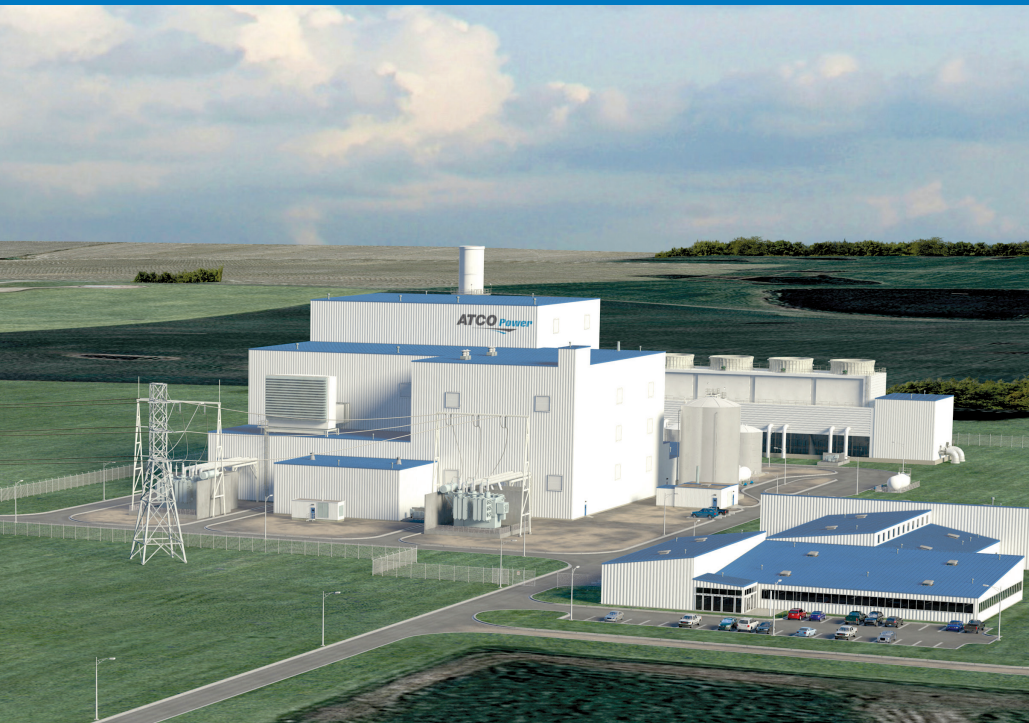


Heartland Generating Station

Project Summary submitted under the

Canadian Environmental Assessment Act



Submitted to:
Canadian Environmental
Assessment Agency
March 2014

General Information

Project Name, Nature and Proposed Location

ATCO Power is pleased to provide this Project Description Summary to the Canadian Environmental Assessment Agency (the CEA Agency) to assist the Agency determine if a federal environmental assessment will be required for the proposed Heartland Generating Station (the Project).

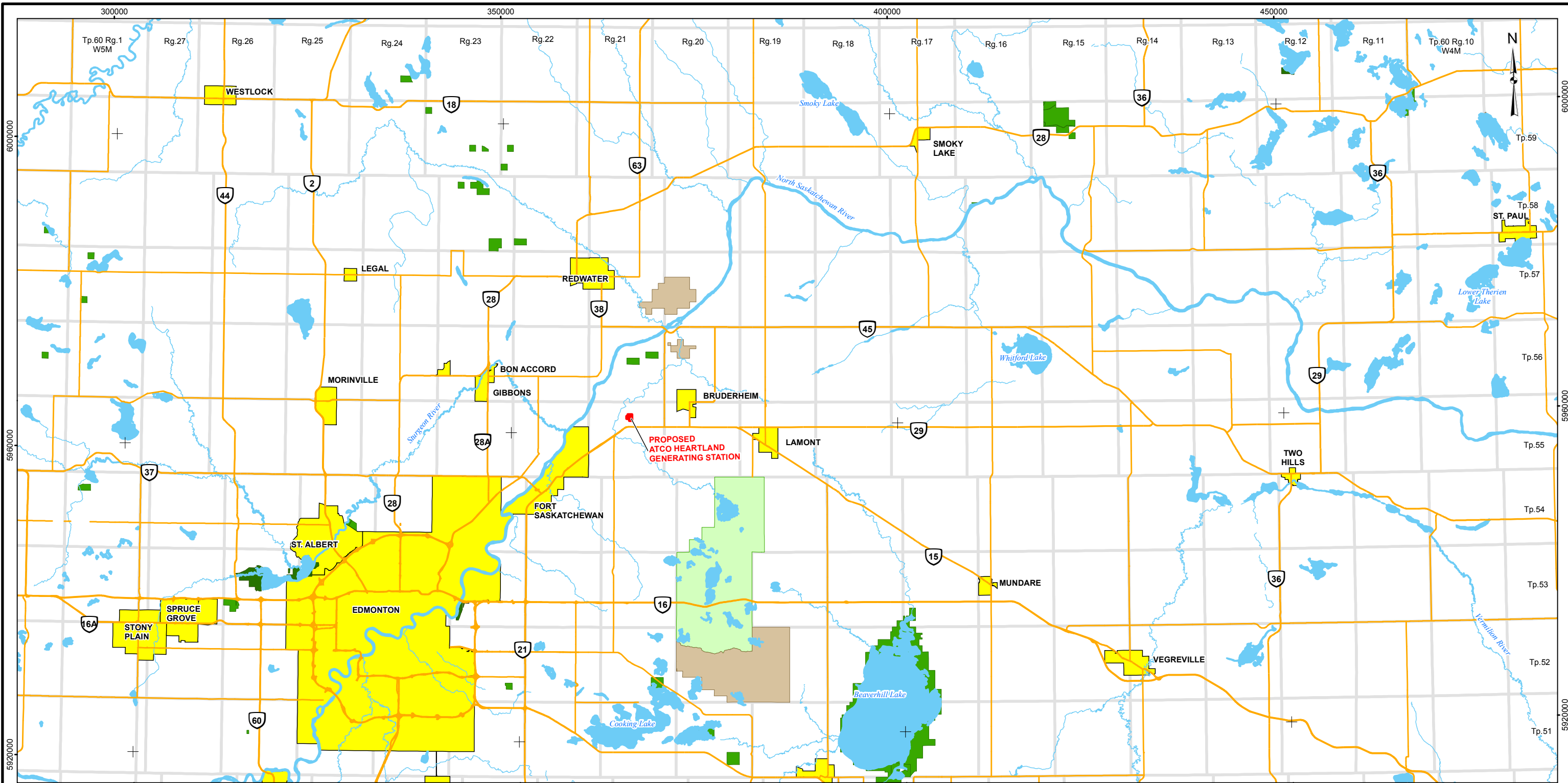
The proposed Heartland Generating Station (the Project) is a nominal 400 megawatt (MW) natural gas-fired combined cycle gas turbine (CCGT) power plant to be located in Alberta's Industrial Heartland (AIH), approximately 14 km north east of Fort Saskatchewan, Alberta (Figure 1). The AIH is an area of 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 will be located on a land parcel privately owned by ATCO Real Estate Holdings Ltd. (AREHL) 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 utilize approximately 9.4 ha of the 57 ha land parcel.

