects Management System

In 2007, the Government of Alberta adopted the Cumulative Effects Management System to provide a comprehensive integrated and legislated system to protect water, air, land and biodiversity in Alberta. While the Cumulative Effects Management System applies to all of Alberta, the AIH is identified as a key area for managing cumulative environmental effects because of industrial and municipal development.

Since the adoption of the Cumulative Effects Management System, ESRD has developed two frameworks for the AIH that are applicable to the Project, including:

- *Water Management Framework for the Industrial Heartland and Capital Region* (Alberta Environment [AENV] 2007)*; and*
- *Capital Region Air Quality Management Framework* (ESRD 2012).

In addition, ESRD is currently developing an Air Management Framework for the Industrial Air Management Area and Capital Region. These three frameworks, and how they apply to the Project, are discussed in more detail below.

Water Management Framework for the Industrial Heartland and Capital Region

As part of the Cumulative Effects Management System, ESRD developed a Water Management Framework for the AIH and Capital Region to protect water quantity and quality within the Devon-to-Pakan reach of the NSR and to address the cumulative effects of various individually regulated projects. Framework goals include improving water quality from fair to good, minimizing load discharge, and minimizing the impacts on the NSR (AENV 2007). The framework also endeavors to ensure that sufficient water remains in the river to maintain aquatic life and to support current and proposed industrial development (AENV 2007). Specific targets and requirements are currently under development, including a maximum allowable load for certain pollutants. Based on water withdrawal and returns data for *Water Act* licences in the Devon-to-Pakan reach of the NSR, there is sufficient flow within the NSR to support current and future use (AENV 2007). Water use within this reach of the NSR continues to be tracked and considered by decision makers in new licence applications and amendments (AENV 2007).

ATCO Power reviewed the Water Management Framework to look for opportunities to incorporate objectives of the framework into the early design stage of the Project. Design criteria such as the volume of water withdrawal from the river, the degree of recycling of cooling water, and the degree of wastewater treatment necessary were considered, with the intention of minimizing the effects of the Project on the NSR.

Capital Region Air Quality Management Framework

The ESRD has also developed an ambient air quality framework for the Capital Region (including the AIH). The Capital Region Air Quality Framework sets ambient air quality levels for four contaminants of concern: NO_2, SO_2, $PM_{2.5}$ and O_3. These limits are based on the Alberta Ambient Air Quality Objectives for NO_2 and SO_2, and Canada-wide Standards for $PM_{2.5}$ and O_3. Each level includes various management actions that can range from baseline monitoring and data gathering to a mandatory plan to reduce the ambient levels below the applicable air quality standard (ESRD 2012).

During the early design stage of the Project, ATCO Power made decisions about technology alternatives, including air emissions control technologies, to be compatible with the Air Quality Management Framework. For example, choice of fuel (low-sulphur natural gas), use of low NO_x combustion systems in the GTG and HRSG, and use of a SCR system on the HRSG demonstrate ATCO Power's commitment to meeting the intent of the Air Quality Management Framework.

Air Management Framework for the Industrial Air Management Area

A specific AIH Air Management Framework, which incorporates both emission targets and an allocation system, is under development. The AIH Air Management Framework will set cumulative airshed thresholds for NO_x and SO_2 emissions for all large industrial facilities within the AIH (NCIA 2009). The allocation system will allow industry to work cooperatively to meet these targets. This framework is currently in the development stage and is expected to be finalized and implemented in the near future, and it is anticipated that the Heartland Project will be included in this management framework once it is implemented.

Northeast Capital Industrial Association - Regional Noise Management Plan

The NCIA consists of member industrial companies in the Fort Saskatchewan area. The NCIA has developed a Regional Noise Management Plan (RNMP) for the AIH. The purpose of the RNMP is to provide facilities in the AIH with an alternative method for demonstrating noise compliance (i.e., an alternative to Permissible Sound Level [PSL] compliance conventionally required by AUC Rule 012 [AUC 2011] and by Alberta Energy Regulator [AER] Directive 038 [EUB 2007]).

The NCIA RNMP has recently been approved by both the AUC and the AER as an acceptable alternative to conventional PSL compliance. As such, facilities operating in the AIH can now demonstrate noise compliance via either the conventional PSL approach (i.e., by showing that cumulative noise levels will not exceed the PSL at the nearest or most impacted occupied dwellings) or by adherence to the RNMP.

Rather than setting strict noise thresholds that must not be exceeded, the RNMP has been established on the basis of due diligence (i.e., taking all reasonable steps to minimize noise impact). The RNMP requires participating companies to implement a noise management framework. The noise management framework requires senior management to set clear expectations for management of noise compliance at their site. The RNMP further requires participating companies to develop and implement a site-specific noise management plan that integrates both occupational and environmental objectives. Companies participating in the RNMP must also conduct regular self-audits, disclose results of their site-specific noise management plan to the NCIA, support development and updates of the NCIA's regional noise model, and use the "Life in the Heartland" platform to communicate and engage public feedback on the RNMP.

In 2014, ATCO Power became a NCIA member and will participate in the further development of regional management plans for the Alberta Industrial Heartland. ATCO Power will work with the NCIA to implement the principles of the RNMP into the design and operation of the Project.

Northeast Capital Industrial Association – Regional Groundwater Management

Both the NCIA and ESRD recognised the importance and environmental sensitivity of the Beverly Channel aquifer to the province and the AIH. In 2006, a regional groundwater monitoring project was initiated by the NCIA in association with ESRD and the public. The goal of the project was to identify ways to improve and streamline groundwater management through a cooperative approach for monitoring and reporting to the public. The project was known as the Regional Assessment of the Groundwater Quality in the Beverly Channel in the Fort Saskatchewan Area. The project included Sturgeon and Strathcona Counties and consisted of several phases, including data collection, database development, monitoring, and groundwater modelling.

The results of this study have allowed the NCIA to provide input into the Province's Water Management Framework (discussed above). The NCIA is currently developing the Regional Groundwater Monitoring Framework in conjunction with ESRD, which will be part of the North Saskatchewan Regional Planning process. In addition, NCIA has been working with the provincial government to finalize a Groundwater Monitoring Directive for the AIH. The NCIA is currently proceeding with an annual groundwater quality monitoring program. As part of participation in the NCIA, ATCO Power will become involved in the annual groundwater quality monitoring program.

Strathcona County Management Plans

Land use in the AIH is addressed by an Area Structure Plan Bylaw (Strathcona County 2001) and Amendment (Strathcona County 2002) and the Project site is located within the Strathcona: Heavy Industrial Policy Area.

Strathcona County has prepared a Municipal Development Plan according to the legislative framework in the *Municipal Government Act*. The Municipal Development Plan provides an overall plan for the next 20 years and beyond, and can be used to manage growth, development and sustainability in an orderly manner (Strathcona County 2007). The Municipal Development Plan includes specific policies that deal with development along the NSR and the conservation and quality of water, land, air and natural resources within Strathcona County.

d. For the proposed construction, operation, decommissioning and abandonment of a marine terminal, state whether or not the lands are routinely, and have been historically, used as a marine terminal, or are designated for such use in a land use plan that has been the subject of public consultation.

The Project will not involve the construction, decommissioning or abandonment of a marine terminal.

e. If the project is to take place within the waters or lands administered by a Canada Port Authority under the Canada Marine Act and its regulations, describe applicable land status and zoning under the Port Land Use Plan.

The Project will not take place within waters or lands administered by a Canada Port Authority under the *Canada Marine Act* and its regulations.

f. Describe whether the designated project is going to require access to, use or occupation of, or the exploration, development and production of lands and resources currently used for traditional purposes by Aboriginal peoples.

The Project will be constructed entirely on lands that have been privately owned since the early 1900s. As a result, the Project will not require access to, use of, or the exploration, development, and production of resources or lands currently used for traditional purposes by Aboriginal peoples.

4.0 FEDERAL INVOLVEMENT

4.1 Federal Financial Support

Describe if there is any proposed or anticipated federal financial support that federal authorities are, or may be, providing to the designated project.

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

4.2 Federal Lands

Describe any federal lands that may be used for the purpose of carrying out the designated project. This is to include any information on any granting of interest in federal land (i.e., easement, right of way, or transfer of ownership).

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

4.3 Federal Legislative or Regulatory Requirements

Detail any federal legislative or regulatory requirements that may be applicable, including a list of permits, licenses or other authorizations that may be required to carry out the designated project.

On November 8, 2013, ATCO Power submitted an Assessment Request for Obstruction Marking and Lighting to Transport Canada, and a Land Use Application to NAV Canada. The Project will include an exhaust stack approximately 50 m in height. The exhaust stack will be the tallest obstruction on the Project site and will not exceed any of the criteria constituting an obstacle to navigation listed in CARs 2012-1 *Division III – Marking and Lighting of Obstacles to Air Navigation, Section 601.23*. The stack will not penetrate a limitation surface, will be more than 6 km from the nearest aerodrome and will be less than 90 m in height.

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

5.0 ENVIRONMENTAL EFFECTS

The information to be provided in this section is meant to be a brief assessment of the environmental interactions of the project. A detailed examination of the potential environmental effects of the project does not need to be included in the project description.

Using existing knowledge and available information provide an overview of the following:

Section 5.1 summarizes available information on the existing physical, biological and human environment on the Project site and surrounding area. The section also describes the potential interactions between the Project and the environment, and assesses changes that might occur as a result of Project activities or infrastructure.

Section 5.2 provides a more detailed description of the potential environmental effects on fish and fish habitat as defined under the *Fisheries Act*, aquatic species as defined under the *Species at Risk Act (SARA)*, and migratory birds as defined in the *Migratory Birds Convention Act*.

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

1. A description of the physical and biological setting, including the physical and biological components in the area that may be adversely affected by the project (e.g., air, fish, terrain, vegetation, water, wildlife, including migratory birds, and known habitat use).

5.1.1 Soils and Terrain

Soils information for the Project site was obtained from a desktop assessment and a soils field survey conducted in June 2013. 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 10 m of elevation change across the Project site. Three soil series were identified within the Project site: Angus Ridge (96%), Peace Hills (1%) and Ukalta (3%). The soil texture within the Project site is predominantly loam, with up to 3% coarse fragments in the topsoil and up to 3% coarse fragments in the subsoil. The topsoil is typically darker than the subsoil, with an obvious colour change to subsoil. The average topsoil and subsoil depths within the Project site are approximately 20 centimetres (cm) and 30 cm, respectively.

The reclamation suitability of the soils within the Project site was assessed as “poor” to “good” for the topsoil, and “fair” for the upper subsoil, using the system outlined by the Alberta Soil Advisory Committee (Alberta Agriculture 1987) for the Plains Region. The main limitation for reclamation

of the topsoil is pH, which affects nutrient availability. The main limitations for reclamation of the subsoil are pH, consistency, and texture.

Wind and water erosion risk is low for the majority of the soils within the Project site (Coote and Pettapiece 1989; Pedocan 1993). Physical loss of topsoil lowers the capability of the land by decreasing the amount of available nutrients and organic matter in the root zone. The severity of the problem is directly related to the proportion of soil lost, and is most severe where topsoils are thin (less than 15 cm) or are highly erodible (medium-textured).

The capability of soil to support the plant growth required for reclamation can be reduced if the soil is compacted. Generally, coarse-textured soils (e.g., sandy loam, loamy sand) have low compaction sensitivity, and medium to fine textured soils (e.g., loam, silty loam, clay loam, clay) have high compaction sensitivity in wet conditions. As a result, soils within the Project site have a low sensitivity to compaction under dry conditions but are sensitive when wet.

