ENERGY
Alberta

Peace River Nuclear Power Project

Initial Project Description

February, 2026

Changes to the Initial Project Description (IPD)

In April 2025 Energy Alberta submitted the Initial Project Description (IPD) and a Summary of the IPD for the Peace River Nuclear Power Project (the Project) to the Impact Assessment Agency of Canada (IAAC). This step formally starting the Planning Phase of the federal Impact Assessment (IA) process. The April version of the IPD included the CANDU MONARK as the proposed technology for the Project.

In October 2025, Energy Alberta signed a Memorandum of Understanding (MOU) with Westinghouse Electric Company (WEC) to collaborate in defining the next steps in considering the deployment of an advanced AP1000® modular reactor in Alberta. What this means is that now there are two reactor technologies that are being considered for the Project. Therefore, the IPD needs to be updated and additional information to support the addition of another technology option is provided in this document. The adjustments now represent a Plant Parameter Envelope (PPE) approach which considers both technologies as viable options for the Project. A PPE is a set of values that define the characteristics of a reactor that may be built at the site; and represents a conservative surrogate for the final reactor design. The use of a PPE approach has been used previously in Canada, and is accepted by the Canadian Nuclear Safety Commission (CNSC).

The key changes to the April version of the IPD are centered on Section 3: Planning Phase Results, and Section 4: Project Information. Section 3 has been replaced with a full update on engagement efforts since April 2025. In Section 4, the main changes are found in subsection 4.4: Project Production Capacity and Process, where additional of information related to the AP1000 technology is now included.

Other changes in the updated IPD mostly relate to adjustments from referring to only the CANDU MONARK and its specifications, to include the AP1000 technology and its specifications, such as in Section 1.0: Introduction, and Section 2.1: Project Overview.

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ABBREVIATIONS AND UNITS OF MEASURE

Abbreviation	Definition
AAQG	Ambient Air Quality Guideline
AB	Alberta
ACSW	Arts Culture and Status of Women
AECL	Atomic Energy Canada Limited
AEPA	Alberta Environment and Protected Areas
ALWR	Advanced Light Water Reactor
BGS	Below Ground Surface
CANDU	Canadian Deuterium Uranium
CH_4	Methane
CN	Canadian National
CNA	Canadian Nuclear Association
CNSC	Canadian Nuclear Safety Commission
CO	Carbon Monoxide
CO_2	Carbon Dioxide
COP	Conference Of Parties
COPC	Contaminants of Potential Concern
COSEWIC	Committee On the Status of Endangered Wildlife In Canada
CPZ	Contingency Planning Zone
CSA	Canadian Standards Association
CWS	Circulating Water System
DFO	Fisheries and Oceans Canada
DPZ	Detailed Planning Zone
EA	Environmental Assessment
EAB	exclusion area boundary
EC6	Enhanced CANDU 6
ECCC	Environment and Climate Change Canada
EMS	Emergency Medical Services
EPRI	Electric Power Research Institute
EPZ	Emergency Planning Zone
GBA+	Gender-Based Analysis Plus
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GOA	Government of Albert
GOC	Government of Canada
GW	gigawatt

Abbreviation	Definition
ha	Hectares
HADD	Harmful Alteration, Disruption, Or Destruction
HRA	Historical Resources Act
HRIA	Historic Resource Impact Assessment
HRO	Historical Resources Overview
HRV	Historic Resource Value
IAA	Impact Assessment Act
IAAC	Impact Assessment Agency of Canada
IAEA	International Atomic Energy Agency
IK	Indigenous Knowledge
IPCC	Intergovernmental Panel on Climate Change
IPD	Initial Project Description
IPZ	Ingestion Planning Zone
IQR	Interquartile Range
IR	First Nation Reserve
IS	Impact Statement
km	Kilometre
km/h	Kilometre per Hour
km^2	squared kilometres
kPa	kilopascals
KWBZ	Key Wildlife and Biodiversity Zones
kWh	Kilowatt Hour
LTC	License to Construct
LTO	License to Operate
LGA	Local Geographic Area
LSA	Low Specific Activity
LSA	Local Study Area
m	Metres
m^3	Cubic Metres
MBCA	Migratory Birds Convention Act
MD	Municipal District
mg/L	Milligrams per Litre
mg/m^3	Milligram per Cubic Metre
mg-N/L	Milligrams of Nitrogen per Litre
mm	Millimetres
m^3/s	Cubic Metres per Second
m/s	Metres per Second

Abbreviation	Definition
Mw	Moment Magnitude
MWd/MgU	Megawatt-Day Per Metric Ton Uranium
MWe	Megawatts (electrical)
MWth	Megawatts (thermal)
NDC	Nationally Determined Contributions
NGO	Non-Governmental Organization
NOx	Oxides of Nitrogen
NRC	U.S. Nuclear Regulatory Commission
NRCAN	Natural Resources Canada
OCAP®	Ownership, Control, Access, Possession
ONR	Office for Nuclear Regulation
PDP	Preliminary Decommissioning Plan
PGA	Peak Ground Acceleration
PM	Particulate Matter
$PM_{2.5}$	Particulate Matter with a nominal diameter of 2.5 microns or less
PM_{10}	Particulate Matter with a nominal diameter of 10 microns or less
PNERP	Provincial Nuclear Emergency Response Plan (for Province of Ontario)
PPE	Plant Parameter Envelope
PRAMP	Peace River Area Monitoring Program
PwC	PricewaterhouseCoopers
PWR	Pressurized Water Reactor
PXS	Passive Core Cooling System
Qty	Quantity
RAP	Restricted Activity Period
RCMP	Royal Canadian Mounted Police
RCS	Reactor Coolant System
RLE	Review Level Earthquake
RSA	Regional Study Area
SACC	Strategic Assessment for Climate Change
SARA	Species At Risk Act
SCC	Species of Conservation Concern
SD	School District
SO_2	Sulphur Dioxide
SSC	Structure, System, and Component
SSE	Safe Shutdown Earthquake
SSSHA	Site-Specific Seismic Hazard Assessment
TLRU	Traditional Land and Resource Use

Abbreviation	Definition
TSP	Total Suspended Particulates
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
UTM	Universal Transverse Mercator
V_{S30}	Time-Averaged Shear-Wave Velocity across the upper 30 m below ground surface
WEC	Westinghouse Electric Company
°C	Degrees Celsius
%	Percent

1 INTRODUCTION

This document constitutes the Initial Project Description (IPD) for the Peace River Nuclear Power Project (the Project), a nuclear power generating facility proposed by EAC Capital Limited Partnership (trade name Energy Alberta) in the Peace River Region of Alberta (Figure 1-1). This IPD has been prepared in accordance with the *Impact Assessment Act* (IAA), and contains all of the information prescribed in the following:

- Information and Management of Time Limits Regulations;
- Guide to Preparing an IPD and a Detailed Project Description (GOC 2024a); and,
- Strategic Assessment of Climate Change (ECCC 2020a).