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, including high voltage transmission lines with available capacity, high pressure natural gas pipelines with available capacity, and existing cooling water source and infrastructure.

The Project is being developed to supply electricity to meet future electricity needs in Alberta and to act as 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. The Project has been designed to provide flexible operation to allow electricity output to vary and offset changes in the supply of power in the Alberta Interconnected Electrical System from renewable generation sources that produce electricity intermittently.

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LEGEND

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



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					
	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		
	REVIEW	RR	17 Jan. 2014		
					FIGURE: 1

Proponent's Name and Contact Information

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

Consultations Undertaken with Jurisdictions and Other Parties

Overview of Stakeholder Consultation Program

ATCO Power undertook a comprehensive participant involvement program (PIP) for the Project in accordance with Section 3 and Appendix A of the Alberta Utilities Commission (AUC) *Rule 007: Applications for Power Plants, Substations, Transmission Lines and Industrial System Designations*. The program included consultations with the public, including: local landowners and Aboriginal groups, government agencies, municipalities, companies and industry associations. Consultation activities for the Project began in April 2013 and will continue for the duration of the Project.

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

The following participants were identified for inclusion in the PIP:

- 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.

ATCO Power's consultation program for the Project consisted of multiple communication methods, including:

- Personal consultations with landowners and other interested parties;
- Project information packages sent to all landowners within 5 km of the Project site and other interested stakeholders in July 2013 and November 2013;
- Dedicated Project website (<http://www.atcopower.com/Projects/Heartland/>), including a contact request form;
- Dedicated Project toll free phone number (1.855.509.6996);
- Dedicated Project email address (heartland@atcopower.com); and
- Project open house in the hamlet of Josephburg, approximately 8 km south of the Project location.

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.

Consultations with Other Jurisdictions

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

ATCO Power consulted with ESRD staff on various occasions to introduce the Project and discuss the provincial *Environmental Protection and Enhancement Act* (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, ATCO Power prepared and submitted in November, 2013, an Industrial Approval Application under the EPEA to ESRD for review.

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. On January 14, 2014 ATCO Power met with Strathcona County's land rezoning and development permit team and provided a

Project update presentation to the Strathcona County Mayor and Council. Strathcona County has provided a Letter of Support for the Project.

Consultation with Aboriginal Groups

ATCO Power's process for First Nation engagement was intended to meet the requirements of Aboriginal peoples who may have an interest in the Project, as well as fulfilling the regulatory consultation requirements of federal and provincial government agencies. The consultation program 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).

In August 2013, a First Nation consultation assessment request for the Project was submitted to the Province, through a process administered by ESRD. In October, 2013, ATCO Power received a letter from ESRD recommending that First Nation consultation was not required for the Project for the following reasons:

1. The project does not fall within any First Nation Consultation Boundary.
2. The project infrastructure footprint will be located on land 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.
4. The Project site is not located adjacent (within 10 km) to First Nations reserve land.

While ATCO Power acknowledges ESRD's recommendation that First Nation consultation is not required for the Project, based on its relationships and dealings in the Project area, ATCO Power decided to engage with eight First Nations and two Metis Regions as well as the Metis Nation of Alberta, including the following:

- 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; and
- Metis Region 4.

In September 2013, ATCO Power sent an information package and introductory letter to these First Nations and Metis groups followed by an update on the Project in November 2013. To date, ATCO Power has received no response or comments from the First Nations or Metis Regions in response to the Project information provided.

Based on their participation in the regulatory review of previously proposed projects located in the AIH, ATCO Power contacted the Alexander First Nation and Saddle Lake Cree Nation, and met with each First Nation face-to-face. 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. 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.

Based on the advice received from ESRD regarding the lack of a need to consult with Aboriginal communities regarding this Project, and 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 other than, as previously discussed, conducting the presentations to Alexander First Nation and Saddle Lake Cree Nation. In addition, ATCO Power will continue to send Project updates produced for the public consultation program to the Aboriginal communities and groups identified to date.

Consultations with the Public and Other Parties

From July to November 2013, ATCO Power conducted personal consultations with all 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. During the first round of personal consultations, ATCO Power representatives conducted over 54 meetings with participants.

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 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.

Throughout the PIP, the most commonly raised concerns about the Project related to noise and air emissions. ATCO Power addressed these concerns by providing detailed information on how the Project will meet regulatory requirements for noise and air emissions at the Project open house and in face-to-face personal consultations. One landowner was also provided with information on electromagnetic fields (EMF). ATCO Power believes they have resolved all concerns that are directly associated with the Project.

Two participants consulted during the PIP raised a concern about the potential route of the transmission line required to interconnect the Project to the Alberta Interconnected Electrical System (AIES). The transmission interconnection will be subject to its own regulatory and public review process, separate from the process required for the Project. The transmission route planning, public consultation, and AUC application associated with the transmission line are the responsibility of AltaLink, the local third-party Transmission Facility Operator that will build, own and operate the transmission line. 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 AltaLink on the design and public consultation efforts associated with the transmission line in an effort to understand potential concerns and minimize impacts to 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 gather any feedback and/or concerns local landowners may have regarding the Project construction plans.

Introductory meetings were also held with regional associations including the Northeast Capital Industrial Association (NCIA), Alberta Heartland Industrial Association (AHIA), and the AIHA 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. In addition to providing an introduction to the Project, ATCO Power also gathered regionally specific information with regards to environmental, community and industry related issues in the Heartland region. In early 2014 ATCO Power became 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 petrochemical industries to industrial service companies.

Environmental Assessment and Regulatory Requirements of Other Jurisdictions

The environmental assessment requirements and regulatory review process for the Project are primarily under the jurisdiction of ESRD and the AUC. 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 (EPEA: RSA 2000, c. E-12)* was not required for the Project. On November 20, 2013, ATCO Power submitted an industrial approval application to ESRD for the construction and operation of the Project.

ATCO Power submitted two applications to ESRD under the *Water Act (RSA 2000, c. W-3)* in June 2013 for approval of: use of water from the North Saskatchewan River (NSR) and surface water diversion into a stormwater pond on the Project site for use in power generation; and removal of wetlands that are located entirely within the Project site. A third application will be filed in early 2014 for 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 for approval to construct and operate the Project. This application was made subject to all applicable provisions of the *Alberta Hydro and Electric Energy Act (HEEA: RSA 2000, c. H-16)* HEEA and the *Alberta Utilities Commission Act (SA 2007, c. A-37.2)* as well as any regulations, orders, or Commission rules made pursuant to those Acts.