During construction and operation, the Project has the potential to reduce the reclamation suitability of the topsoil and subsoil and result in soil erosion and compaction if not properly mitigated. ATCO Power will implement the following activities to mitigate any potential adverse environmental effects on soils in accordance with applicable provincial regulatory requirements concerning conservation and reclamation:

- ATCO Power will salvage all topsoil in areas used for construction within the Project site.
- In areas to be occupied by permanent facilities, ATCO Power will salvage the topsoil and subsoil and store each separately for the life of the Project in soil stockpiles along the southern edge of the Project site.
- ATCO Power will ensure that soil salvage will be conducted according to relevant standards and in a manner consistent with the Environmental Protection Plan that will be developed before construction begins.
- Following construction, all topsoil will be replaced in areas not occupied by permanent facilities.

During construction, ATCO Power will closely monitor soil handling activities and ensure the above mitigation measures are successfully deployed. Once operation commences, and to the extent possible, portions of the Project site that are not used for the facility footprint 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 Project is not expected to result in any adverse environmental effects on soils.

5.1.2 Vegetation and Wetlands

Vegetation surveys, listed plant surveys and a wetlands inventory were carried out within the Project site during the spring and summer of 2013. The listed plant surveys included an early-flowering listed plant survey in June 2013 and a late-flowering listed plant survey in August 2013.

The Project is situated within the Central Parkland and Dry Mixedwood Natural Subregions. The Project site and surrounding landscape are dominated by cultivated land and forested patches bordering the NSR. The Project site occurs primarily in cultivated land, with narrow windrows of trembling aspen (*Populus tremuloides*) and balsam poplar (*Populus balsamifera*), and small wetlands surrounded by Canada thistle (*Cirsium arvense*) or willow species (*Salix sp*.). The land parcel has been under cultivation since the early 1900s and the most recently harvested crop (Fall 2013) was canola (*Brassica* sp.).

The Project site overlaps Environmental Significant Area (ESA) 454. ESA 454 contains habitat for five elements of conservation concern including one moss species (*Campylium radicale*) and four vascular plant species (False dragonhead [*Physostegia ledinghamii*], hybrid dwarf raspberry [*Rubus* x *paracaulis*], *Panicum wilcoxianum*, tall blue lettuce [*Lactuca biennis*]) (Fiera Biological Consulting 2009). None of these species were observed during the vegetation surveys of the Project site. Additionally, no federally or provincially listed plant species were observed during the vegetation surveys of the Project site. Therefore, the Project is not expected to result in any adverse environmental effects on listed plant species or ESA 454.

Three noxious weeds (Province of Alberta 2010), Canada thistle, white cockle (*Silene pratensis*) and perennial sow-thistle (*Sonchus arvensis*), were observed within the Project site. To limit the potential for further introduction of weeds and to ensure compliance with the Alberta *Weed Control Act*, all construction equipment will enter the construction area in a clean condition, free of mud, vegetation and seeds. Following construction of the facilities, areas not containing permanent facilities or access roads will be reclaimed. Only certified weed-free seed mixes will be used, selected in consultation with Strathcona County. With the implementation of these mitigation measures, the Project is not expected to introduce or spread listed weed species.

Ten prairie wetlands were observed during the field surveys of NW 27-55-21 W4M, including seven Class I and Class II wetlands heavily impacted by tilling; two large Class II and Class III wetlands on the eastern edge of the quarter-section; and one Class IV wetland on the western edge of the quarter-section. During infrequent high water years, the wetlands would drain into Astotin Creek northwest of the Project and an unnamed tributary of Beaverhill Creek upstream of Township Road 560 southeast of the Project via existing roadside ditches.

The Project's planned on-site major equipment, buildings and transmission lines will create an impact within the Project footprint and require a level, well-graded Project site. Given the scale and scope of the proposed Project, and the required modifications to on-site surface flow runoff

for Project construction that will alter the natural hydrological cycles of these basins, ATCO Power proposes to remove all ten wetlands within NW 27-55-21 W4M.

ATCO Power has submitted an application under the *Water Act* requesting approval to remove nine of the ten wetlands within NW 27-55-21 W4M. In early 2014, ATCO Power will file another *Water Act* application requesting approval to remove the tenth wetland that is located partially on the Project site land parcel and partially on the adjacent land parcel owned by a different party.

ATCO Power will mitigate any adverse environmental effects associated with the wetlands by implementing the following mitigation measures:

- Each wetland will be drained. The topsoil will be salvaged and the wetland will be filled with an appropriate material.
- If possible, activities will take place outside Environment Canada's Restricted Activity Period for migratory birds, which is currently April 15 to August 20 in wetlands (P. Gregoire 2013, pers. comm.). If any activities are required during this period, a breeding bird survey will be conducted before commencing any activities in the affected wetlands.
- A wetland compensation program will be implemented to mitigate the loss of the wetlands. ATCO Power will work with ESRD to develop an appropriate wetland compensation program to offset, at a ratio of 3:1, the loss of the on-site wetlands.

Following the wetland compensation program, the Project will result in a positive net effect on wetlands in the region.

5.1.3 Wildlife and Wildlife Habitat

Wildlife and wildlife habitat surveys for the Project site were completed during the summer of 2013. These included an amphibian survey, breeding bird survey, owl survey, and raptor stick nest search. Incidental wildlife observations were also recorded during all field surveys.

The Project is located approximately 1 km east of an area of the NSR valley that has been designated by the Province as a Key Wildlife and Biodiversity Zone (KWBZ) (Figure 3.0.3). KWBZs are considered to be "a combination of key winter ungulate habitat and higher habitat potential for biodiversity" by ESRD (Alberta Sustainable Resource Development [ASRD] 2011). Timing and/or, types of activities may be restricted within these zones; however, these restrictions do not apply outside the KWBZ and therefore do not apply to the Project.

The amphibian survey was conducted on May 27, 2013 at three plot locations within the Project site. No evidence of amphibian breeding (e.g., egg clusters) was found during daylight surveys, and the only species detected during night surveys was the boreal chorus frog (*Pseudacris maculata*), which is not listed provincially or federally (ESRD 2013; COSEWIC 2013).

The breeding bird survey was conducted on May 30, 2013 at four plot locations within the Project site. A total of 14 species were detected during the breeding bird survey (Table 5.1.1). Two species listed provincially as "Sensitive" were observed during the breeding bird survey: one northern pintail (*Anas acuta*) was observed loafing on a wetland, and one Swainson's hawk (*Buteo swainsoni*) was observed soaring overhead. No nests of any avian species were found within the Project site.

Table 5.1.1 Bird Species Detected During the Breeding Bird Survey

Common Name	Scientific Name	Number Detected
American crow	*Corvus brachyrhynchos*	3
American goldfinch	*Carduelis tristis*	2
blue-winged teal	*Anas discors*	6
Canada goose	*Branta canadensis*	1
clay-coloured sparrow	*Spizella pallida*	6
common goldeneye	*Bucephala clangula*	2
Le Conte's sparrow	*Ammodramus leconteii*	1
mallard	*Anas platyrhynchos*	5
northern pintail	*Anas acuta*	1
ruddy duck	*Oxyura jamaicensis*	3
savannah sparrow	*Passerculus sandwichensis*	6
song sparrow	*Melospiza melodia*	3
Swainson's hawk	*Buteo swainsoni*	2
vesper sparrow	*Pooecetes gramineus*	4

The nocturnal owl call survey was conducted at two plot locations near the Project site on May 5, 2013. The only species detected during the owl survey was one northern saw-whet owl (*Aegolius acadicus*), located north of the Project site. Northern saw-whet owl is not listed provincially or federally (ESRD 2013; COSEWIC 2013).

The raptor stick nest survey was conducted on April 28, 2013 prior to extensive leaf out. No raptor nests or raptor observations were recorded during the stick nest searches on or within 1 km of the Project site.

Data obtained from the Fisheries and Wildlife Management Information System database on May 1, 2013 identified historical observations of 12 listed species within a 3 km radius of the Project site centroid. However, the majority of the Project site is cultivated cropland that is considered to be low quality habitat for most wildlife species, especially listed species. The only listed species observed on the Project site during the 2013 wildlife and wildlife habitat surveys were northern pintail (loafing on a wetland) and Swainson's hawk (flying overhead).

It is not expected that any upland habitat that would be considered preferred by migratory birds will be adversely affected by the Project. The Project site has been heavily affected by agricultural practices since the early 1940s; consequently, little natural habitat exists (Photos 1 to 3). As described in Section 5.1.2, ten prairie wetlands will be removed within NW 27-55-21 W4M to safely accommodate the Project. These wetlands have also been affected by agriculture, with the result that there is little to no natural vegetation remaining within or surrounding the wetlands (Photos 3 to 5). Consequently, the wetlands are considered to provide marginal habitat for nesting migratory birds.

The primary mitigation to limit potential adverse environmental effects on wildlife and to ensure compliance with the *Migratory Birds Convention Act* will be to conduct vegetation clearing outside the migratory bird restricted activity period of May 1 to August 20 in upland areas and April 20 to August 25 in wetlands (P. Gregoire 2013, pers. comm.). If vegetation clearing is required during either of these periods, a pre-construction survey for active nests will be completed by an avian biologist within in seven days of any clearing activities. During the preconstruction survey, if any active nests are found (i.e., eggs present, or female present in nest) or suspected to be present based on bird behaviour in areas to be cleared, then the nests or suspected nest locations will be flagged with a buffer distance appropriate to the species (i.e., minimum 30 m; P. Gregoire 2013, pers. comm.). Clearing will not be conducted within this buffer until the nest is no longer active (i.e., after young have fledged). An avian biologist will complete a second pre-construction survey approximately two weeks after the first survey to determine the status of the nest, and to determine that no new active nests are present, before clearing can occur. If no occupied nests are identified during the survey then clearing can occur within seven days.

Given the paucity of natural habitat on the Project site, and with the implementation of the mitigation measures described above, the Project is not expected to result in adverse environmental effects on wildlife and wildlife habitat.

5.1.4 Groundwater

The regional hydrogeology in the Fort Saskatchewan area is influenced by pre-glacial, glacial, and post-glacial events. The surficial soils at the Project site consist of topsoil/organic silty clay underlain by glacial till, which represents the dominant soil unit in the region. This glacial till is underlain by lower sand and gravel of the Empress Formation overlying bedrock.

The Empress Formation is interpreted to be located on a bedrock terrace adjacent to the Beverly Channel deposits, and represents a potential aquifer beneath the Project site. These sand and gravel materials were encountered some 25 m below grade and ranged in thickness across the Project site from about 1.5 m to 4 m. The regional direction of groundwater flow is toward both the Beverly Channel and the NSR.

Based on information collected from the Groundwater Information Centre database, 15 water wells are located within 2 km of the Project site. The majority of these wells are identified as being used for domestic and/or stock use.

Effects on groundwater are not anticipated from the Project because of the low risk of spills that could cause groundwater impacts. Because the Project will be fuelled by natural gas, only small volumes of petroleum fuel will be stored on the Project site in a small, above-ground storage tank for stand-by diesel generation purposes. Aqueous ammonia, lubricating oils and caustic soda may also be stored in small quantities on the Project site. Releases of these materials to the environment will be prevented through the use of appropriate secondary containment and leak detection systems.

Groundwater monitoring programs are typically required for all industrial developments in the AIH. Therefore, it is anticipated that a groundwater monitoring program will be required by ESRD as part of the approval to operate the Project. ATCO Power will commission a post-construction groundwater monitoring network consisting of four groundwater monitoring locations. Based on the results of the groundwater monitoring program, ATCO Power will implement mitigation, if required, to address the unlikely potential that adverse environmental effects that may occur on groundwater resources.

5.1.5 Surface Hydrology

The Project site is located within the NSR watershed. The NSR is a glacier-fed river that flows east from the Canadian Rockies to central Saskatchewan. The NSR is one of the largest watersheds in Alberta, with a total drainage area of 122,800 square kilometres (km^2), and a gross drainage area at Edmonton of 28,000 km^2. Flow in the river is regulated by two upstream dams, which reduce peak flow and increase low flow.