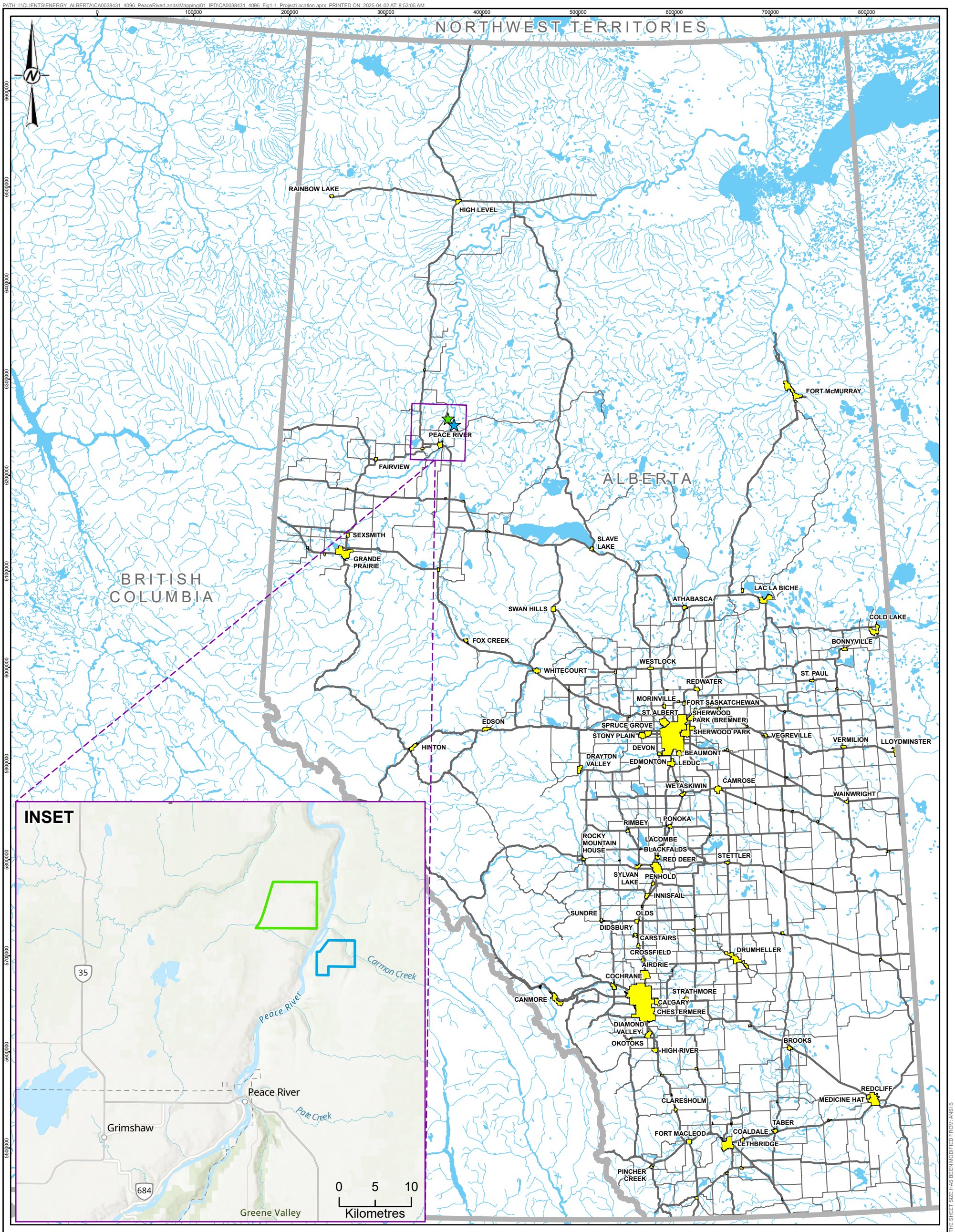
The Project is driven by and provides a solution to Alberta's need for non-emitting, reliable energy as part of the broader transition away from a fossil fuel-dominated energy mix. This Project would support Alberta's growing energy needs, while advancing federal and provincial carbon emissions goals.

Energy Alberta is a proud Alberta-based company that was founded in 2005 to bring nuclear power to western and northern Canada. As described below in more detail, this Project is important in furthering this vision.

The Project will build on the success of existing and long-standing nuclear power technology, and existing research completed for the Project between 2005 and 2010. This Project will be an important component to diversify and strengthen electrical power grid in Alberta and to meet the climate change mitigation targets of the province and country.

This IPD is updated from the April 2025 version to include consideration of the Westinghouse AP1000 Pressurized Water Reactor technology in addition to the Atkins Réalis CANDU MONARK reactor which was included in the previous IPD. The impact assessment of the Project will use a Plant Parameter Envelope (PPE) approach, using these two reactor technologies. A PPE is a set of values that define the characteristics of more than one technology option. It is considered bounding as none of the individual reactor designs would have a greater impact on the environment, socio-economic or human health conditions than what is defined in the PPE. The bounding envelope includes the available information currently available. The PPE approach allows for the evaluation of the potential effects of various reactor designs before a specific technology is chosen. This approach has been used before in regulatory processes for new nuclear power projects in Canada and the United States. Energy Alberta anticipates the selection of a reactor technology prior to the Licence to Construct application being submitted to the Canadian Nuclear Safety Commission (CNSC).

Energy Alberta recognizes that the proposed Peace River Nuclear Power Project is located within the traditional lands of the Treaty 8 First Nations. This region, including the Peace River area, has been home to the Dane-zaa (Beaver), Cree, Dene Tha', and Métis peoples for generations. Energy Alberta recognizes and respects their deep connection to this land, water, and sky, as well as their enduring stewardship and contributions to these territories. Energy Alberta is committed to fostering respectful relationships with the Indigenous Nations and Communities of the region.



LEGEND

- OPTION 1 PROJECT LOCATION
- OPTION 2 PROJECT LOCATION
- PRIMARY HIGHWAY
- SECONDARY HIGHWAY
- WATERCOURSE
- OPTION 1 SITING AREA OF INTEREST
- OPTION 2 SITING AREA OF INTEREST
- POPULATED PLACE
- PROVINCIAL BOUNDARY
- WATERBODY

0 75 150
1:3,750,000 KILOMETRES

NOTE(S)

1. PROJECTED COORDINATE SYSTEM: NAD 1983 10TM AEP FOREST

REFERENCE(S)

CLIENT
ENERGY ALBERTA

PROJECT
PEACE RIVER NUCLEAR POWER PROJECT

TITLE
PROJECT LOCATION

CONSULTANT
wsp

YYYY-MM-DD	2025-04-02
DESIGNED	MS
PREPARED	KW
REVIEWED	CB
APPROVED	MM

PROJECT NO.	CONTROL	REV.	FIGURE
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2 PART A – GENERAL INFORMATION

2.1 Project Overview

Energy Alberta is proposing to develop a nuclear power generating facility in the Peace River region of Alberta and Energy Alberta is seeking to build and operate up to 4,800 megawatts of electricity (MWe) for the Alberta electrical grid. This Project involves the permitting, construction, operation, and eventual decommissioning of four (4) nuclear reactors. There are two reactor designs under consideration for the Project:

1) Atkins Réalis – CANDU MONARK 1000MWe – produces 1,100MWe (gross output), and 1,000 (net output) (depending on the site conditions)

2) Westinghouse Electric Company (WEC) – AP1000 Plant – produces 1,300 MWe (gross output), and 1,200 MWe (net output) (depending on the site conditions)

The facility will be seeking licensing to a maximum permitted envelope of 4,800MWe to account for the gross power production of each reactor, as well as potential for operational efficiencies to develop over time. Each reactor unit is expected to produce an approximate net of 1,000MWe to 1,200MWe sent to the electrical grid. This accounts for use of some power within the facility. With four reactors, the total gross capacity of the facility is expected to be within the 4,800MWe licence limit.

Licensing the total facility to 4,800MWe aligns with the licensed capacity of other nuclear power projects operating in Canada and therefore is expected to streamline aspects of the licensing process, while allowing for consideration of potential future efficiency improvements. This represents approximately 15 percent (%) of the province's current generation capacity, and 30% of future power needs. The generated energy will be sold through long-term contracts to Alberta consumers and industry.

The Project strives to drive economic growth, creating long-term, high-value jobs during both the construction and operational phases, while supporting local businesses and infrastructure development. The Project also encourages innovation and collaboration in advanced technologies, opening new avenues for skills development and research.

There are currently two locations under consideration for Project siting, as follows.