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 expects to file a development permit application in Q2 2014.

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

Regional Studies

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

Project Information

Project Context and Objectives

The objectives of the Project are as follows:

- 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 as Alberta's coal generating units begin to retire in 2019;
- to locate the Project in an industrial setting close to large industrial electricity customers: siting generation close to load improves the efficiency of the AIES by reducing electricity losses on the high voltage transmission system;
- to minimize the Project's environmental footprint by siting the Project very near to 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.

Provisions Under the Regulations Designating Physical Activities

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).

Description of Physical Works

The Project involves the construction and operation of the Heartland Generating Station on privately owned land purchased specifically for the Project by AREHL, a sister company to ATCO Power.

Scaled diagrams of the Project site layout and general arrangement are provided in Figures 2 and 3, respectively. Buildings and other physical works associated with the Project will include the following:

- Powerhouse building that will enclose the main mechanical and electrical equipment used to generate electricity, and provide support services such as water and wastewater treatment. This building will be approximately 100 metres by 80 metres and the majority of the roof will be 29 metres high. The maximum roof height is 38 metres.
- Administration, control, maintenance and warehouse building to house the facility administration offices, plant control room, maintenance shop and the spare parts warehouse.

-
- Five other small buildings or sheds to enclose pumps and motors and 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 pumps and/or motors contained within the buildings.
 - A cooling tower, which is a large heat exchanger, that will provide cooled water to condense steam at the outlet of the steam turbine. This 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 the discharge of treated wastewater to the NSR including sampling and monitoring requirements. The pipeline and outfall required to transport the wastewater to the NSR will be infrastructure provided by a third party.

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, and development of new infrastructure in the region, to minimize pipeline congestion in the region, and to 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. These suppliers will be responsible for permitting, constructing and operating these facilities in accordance with applicable federal, provincial and municipal regulations.

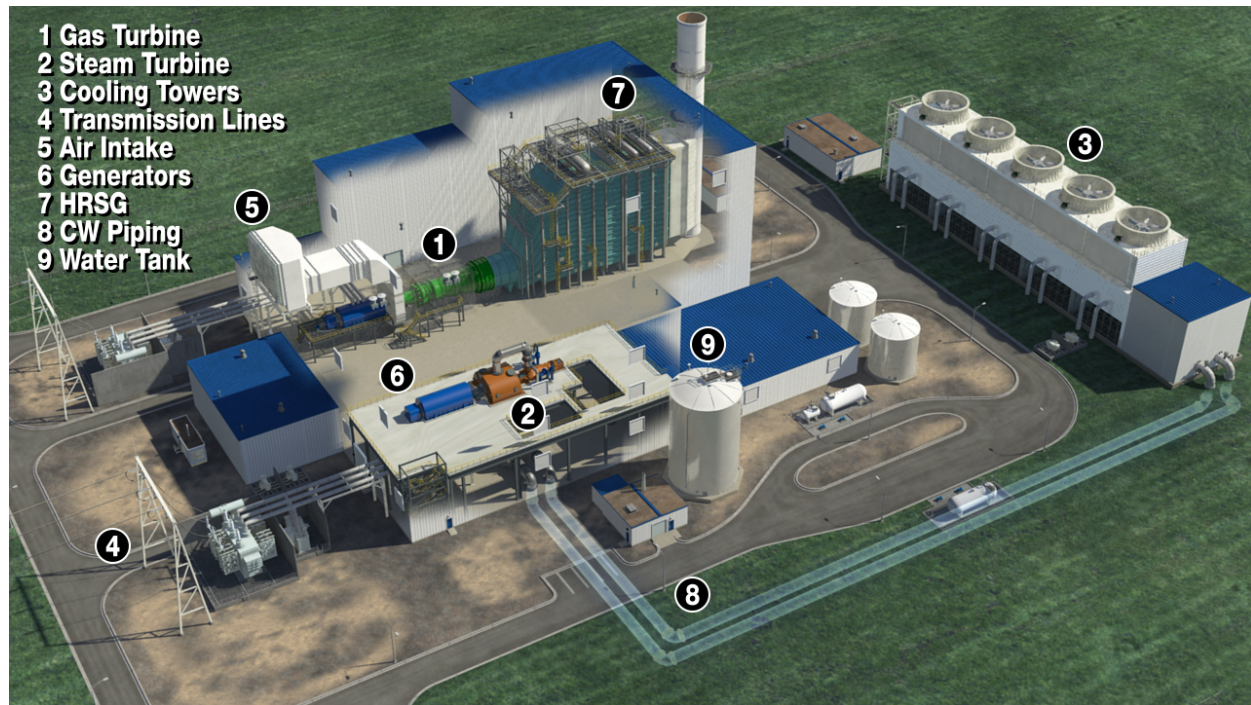
- The infrastructure that will be used to convey water to and wastewater from the Project will be provided primarily through the existing ATCO Energy Solutions Ltd. (AESL) Heartland Industrial Water System, which serves a growing number of facilities in the AIH. A clarification pond with an expected capacity of 100,000 m³ to 300,000 m³ will be located on land owned by AESL. The size and location of the clarification pond have not been finalized, but the point of interconnection is anticipated to be on the northern edge of the Project site.
- ATCO Pipelines Limited will provide the very short high pressure natural gas pipeline connection to the site.
- AltaLink, the Transmission Facility Owner in this region of Alberta will provide a short (less than 15 km) 240 kilovolt (kV) transmission interconnection between the Project and the AIES.
- 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 Project site for construction. ATCO Power is working with Strathcona County to assess the existing road suitability for the construction of the Project.

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>.

Figure 3 - General Arrangement – Power Block Area



Anticipated Production Capacity and Description of Production Processes

The Project will be a CCGT power generating plant with a total nominal generating capacity of 400 MW. The Project will include one gas turbine generator (GTG) set coupled with an electric generator; and a heat recovery steam generator (HRSG) with duct burners supplying steam to a 126 MW steam turbine generator (STG) set. Maximum output will be slightly in excess of 500 MW at an ambient temperature of -40°C, and under 400 MW at high ambient temperatures.

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 suppress fires, and handle the electrical needs of and electricity produced by the Project.

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.

Description of Project Activities

The Project activities will include the construction of the facility, commissioning, operation and maintenance of the facility for approximately 35 years and decommissioning of the facility. Additional details for the Project activities are provided below.

Construction

The construction phase includes the major work and activities required for the construction of the Project, including site preparation, excavation and foundation construction, building erection, installation of equipment, and equipment commissioning.

Site Preparation

The Project site will be leveled and graded as required to prepare for construction. 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 graded in accordance with the site surface water drainage plan.

The site will be fenced off, and access to connect the Project site to existing roadways will be constructed. 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 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 up against the foundations to complete the surface works.