Flow values presented herein are based on the period of 1973 to 2011; this period was selected because it represents the period after the construction and initiation of operations of the two upstream dams on the NSR. The NSR has a 100-year maximum instantaneous flood discharge of 4,612 cubic metres per second (m^3/s) and a 2-year maximum instantaneous flood discharge of 855 m^3/s. The mean annual discharge for the NSR at Edmonton for the period is 194 m^3/s. Monthly flows in the river peak in June and July due to snowmelt and storm events that prevail in early summer season. Lowest flows occur in winter under ice-covered conditions. The 10-year low-flow discharge is 43.5 m^3/s and the 100-year low-flow discharge is 17.3 m^3/s.

A total of 141 surface water withdrawal licences are located along the NSR reach between the Town of Devon and the Town of Pakan. Major water uses covered by the licenses include cooling water for thermal power plants, oil and gas processing, and well injection. Many of the licenses referred to as “other” are chemical processing facilities. Other common water uses along this reach include agriculture, aggregate washing, wetland enhancement, urban water

supply and golf course irrigation. Based on water withdrawal and returns data for *Water Act* licences in the Devon to Pakan reach, there is sufficient flow within the NSR to support current and future use (AENV 2007).

The Project site is located approximately 5 km east of the NSR and east of the lower portion of Astotin Creek in an area consisting of cultivated fields with a few trees and shrubs near the property boundary. Runoff within the Project site generally flows in two directions (northwest and southeast) because of slightly higher elevation near the centre of the Project site (elevation variance across the entire Project site is less than 10 m). The natural drainage conveys runoff from the northwestern area to Astotin Creek via roadside ditches and from the southeastern area to an unnamed tributary of Beaverhill Creek via undefined, discontinuous watercourses and small wetlands. Local drainage in this area is highly influenced by road and rail ditches, culverts and grading associated with land development.

There are no surface waterbodies or watercourses present on the Project site aside from the ten prairie wetlands that ATCO Power plans to remove, as discussed in Section 5.1.2. Therefore, there will be no other adverse environmental effects on surface waterbodies or watercourses within the Project site.

The anticipated water withdrawal for the Project from the NSR is 0.128 m^3/s and the anticipated treated wastewater discharge is 0.019 m^3/s, which will result in a net withdrawal from the NSR of 0.109 m^3/s. The NSR mean annual flow is 195 m^3/s and the 2-year maximum instantaneous flow is 855 m^3/s. The change in flow due to the Project is predicted to be 0.06% of the mean annual flow, and typical changes in water level in the NSR due to water withdrawal for the Project will be 1 mm or less. As a result, the Project is not anticipated to result in a change in flow in the NSR that would result in adverse environmental effects on aquatic resources because the volume of water that will be withdrawn for the Project is very small relative to the flow in the NSR. As requested in the *Water Act* diversion application submitted to ESRD in November 2013, the maximum annual withdrawal from the NSR is expected to be 3,504,000 m^3.

5.1.6 Surface Water Quality

ATCO Power's industrial approval application submitted to ESRD in November 2013 included a water quality and wastewater assessment. As part of that assessment, baseline water quality data for the NSR in the Devon-to-Pakan reach and for several surrounding lakes were obtained from the Water Data System maintained by ESRD and from a baseline study of the NSR by Total E&P Canada Ltd. (Total 2008). Additional data for surrounding lakes were obtained from Mitchell and Prepas (1990).

The assessment included an overview of baseline water quality data for the NSR from 2001 to 2012 summarized by season and compared to water quality guidelines. During this timeframe, the NSR was well oxygenated, with hard, alkaline water. Turbidity ranged from clear to turbid,

and varied by season. The dominant ions were bicarbonate and calcium, and fluoride was above the chronic guideline for aquatic life. Nutrient concentrations were high and reflect inputs from municipal wastewater treatment plants. Total metal concentrations were variable, and aluminum, cadmium, chromium, copper, iron, lead, mercury, silver and zinc concentrations were often above the chronic aquatic life guidelines. Occasional exceedances of human health guidelines also occurred for aluminum, beryllium, chromium, lead and mercury, and wildlife health guidelines were exceeded by total phenolics, aluminum and chromium. Most water quality guideline exceedances occurred during high flows during the open-water season, and reflect elevated suspended sediment concentrations. Exceptions include aluminum and total phosphorus, which were consistently above guidelines downstream of Edmonton.

Seasonal variation was observed in the concentrations of ammonia, major ions, nutrients and metals. Ammonia and major ions were higher in the winter. Total phosphorus and metals were higher in the open-water season compared to winter, reflecting high flows from surface runoff, and associated elevated suspended sediment concentrations.

The potential adverse environmental effects of wastewater releases and acidifying air emissions from the Project were evaluated using conservative quantitative and qualitative methods as part of the water quality and wastewater assessment. The assessment focused on the release of treated wastewater to the NSR and the potential for acidification of surrounding waterbodies. Potential aquatic effects of stormwater management and spills and leaks were considered negligible based on the level of stormwater management, and spill response and cleanup procedures that will be in place at the Project site.

Potential water quality changes in the NSR from the Project wastewater discharge were assessed using the screening approach described in the *Water Quality Based Effluent Limits Procedures Manual* (Alberta Environmental Protection [AEP] 1995). Modelled release of the treated wastewater to the NSR was found to result in non-measurable to small increases in concentrations of water quality parameters for all assessed scenarios, without changes to aquatic life guideline exceedances or the concentrations of parameters of particular concern in the NSR (i.e., nutrients, metals). Predicted changes in water temperature in the NSR downstream of the Project wastewater discharge outfall were also within the applicable regulatory guideline (AENV 1999). The predicted effect of the treated wastewater discharge on water quality can be characterized as low, because changes in some parameters may be measurable under worst-case conditions. However, based on the lack of additional guideline exceedances and the small increases in concentrations of parameters with guidelines under all scenarios, the Project is not expected to have adverse environmental effects on aquatic life in the NSR.

In accordance with EPEA approvals for similar power generation facilities in Alberta, wastewater quantity and quality, runoff control, and the storm water retention pond will be regulated by ESRD under the EPEA Approval to be granted for the Project.

ATCO Power anticipates the EPEA approval to provide wastewater discharge limits, and monitoring and reporting requirements for the Project. Although discussions with ESRD have not yet occurred on the parameters that will be required for monitoring and reporting, ATCO Power provided the wastewater testing regime outlined in Table 5.1.2 as the proposal for periodic wastewater testing pursuant to the requirements in section 5.12 of the *Guide to Content for Industrial Approval Applications: Part 1, New Plants and Facilities* (Alberta Government 2013). This wastewater testing regime was based on existing EPEA approvals in the region.

Table 5.1.2 Proposed Periodic Wastewater Monitoring Characterization

Parameter	Frequency	Sample Type	Location
Flow	Continuous	Flow Meter	Wastewater holding tank outflow
Temperature	Continuous	Thermistor	Wastewater holding tank outflow
pH	Daily	Composite	Wastewater holding tank outflow
96-hour static acute lethality test using rainbow trout (*Oncohynchus mykiss*)	Biannual / Quarterly For a limited period as described in 5.13	Composite or Grab	Wastewater holding tank outflow
48-hour static acute lethality test using *Daphnia magna*	Biannual / Quarterly For a limited period as described in 5.13	Composite or Grab	Wastewater holding tank outflow
Free Available Chlorine	Monthly	Grab	Wastewater holding tank outflow
Total Suspended Solids	Monthly	Composite or Grab	Wastewater holding tank outflow
Total Dissolved Solids	Monthly	Composite or Grab	Wastewater holding tank outflow
Total Phosphorus	Monthly	Composite or Grab	Wastewater holding tank outflow
COD	Monthly	Composite or Grab	Wastewater holding tank outflow
Heavy Metals	Annual	Composite or Grab	Wastewater holding tank outflow
Oil and Grease	Daily	Visual	Wastewater holding tank
Floating Solids	Daily	Visual	Wastewater holding tank
Visible Foam	Daily	Visual	Wastewater holding tank

Wastewater discharge from the Project is not expected to cause adverse environmental effects on aquatic life in the NSR due to the wastewater treatment measures ATCO Power will employ for the Project, and the low volume of wastewater that will be released into the NSR.

Water in the stormwater pond will be preferentially diverted for use in the cooling system, and will be treated (and monitored) through the plant wastewater treatment system.

The potential acidification of 20 waterbodies in the area surrounding the Project was assessed. Based on the lack of sensitivity to acidification and the small predicted change in potential acid input to surrounding lakes, the Project is not expected to cause acidification in surrounding waterbodies.

5.1.7 Fish and Fish Habitat

There are no watercourses located on the Project site. There are 10 prairie wetlands that ATCO Power plans to remove, as discussed in Section 5.1.2. None of these wetlands were fish-bearing and thus there is no fish habitat on the Project site.

Runoff from the power block area of the Project site will drain to a stormwater retention pond, and water from this pond will be recycled for plant cooling purposes. Runoff that originates from other areas of the Project site is expected to be of suitable quality such that direct discharge into adjacent natural watercourses would not be a concern. Astotin Creek is located approximately 1 km west of the Project site, and is not expected to directly receive surface runoff. Current drainage is onto adjacent lands or a roadside ditch on the west boundary of the property. Consequently, there will be no adverse environmental effects on fish or fish habitat on the Project site or in local natural watercourses.

The Project will draw raw water from an existing water intake structure located on the NSR. No upgrades to that existing water intake structure are required for the Project, and therefore, there are no fish and fish habitat impacts associated with the infrastructure required to supply raw water to the Project. From the hydrology assessment presented in Section 5.1.5, the change in flow within the NSR due to the Project is 0.06% of the mean annual flow, and typical changes in water level in the NSR due to net river water withdrawal for the Project will be 1 mm or less. There are no adverse effects on fish habitat expected due to water withdrawal.

The discharge of treated wastewater from the Project is not expected to affect temperature in the NSR to an extent that results in adverse environmental effects on fish and fish habitat. Conservative evaluation of potential temperature changes in the NSR downstream of the wastewater discharge from the Project indicates that measurable changes in water temperature will be unlikely beyond the zone of initial mixing in the river. The most conservative calculations using 5% fraction of seasonal Q10 flows resulted in estimated increases of 0.1°C and 0.2°C in water temperature during open-water and winter conditions, respectively. Estimated changes for other scenarios were 0.1°C or less. These changes are within the Alberta water quality guideline of an increase of no greater than 3°C above ambient water temperature (AENV 1999).

Similarly, the discharge of treated wastewater from the Project is not expected to affect water quality in the NSR to an extent that results in adverse environmental effects on fish and fish habitat. Based on the results of the water quality modelling, the release of the treated wastewater was found to result in non-measurable to small increases in concentrations of water quality parameters. However, these changes are expected to result in no additional guideline exceedances beyond those that already occur under baseline conditions. In particular, these differences would not change the aquatic life guideline exceedances or the concentrations of parameters of particular concern in the NSR (i.e., nutrients, metals).

Prior to release to the NSR, the wastewater will be treated for phosphorus, which is anticipated to include flocculation and ultrafiltration. This treatment of the wastewater is expected to remove any remaining suspended solids and result in a net reduction of phosphorus loading (by mass) in the river.

Adverse environmental effects to fish and fish habitat are not anticipated from the construction of the wastewater outfall structure on the NSR. Discussions with DFO and application of the self-assessment process suggest there will be minimal risk of serious harm to fish if best management practices are implemented during the construction of the outfall, to ensure no adverse effects occur to instream fish habitat and riparian areas.

In summary, there are no adverse effects on fish or fish habitat predicted on the Project site or in local natural watercourses. In addition, the Project is not expected to have adverse environmental effects on fish and fish habitat in the NSR.