Option 1 (Figure 2.1-1): The Project siting option is located east of Highway 743 and south of Township Road 864 in Alberta, within the County of Northern Lights, and on the west side of the Peace River, approximately 30 kilometres (km) north of the Town of Peace River. The Project location is within the Peace River region, part of the larger area of northern Alberta.

Option 2 (Figure 2.1-2): The Project siting option is located north of Highway 986 and Township Road 854, and is directly adjacent to Range Road 203 in Alberta, the Northern Sunrise County, and on the east side of the Peace River, approximately 30 km north of the Town of Peace River. The Project location is within the Peace River region, part of the larger area of northern Alberta.

The final decision regarding the site location will be made after evaluating the technical and safety requirements, along with the key environmental, Indigenous and social criteria used to determine overall site suitability. This evaluation will build on similar assessments conducted in the region in 2008 and 2010. Energy Alberta is engaging with Indigenous Nations and Communities, and local governments to gather input on the site options. A final decision on the preferred site is expected to be made by spring 2026.

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Twp.87 Rge.21 W5M

Twp.87 Rge.20 W5M

Twp.86 Rge.21 W5M

Twp.86 Rge.20 W5M

Twp.85 Rge.21 W5M

Twp.85 Rge.20 W5M

743

TOWNSHIP ROAD 864

TOWNSHIP ROAD 863

TOWNSHIP ROAD 862

TOWNSHIP ROAD 861

TOWNSHIP ROAD 860

TOWNSHIP ROAD 854

TOWNSHIP ROAD 852.5

RANGE ROAD 210

RANGE ROAD 211

RANGE ROAD 215

RANGE ROAD 212

RANGE ROAD 213

RANGE ROAD 214

RANGE ROAD 220

RANGE ROAD 204

RANGE ROAD 203

Whitemud River

Cammon Creek

Peace River

RGE 22 W5M RGE 21 W5M RGE 20 W5M

LEGEND

- SECONDARY HIGHWAY
- LOCAL ROAD
- WATERCOURSE
- OPTION 1 SITING AREA OF INTEREST
- WATERBODY

0 1.5 3

1:65,000 KILOMETRES

NOTE(S)

1. PROJECTED COORDINATE SYSTEM: NAD 1983 UTM ZONE 11N

REFERENCE(S)

CLIENT
ENERGY ALBERTA

PROJECT
PEACE RIVER NUCLEAR POWER PROJECT

TITLE
PROJECT SITE CONTEXT - OPTION 1

CONSULTANT

wsp

YYYY-MM-DD	2025-04-02
DESIGNED	MS
PREPARED	KW
REVIEWED	CB
APPROVED	MM

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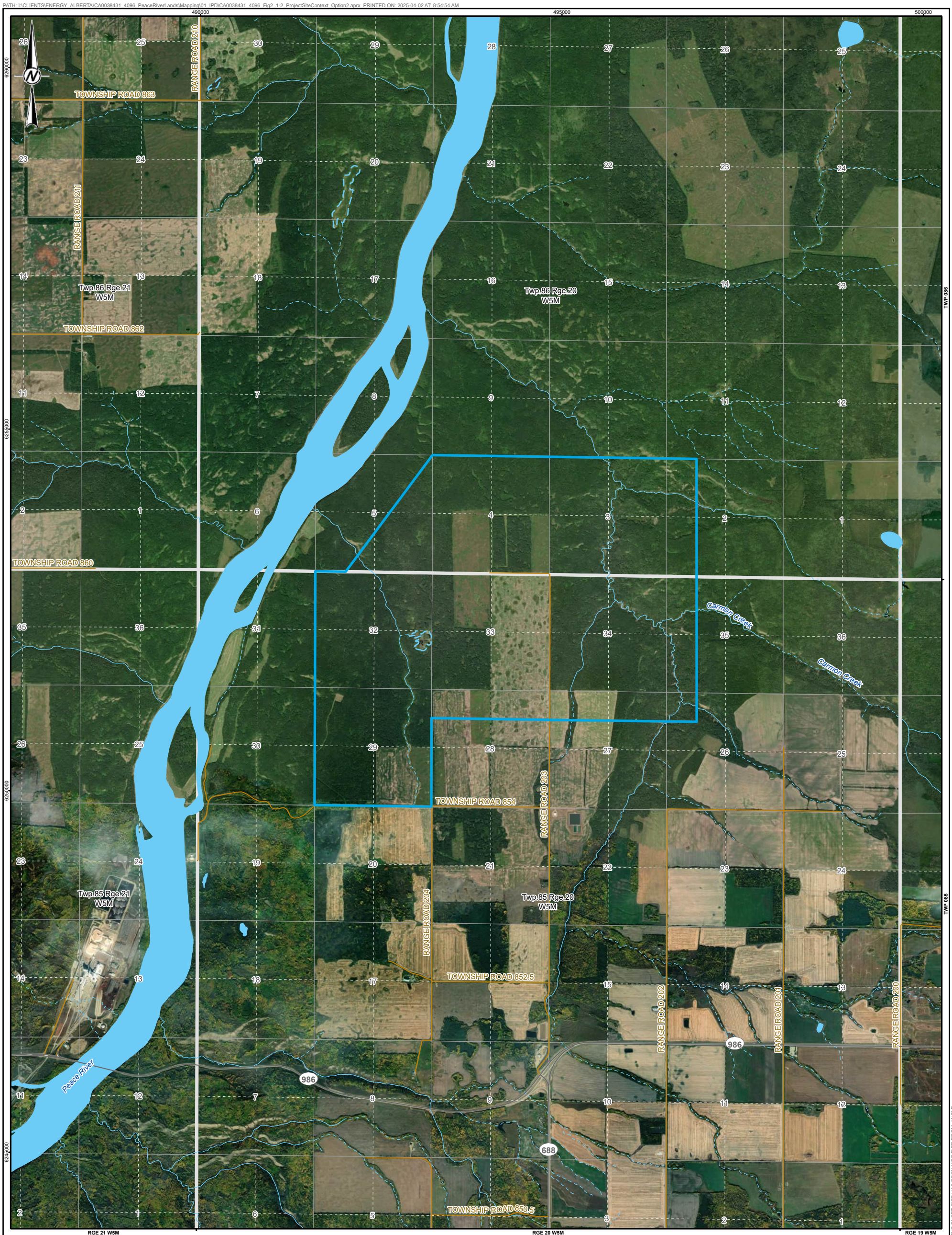

LEGEND

- SECONDARY HIGHWAY
- LOCAL ROAD
- WATERCOURSE
- OPTION 2 SITING AREA OF INTEREST
- WATERBODY

0 1 2

1:50,000 KILOMETRES

NOTE(S)

1. PROJECTED COORDINATE SYSTEM: NAD 1983 UTM ZONE 11N

REFERENCE(S)

CLIENT
ENERGY ALBERTA

PROJECT
PEACE RIVER NUCLEAR POWER PROJECT

TITLE
PROJECT SITE CONTEXT - OPTION 2

CONSULTANT

YYYY-MM-DD	2025-04-02
DESIGNED	MS
PREPARED	KW
REVIEWED	CB
APPROVED	MM

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2.2 Proponent Contact Information

Proponent: Energy Alberta

Energy Alberta Executive Contact (Primary Contact):
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3 PART B – PLANNING PHASE RESULTS

3.1 Summary of Engagement and Communications

This section has been updated in full to reflect engagement and communications activities undertaken by Energy Alberta between January 2024 and February 2026.

Energy Alberta is committed to open, transparent and thorough engagement and communication as a vital component to the success of the Project. The aim is to build and sustain meaningful relationships based on mutual respect and trust with Indigenous Nations and Communities, non-Indigenous stakeholders, local communities and other potentially affected parties. Energy Alberta recognizes the importance of engaging early and often to understand each group's unique interests and concerns.

In alignment with its corporate policies, Energy Alberta is committed to undertaking engagement and communications that will meet or exceed requirements from federal and provincial agencies, and it will also draw upon best practices.