Building Erection and Equipment Installation

Structural steel will be erected upon the foundations for the powerhouse and the administration buildings. Some modularization and preassembly work will occur where practical to speed the building erection construction. 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 within 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 increase construction productivity in cold weather.

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

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

During powerhouse construction, external tanks will be installed for water storage.

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

The Project is 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 site will be reclaimed to an equivalent pre-disturbance agricultural land capability.

Description of Wastes Produced, and Methods of Management

Atmospheric Emissions

The Project has been designed to incorporate some of the cleanest fuel sources and technologies currently available to generate electricity from fossil fuels. Air emissions during Project operation will include carbon monoxide (CO), oxides of nitrogen (NO_x), particulate matter with a mean aerodynamic diameter less than 2.5 microns (PM_{2.5}) and ammonia (NH₃). Because of the low sulphur content of the feed gas, the Project is not expected to emit measureable amounts of sulphur dioxide (SO₂). Similarly, because of the natural gas fuel and design of combined cycle power plants, the Project is expected to have negligible emissions of Volatile Organic Compounds (VOCs).

A number of emissions control and monitoring systems will be installed on the GTG and HRSG, as follows:

- The GTG will be equipped with an ultra-low NO_x combustion system that optimizes 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.
- 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 consists 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 (CEMS) on the exhaust stack.

Liquid Discharges

The wastewater stream for the Project will primarily consist of cooling tower water. 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. The liquid discharges will be managed as follows:

- 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 a third-party pipeline to a new third-party outfall on the NSR.
- Surface run-off water and effluent from the demineralized water treatment plant will be recycled back into cooling tower as cooling tower makeup.
- Drainage from within the powerhouse building 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 third-party carrier.
- Gas turbine wash water, used oil and other solvents (hazardous waste) and sewage will be held on-site in appropriate storage vessels, then periodically removed off-site by an approved third-party carrier.

Solid Wastes

The Project will produce sludge from the cooling tower basin and as part of the wastewater treatment system. All sludge will be stored onsite 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 then sent to county landfill through a qualified carrier.

Schedule of Project Phases

A high level Project schedule is provided in Table 1.

Table 1 Heartland Generating Station Project Schedule

Project Phase	Proposed Project Schedule
Construction	September 2014 to June 2017
Commissioning	June 2017 to August 2017
Operation	August 2017 to July 2047
Decommissioning	August 2047

Project Location

The geographic coordinates for the centre of the Project are: 53° 47' 2.09" N; 113° 2' 58.95" W. The legal land description is LSD: NW Section 27-55-21 W4M

A site plan of the Project is provided in Figures 2 and 3. Maps showing the Project location and spatial relation of Project components; proximity to permanent seasonal and temporary residences; proximity to reserves, traditional territories as well as lands and resources currently used for traditional purposes by Aboriginal peoples; and proximity to federal lands are provided in Figure 4, Figure 5, Figure 6 and Figure 7.

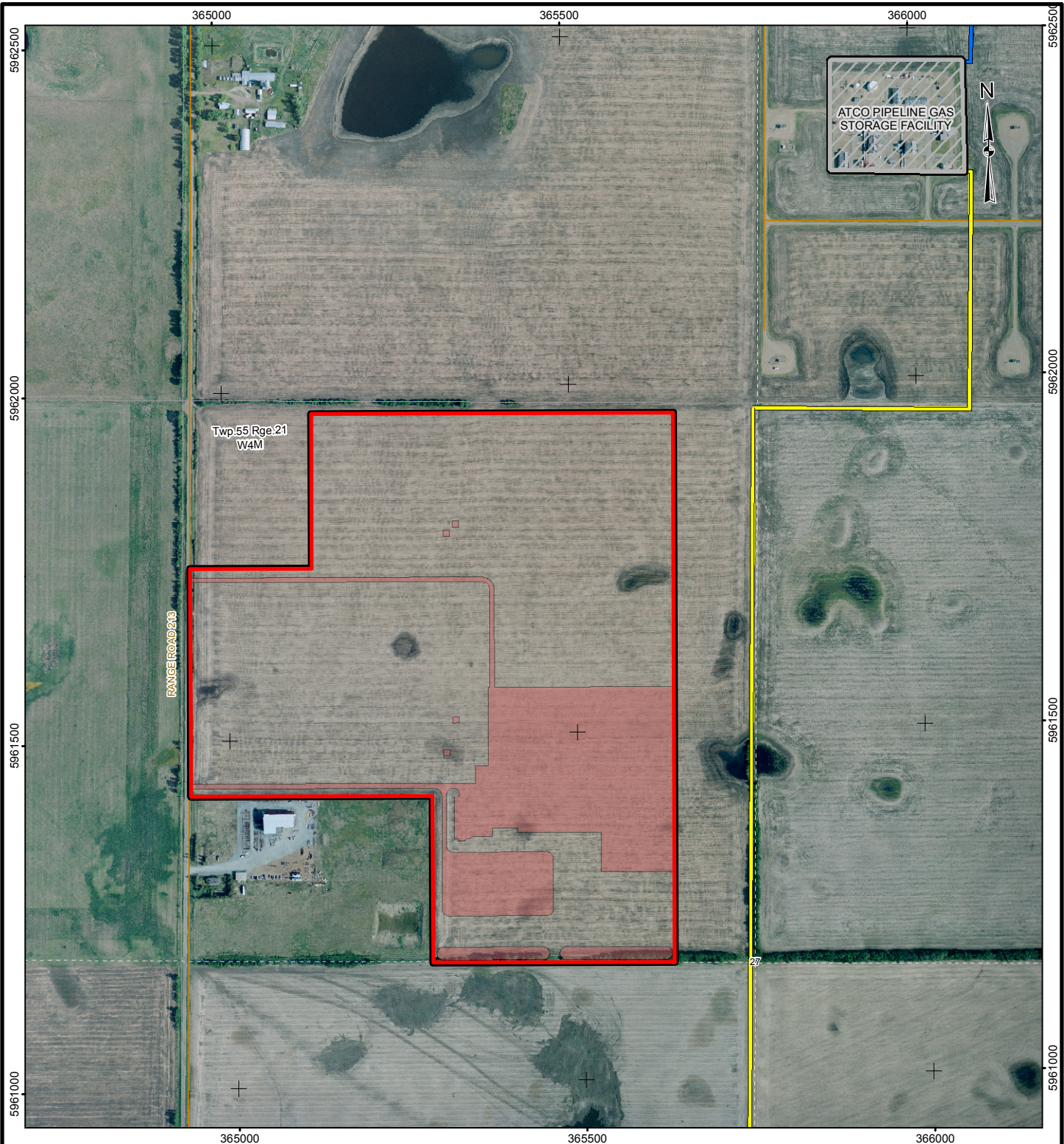
A copy of the legal title has been included as Appendix C of the CEAA Project Description.