5.1.8 Air Quality

The Project site is located within the boundaries of the North Saskatchewan Air Zone, which includes both the Capital Region Airshed Zone and the Fort Air Partnership (FAP) Airshed Zone. The North Saskatchewan Air Zone is characterized by a strong industrial base of oil refineries, chemical manufacturing, and power generation. Future industrial activity in the region is also expected to include bitumen upgrading. Industrial activity, in combination with vehicle use, home heating and urban activity, results in emissions of NO_2, SO_2, $PM_{2.5}$ and O_3. The Project is not expected to result in additional adverse environmental effects on air quality relative to baseline conditions.

Air quality within the Capital Region is monitored by several organizations, including ESRD, the FAP, and the Strathcona Industrial Association. The Project site lies within the FAP Airshed Zone, which collects air quality data through a combination of 8 continuous and 62 passive monitoring stations.

Exceedances of the Alberta Ambient Air Quality Objective (AAAQO) for some substances have been documented over the FAP air quality recording period at discrete monitoring locations. Exceedances of the 1-hour and the 24-hour AAAQOs for SO_2 and 1-hour AAAQO for NO_2 were noted between 2008 and 2012 at the Redwater monitoring station. In the FAP Annual Report (FAP 2011), these SO_2 exceedances are attributed to adjacent local industry. The SO_2 and NO_2 concentrations recorded at the remaining monitoring stations within the FAP network were below the AAAQOs.

All the continuous monitoring stations in the FAP network recorded exceedances of the 24-hour AAAQO for $PM_{2.5}$ at some point between 2008 and 2012. These high $PM_{2.5}$ events are typically attributed to forest fires, brush fires, peat fires or poor meteorological conditions, such as winter temperature inversion (FAP 2009, 2010).

Ambient CO concentrations are only measured at the Fort Saskatchewan monitoring station. Based on the most recent five years of ambient monitoring data, the maximum 1-hour and 8-hour concentrations between 2008 and 2012 were below the AAAQO for CO.

Ammonia (NH_3) is continuously monitored at five stations within the FAP network. Both natural and industrial (e.g., fertilizer production) sources of NH_3 exist within the airshed (FAP 2012). The highest 1-hour NH_3 concentration over the most recent five-year period from 2008 to 2012 was observed at the Ross Creek monitoring station. The NH_3 exceedances at the Ross Creek station are attributed to local industrial sources (FAP 2011).

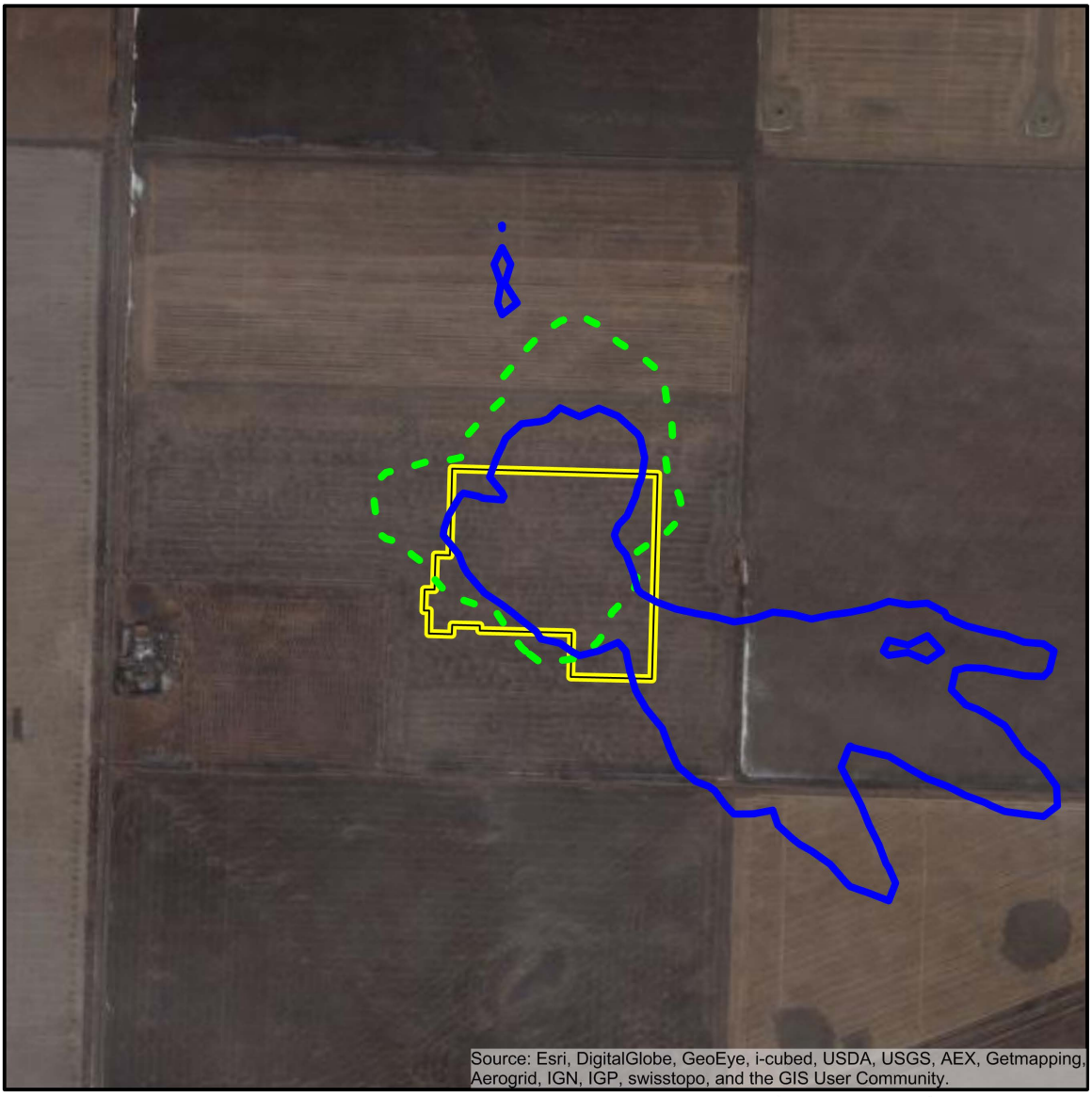
The Project is expected to release combustion products such as NO_x, particulate matter (PM), and CO. These substances are released as a result of natural gas combustion in the GTG and auxiliary boiler. Dry low NOx burners will be installed on the combustion turbine to reduce NO_x emissions. An SCR system will be installed on the HRSG to reduce NO_x in the exhaust gases. The SCR system will be installed downstream of the duct burners and will consist of ammonia injection and storage equipment, a control system and a catalyst section. Small quantities of ammonia will be injected into the exhaust gas stream ahead of the catalyst section to reduce NOx (NO and NO_2) to nitrogen (N_2) and water (H_2O). As a result of NH_3 addition in the SCR system, the HRSG emissions will therefore also include NH_3.

A detailed Air Quality Assessment was completed and submitted to ESRD as part of the industrial approval application. The assessment included the following Project-related emissions sources: one 302.5 MW combustion turbine; one HRSG with duct burners; one 19.4 MW auxiliary boiler and a six-cell cooling tower.

CALPUFF (Version 6.42) was used to model the dispersion of Project air emissions. Air quality effects associated with three cases were considered: the Baseline Case, the Project Case and the Application Case. The Application Case assesses predicted changes to air quality associated with existing and approved industrial and community emission sources within the Industrial Heartland Region (i.e., the Baseline Case) in combination with the Project emissions (i.e., the Project Case). Three operating scenarios were considered as part of the Project Case and the Application Case. The design scenario assumes normal operation of the GTG; the start-up scenario, which considers Project emissions during GTG start-up; and the upset scenario, which assumes the SCR is offline.

The predicted direction of flow and dispersion to background levels for NO_2 and $PM_{2.5}$ are shown in Figure 5.1.1. For the purposes of this assessment, background levels are considered to be the predicted ground-level concentrations at or above 10% of the AAAQO as per the Alberta Air Quality Model Guideline (AQMG). NO_2 and $PM_{2.5}$ are predicted to reach background levels approximately 3 km from the center of the Project.

The dispersion modelling results demonstrate that the predicted concentrations of SO_2, NO_2, CO, $PM_{2.5}$ and NH_3 within the 5 km by 5 km air quality study area are below respective AAAQOs for the Baseline Case and Application Case for all three operating scenarios. Based on the results of this assessment, the Project will meet provincial and federal air quality requirements and adverse environmental effects on air quality from the Project under the design, start-up or upset operating scenarios are not expected.



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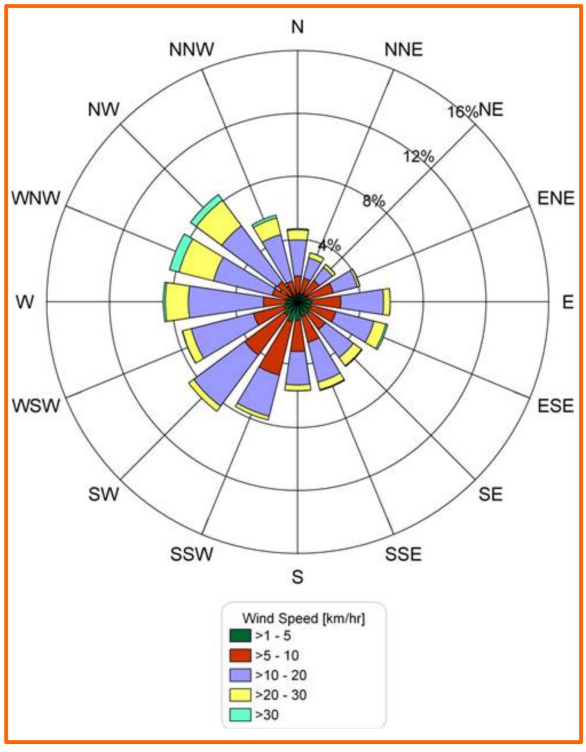
SCALE KILOMETRES



LEGEND

- Boundary of contour at which concentrations from Project Only emissions reach 10% of the 24-hour $PM_{2.5}$ AAAQO.
- Boundary of contour at which concentrations from Project Only emissions reach 10% of the 1-hour NO_2 AAAQO.
- Project Development Area
- CALMET Windrose (2002-2006)

PROJECT

ATCO POWER
HEARTLAND GENERATING STATION

TITLE

PROJECT ONLY - DESIGN CASE NO_2 and $PM_{2.5}$ PREDICTIONS

Golder Associates

PROJECT No.		12-1334-0068	FILE No.	
DESIGN	CH	2013-09-04	SCALE	AS SHOWN
AIR	TJ	2014-02-05		
CHECK	RJ	2014-02-07		
REVIEW	SM	2014-02-07		

FIGURE 5.1.1

R:/Active/_2012/1331/WorkingFiles_12-1334-0068.ATCO GasFiredPowerPlant/E_Air Reporting/Figures

5.1.9 Noise

Environmental noise from power generating facilities in Alberta is regulated by the AUC through *Rule 012: Noise Contro*l (AUC 2011); hereafter referred to as Rule 012. A Noise Impact Assessment (NIA) was conducted to predict the potential noise impact of the Project under representative operating conditions, and to compare the results of these predictions to compliance criteria defined by Rule 012.

Existing noise levels at the Project site will include contributions from natural and non-industrial sources and existing and approved third-party industrial facilities regulated by the AUC or the AER. Nine industrial facilities contribute to the baseline case considered in the NIA, and the noise contribution from these nine facilities was characterized using results presented in the most recent assessment for a facility in the area that has received regulatory approval (Shell 2010).

A computer noise model was created for the Project NIA using the Type 7810 Predictor Version 8.10 software. The results of the NIA indicate that cumulative noise levels are predicted to be compliant with relevant PSL values for all receptors during both daytime and nighttime.