3.2 Indigenous Engagement and Communications

Energy Alberta's engagement and communications efforts are intended to be inclusive of Indigenous Nations, Bands, Communities, and Métis Settlements and Groups potentially impacted by the Project. The term "Indigenous Nations and Communities" is used throughout Project documentation to represent this inclusion.

Meaningful engagement and communication with Indigenous Nations and Communities is a corporate value of Energy Alberta, and a vital component of the Project development process. Energy Alberta is committed to building meaningful, mutually-beneficial relationships with Indigenous Nations and Communities, guided by respect, integrity and a shared commitment to advancing reconciliation, and as outlined in its Indigenous Relations Policy.

Details regarding Energy Alberta's approach to Indigenous Engagement and Communication can be found in Appendix A: Indigenous Engagement and Communications Plan

In August 2025, Energy Alberta submitted a formal request to the Impact Assessment Agency of Canada (IAAC), requesting a three to six month suspension of the timeline for the Planning Phase of the Impact Assessment. This request was made in response to requests from five Indigenous Nations and Communities for more time to engage in this early stage of the Project's development and build awareness and understanding of the nuclear energy industry.

During this pause, Energy Alberta's Engagement Team has continued engagement and communications with Indigenous Nations and Communities and public stakeholders to deepen our understanding of specific interests and concerns related to the Project.

3.2.1 Identification of Potentially Impacted Indigenous Nations and Communities

Energy Alberta sought guidance from the Government of Canada First Nation Profiles Interactive Map and the Alberta Aboriginal Consultation Office Electronic Disposition System Landscape Analysis Tool, to determine a preliminary list of Indigenous Nations and Communities that may be potentially impacted by, or have interest in, the Project. Since the release of the Initial Project Description, additional Indigenous Nations and Communities have expressed an interest in engaging on the Project.

Engagement and communications efforts have been initiated and undertaken to varying degrees with the following 41 Indigenous Nations and Communities (listed in alphabetical order):

- Asini Wachi Nehiyawak
- Athabasca Chipewyan First Nation
- Beaver First Nation
- Cadotte Lake Métis Nation
- Dene Nation
- Dene Tha' First Nation
- Driftpile Cree Nation
- Duncan’s First Nation
- East Prairie Métis Settlement
- Ermineskin Cree Nation
- Fort Chipewyan Métis Nation
- Fort McKay First Nation
- Gift Lake Métis Settlement
- Grande Prairie Métis Local
- Horse Lake First Nation
- Kapawe'no First Nation
- Kee Tas Kee Now Tribal Council (comprised of Loon River First Nation, Lubicon Lake Band, Peerless Trout First Nation, Whitefish Lake First Nation #459, and Woodland Cree First Nation)
- Kikino Métis Settlement
- Little Red River Cree Nation
- Loon River First Nation
- Lubicon Lake Band
- Mikisew Cree First Nation
- Nations of the North Peace (comprised of Beaver First Nation, Dene Tha' First Nation, Little Red River Cree Nation, and Tallcree First Nation)
- O’Chiese First Nation
- Otipemisiwak Métis Government
- Paddle Prairie Métis Settlement
- Peavine Métis Settlement
- Peerless Trout First Nation
- Sawridge First Nation
- Sturgeon Lake Cree Nation
- Sucker Creek First Nation
- Sucker Creek Off Reserve Elders Council
- Swan River First Nation
- Tallcree Tribal Government
- Treaty 8
- Valleyview Métis Local

- Lac Ste. Anne Métis Community Association
- Lakeland Métis Nation
- Whitefish (Goodfish) Lake First Nation #128
- Whitefish Lake First Nation #459
- Woodland Cree First Nation

As the project progresses, the list of potentially affected Indigenous Nations and Communities may be updated, based on interest and feedback from Indigenous Nations and Communities, and additional planning and guidance from applicable regulators.

3.2.2 Summary of Indigenous Engagement and Communication

Early Engagement and Communication: January 2024 – July 2025

Energy Alberta commenced its Indigenous engagement and communications for the proposed Project early in 2024. Since then, Energy Alberta has initiated contact with the Indigenous Nations and Communities listed in Section 3.2.1 and activities have been undertaken to varying degrees based on the Nation or Community's interest, responsiveness and availability. The following provides a summary of the Indigenous engagement and communications activities conducted prior to August 2025 when Energy Alberta requested a pause in the Planning Phase timeline.

- March 2024 through to July 2025 – Introductory emails containing the Project information package and mapping were sent to Indigenous Nations and Communities in 2024. Following January 2025, Project information packages and mapping was sent to Indigenous Nations and Communities as they made themselves known to Energy Alberta.
- April 2024 through to July 2025 - Introductory meetings held with 10 Indigenous Nations and Communities, as they were available, to outline the Project scope, key objectives, deliverables, timelines, and roles and responsibilities of team members. This was also an opportunity to discuss expectations, identify potential challenges, and establish communication protocols to facilitate collaboration throughout the Project.
- January 2025 through to March 2025 – Discussions with Indigenous Nations and Communities that had already engaged more extensively with Energy Alberta, regarding the draft Initial Project Description (IPD) to gather their initial feedback on the draft.
- February 2025 - A Project update email was sent to Indigenous Nations and Communities that contained information on how to stay connected, the results of Energy Alberta's preliminary land investigations, an indication that the IAAC would be reaching out to facilitate its own consultation process, and a request from Energy Alberta to meet.
- April 2025 - Energy Alberta informed Nations and Communities when it submitted its Initial Project Description (IPD) to the Impact Assessment Agency of Canada (IAAC) and provided a follow-up email with links to the document when they became publicly available. Energy Alberta also informed where hard copy versions of the documents could be accessed, locally.

- May 2025 – Energy Alberta kept Nations and Communities informed of upcoming comment period deadlines. Energy Alberta offered Capacity Funding to Nations and Communities to support efforts in reviewing Planning Phase documents (i.e. the Initial Project Description (IPD) and Tailored Impact Statement Guidelines (TISGs)) within the timeframe specified by the Impact Assessment Agency of Canada (IAAC).
- July 2025 -Energy Alberta invited Nations and Communities opportunities to participate in the early field data collection programs occurring that summer. Baseline studies included River Channel Depth Survey (July 28 – Aug 1), Water Intake Siting Inspection (mid-August), and Wildlife Survey (August 25 - 29).

Regulatory Pause: August 2025 – February 2026

On August 18, 2025, Energy Alberta submitted a request to IAAC, requesting a three to six month suspension of the timeline for the Planning Phase of the Impact Assessment. During this pause, Energy Alberta continued to engage with Indigenous Nations and Communities. A summary of engagement and communications activities completed between August 2025 and February 2025 is as follows:

- **Introductory Meetings:** Between August 2025 and February 2026, Energy Alberta has held introductory meetings with 19 Nations and Communities. These meetings included presentations by Energy Alberta that provide information about the Project, the regulatory process, and the Canadian nuclear industry. Meetings were either in-person or virtual, depending on the preferences and availability of each Nation and Community. Meeting attendance varied depending on the preferences and protocols of each Nation or Community, with some meetings including Chief, Council, and Elders, some involving community members, and some involving technical staff and consultants.
- **Participation in Summer 2025 Fieldwork:** Interested Nations and Communities were invited to participate in early fieldwork in Summer 2025. This fieldwork was part of initial siting analysis and was not part of the Impact Assessment process.
- **Agreements and Capacity Funding:** Energy Alberta continued to offer capacity funding intended to match that provided by IAAC. Requests for Bridge/Interim funding received from Nations and Communities were considered on a case by case basis.
- Framework agreement and work planning meetings with interested Nations and Communities have commenced and continue to be scheduled into Q1 2026. These sessions are intended to identify which aspects of the Impact Assessment are of interest to each Nation and Community and in what capacity they would like to be involved.
- Other agreements in development include confidentiality agreements for the protection of Nation and Community-specific data.
- **Siting Workshops and Meetings:** Energy Alberta hosted an in-person siting workshop for Indigenous Nations and Communities in September 2025. The purpose of this workshop was to provide information about initial site analysis and the identification of Energy Alberta's two siting options. 12 Nations and Communities sent representatives to participate in the workshop.