There are currently eight permanent residences within 1.5 kilometres (km) of the Project that will likely be occupied at the time the Project commences (Figure 7).

The closest First Nation Reserves are the Alexander First Nation (Treaty Six) located 51 km west of the Project. The Saddle Lake Cree Nation (Treaty Six) is located 90 km east of the Project (Figure 5).

The closest federal land is Elk Island National Park, approximately 13 km southeast of the Project (Figure 6).

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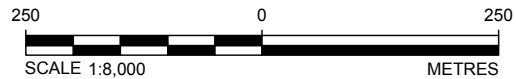
- PROJECT FOOTPRINT (9.4 ha)
- PROJECT SITE (42.7 ha)
- EXISTING INFRASTRUCTURE**
- LOCAL ROAD
- NATURAL GAS PIPELINE
- RAW WATER PIPELINE
- INDUSTRIAL SITE

NOTE

*STEWART AND KANTRUD (1971) WETLAND CLASSIFICATION SYSTEM

REFERENCE

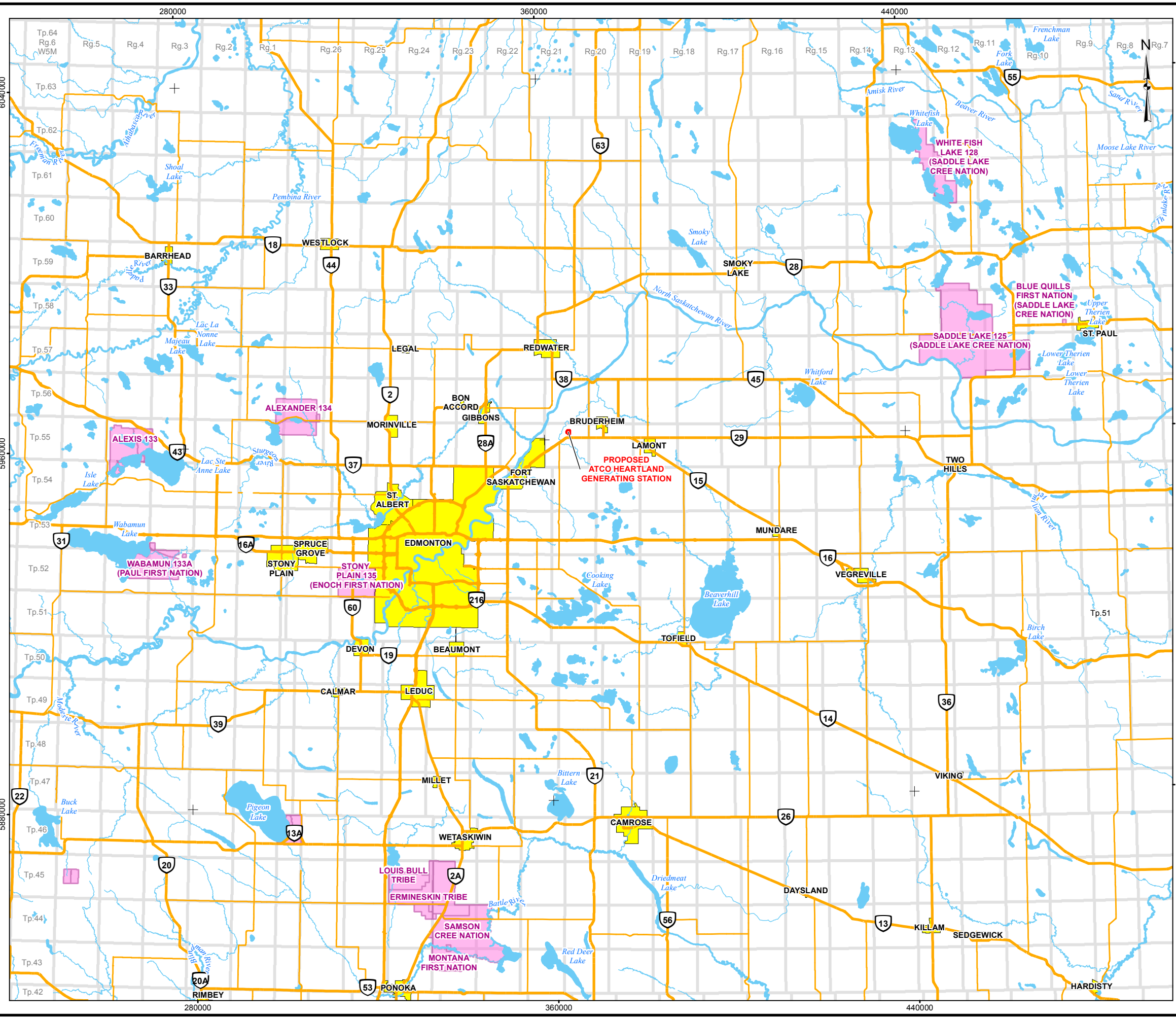
ROADS OBTAINED FROM GEOBASE®. IMAGERY OBTAINED FROM AESRD AIR PHOTO SERVICES. IMAGERY DATE: 2011. IMAGERY IS NOT TO SCALE.
 DATUM: NAD 83 PROJECTION: UTM ZONE 12



PROJECT		ATCO Power		HEARTLAND GENERATING STATION	
TITLE					
PROJECT SITE					
				FIGURE: 4	
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			