Conservative assumptions about noise emissions from the Project and noise propagation from the Project to the receptor locations were incorporated throughout the NIA. The combination of these conservative assumptions likely resulted in an overestimate of potential Project noise impacts. In other words, field measurements conducted at any of the receptors considered in this NIA once the Project commences operations will likely result in noise levels lower than those predicted in the NIA. Consequently, the Project is not expected to have an effect on noise levels in the area surrounding the Project site and is not expected to result in adverse environmental effects associated with noise.

5.1.10 Historical Resources

A SoJ was prepared for the Project site and submitted to Alberta Culture on November 22, 2013 and clearance was received on February 6, 2014. The SoJ included a desktop assessment of the Project site in NW 27-55-21 W4M.

Over 60 previous Historical Resources Impact Assessments have been conducted in the general vicinity of the Project site, none of which identified any significant historic resource sites. The Project site has been extensively disturbed by agricultural activities and, therefore, it is highly unlikely that any intact, previously unrecorded historic resource sites will be impacted by the Project.

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

2. A description of any changes that may be caused as a result of carrying out the designated project to:

a. fish and fish habitat, as defined in the Fisheries Act

b. aquatic species, as defined in the Species at Risk Act

c. migratory birds, as defined in the Migratory Birds Convention Act, 1994

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

There no fish-bearing water bodies and thus no fish habitat on the Project site. Runoff that originates from the Project site is expected to be of suitable quality for direct discharge into adjacent natural watercourses. Consequently, there will be no adverse environmental effects on fish or fish habitat on the Project site or in local natural watercourses (Section 5.1.7).

The Project is not expected to result in adverse environmental effects on fish or fish habitat in the NSR, as follows (Section 5.1.7):

- There are no adverse effects on fish or fish habitat expected due to water withdrawal from the NSR.
- The discharge of treated wastewater from the Project is not expected to affect temperature or water quality to an extent that results in adverse environmental effects on fish and fish habitat in the NSR.
- Adverse environmental effects to fish and fish habitat are not anticipated from the construction of the wastewater outfall structure on the NSR.

In summary, the Project is not anticipated to have adverse environmental effects on fish and fish habitat.

5.2.2 Aquatic Species, as Defined in the *Species at Risk Act*

There were no aquatic species as defined under the *Species at Risk Act* observed on the Project site. No federally listed wildlife species were identified during the various wildlife surveys. The majority of the Project site is cultivated cropland that would not be considered habitat for aquatic species. As such, the Project is not expected to adversely affect aquatic species at risk, as defined under SARA. In addition, as described in Section 5.1.6 and 5.1.7, the negligible

changes predicted in water quality and quantity in the NSR are not expected to have any adverse environmental effects on aquatic species within the NSR.

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

The majority of the Project site is cultivated cropland that would not be considered preferred habitat for most bird species. A raptor stick nest survey was conducted in April 2013, and no raptor nests or raptor observations were recorded on or within 1 km of the Project site. A nocturnal owl call survey was conducted at two plot locations near the Project site in May 2013. The only species detected during the survey was one northern saw-whet owl (*Aegolius acadicus*) located north of the Project site; and this species is not listed provincially or federally.

The Project's planned on-site major equipment, buildings and transmission lines will create an impact within the Project footprint and require a level, well-graded Project site. Given the scale and scope of the proposed Project, and the required modifications to on-site surface flow runoff for Project construction that will alter the natural hydrological cycles of these basins, ATCO Power proposes to remove all ten wetlands within NW 27-55-21 W4M.

ATCO Power has submitted an application under the *Water Act* requesting approval to remove nine of the ten wetlands within NW 27-55-21 W4M. In early 2014, ATCO Power will file another *Water Act* application requesting approval to remove the tenth wetland that is located partially on the Project site land parcel and partially on the adjacent land parcel owned by a different party.

ATCO Power will mitigate any effects associated with the wetlands by implementing the following mitigation measures:

- Each wetland will be drained. The topsoil will be salvaged and the wetland will be filled with an appropriate material.
- If possible, activities will take place outside Environment Canada's Restricted Activity Period for migratory birds, which is currently April 15 to August 20 in wetlands (P. Gregoire 2013, pers. comm.). If any activities are required during this period, a breeding bird survey will be conducted before commencing any activities in the affected wetlands.
- A wetland compensation program will be implemented to mitigate the loss of the wetlands. ATCO Power will work with ESRD to develop an appropriate wetland compensation program to offset, at a ratio of 3:1, the loss of the onsite wetlands.

Given plans for wetland compensation and the timing of wetland drainage, the Project is not expected to adversely affect migratory birds, as defined under the *Migratory Birds Convention*

Act. Following the wetland compensation program, the Project is predicted to result in a positive net effect on wetland habitat in the region.

5.3 Changes that may be caused by the Project to Federal Lands or Lands Outside of Alberta

3. A description of any changes to the environment that may occur, as a result of carrying out the designated project, on federal lands, in a province other than the province in which the project is proposed to be carried out, or outside of Canada.

The closest federal land is Elk Island National Park, approximately 13 km southeast of the Project. Air dispersion modelling indicates that predicted concentrations of SO_2, NO_2, CO, $PM_{2.5}$ and NH_3 resulting from the Project in combination with other existing and approved development in the AIH are below respective AAAQOs. Dispersion of Project emissions outside of the 5 km air quality study area will further decrease predicted concentrations. Project-related emissions are predicted to reach background levels approximately 3 km from the center of the Project. Based on the lack of sensitivity to acidification and the small predicted change in potential acid input to surrounding lakes, the Project is not expected to cause acidification in local and regional waterbodies. Therefore, changes in air quality at Elk Island National Park are not anticipated, and the Project is not expected to result in any adverse environmental effects at Elk Island National Park.

Given that the Project is not expected result in any adverse environmental effects within the region, adverse environmental effects on lands outside Alberta 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

4. A description of the effects on Aboriginal peoples of any changes to the environment that may be caused as a result of carrying out the designated project, including effects on health and socio-economic conditions, physical and cultural heritage, the current use of lands and resources for traditional purposes, or any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.

The Project will not require access to, use of, or the exploration, development, and production of resources or lands currently used for traditional purposes by Aboriginal peoples. The closest First Nation Reserves are the Alexander First Nation (Treaty Six) on Indian Reserves 134, 134A and 134 B located 51 km west of the Project (west of Morinville, AB) and the Saddle Lake Cree Nation (Treaty Six) located 90 km east of the Project.

The Project is not expected to adversely affect Aboriginal peoples from changes to the environment, as follows:

- The potential for adverse environmental effects on any component of the environment that would directly affect Aboriginal peoples is limited by the location of the Project and the distance to any lands currently occupied by Aboriginal peoples. This reduces the potential for effects to negligible for health and socio-economic conditions, physical and cultural heritage, the current use of lands and resources for traditional purposes, or any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.
- The subject lands are privately owned and partially fenced and there are no current or known traditional uses of the Project site by Aboriginal groups or peoples. There is no habitat to support wildlife that Aboriginal groups or peoples may have an interest in hunting, and no vegetation that would be the subject of gathering activities. There is no known use of lands and resources within the Project site boundary by Aboriginal groups.
- Over 60 previous Historical Resources Impact Assessments have been conducted in the general vicinity of the Project site, none of which identified any significant historic resource sites. The Project site has also been extensively disturbed by agricultural activities and, therefore, it is highly unlikely that any intact, previously unrecorded historic resource sites will be impacted by the Project.
- Air dispersion modelling indicates that predicted concentrations of SO_2, NO_2, CO, $PM_{2.5}$ and NH_3 resulting from the Project in combination with other existing and approved development in the AIH are below respective AAAQOs. Dispersion of Project emissions outside the 5 km air quality study area will further decrease predicted concentrations. Given that the closest First Nation community is over 50 km from the Project site, and that air emissions from the Project will continue to disperse, adverse effects on air quality over or on lands currently used by Aboriginal peoples are not anticipated.
- Adverse environmental effects on water quality and quantity, and fish and fish habitat in the NSR are not expected. The discharge of treated wastewater is predicted to result in small but measurable changes in NSR water quality under worst-case conditions. However, these changes are expected to result in no additional guideline exceedances beyond those that currently already occur under baseline conditions. The change in flow within the NSR due to the Project is 0.06% of the mean annual flow, and typical changes in water level in the NSR due to net river water withdrawal for the Project will be 1 mm or less.

6.0 PROPONENT ENGAGEMENT AND CONSULTATION WITH ABORIGINAL GROUPS

Experience has shown that engagement by proponents with Aboriginal groups early in the planning and design phases of a proposed project can benefit all concerned. By learning about Aboriginal interests and concerns and identifying ways to avoid or mitigate potential impacts, proponents can build these considerations into their project design, reducing the potential for future project delays and increased costs.

Provide the following information to the extent that it is available or applicable:

6.1 List of Potentially Affected and Interested Aboriginal Groups

1. A list of Aboriginal groups that may be interested in, or potentially affected by, the designated project, including contact information (location, name, mailing address, email address, and fax and telephone numbers).

ATCO Power identified eight First Nations as potentially interested in the Project (Table 6.1.1) based on past ATCO experience working with Treaty 6 First Nations on electricity transmission-related projects, First Nation consultation efforts of recently proposed projects in the Alberta Industrial Heartland region, and the proximity of First Nation communities to the Project site.

Table 6.1.1 First Nations in Proximity to the Heartland Generating Station

First Nation	Distance from Project Site	Address
Alexander First Nation	NW 51 km	Box 3480, Morinville, AB T8R 1S3
Saddle Lake Cree Nation	NE 91 km	Box 696, Saddle Lake, AB T0A-3T0
Enoch Cree Nation	SW 60 km	#440, PO Box 543, Enoch, AB T7X 3Y3
Paul First Nation	West 90 km	PO Box 30, Duffield, AB T0E 0N0
Montana First Nation	SW 113 km	PO Box 70, Hobbema, AB T0C 1N0
Samson Cree Nation	SW 113 km	PO Box 159, Hobbema, AB T0C 1N0
Ermineskin Tribe	West 113 km	PO Box 219, Hobbema, AB T0C 1N0
Louis Bull Tribe	West 113 km	PO Box 130, Hobbema, AB T0C 1N0

Figure 3.0.2, above shows the locations of the above First Nation communities.

The Metis Nation of Alberta is divided into six regions within which there are eight Metis communities. ATCO Power identified the Metis Nation Region 2 in central eastern Alberta and the Metis Nation Region 4 in central western Alberta, as potentially interested in the Project (Table 6.1.2).

Table 6.1.2 Metis Nation Regions in Proximity to the Heartland Generating Station

Metis Nation	Address
Metis Nation of Alberta	#100, 11738 Kingsway Ave, Edmonton, AB T5G 0X5
Metis Nation of Alberta - Region 2	PO Box 6497, Bonnyville, AB T9H 2H1
Metis Nation of Alberta - Region 4	11724 - 95 Street, Edmonton, AB T5G 1L9

6.2 Description Engagement or Consultation Activities Carried Out To Date with Aboriginal Groups

2. A description of the engagement or consultation activities carried out to date with Aboriginal groups, including:

a. names of Aboriginal groups engaged or consulted to date with regard to the project;

b. date(s) each Aboriginal group was engaged or consulted; and

c. means of engagement or consultation (e.g., community meetings, mail or telephone).

In addition to fulfilling the regulatory consultation requirements of government agencies such as the AUC and ESRD, ATCO Power's process for First Nation engagement acknowledges the *Government of Alberta's First Nations Consultation Policy on Land Management and Resource Development* (May 16, 2005) and *Alberta's First Nations Consultation Guidelines on Land Management and* Resource *Development* (November 14, 2007), as well as past experiences and relationships ATCO Power and other ATCO Group companies have had, or have, with individual Aboriginal communities. As described in Section 6.1, ATCO Power identified eight First Nations and two Metis Regions as well as the Metis Nation of Alberta as potentially interested in the Project.