- Participant feedback at the workshop indicated that the information as presented was too technical to bring back to communities and instead, was better suited to technical staff. Requests were received for this information to be provided virtually for Nations and Communities who were unable to attend the in-person workshop.
- In February 2026, Energy Alberta held a virtual siting workshop with 8 Nations and Communities represented. At the virtual siting workshop, Energy Alberta presented the siting criteria that have been used in identifying siting options and requested feedback from Nations and Communities on known sites of significance in proximity to the two proposed siting options. Following the workshop, Energy Alberta provided shapefiles to Nations and Communities and has offered to meet with individual Indigenous Nations and Communities to gather siting feedback
- **Nuclear Fundamentals Workshop:** In January 2026, Energy Alberta sponsored a half-day workshop led by prominent figure in the nuclear sector, Tracy Primeau of *Agile Bear Consulting*. The workshop aimed to enhance community awareness and education about nuclear energy among Indigenous Nations and communities and was in response to requests from Nations and Communities for an Indigenous perspective on nuclear energy. Energy Alberta is exploring the potential of hosing a virtual workshop later in 2026.
- **Ongoing Project Updates:** Energy Alberta continued to provide ongoing Project updates by email to Nations and Communities. Between August 2025 and February 2026 updates were provided on the following topics:
  - August 7, 2025: Summer Field Work Program and Capacity Funding Offer
  - August 18, 2025: Regulatory Pause
  - September 29, 2025: National Day for Truth and Reconciliation
  - October 7, 2025: Update on Technology
  - October 10, 2025: Indigenous Perspectives on Nuclear Power, a list of Indigenous leaders who have worked in or have knowledge of the Canadian nuclear sector and who had offered to share personal insights and experiences with Nations and Communities.
  - October 21, 2025: Follow Up to Update on Technology
  - November 10, 2025: Indigenous Engagement Team Member Introduction
  - December 9, 2025: Plant Parameter Envelope Approach
  - December 18, 2025: Holiday Greeting and Office Closure Information
  - January 28, 2026: Indigenous Engagement Team Member Introduction
  - February 10, 2026: Siting Options Information

Detailed records of communication including topics of interest are being maintained and will be provided in Energy Alberta's annual *Engagement and Communications Report* which will be provided to regulatory agencies by March 31 of each year. Records of communication will be provided to Indigenous Nations and Communities for review and validation prior to submission to regulatory agencies.

3.2.3 Indigenous Nations and Communities Interests Identified to Date

Engagement and communications with Indigenous Nations and Communities is ongoing. As such, some but not all potentially impacted Nations and Communities have identified topics of interest related to the Project. Feedback has been received through the activities listed in the preceding sections. Energy Alberta has compiled a list of preliminary topics of interest communicated by Indigenous Nations and Communities to date including, but not limited to, those listed in Table 3.2-1. Some topics listed may overlap or intersect; in the interest of thoroughness, Energy Alberta has erred on the side of inclusion to ensure no topics of interest are overlooked.

At the time of writing, Energy Alberta has only received the draft Tailored Impact Statement Guidelines which may change prior to being finalized. Energy Alberta is awaiting the final TISGs before determining how issues raised through engagement and communications may be addressed in the Impact Statement.

Table 3.2-1: Preliminary Topics of Interest – Indigenous

Theme	Key Issues/Interests Identified
Accidents or malfunctions	■ Concerns raised regarding the risk of reactor malfunction ■ Concerns raised regarding pollution in the event of an accident or malfunction ■ Interest in reach of impacts in the event of an accident or malfunction
Agreements	■ Interests raised regarding Capacity Funding Agreements ■ Interests raised regarding Engagement Framework Agreements ■ Interests raised regarding Work Plan Agreements
Air Quality	■ Concerns raised regarding human health risks and wellbeing, including exposure to emissions ■ Concerns raised regarding the impacts of steam and potential contaminants leaving the facility, including the potential for contaminants to precipitate out ■ Interests raised regarding airshed considerations and dispersion modelling
Baseline Studies	■ Interests raised regarding project scope, specifically baseline studies. ■ Interests raised regarding Indigenous participation in the Project, including baseline studies.
Birds/Bird Habitat	■ Interests raised regarding migratory birds and their habitat
Capacity Funding	■ Concerns raised regarding the availability and amount of capacity funding ■ Concerns raised regarding Nations subsidizing any part of the engagement process
Climate Change	■ Concerns raised regarding the potential for weather patterns to change over time due to climate change. ■ Interests raised regarding how climate change considerations will be covered in baseline studies and the Impact Assessment.
Engagement	■ Interests raised regarding materials that are easy to understand and culturally relevant (e.g., plain language, translation to Indigenous languages, visual representations) ■ Interests raised regarding timelines for consultation ■ Interests raised regarding proponent participation in community and on the land ■ Interests raised regarding nuclear science education ■ Interests raised regarding Indigenous participation in the Project ■ Concerns raised regarding a lack of early and meaningful engagement ■ Concerns raised regarding the need for a regulatory pause

Table 3.2-1: Preliminary Topics of Interest – Indigenous

Theme	Key Issues/Interests Identified
Country Foods	■ Concerns raised regarding contamination of harvested foods, and human health impacts related to consumption of these foods
Cumulative Effects	■ Interests raised regarding how cumulative effects will be assessed ■ Concerns raised regarding the cumulative effects of water usage, there are many different industries and many projects being proposed right now ■ Concerns raised regarding industry in the area gradually eroding the ability to practice Treaty Rights, and interest in how this will be reflected in the cumulative effects assessment
Economic	■ Interests raised regarding Indigenous economic inclusion and equity partnerships ■ Interests raised regarding what the economic impacts in the region will be ■ Concerns raised regarding housing affordability, jobs, increase in population ■ Interests raised regarding a desire to see real, lasting benefits for communities ■ Interests raised regarding understanding what the benefits will be for Indigenous communities
Emergency Management	■ Concerns raised regarding how Indigenous communities would be contacted in the event of an emergency as many communities don't have good cell reception ■ Concerns raised regarding financial responsibility for emergency management ■ Interests raised regarding financial security and guaranteed funding set aside for emergency response ■ Interests raised regarding a potential timeline for when emergency planning will occur and who is responsible for it
Employment and Training	■ Interests raised regarding employment allocation for Indigenous applicants ■ Interests raised in early education opportunities so that Indigenous groups are in a position to benefit from economic opportunities as they arise ■ Interests raised regarding skilled jobs training
Environmental Monitoring and Mitigation	■ Interests raised regarding environmental mitigation measures ■ Interests raised regarding post-closure monitoring
External Events/Hazards	■ Concerns raised regarding terrorism hazard
Fire and Explosion Hazards	■ Concerns raised regarding increasing wildfire hazards and facility safety