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LEGEND

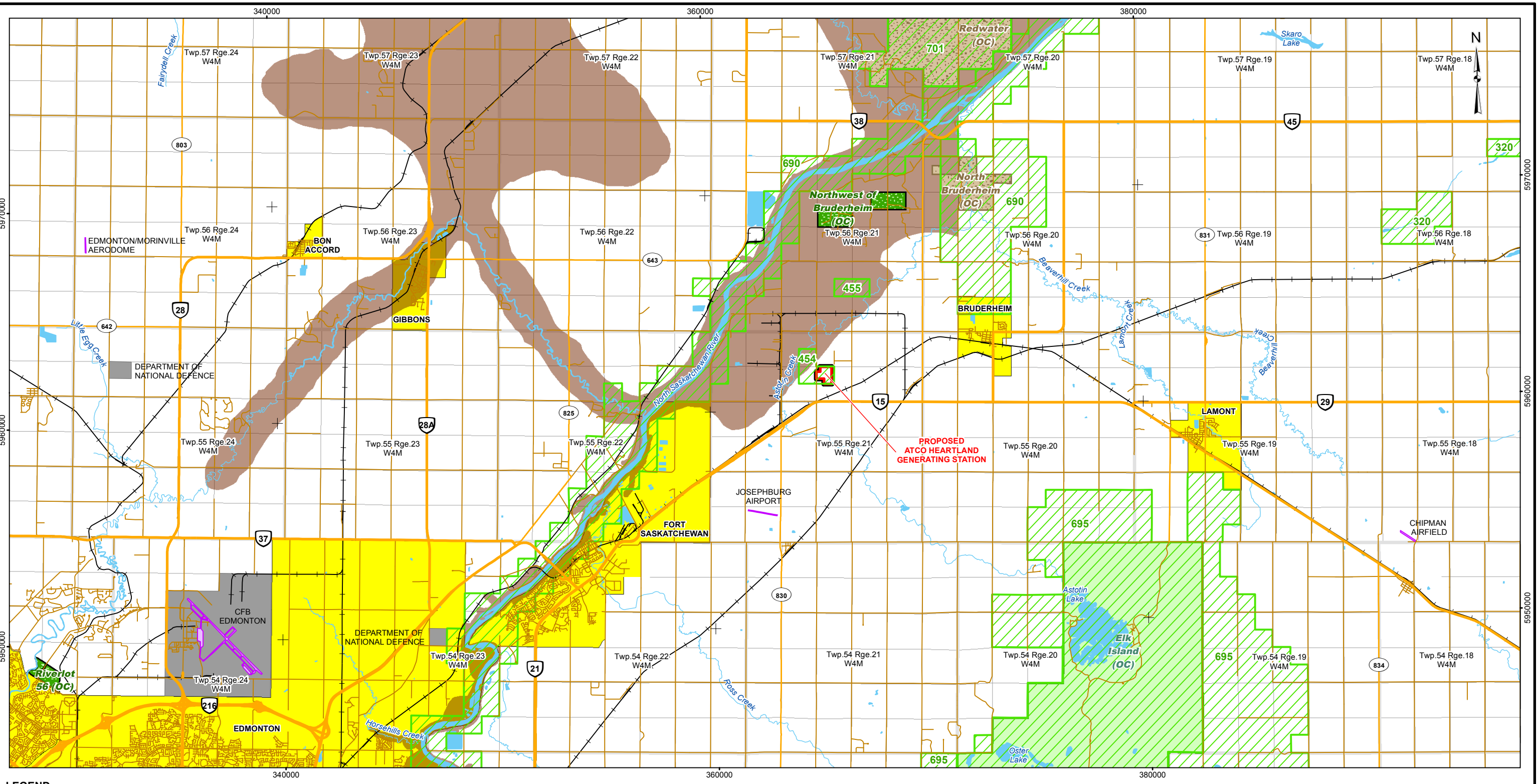
- PROJECT SITE
- PRIMARY HIGHWAY
- SECONDARY HIGHWAY
- WATERCOURSE
- FIRST NATIONS RESERVE
- POPULATED PLACE
- WATERBODY

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



<p>PROJECT</p> <p>ATCO Power</p> <p>TITLE</p> <p>FIRST NATIONS AND LOCAL COMMUNITIES</p>	<p>HEARTLAND GENERATING STATION</p>																				
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">PROJECT NO. 12-1334-0068</td> <td style="width: 20%;">FILE No.</td> <td style="width: 20%;">SCALE AS SHOWN</td> <td style="width: 30%;">REV. 0</td> </tr> <tr> <td>DESIGN SM 15 Jan. 2014</td> <td></td> <td></td> <td></td> </tr> <tr> <td>GIS MP 15 Jan. 2014</td> <td></td> <td></td> <td></td> </tr> <tr> <td>CHECK CS 16 Jan. 2014</td> <td></td> <td></td> <td></td> </tr> <tr> <td>REVIEW SM 16 Jan. 2014</td> <td></td> <td></td> <td></td> </tr> </table> <p style="text-align: right; font-weight: bold; font-size: 1.2em;">FIGURE: 5</p>	PROJECT NO. 12-1334-0068	FILE No.	SCALE AS SHOWN	REV. 0	DESIGN SM 15 Jan. 2014				GIS MP 15 Jan. 2014				CHECK CS 16 Jan. 2014				REVIEW SM 16 Jan. 2014			
PROJECT NO. 12-1334-0068	FILE No.	SCALE AS SHOWN	REV. 0																		
DESIGN SM 15 Jan. 2014																					
GIS MP 15 Jan. 2014																					
CHECK CS 16 Jan. 2014																					
REVIEW SM 16 Jan. 2014																					

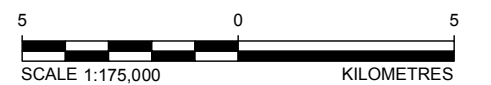
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LEGEND

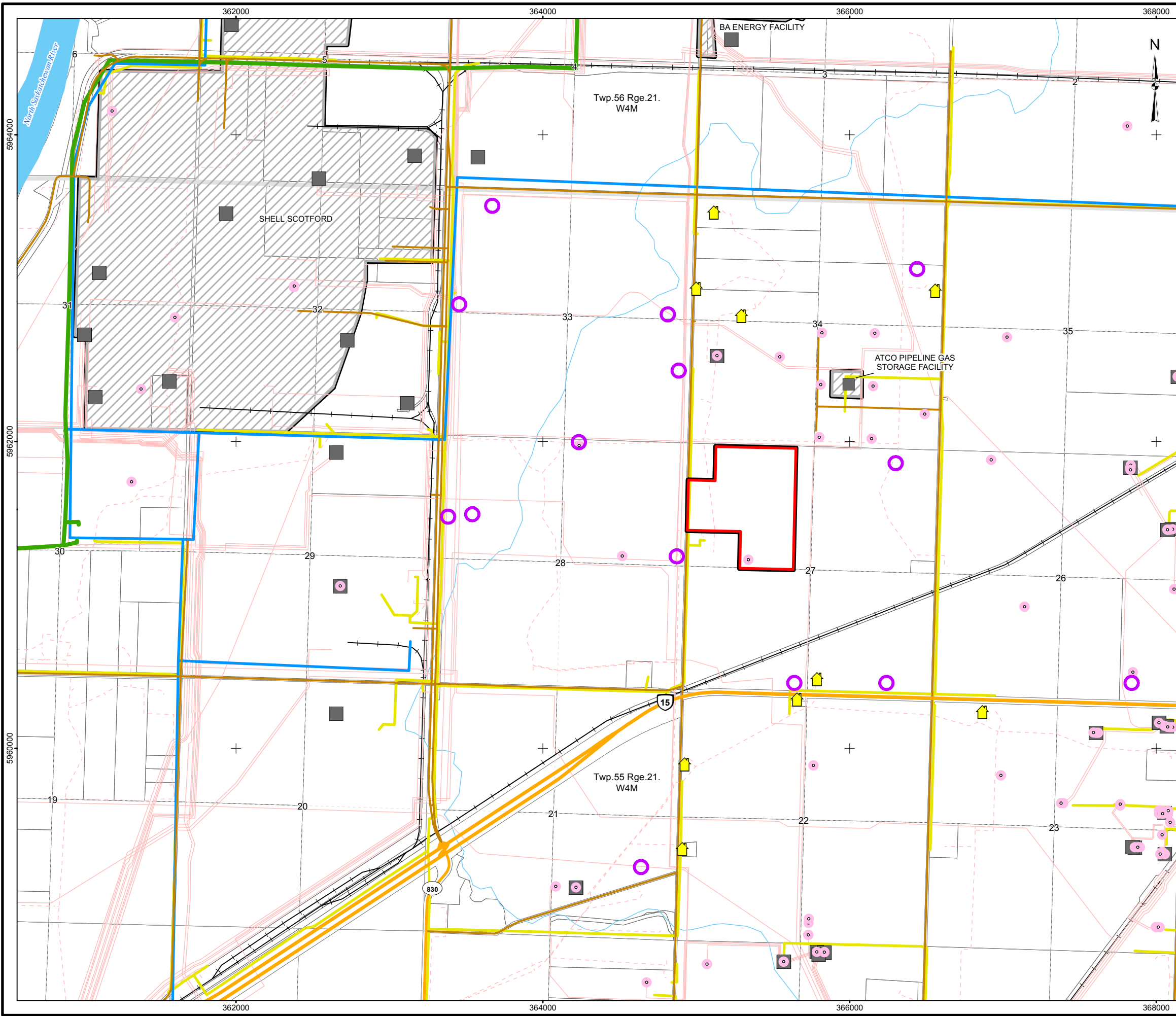
PROJECT SITE	PRIMARY HIGHWAY	AIRPORT
SECONDARY HIGHWAY	CITY / TOWN	ENVIRONMENTALLY SIGNIFICANT AREA
LOCAL ROAD	FEDERAL MILITARY LAND	KEY WILDLIFE AND BIODIVERSITY ZONE
RAILWAY	NATIONAL PARK	PROVINCIAL NATURAL AREA
RUNWAY	PROVINCIAL RECREATION AREA	WATERBODY
WATERCOURSE		