In August 2013, a First Nation consultation assessment request for the Project was submitted to ESRD via the Electronic Disposition System. In October, 2013, ATCO Power received a letter from ESRD recommending that First Nation consultation was not required for the Project (Appendix A) for the following reasons:

1. The Project will not fall within any First Nation Consultation Boundary.
2. The Project infrastructure footprint will cover approximately 12 ha (30 acres) of a 140 acre land parcel privately owned by ATCO Real Estate Holdings.
3. The Ministry of Alberta Culture's Listing of Historical Resources (March 2013) was found to be clear of any historical resources of concern for the Project site located at NW 27-55-21 W4M.
4. The Project site is not located adjacent (within 10 km) to First Nations reserve land.

ATCO Power acknowledges ESRD's recommendation that First Nation consultation is not required for the Project However, based on its relationships and dealings in the Project area, ATCO Power decided to provide Project introductory information and ongoing updates to the First Nations and Metis groups identified in Section 6.1. In September 2013, ATCO Power sent the Project Information Package and an introductory letter to the eight First Nations previously identified having a potential interest in the Project. In November 2013, ATCO Power sent the Project Update package to these First Nations and the Metis groups.

To date, other than as described below, ATCO Power has received no response or comments from the above First Nations or Metis Regions in response to the Project Information Package and Project Update provided.

Based on their participation in the regulatory review of previously proposed projects located in the Alberta Industrial Heartland area, ATCO Power contacted the Alexander First Nation and Saddle Lake Cree Nation to offer one-on-one overviews of the Project. On August 29, 2013 ATCO Power met with representatives of Alexander First Nation and on September 19, 2013 met with Saddle Lake Cree Nation. During both meetings, ATCO Power provided an in-depth overview of the proposed Project, the existing Alberta electricity system and power market, the role the Project will play in meeting electricity demand growth in Alberta and replacing retiring coal-fired power generation, the environmental benefits of natural gas-fired combined cycle technology, and the Project site benefits including access to existing transmission, pipeline and water infrastructure.

6.3 Key Comments and Concerns by Aboriginal Groups

3. An overview of key comments and concerns expressed by Aboriginal groups identified or engaged to date, including any responses provided to these groups.

Saddle Lake Cree Nation requested follow up information on the predicted air emissions from the Project, the amount of natural gas the Project will consume, the water treatment process the Project will utilize, the potential for archeological resources within the Project site boundary, and the economic development and job opportunities that may be available to their community in relation to the Project. On October 24, 2013 ATCO Power provided a detailed response to the questions raised by Saddle Lake Cree Nation and provided contact information should any further clarification be required. ATCO Power has not had a request for any further clarification.

Both Alexander First Nation and Saddle Lake Cree Nation requested that ATCO Power make a presentation in their community to their Elders regarding the proposed Project. ATCO Power has agreed to do so and anticipates the scheduling of such a presentation early in 2014.

To date, no First Nation or Metis community have indicated they have an interest in the Project or any outstanding concerns with the Project.

6.4 Current Aboriginal Traditional Land Use

4. An overview of information on current use of lands and resources for traditional purposes by Aboriginal groups or peoples (e.g., information provided verbally or in writing, and past or present studies).

The Project site is a 140 acre parcel that has been under continuous cultivation since it was first homesteaded in the early 1900s. The Project is located in the AIH, an area of the Province that has been designated for industrial uses. The AIH is characterized as having a strong industrial base of oil refineries, chemical manufacturing, and power generation. Future industrial activity in the region is also expected to include bitumen upgrading and additional chemical manufacturing facilities.

The Project received Alberta *Historical Resources Act* clearance on February 6, 2014. As part of this clearance process, ATCO Power contracted Golder Associates Ltd. to prepare a SoJ for the Project. The SoJ is a planning document produced by a professional archaeologist and submitted to Alberta Culture to review the Project. The purpose of an SoJ is to assess whether the Project will impact significant historic resources. The SoJ prepared for the Project recommended that the Project site be granted *Historical Resources Act* clearance, and that no further work was necessary. This recommendation was based on the fact that over 60 previous Historical Resources Impact Assessments have been conducted in the general vicinity of the

Project site, none of which identified any significant historic resource sites; and that the Project site has also been extensively disturbed by agricultural activities and, therefore, it is highly unlikely that any intact previously unrecorded historic resource sites will be impacted by the Project.

The subject lands are privately owned and partially fenced and there are no current or known traditional uses of the Project site by Aboriginal groups or peoples. There is no habitat to support wildlife that Aboriginal groups or peoples may have an interest in hunting, and no vegetation that would be the subject of gathering activities. There is no known use of lands and resources within the Project site boundary by Aboriginal groups.

6.5 Aboriginal Consultation and Information Gathering Plan

5. A consultation and information-gathering plan that outlines the ongoing and proposed Aboriginal engagement or consultation activities, the general schedule for these activities and the type of information to be collected (or, alternatively, an indication of why such engagement or consultation is not required).

Based on the advice received from ESRD regarding the lack of a need to consult with Aboriginal communities regarding this Project, and the fact that none of the Aboriginal communities or groups contacted have thus far indicated that they have an interest or outstanding concern in the Project, ATCO Power does not intend to conduct further Aboriginal engagement activities. ATCO Power will continue to send Project updates produced for the public consultation program to the Aboriginal communities and groups identified to date.

7.0 CONSULTATION WITH THE PUBLIC AND OTHER PARTIES (OTHER THAN ABORIGINAL CONSULTATION INCLUDED ABOVE)

Provide the following information to the extent that it is available or applicable:

7.1 Stakeholders and Related Consultation Activities

1. A list of stakeholders that may be interested and potentially affected by the carrying out of the designated project. In addition, please describe consultation activities carried out to date with stakeholders, including:

a. names of stakeholders previously consulted;

b. date(s) each stakeholder was consulted; and

c. means of consultation (e.g., community meetings, mail or telephone).

7.1.1 Potentially Affected and Interested Stakeholders

The non-Aboriginal stakeholders identified by ATCO Power who may be potentially affected and/or have an interest in the Project are listed in Table 7.1.1.

Table 7.1.1 Stakeholders who may be Potentially Affected and/or Interested in the Heartland Generating Station

Federal Government	Canadian Environmental Assessment Agency Transport Canada NAV Canada
Provincial Government	Alberta Environment and Sustainable Resource Development Alberta Utilities Commission
Municipal Government	Strathcona County Sturgeon County Lamont County City of Fort Saskatchewan Town of Bruderheim
Local Landowners (consultation per AUC Rule 007)	All Landowners, occupants and residents within 800 m of the Project site boundary All residents and occupants within 2 km of the Project site boundary
Regional Associations	NCIA AIHA AIHA Land Trust Society

Landowners, residents and occupants include private residents; farmers; various local industries such as oil and gas producers and petro-chemical producers; natural gas and oil pipeline companies; electric and gas distribution utilities; and light industry such as fabrication and welding and an auto wrecker.

7.1.2 Overview of Stakeholder Consultation Activities to Date

ATCO Power undertook a comprehensive participant[2] involvement program for the Project in accordance with Section 3 and Appendix A of AUC Rule 007: Applications for Power Plants, Substations, Transmission Lines and Industrial System Designations. This program involved consultations with the public, including local landowners, government agencies, municipalities, companies and non-government organizations. Consultation activities for the Project were initiated in April 2013 and will continue for the duration of the Project.

In designing and executing the participant involvement program, ATCO Power sought to inform and consult with all persons whose rights may be directly and adversely affected by the Project, as well as others who may have an interest in the Project. The objectives of the program were to provide these individuals with Project-specific information and opportunities to voice their concerns and ask questions. ATCO Power undertook these activities with a commitment to work with potentially impacted and other interested parties to discuss options, address questions and concerns and, where practicable, resolve issues.

The following participants were identified for inclusion in the participant involvement program:

- Project Notification:
    - all landowners, residents and occupants within 5 km of the Project site boundary; and
    - other interested parties, including government agencies, Aboriginal groups, municipalities and regional associations.
- Personal consultation with:
    - all landowners, residents and occupants within 800 m of the Project site boundary; and
    - all owners and occupants of residences located within 2 km of the Project site boundary.

[2] For the purposes of this document, “participant” refers to all occupants, residents, landowners, agencies, municipalities and other interested parties contacted by ATCO Power during its participant involvement program for this Project.

Early consultation activities included discussions with municipal, provincial and federal government officials. Meetings were held with representatives from Strathcona County, the Canadian Environmental Assessment Agency (CEA Agency), ESRD and the AUC 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; and
- review Strathcona County's development permit and land re-zoning timelines, and obtain information regarding local development plans.

The objectives of the program were to provide participants with Project-specific information and opportunities to voice their concerns and ask questions. ATCO Power undertook these activities with a commitment to work with participants to respond to questions and concerns, discuss options, alternatives and mitigation measures, and, where practical, resolve issues.

ATCO Power's participant involvement program for the Project consisted of multiple stages as shown in Table 7.1.2.

Table 7.1.2 Timing of Key Participant Involvement Program Activities

Timing	Stages	Activity or Milestone
April 2013	Program initiation – early discussions with government agencies and industry associations	Initiate consultation efforts with provincial and federal regulatory agencies, Strathcona County, and regional industrial associations.
July 2013	Public notification – Project Information Package was sent to introduce the Project	Heartland Generating Station Project information package sent to all landowners, residents and occupants within 5 km of the Project site boundary, and other interested parties (see Section 6.1).
August to October 2013	First round of participant consultations	First round personal one-on-one consultations[1] with: • all landowners, residents and occupants within 800 m of the Project site boundary and, • All owners and occupants of residences located within 2 km o the Project site boundary • Other interested parties
October 3, 2013	Open House	An open house was held in Josephburg to provide Project information and seek input from participants, other interested parties and the broader public.
November 2013	Heartland Generating Station Project Update	Project Update sent to all landowners, resident and occupants within 5 km of the Project site boundary, and other interested parties.
November 2013	Second round of participant consultations	Second round personal one-on-one consultations with participants that requested Project specific information related to noise and air emissions, Project traffic planning, and transmission line planning.

[1] Personal one-on-one consultations were conducted either face-to-face or as telephone conversations per the preference of the participant.

Feedback obtained through the participant involvement program played an important role in Project planning. For example, personal consultations with participants generated new information that was used to identify additional noise mitigation measures that were taken into consideration during subsequent engineering design analysis.

Project Notification

In mid-July 2013, ATCO Power mailed a Project Information Package to more than 290 landowners, occupants and residents within 5 km of the Project site boundary. The Project Information Package was also mailed to other interested parties, such as municipalities, government departments, Aboriginal communities and regional associations. A copy of AUC brochure *Public Involvement in Needs and Facilities Applications* was included in the mail out. The materials distributed by mail were also made available on ATCO Power's website (http://www.atcopower.com/Projects/Heartland/).

The Project Information Package provided a description of the following:

- scope of the Project;
- Project location;
- need for the Project;
- environmental benefits of the Project;
- Project technology;
- Project schedule;
- participant consultation process;
- ATCO Power and Project contact information; and
- ATCO Power's power generation experience and the ATCO companies' presence in AIH.

ATCO Power established additional means for participants to contact the Project team through a dedicated 1-800 phone number, through a dedicated email address and through a Project website (http://www.atcopower.com/Projects/Heartland/) that contains a contact form.

In November 2013, a Project update was mailed to the same group of participants to whom the Project Information Package was sent. The update included:

- an update on the Project and Project schedule;
- Project location, including statement that there are no site-specific building or development restrictions or setbacks;
- additional information on the Project technology, including an explanation of, and image showing, the location of major on-site equipment;

- an explanation of the process whereby the Project will be interconnected to the AIES; and
- an overview of the air quality assessment and NIA completed for the Project.