Table 3.2-1: Preliminary Topics of Interest – Indigenous

Theme	Key Issues/Interests Identified
Fish/Fish Habitat	■ Concerns raised regarding impacts of water withdrawal and water quality on fish habitat ■ Concerns raised regarding sedimentation
Geotechnical	■ Concerns raised regarding borehole depth, location and future site investigations ■ Interest in suitability of bedrock
Human Health Effects	■ Concerns raised regarding human health risks and wellbeing, including radiation exposure
Impact Statement	■ Interests raised regarding project scope, Indigenous input, and timing
Indigenous Knowledge	■ Interests raised regarding incorporation of Indigenous Knowledge into siting, studies, and Impact Assessment
Indigenous Physical and Cultural Heritage	■ Concerns raised regarding impacts to Indigenous and Treaty Rights ■ Concerns raised regarding impacts to culture and way of life, including cumulative effects and accommodations ■ Interests raised regarding cultural and spiritual aspects of the Peace River and the Peace–Athabasca Delta ■ Concerns raised regarding cultural preservation
Indigenous Sites of Significance	■ Concerns raised regarding culturally sensitive sites ■ Concerns raised regarding hunting and gathering areas ■ Interests raised regarding cultural, spiritual, and environmental significance of the Peace River including the Peace-Athabasca Delta
Indigenous Traditional Land and Resource Use	■ Interests raised regarding Traditional Land and Resource Use ■ Interests raised regarding potential impacts to wildlife habitat - Site Option 2 covers well-used hunting areas ■ Interests raised regarding collection of wild medicines in Site Option 2 area
Infrastructure Services	■ Concerns raised regarding increased use of infrastructure and services ■ Interests raised regarding community services ■ Concerns raised regarding the impact of construction and operations workforce on local airports and roads

Table 3.2-1: Preliminary Topics of Interest – Indigenous

Theme	Key Issues/Interests Identified
Land and Resource Use	■ Concerns raised regarding potential impacts to outdoor recreation ■ Concerns raised regarding potential impacts to hunting and gathering areas
Meteorological Conditions and Hazards	■ Concerns raised regarding extreme weather events and their potential impact to the facility ■ Interests raised regarding changes to current weather patterns and new weather hazards
Physical Protection	■ Concerns raised regarding how radiation would be contained in the event of malfunction or accident
Power Costs and Rates	■ Interests raised regarding whether power will be cheaper for local Nations ■ Interests raised regarding agreements to provide free power to impacted Nations and communities
Powerlines	■ Interests raised regarding whether transmission lines will be part of the Impact Assessment ■ Concerns raised regarding including the impacts of transmission lines as part of the cumulative effects assessment ■ Interests raised regarding where the power will be directed
Procurement/Business Opportunities	■ Interests raised regarding procurement opportunities for Indigenous businesses ■ Interests raised regarding partnership opportunities for construction camps
Project Need	■ Interests raised regarding the proportion of increased power demand provided by the Project ■ Interests raised regarding options analysis, including comparison to solar and wind ■ Concerns raised regarding project need and site location in the Peace Region ■ Interests raised regarding where the power is needed ■ Interests raised regarding whether power will serve the grid or specific uses such as data centres
Project Phases and Schedule	■ Interests raised regarding understanding Project timelines
Radioactivity	■ Concerns raised regarding human health risks from radiation exposure ■ Interests raised regarding monitoring of radioactivity
Regulatory Process	■ Interests raised regarding who the regulator is ■ Interests raised regarding opportunities for and format of Indigenous participation in regulatory process

Table 3.2-1: Preliminary Topics of Interest – Indigenous

Theme	Key Issues/Interests Identified
Rights of Indigenous Peoples	■ Concerns raised regarding UNDRIP implications and free, prior and informed consent ■ Concerns raised regarding impacts to Indigenous culture, and way of life ■ Concerns raised regarding impacts to Treaty Rights, particularly on Crown land ■ Concerns raised regarding Natural Resources Transfer Agreement (NRTA) rights
Riparian/Wetlands	■ Concerns raised regarding riverbank fragility and stability
Safety of Community	■ Concerns raised regarding risks to residents living near the facility
Safety of Facility	■ Interests raised regarding how the facility is designed/constructed to ensure safety ■ Interest in facility design and safety measures that ensure worker safety
Security	■ Interests raised regarding understanding how security is conducted at the facility
Seismic	■ Concerns raised regarding seismic activity in the area, including both fracking and earthquakes ■ Concerns raised regarding seismic events recorded in the area ■ Concerns raised regarding siting a nuclear facility in an area with fracking
Site Evaluation	■ Interests raised regarding how the two siting options were selected ■ Interests raised regarding criteria used to select siting options
Siting/Selection	■ Interests raised regarding how the siting decision will be made and what inputs will be considered ■ Concerns raised regarding siting decisions being made without engagement
Social – Gender Equality	■ Concerns raised regarding safety of women in communities ■ Concerns raised regarding safety risks posed by workforce influx
Social – Vulnerabilities	■ Interests raised regarding ensuring the protection of vulnerable community members, including children and Elders
Social Conditions and Effect	■ Interests raised regarding socio-economic conditions and impacts ■ Concerns raised regarding housing affordability ■ Concerns raised regarding potential impacts of population influx, both temporary and permanent
Species At Risk/Habitat	■ Interests raised regarding the identification of species at risk
Tailored Impact Statement Guidelines	■ Interests raised regarding what is included in the TISGs

Table 3.2-1: Preliminary Topics of Interest – Indigenous

Theme	Key Issues/Interests Identified
Technology Selection	■ Concerns raised regarding how the Impact Assessment will address multiple technology options ■ Concerns raised regarding dependence on other countries due to enriched uranium use
Topography/Soil/Sediment	■ Concerns raised regarding existing sedimentation in the Peace River and the potential for this Project to make it worse
Vegetation	■ Concerns raised regarding impacts to terrestrial habitat and wild plant medicines
Waste Management – Storage	■ Interests raised regarding learning more about where and how waste would be stored, both on-site and long-term ■ Concerns raised regarding the risks of storing nuclear waste ■ Concerns raised regarding absence of operational long-term waste storage in Canada ■ Interest in the management of all levels and all types of waste, including radiated water from cooling pond
Waste Management - Transportation	■ Concerns raised regarding the transportation of waste from the site to long-term storage
Water	■ Concerns raised regarding effects to the Peace River, including the Peace–Athabasca Delta ■ Interests raised regarding the cultural and environmental importance of the Peace River ■ Concerns raised regarding current river health ■ Concerns raised regarding sedimentation in the Peace River ■ Concerns raised regarding potential for contaminants in precipitation from steam released ■ Interests raised regarding water use volumes and return flows to the Peace River ■ Interests raised regarding water quality in holding pools ■ Concerns raised regarding volume of water needed given recent lower-than-normal river levels ■ Concerns raised about risk to Grimshaw aquifer ■ Concerns raised regarding the potential for contamination of water downstream of facility
Wildlife/Wildlife Habitat	■ Concerns raised regarding impacts to traditionally important species such as Bear, Elk, Fish, Moose, Caribou, and Squirrel ■ Concerns raised regarding impacts to wildlife habitat, particularly in well-used hunting areas within Site Option 2 ■ Concerns raised regarding impacts to terrestrial habitat

3.2.4 Future Indigenous Engagement and Communications Activities

Engagement and communications will continue through the Impact Assessment, construction and operations phases of the Project. Activities will be based on each Indigenous Nation or Community's interest and degree of potential impact. Energy Alberta has identified the following activities for this next phase of Indigenous engagement and communications. Additional details regarding future activities can be found in Appendix A: Indigenous Engagement and Communications Plan.

- **Introductory Meetings:** Energy Alberta will continue to pursue introductory meetings with interested Indigenous Nations and Communities.
- **Agreements and Capacity Funding:** Energy Alberta will continue to work with interested Indigenous Nations and Communities to establish framework agreements.
- **Participation in Impact Statement Studies:** Energy Alberta will work with interested Indigenous Nations and Communities to develop work plans for participation in the Impact Statement. Work plans will be unique to each Nation and Community and will reflect areas of interest, anticipated or potential community impacts, culture and ways of knowing, and regulatory requirements. Participation in the Impact Statement could include but are not limited to, Indigenous monitors, observing data collection, reviewing data and reports, participation with technical experts on study design, development or co-development of studies and reports. Energy Alberta will provide Indigenous Nations and Communities with capacity funding to support participation.
- **Community Information Sessions:** Energy Alberta will make community information sessions available to interested Indigenous Nations and Communities. Topics covered and format for the sessions will be determined in collaboration with communities.
- **Ongoing Project Updates-** Energy Alberta will provide Indigenous Nations and Communities with notification in advance of regulatory filings and to provide updates as the Project progresses through the regulatory process.