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 SENSITIVE AREAS OBTAINED FROM ALBERTA TOURISM, PARKS AND RECREATION. PREPARED BY FIERA BIOLOGICAL CONSULTING, 2014.
 DATUM: NAD 83 PROJECTION: UTM ZONE 12



PROJECT		ATCO Power		HEARTLAND GENERATING STATION	
TITLE					
ENVIRONMENTALLY SENSITIVE AREAS, FEDERAL LANDS AND AIRPORTS					
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: 6		

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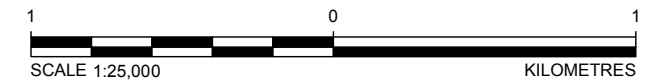


LEGEND

- 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 PIPELINE
 - 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



PROJECT		ATCO Power		HEARTLAND GENERATING STATION	
TITLE					
ENERGY INFRASTRUCTURE, OCCUPIED RESIDENCES AND ARCHAEOLOGICAL SITES					
	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: 7		

Federal Involvement

Financial Support from Federal Authorities

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

Use of Federal Land for Carrying Out the Project

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

Federal Legislative and Regulatory Requirements

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 of approximately 50 m in height. The exhaust stack would be the tallest obstruction on the Project site and would 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 would not penetrate a limitation surface, would be more than 6 km from the nearest aerodrome and less than 90 m in height.

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

Environmental Effects

Description of the Physical and Biological Setting

Current Land Use and Zoning

The Project site is located within the Strathcona Heavy Industrial Policy Area as 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). A copy of the title for the land parcel is located in Appendix C of the CEAA Project Description. In early 2014, ATCO Power will file a re-zoning application to rezone the land parcel to “Heavy Industry”. Preliminary discussions with Strathcona County have occurred regarding rezoning the land parcel.

The AIH can be characterized as a region that has been heavily affected by human development. Since the early 1900s the region has been used for agriculture, but over the past 40 years has gradually transitioned to an area dominated by industrial development. The area surrounding the Project site within the AIH consists of a mix of industrial facilities, rural farms and residences, as well as public infrastructure, Highway 15 and various railway lines. The Project is located near multiple industrial facilities, including Shell Canada’s Scotford Manufacturing Centre and BA Energy’s proposed but not constructed Heartland Upgrader (Figure 7).

The Project site is on land that is currently under cultivation. 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.

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% and 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%).

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:

- Topsoil will be salvaged in areas used for construction and stored within the Project site.
- In areas to be occupied by permanent facilities, topsoil and subsoil will be salvaged and stored 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.

Vegetation

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.

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.

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.

Wetlands

Ten prairie wetlands were observed during the field surveys of NW 27-55-21 W4M, including: (i) seven Class I and Class II wetlands heavily impacted by tilling; (ii) two large Class II and Class III wetlands on the eastern edge of the quarter-section; and (iii) one Class IV wetland on the western edge of the quarter-section.

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 which 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 Alberta *Water Act* requesting approval to remove nine of the ten wetlands within NW 27-55-21 W4M. In early 2014, ATCO Power plans to 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 of Environment Canada's Restricted Activity Period for migratory birds, which is currently April 20 to August 25 in wetlands (P Gregoire 2013, pers. comm.). If any activities are required during this period then 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.

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

Wildlife and Wildlife Habitat

Data obtained from the Fisheries and Wildlife Management Information System (FWMIS) database identified historical observations of 12 listed species within a 3 km radius of the Project site centroid.

Wildlife and wildlife habitat surveys for the Project site were completed during the summer of 2013. The results of these surveys are summarized as follows:

- A daylight amphibian survey indicated no evidence of breeding on the Project site, and the only species detected during night surveys was the boreal chorus frog (*Pseudacris maculata*), which is not listed provincially or federally.
- A breeding bird survey identified a total of 14 species. Two species listed provincially as 'Sensitive' were observed within the Project site during the survey: one northern pintail (*Anas acuta*) was observed loafing in a wetland, and one Swainson's hawk (*Buteo swainsoni*) was observed flying overhead.
- A nocturnal owl call survey detected one northern saw-whet owl (*Aegolius acadicus*) north of the Project site; this species is not listed provincially or federally.
- A raptor stick nest survey was conducted in April 2013 prior to extensive leaf out. No raptor nests or raptor observations were recorded on or within 1 km of the Project site.

It is not expected that any upland habitat that would be considered preferred habitat by migratory birds will be adversely affected by the Project. The Project Site as a whole has been heavily impacted by agricultural practices since the early 1940s, and consequently little natural habitat exists.

The primary mitigation to limit potential adverse environmental effects on wildlife to ensure compliance with the *Migratory Birds Convention Act* will be to conduct vegetation clearing outside the minimum migratory bird restricted activity period of May 1 to August 20 in uplands and April 20 to August 25 in wetlands. If vegetation clearing is required during this period then a pre-construction breeding bird survey will be conducted before clearing.