Project Open House

ATCO Power held a Project open house in the hamlet of Josephburg on October 3, 2013 that was attended by 56 people. Open house invitations were sent to:

- landowners, residents and occupants within 5 km of the Project site boundary;
- municipal governments, including Strathcona County, Lamont County, Sturgeon County, Town of Fort Saskatchewan, Town of Bruderheim;
- Alexander and Saddle Lake Cree First Nations;
- provincial and federal agencies, including AUC, ESRD and CEAA; and
- regional associations, including NCIA, AIHA, and AIH Land Trust Society.

The open house was advertised in two local weekly distribution newspapers: the Fort Saskatchewan Record and the Lamont Leader. The advertisements provided contact information for ATCO Power and encouraged those unable to attend the open house to share their questions or concerns about the Project, or request further information by contacting ATCO Power.

The purpose of the open house was to provide participants with an opportunity to obtain information about the Project and share their questions and concerns. ATCO Power representatives, along with noise and air emission modelling technical consultants, were available to speak with and consult with open house attendees. Attendees were invited to complete feedback comment forms and to sign the optional sign-in sheet that ATCO Power used to document attendance.

A representative from AltaLink, the Transmission Facility Operator in this region, was at the open house to respond to questions regarding the transmission line planning process and regulatory review process for the transmission line needed to interconnect the Project to the AIES.

Feedback from open house attendees was positive overall. Attendee feedback focused on the positive aspects of transitioning to cleaner forms of power generation and the benefits of siting new generation in the Alberta Industrial Heartland region, and expressed enthusiasm regarding the employment and contracting opportunities the Project will generate for the local community.

The following information display boards and AUC information were made available to attendees during the open house:

- About ATCO Power;
- Alberta Power Basics;
- Power Overview;
- Project Location;
- Project Schedule;
- The Transition to Lower Emission Electricity Generation;
- Project Need;
- What is Combined Cycle Gas Technology;
- Project Site Benefits;
- Noise Impact Assessment;
- Noise Mitigation;
- Air Quality Assessment;
- Air Quality Assessment Results;
- Public Involvement; and
- Contact information for the Project Stakeholder Consultation Manager and Project-dedicated local landowner liaison and the Project dedicated 1-800 feedback line and email address.

In addition to the above Project-specific display boards, the AUC brochure *Public Involvement in Needs and Facilities Applications* was made available to attendees. Additional copies of the Project Information Package were also available to attendees.

Personal Consultations

During the months of July to November 2013, ATCO Power conducted personal consultations with all land interest holders, including occupants, residents, landowners and caveat holders within 800 m of the Project site boundary, and all occupants and residents within 2 km of the Project site boundary. The purpose of the consultations was to explain the proposed Project, to answer questions and address concerns, to document the views and concerns of participants, and gather feedback regarding the Project.

During these meetings, ATCO Power representatives recorded participant concerns and feedback on Project-specific ATCO Power Heartland Generating Station Contact Forms and provided or arranged to provide additional information when requested. In some cases,

additional visits and/or follow-up calls were made to participants based on feedback from the initial consultation.

During the first round of personal consultations, ATCO Power representatives conducted over 54 meetings with participants. Feedback from the first round of consultation was reviewed and entered into ATCO Power's stakeholder consultation tracking database. Input received during consultations, and analysis of consultation results, were used to identify requests for follow-up on specific issues, namely requests to receive information on air emission and noise emission modelling results. Once the air emission and noise emission assessments were completed, follow-up consultations were conducted with participants who requested this information.

7.2 Key Comments and Concerns by Stakeholders

2. An overview of key comments and concerns expressed to date by stakeholders and any responses that have been provided.

ATCO Power has carefully considered the feedback received from landowners, industry, government and other interested parties.

ATCO Power developed a stakeholder consultation process that involved the use of comment cards and a stakeholder issues tracking database. During one-on-one consultations, ATCO Power entered the results of consultations into comment forms and left a copy of each completed comment form with each stakeholder. Information from those comment forms was reviewed by Project staff and entered into ATCO Power's consultation tracking database. The comment form review process was used to identify issues or concerns that required follow-up and to identify site-specific opportunities for mitigation activities that could potentially reduce Project impacts.

ATCO Power endeavored to systematically assess the combined feedback received on comment forms by compiling this information in a stakeholder consultation database and analyzing the results. To this end, the comment form review process included categorizing the nature of concerns raised by each participant, and formalizing a follow up plan with participants who had raised specific concerns or requested to review noise and air emission results.

Throughout the public consultation program, the most commonly raised concerns about the Project related to noise, air emissions and the location of the transmission line required to interconnect the Project to the AIES. ATCO Power addressed these concerns by providing detailed information on the noise and air emission study results at the Project open house and in face-to-face personal consultations, and by providing information on the process AltaLink will undertake to plan the transmission route, conduct public consultation and file an AUC application. Specifically, ATCO Power has:

- provided participants with information on the transmission line planning process;
- involved AltaLink in the open house to explain the transmission line planning process;
- provided AltaLink with a list of the participants who have expressed concerns related to the transmission line and substation location; and
- provided one participant with information on electromagnetic fields.

ATCO Power has identified and responded to all participants' questions, issues and concerns associated with the Project. ATCO Power has resolved all concerns, with the exception of the concern raised by two participants in relation to the potential route of the transmission line required to interconnect the Project to the AIES. ATCO Power is committed to continuing to work with the two participants who have outstanding concerns and with AltaLink, the local Transmission Facility Operator that will build, own and operate the transmission line, until their concerns have been addressed.

7.3 Overview of Any Ongoing or Proposed Stakeholder Consultation Activities

3. An overview of any ongoing or proposed stakeholder consultation activities.

Consultation activities will continue throughout all phases of the Project. ATCO Power has developed positive relationships with local landowners and will continue to work with local landowners to communicate changes and/or updates to the Project and Project site configuration. ATCO Power will also work with AltaLink on the design and public consultation efforts associated with the transmission line route and configuration required to interconnect the Project to the AIES in an effort to understand potential concerns and minimize impacts on local landowners.

In 2014, ATCO Power intends to hold a second open house in the local community once the Project construction schedule and construction plan is further developed to provide this information to local landowners and other interested parties, and to gather any feedback and/or concerns local landowners may have regarding Project construction plans.

At key Project development periods, such as upon the receipt of regulatory approvals, Project updates will be developed and mailed out for the 5 km Project Notification radius and to other interested parties, including government agencies, Aboriginal groups, municipalities and regional associations.

In 2014, ATCO Power will become a formal member of the NCIA. The NCIA is a not-for-profit cooperative representing industry operating in Strathcona County, Sturgeon County, the City of Fort Saskatchewan and Lamont County. NCIA member companies range from large, integrated global chemical and petro-chemical industries to industrial service companies.

7.4 Consultations with Other Jurisdictions

4. A description of any consultations that have occurred with other jurisdictions that have environmental assessment or regulatory decisions to make with respect to the project.

Meetings with the CEA Agency, ESRD and AUC, all agencies responsible for administering legislation potentially applicable to the Project, began in April 2013 to introduce ATCO Power and the Project, and to obtain information on regulatory processes that should be followed. These agencies received all the notification materials issued at each stage of the consultation program.

Introductory meetings were also held with regional associations, including the NCIA, Alberta Heartland Industrial Association (AHIA), and AIH Land Trust Society. During these meetings, ATCO Power introduced the Project and gathered regionally specific information with regards to environmental, community and industry-related issues in the Heartland region.

Three meetings with Strathcona County have been held to introduce ATCO Power and the Project and to discuss Strathcona County's development permitting and land rezoning process. On June 12, 2013 and November 4, 2013, meetings were held with Strathcona County's Director of Economic Development and Manager of Industrial Development. A meeting also occurred on June 20, 2013 with Strathcona County's Mayor, Director of Corporate Planning and Intergovernmental Affairs, and Chief Commissioner. Strathcona County supports the Project and has stated that the Project will contribute to meeting the economic objectives and environmental goals of the council's Strategic Plan. Strathcona County has provided a Letter of Support for the Project.

ATCO Power consulted with ESRD staff on various occasions to introduce the Project and discuss the provincial EPEA and *Water Act* regulatory process and timelines. In June 2013, ATCO Power received a letter from ESRD indicating that an Environmental Impact Assessment was not required for the Project. Accordingly, in November 2013 ATCO Power prepared and submitted an Industrial Approval Application under the EPEA to ESRD for review.

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9.0 ACRONYMS

Acronym	Definition
AAAQO	Alberta Ambient Air Quality Objectives
AENV	Alberta Environment
AEP	Alberta Environmental Protection
AER	Alberta Energy Regulators
AESL	ATCO Energy Solutions Limited
AESO	Alberta Electric System Operator
AHIA	Alberta Hartland Industrial Association
AIES	Alberta Interconnected Electrical System
AIH	Alberta's Industrial Heartland
AIHA	Alberta Industrial Heartland Association
AREHL	ATCO Real Estate Holdings Ltd.
ASRD	Alberta Sustainable Resource Development
AUC	Alberta Utilities Commission
CEA	Canadian Environmental Assessment
CEAA	Canadian Environmental Assessment Act
DFO	Fisheries and Oceans Canada
EPEA	Environmental Protection and Enhancement Act
ESA	Environmental Significant Area
ESRD	Alberta Environment and Sustainable Resources Development
EUB	Alberta Energy and Utilities Board
FAP	Fort Air Partnership
GTG	Gas Turbine Generator
HEEA	Alberta Hydro and Electric Energy Act
HRSG	Heat Recovery Steam Generator
KWBZ	Key Wildlife and Biodiversity Zone
LSD	Legal Sub-Division
NAV Canada	Navigation Canada
NCIA	Northeast Capital Industrial Association
NIA	Noise Impact Assessment

Acronym	Definition
NSR	North Saskatchewan River
NSWA	North Saskatchewan Watershed Alliance
PSL	Permissible Sound Level
RNMP	Regional Noise Management Plan
RSA	Regional Study Area
SARA	Species at Risk Act
SCR	Selective Catalytic Reduction
STG	Steam Turbine Generator

APPENDIX A

ALBERTA ENVIRONMENT AND SUSTAINABLE RESOURCE DEVELOPMENT – LETTER REGARDING FIRST NATIONS CONSULTATION

Government of Alberta Environment and Sustainable Resource Development

Stewardship Branch
Alberta Environment and Sustainable Resource Development
4999 – 98 ave
Edmonton T6B 2X3
Canada
Telephone: 780-643-1708

From: Vince Biamonte, Region Lead
Lower Athabasca Region
Stewardship Branch, ESRD

FNC201306252

To: Leigh-Ann Lowrie
Approval Specialist
AESRD

Date: October 11, 2013

Subject: ATCO Power Heartland Generating Station (FNC201306252) Consultation intensity assessment.

On the request of the FNC Approvals Unit, I have reviewed an Assessment Request submitted by ATCO Electric Ltd. under FNC201306252 for consultation intensity. ATCO proposing to build and operate a 400 megawatt (MW) natural gas-fired power generation station called the ATCO Heartland Generating Station in Strathcona County, Alberta. The station will use clean and efficient natural gas-fired combined cycle technology that will produce enough electricity to power approximately 400,000 homes in Alberta. Construction activities will begin in late 2014 with full operation in 2017. The project infrastructure footprint will cover approximately 30 acres (12 ha) on a 140 acre ATCO owned land parcel and will work with local farmers to keep as much of the remaining land within the 140 acres in cultivation as productive farmland.

The station is located 14 kilometres northeast of Fort Saskatchewan in Strathcona County within Alberta's Industrial Heartland region (Sec 27 Twp 55 Rge 21 W4M).
The need to build additional infrastructure to support the project will be minimized by:

- Using an existing water intake and pipeline system to provide water to the station.
- Accessing natural gas from an existing gas line located on the site.
- Interconnecting to Alberta's electrical transmission system located only 3 km north.