Engagement and communications plans for 2026 and beyond will continue to be informed by feedback received through ongoing activities and through the establishment of Nation and Community specific agreements and work plans.

3.3 Public and Stakeholder Engagement

Energy Alberta is committed to open and transparent engagement with stakeholders and members of the public throughout the life of the Peace River Nuclear Power Project. Public engagement activities are intended to maximize information available to the public, increase the public understanding of the Project, and gathering input from the public to be incorporated into Project plans, where practicable. Public engagement will continue throughout the lifecycle of the Project.

Feedback loops will be created to facilitate dialogue between the public and Energy Alberta. Feedback collected through public engagement activities will be integrated into Project planning.

3.3.1 Local Governments

Engaging with local governments is essential for Energy Alberta to understand community priorities, considerations and concerns, including the capacity of local infrastructure and services to support the construction and operation of the Project. Energy Alberta also engages with local governments to build positive, long-term partnerships in local communities.

Energy Alberta has undertaken engagement activities with the following 18 local governments since the submission of the IPD:

- Birch Hills County
- Clear Hills County
- County of Northern Lights
- Municipal District of Fairview No. 136
- Municipal District of Peace No. 135
- Municipal District of Smoky River No. 130
- Northern Sunrise County
- Town of Fairview
- Town of Falher
- Town of Grimshaw
- Town of Manning
- Town of McLennan
- Town of Peace River
- Village of Berwyn
- Village of Donnelly
- Village of Girouxville
- Village of Hines Creek
- Village of Nampa

Since early 2024, Energy Albera has held formal delegations and staff level meetings with the following local governments:

- Birch Hills County
- County of Northern Lights
- Municipal District of Fairview No. 136
- Municipal District of Peace No. 135
- Municipal District of Smoky River No. 130
- Northern Sunrise County
- Town of Fairview
- Town of Falher
- Town of Grimshaw
- Town of Manning
- Town of Peace River
- Village of Berwyn
- Village of Hines Creek
- Village of Nampa

Delegation presentations provided councils with an overview of the proposed Project, anticipated Project timelines, the Impact Assessment process and opportunities for collaboration throughout the regulatory process.

Siting Workshop

On September 23, 2025, Energy Alberta hosted representatives from six local governments at an in-person siting workshop. In addition to the local government representatives, interest groups, Chambers of Commerce and tourism associations were also invited to attend. The purpose of this workshop was to provide information about initial site analysis and the selection of Energy Alberta's two potential siting options, offering an opportunity for participants to view the results of the initial assessment. Subject matter experts explained the siting criteria that was used in identifying siting options, and requested initial feedback from a local perspective to inform the selection of a preferred site.

3.3.2 Chambers of Commerce

Energy Alberta is committed to ensuring that local communities benefit from the economic opportunities presented by the Project. Engaging with local Chambers of Commerce will help Energy Alberta communicate with local business owners about procurement opportunities, industry standards and training requirements. Local Chambers of Commerce will also serve as an important conduit to local businesses, enabling Energy Alberta to gather data in support of the Impact Statement and to develop a local business registry and business capacity assessment for the region.

Energy Alberta will engage with the following local Chambers of Commerce on the proposed Project:

- Peace River & District Chamber of Commerce
- Manning & District Chamber of Commerce
- Fairview & District Chamber of Commerce
- Grimshaw & District Chamber of Commerce
- Smoky River & District Chamber of Commerce
- High Prairie & Area Chamber of Commerce
- Valleyview & District Chamber of Commerce

Energy Alberta has completed the following engagement activities with Chambers of Commerce since 2024.

- April 2024 – Met with Municipal Councillors and the Peace River Chamber of Commerce to introduce Energy Alberta's proposed Project, discuss Project technical details, and understand community interests and questions.
- January 2025 – Met with Grimshaw and District Chamber of Commerce, Peace River and District Chamber of Commerce, Lac Cardinal Regional Economic Development Board, Northern Sunrise Economic Committee, Peace Region Economic Development Alliance, Town

of Peace River Economic Development Committee, and Town of Peace River Legislative Services to discuss technology, workforce expectations, anticipated facility footprint, regulatory process and upcoming studies.

- On March 11, 2025, Energy Alberta attended and presented at a luncheon organized by the Peace River & District Chamber of Commerce. Chamber of Commerce members heard a presentation about the proposed Peace River Nuclear Power Project.
- On September 23, 2025, representatives from the Grimshaw Chamber of Commerce and the Town of Peace River's Economic Development Committee attended a siting workshop held by Energy Alberta at the Chateau Nova. This workshop's goal was to share an in-depth look at how Energy Alberta came to select the two potential site option areas that are currently being assessed.
- On January 27, 2026, Energy Alberta hosted an open house for local business owners in collaboration with the Peace River & District Chamber of Commerce. The goal of the event was to introduce the Project and potential future procurement opportunities to local business owners. Discussions focused on qualifications to work on nuclear projects, potential range of opportunities during construction and operation phases, impact of the Project on labour force, wages and local communities and future opportunities for outreach to business owners.

3.3.3 Business Associations

Energy Alberta engages with industry and business associations to share Project information and hear about emerging best practices, through attendance and participation at events such as the Small Modular Reactor Canada Summit, the Independent Power Producer Society of Alberta Conference, and the Canadian Nuclear Association Conferences.

In addition, Energy Alberta has engaged with the Peace Regional Energy Committee (PREC), given its purpose to look at opportunities to bring all forms of power generation to the Peace Region. Energy Alberta also collaborated with the PREC on a panel discussion at the Small Modular Reactor Canada Summit in March 2025.

- July 2024 – Meeting with PREC to provide a Project update including overview of site selection, engagement efforts to date, upcoming engagement, and contracting.
- August 2024 – Meeting with PREC to provide a Project update including communications plan, anticipated location, and engagement.
- September 2024 – Meeting with PREC and Lac Cardinal Regional Economic Development Board to discuss updates to financing and community support strategies/grants.
- October 2024 – Meeting with PREC to discuss the regulatory process and next steps, including the IPD timeline.
- November 2024 – Meeting with PREC to discuss details on nuclear waste management, including government mandates.
- December 2024 – Draft IPD was sent to PREC Committee for review and feedback.

- January 2025 – Meeting with PREC to discuss Alberta Nuclear Reactor Licence and engagement plans, including initial engagement sessions and public open houses. Additional meeting to discuss CANDU MONARK reactors, regulatory status, nuclear safety precautions, nuclear power generation, and plans for a technical session, a March 2025 open house and an upcoming conference panel.
- February 2025 – Meeting with PREC to provide Project updates and a technical workshop to discuss Nuclear Power Fundamentals.
- March 2025 – Meeting with PREC to provide an overview of open house feedback and next steps for the Project.

3.3.4 Non-Governmental Organizations (NGOs) and Environmental Groups

Energy Alberta will engage with local NGO's and Environmental Groups through the Impact Assessment process, as their perspectives will help inform the Impact Statement and Project plans. To date, Energy Alberta has held introductory meetings with the Mighty Peace Watershed Alliance and the Peace River Area Monitoring Program. Energy Alberta will engage with each of these groups on the scoping and development of baseline studies relevant to their area of focus.

Energy Alberta will seek to engage with other local environmental organizations, recreational groups and tourism associations as we move into the Impact Statement phase of the regulatory process. The focus of these engagements will be to aid in baseline data gathering, to identify local interests and concerns, share potential impacts associated with the Proposed project and develop mitigation measures.