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 to wildlife and wildlife habitat.

Groundwater

The regional hydrogeology in the Fort Saskatchewan area is influenced by pre-glacial, glacial, and post-glacial events. 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. Based on information collected from the provincial Groundwater Information Centre database, a total of 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 may 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 to groundwater resources.

Surface Hydrology

The Project is located within the watershed of the NSR, 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 (km²), and a gross drainage area at Edmonton of 28,000 km². Flow in the river is regulated by two upstream dams, which reduce peak flow and increase low flow. A total of 141 surface water withdrawal licences are located along the NSR reach between the Town of Devon (upstream of the City of Edmonton) and the Town of Pakan (downstream of the Project Site). Major water uses covered by the licenses include cooling water for thermal power plants, oil and gas processing, and well injection.

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). 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.

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

Water Quality

Baseline water quality in the NSR was summarized using existing data obtained from ESRD and other sources. Nutrient concentrations were high and reflect inputs from municipal wastewater treatment plants. Total metal concentrations were variable, and concentrations of some metals were often above the chronic aquatic life guidelines. Occasional exceedances of human health guidelines also occurred for some metals, and wildlife health guidelines were exceeded by total phenolics and some metals. 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 and are associated with the discharge of treated municipal sewage.

ATCO Power will treat and monitor wastewater from the Project to ensure it meets the limits set in the EPEA Approval. The potential adverse environmental effects of wastewater releases from the Project on

water quality in the NSR were evaluated using conservative quantitative and qualitative methods accepted by ESRD. 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. The release of treated wastewater to the NSR is not predicted to result in measurably increased concentrations of parameters of particular concern in the NSR (i.e., nutrients, metals). Predicted changes in water temperature in the NSR were also within the applicable provincial regulatory guideline. Changes in some parameters may be measurable under worst-case conditions; however, based on the lack of additional guideline exceedances, the small increases in concentrations of parameters with guidelines, and the low volume of wastewater that will be released into the NSR, the Project is not expected to have adverse environmental effects on aquatic life in the NSR.

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.

Air Quality

The Project is located within the boundaries of the North Saskatchewan Air Zone, which includes both the Capital Region Airshed Zone and the Fort Air Partnership Airshed Zone. The North Saskatchewan Air Zone is characterized by a strong industrial base of oil refineries, chemical manufacturing, and power generation, as well as vehicle use, home heating and urban activity. Ambient air quality within the region is monitored by several organizations, including ESRD, the Fort Air Partnership (FAP), and the Strathcona Industrial Association, through a combination of 8 continuous and 62 passive monitoring stations. Results of monitoring within the region as a whole have indicated periodic exceedances of Alberta Ambient Air Quality Objectives (AAQOs) for SO₂, NO₂, PM_{2.5} and NH₃. The Project is not expected to result in additional adverse environmental effects on air quality relative to existing conditions.

A detailed air quality assessment was completed in order to assess the potential adverse effects of the Project on regional air quality, and submitted to ESRD in the Industrial Approval Application. The assessment assessed baseline air quality, the effects of the Project alone, and the effects of the Project combined with baseline emissions. The dispersion modelling included Project emissions during three scenarios: a design scenario representing normal operation of the GTG; a start-up scenario; and an upset scenario when the SCR is offline.

The dispersion modelling results demonstrate that within the 5 km by 5 km study area surrounding the Project Site, the predicted concentrations of SO₂, NO₂, CO, PM_{2.5} and NH₃ are below AAQOs under baseline conditions, and this will continue to be the case once the Project is in operation. Based on the results of this assessment, adverse environmental effects on air quality from the Project under the design, start-up or upset operating scenarios are not expected; and, the project will meet provincial and federal air quality requirements.

Noise

A Noise Impact Assessment (NIA) was conducted to predict the potential noise impact of the Project under representative operating conditions, and compare the results of these predictions to compliance criteria defined by the AUC.

The results of the NIA indicate that cumulative noise levels are predicted to be compliant with relevant Permissible Sound Level (PSL) values for all receptors during both the daytime period and the nighttime period. 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.

Historical Resources

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 adversely affected by the Project.

Potential Changes to Fish and Fish Habitat, Listed Aquatic Species and Migratory Birds

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

None of the wetlands on the Project site were considered fish-bearing; therefore, there are 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 to the environment. Consequently, there will be no adverse environmental effects on fish or fish habitat on the Project site or in local natural watercourses

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

- There are no adverse effects on fish or fish habitat expected due to water withdrawal from the NSR. The Project will draw raw water from an existing water intake structure located on the NSR. 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.
- The discharge of treated wastewater from the Project is not expected to affect temperature to an extent that results in adverse environmental effects on fish and fish habitat in the NSR. The most conservative modeling of thermal impacts to the NSR resulted in estimated increases of a maximum of 0.2°C in water temperature. These changes are within the Alberta water quality guideline of an increase of no greater than 3°C above ambient water temperature (AENV 1999), and are not predicted to persist beyond the immediate mixing zone in the river.
- The discharge of treated wastewater from the Project is not expected to affect water quality to an extent that results in adverse environmental effects on fish and fish habitat in the NSR.

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. Treatment of the wastewater is anticipated to result in a net reduction of phosphorus loading (by mass) in the river.

- Prior to release to the NSR, the waste water must be treated for phosphorus, which will require flocculation and ultrafiltration, and is expected to remove any remaining suspended solids. Therefore, no adverse environmental effects are anticipated due to sedimentation changes 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. 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.

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

The Project is not expected to affect aquatic species at risk, as defined under the *Species at Risk Act*. No federally listed aquatic species were identified during the various surveys, and the majority of the Project site is cultivated cropland which is not suitable habitat for aquatic species. In addition, 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.

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

The majority of the Project site is cultivated cropland which is low quality habitat for most bird species. A raptor stick nest survey was conducted in April 2013, and no raptor nests or raptor observations were recorded during the stick nest searches 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*) north of the Project site, and this species is not listed provincially or federally.

Given plans for wetland compensation and the timing of wetland drainage noted in the wetlands section above, 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 expected to result in a positive net effect to wetland habitat in the region.

Potential Changes to Federal Lands, and Lands Outside Alberta or 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 SO₂, NO₂, CO, PM_{2.5} and NH₃ 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. 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 water bodies. Therefore, in summary, changes in air quality at Elk Island National Park or over other federal lands are not anticipated, and therefore the Project is not

expected to result in any adverse environmental effects at Elk Island National Park or within any other federal lands. .

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

Potential Effects on Aboriginal Peoples Resulting from Changes in the Environment

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) located 51 km west of the Project 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 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 to negligible.
- The subject lands are privately owned, 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 SO₂, NO₂, CO, PM_{2.5} and NH₃ 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. Adverse effects on air quality over or on lands currently used by Aboriginal peoples are therefore 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.