The air and water footprint will be minimized by:

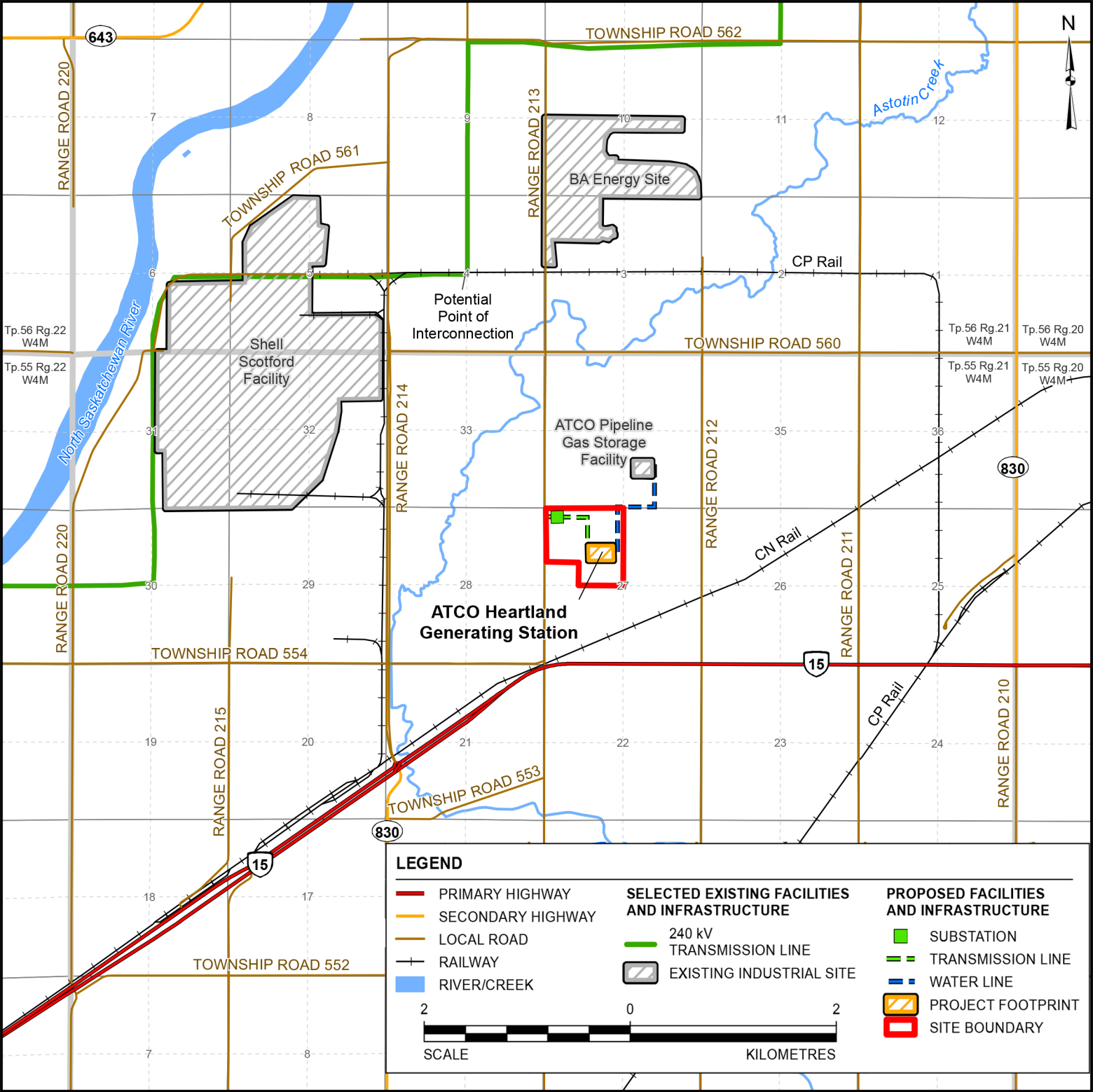
- Reducing water use by recycling water through the station.
- Reducing air emissions by using CCGT technology and state-of-the-art emission control design.

I am recommending No consultation for the following reasons.

1. The project does not fall within any First Nation Consultation Boundary (IMF query)
2. The project infrastructure footprint will cover approximately 30 acres (12 ha) on a 140 acre ATCO owned (private) land parcel.
3. The Ministry of Alberta Culture's Listing of Historical Resources (March 2013) was referenced regarding the proposed expansion has been found to be clear of any historical resources of concern. For Twp 55 Rge 21 W4 Section 27.
4. The project site is not located adjacent (within 10 km) to First Nations reserve land;

This rationale is to be put on the Knowledge Center file for the proposed project.

If you have any questions or concerns please contact me at 780-643-1708 or Vince.biamonte@gov.ab.ca.


N
643
TOWNSHIP ROAD 562
RANGE ROAD 220
RANGE ROAD 213
Astotin Creek
BA Energy Site
TOWNSHIP ROAD 561
CP Rail
Potential
Point of
Interconnection
Tp.56 Rg.22
W4M
Shell
Scotford
Facility
North Saskatchewan River
TOWNSHIP ROAD 560
Tp.56 Rg.21
W4M
Tp.56 Rg.20
W4M
Tp.55 Rg.22
W4M
Tp.55 Rg.21
W4M
Tp.55 Rg.20
W4M
RANGE ROAD 214
ATCO Pipeline
Gas Storage
Facility
RANGE ROAD 212
830
CN Rail
RANGE ROAD 211
RANGE ROAD 220
ATCO Heartland
Generating Station
TOWNSHIP ROAD 554
15
CP Rail
RANGE ROAD 210
RANGE ROAD 215
TOWNSHIP ROAD 553
830
15
TOWNSHIP ROAD 552
LEGEND
PRIMARY HIGHWAY
SECONDARY HIGHWAY
LOCAL ROAD
RAILWAY
RIVER/CREEK
SELECTED EXISTING FACILITIES
AND INFRASTRUCTURE
240 kV
TRANSMISSION LINE
EXISTING INDUSTRIAL SITE
PROPOSED FACILITIES
AND INFRASTRUCTURE
SUBSTATION
TRANSMISSION LINE
WATER LINE
PROJECT FOOTPRINT
SITE BOUNDARY
2
0
2
SCALE
KILOMETRES

APPENDIX B

ENVIRONMENTAL IMPACT ASSESSMENT DECISION LETTER FROM ALBERTA ENVIRONMENT AND SUSTAINABLE RESOURCE DEVELOPMENT

Alberta Environment and Sustainable Resource Development

Environmental Operations
Provincial Programs Branch
111 Twin Atria Building
4999 - 98 Avenue
Edmonton, Alberta T6B 2X3, Canada
Tel: 780-427-5828 Fax: 780-427-9102

June 25, 2013

Shannon Wever
ATCO Power
900, 919 – 11 Avenue SW
Calgary, AB, T2R 1P3

Dear Ms. Wever:

Further to your email sent on behalf of ATCO Power (ATCO) on June 13, 2013. I wish to advise you that pursuant to Section 44 of the *Environmental Protection and Enhancement Act* (EPEA) I have considered the application of the environmental assessment process for proposed natural gas-fired combined cycle power generating facility, the Heartland Generating Station. This activity is not a mandatory activity for the purposes of environmental assessment. Having regard to the consideration set out in Section 44(3) of EPEA, I have decided that further assessment of the activity is not required (i.e., a screening report will not be prepared and no environmental impact assessment report is required).

Please note that this decision is based on the current information about the project and that I reserve the ability to review this decision should different and/or new information come to light. Also, ATCO should note that Section 47 of EPEA gives the Minister of Environment the authority to order the preparation of an environmental impact assessment report under appropriate circumstances notwithstanding a director's decision to not require an environmental impact assessment report.

ATCO should be advised that although an environmental impact assessment report is not required for this project, Alberta Environment and Sustainable Resource Development may have other regulatory requirements under EPEA and/or the *Water Act*. For more information about these regulatory requirements, please contact Amit Banerjee at Amit.Banerjee@gov.ab.ca or 780-422-8686.

ATCO should contact Shauna Sigurdson (780-495-2236) with the Canadian Environmental Assessment Agency to identify any potential federal triggers (including those under the *Fisheries Act* and *Navigable Waters Protection Act)* and thus any federal environmental assessment requirements under the *Canadian Environmental Assessment Act*.

If you have any questions or need further information please contact me at (780) 427-9116.

Sincerely,

Corinne Kristensen
Acting Environmental Assessment Team Leader
Provincial Programs Branch
(Designated Director under the Act)

cc: A. Banerjee (ESRD) B. Pullishy (ESRD) S. Sigurdson (CEAA) D. Wong (ESRD)

APPENDIX C

LEGAL LAND TITLE FOR NW 27-55-21 W4M

LAND TITLE CERTIFICATE

S

LINC	SHORT LEGAL	TITLE NUMBER
0022 494 041	4;21;55;27;NW	132 161 728

LEGAL DESCRIPTION

MERIDIAN 4 RANGE 21 TOWNSHIP 55
SECTION 27
QUARTER NORTH WEST
CONTAINING 64.7 HECTARES (160 ACRES) MORE OR LESS
EXCEPTING THEREOUT:
8.21 HECTARES (20.30 ACRES) MORE OR LESS, SUBDIVIDED
UNDER PLAN 5660NY
EXCEPTING THEREOUT ALL MINES AND MINERALS

ESTATE: FEE SIMPLE

MUNICIPALITY: STRATHCONA COUNTY

REFERENCE NUMBER: 082 323 497

REGISTERED OWNER(S)

REGISTRATION	DATE(DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
132 161 728	05/06/2013	TRANSFER OF LAND	$4,330,700	$4,330,700

OWNERS

ATCO REAL ESTATE HOLDINGS LTD.
OF ATTN: PRESIDENT
1400, 909 - 11 AVENUE SW
CALGARY
ALBERTA T2R 1N6

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
752 115 243	29/08/1975	UTILITY RIGHT OF WAY GRANTEE - LAMCO GAS CO-OP LTD.
832 120 299	24/05/1983	UTILITY RIGHT OF WAY

(CONTINUED)

REGISTRATION
NUMBER DATE (D/M/Y) PARTICULARS

GRANTEE - ATCO GAS AND PIPELINES LTD.
10035-105 ST
EDMONTON
ALBERTA T5J2V6
"DISC. 1/5/84 #842095141 EX. PART PLAN 8420654"
(DATA UPDATED BY: TRANSFER OF UTILITY RIGHT
OF WAY 012023699)

TOTAL INSTRUMENTS: 002

THE REGISTRAR OF TITLES CERTIFIES THIS TO BE AN ACCURATE REPRODUCTION OF THE CERTIFICATE OF TITLE REPRESENTED HEREIN THIS 9 DAY OF AUGUST, 2013 AT 01:43 P.M.

ORDER NUMBER: 24138371

CUSTOMER FILE NUMBER:

END OF CERTIFICATE

THIS ELECTRONICALLY TRANSMITTED LAND TITLES PRODUCT IS INTENDED FOR THE SOLE USE OF THE ORIGINAL PURCHASER, AND NONE OTHER, SUBJECT TO WHAT IS SET OUT IN THE PARAGRAPH BELOW.

THE ABOVE PROVISIONS DO NOT PROHIBIT THE ORIGINAL PURCHASER FROM INCLUDING THIS UNMODIFIED PRODUCT IN ANY REPORT, OPINION, APPRAISAL OR OTHER ADVICE PREPARED BY THE ORIGINAL PURCHASER AS PART OF THE ORIGINAL PURCHASER APPLYING PROFESSIONAL, CONSULTING OR TECHNICAL EXPERTISE FOR THE BENEFIT OF CLIENT(S).