3.3.5 Residents and Landowners

Outreach and engagement with landowners and residents within the two siting options has been ongoing since the spring of 2024. Engagement with landowners and residents have included:

- **March 2025** - Energy Alberta contacted landowners and residents within and adjacent to the two siting options. An Energy Alberta representative met in-person with adjacent landowners and residents and provided a project update letter and a personal invitation to the March 2025 open house.
- **April 2025** - Energy Alberta provided landowners and residents within the identified potential site areas with a project update letter. The letter provided a Project update and advised that Energy Alberta had formally submitted the IPD to IAAC and CNSC and that a public comment period was open from April 14 to May 14, 2025. The letter provided website links to the English and French versions of the full IPD report and plain language summary and a list of locations where printed copies of the IPD could be accessed
- **June 2025** - Energy Alberta completed outreach to landowners and residents within and adjacent to the two site option boundaries. Engagement activities included either an in-person meeting, a phone call or written correspondence offering a meeting when landowners could not be reached in person.

- **July 2025** - Energy Alberta distributed a notice of activity by mail and via email, where possible, of upcoming summer 2025 fieldwork near the proposed siting options 1 and 2.
- **November and December 2025 -** Energy Alberta conducted landowner and resident visits providing a brief update on the status of the Project, including information on the regulatory timeline pause and ongoing Project planning activities. Where landowners could not be contacted in person, Energy Alberta sent a follow-up letter providing the Project update and inviting landowners to connect directly with Energy Alberta representatives.

3.3.6 General Public

Providing opportunities for education, enhancing general understanding about the Project and the associated potential impacts and benefits, is a key objective of engagement with local residents and members of the public. Energy Alberta plans to use a variety of activities to engage with the public including: open houses, engagement sessions, workshops, participation in community events, community pop-up conversations and direct access email and phone lines. For the general public and local residents who may prefer or not be able to engage in person, Energy Alberta will provide online engagement tools.

Public engagement activities completed to date include:

- **March 2025 – Public Open House -** Energy Alberta conducted a public open house on March 11, 2025 at the Weberville Community Hall and welcomed approximately 350 individuals including community members, local government officials, and local business owners. Following the Open House, Energy Alberta published a report entitled “Listening First: What We Heard at the Peace River Open House” which can be found on our website at: https://www.energyalberta.com/blog-posts/peace-river-open-house-march2025
- **September 2025 – Public Engagement Sessions -** Energy Alberta returned to the Peace Region to host a series of four public engagement sessions taking place between September 22 and 25, 2025. Engagement Sessions were held in Peace River, Weberville, Grimshaw and Manning. Energy Alberta welcomed over 250 attendees over the four sessions. In these sessions, Energy Alberta sought to share more detailed information on nuclear fundamentals, environmental effects, community impacts, employment, training and procurement and siting to seek feedback and inform the scope of the TISG’s.

  In the form of an asynchronous townhall, subject matter experts spoke to small groups at stations, giving a 15-minute presentation on their topic followed by a facilitated Q&A period.

  A summary of what we heard during these sessions can be found on our website at: https://www.energyalberta.com/blog-posts/what-we-heard-peace-region-engagement-sessions-september-2025.
- **September 2025 – Peace River Job Fair –** Energy Alberta hosted a booth at the Peace River Job Fair in September 2025, engaging with attendees on the types of jobs that would be needed based on existing facilities and answering general project-related questions.

- **May 2025 – Ongoing – Participation in Community Events –** To date, Energy Alberta has participated in two high-traffic public community events, taking the opportunity answer questions and speak with hundreds of community members about interests and concerns related to the proposed Project.

3.3.7 Public and Stakeholder Interests Identified to Date

Energy Alberta has compiled a list of preliminary topics of interest communicated by stakeholders to date including, but not limited to, those listed in Table 3.3-1. Some topics listed may overlap or intersect; in the interest of thoroughness, Energy Alberta has erred on the side of inclusion to ensure no topics of interest are overlooked.

Table 3.3-1: Preliminary Topics of Interest – Public and Stakeholders

Theme	Key Issue or Interest Identified
Accidents or malfunctions	■ Interest raised in understanding accident and malfunction scenarios that will be assessed ■ Concerns raised about worst-case scenarios, including major nuclear accidents and long-term regional consequences ■ Questions about emergency evacuation zones, accident modelling, and abnormal release scenarios ■ Interest in understanding emergency response scenarios, including financial and social recovery ■ Interests raised regarding potential impacts of hydrogen buildup, industrial fire risks, and nearby facilities on the facility ■ Concerns raised regarding emergency suppression systems and accidental releases ■ Concerns raised regarding the potential for a fire or explosion on site and emergency response plans to ensure worker and community safety
Archaeology	■ Interest in understanding how archaeological resources and heritage sites will be identified and protected ■ Interest in understanding how baseline field work influences final site decision process
Air Quality	■ Concerns raised regarding contaminants (chemical and radioactive) entering the atmosphere ■ Questions and interests raised regarding steam plumes, ice fog, and long-term atmospheric releases ■ Concern about auxiliary emissions (diesel generators, transport, maintenance chemicals) ■ Interests raised regarding whether ongoing monitoring will be made publicly available ■ Interests raised regarding placement of air quality monitoring station ■ Interests raised regarding parameters for ongoing air quality management programs ■ Concerns raised regarding chemical releases, heavy metals, solvents and industrial waste ■ Interests raised regarding transparent disclosure of contaminant releases to the environment (radiological and non-radiological) ■ Concerns raised regarding long-term soil and agricultural impacts due to air contamination
Baseline Studies	■ Interests raised regarding ensuring credible, local baseline data is collected to inform the impact assessment ■ Concerns raised regarding whether sufficient historical data exists for northern Alberta conditions ■ Interest raised regarding desires for publication of all baseline studies
Birds/Bird Habitat	■ Concerns raised regarding migratory birds, waterfowl, and species interacting with cooling ponds or plumes

Table 3.3-1: Preliminary Topics of Interest – Public and Stakeholders

Theme	Key Issue or Interest Identified
Capacity Funding	■ Interests raised regarding the insufficiency and availability of non-Indigenous participant capacity funding ■ Interests raised in obtaining funding for independent technical reviews and third-party expertise ■ Concerns raised regarding lack of participant funding undermining consultation process
Climate Change	■ Interests raised regarding the Project's long-term impacts on climate change ■ Interests raised regarding ensuring assessment on effects of the Project on the environment account for construction and uranium mining ■ Interests raised regarding climate effects on the Project, particularly as it relates to potential drought or wildfire situations
Community Investment/Sponsorship	■ Interests raised expressing desire for visible, long-term community contributions beyond construction phase
Cumulative Effects	■ Concerns raised regarding potential combined cumulative effects with pulp mills, dams, oil and gas, agriculture and other industry ■ Interests raised in understanding total regional demand on water, land and services
Economic – Community Development	■ Interests raised regarding opportunity for the Project to prevent regional economic decline and stimulate growth ■ Concerns raised regarding impacts on inflation and local affordability
Engagement	■ Interests raised regarding desires to understand engagement program with local communities ■ Interests raised regarding desires for ongoing, transparent, face-to-face engagement ■ Interests raised requesting studies, findings, and responses be shared in plain language ■ Interests raised regarding understanding proponent's plans for engaging youth and underrepresented groups
Project Economics	■ Interests raised regarding whether the Project has a strong business case ■ Interests raised regarding long-term business competitiveness of adding a facility like this to the Alberta power grid ■ Interests raised regarding project funding and investors

Table 3.3-1: Preliminary Topics of Interest – Public and Stakeholders

Theme	Key Issue or Interest Identified
Economic Effects	■ Concerns raised regarding boom-and-bust cycles, including construction vs. operations vs decommissioning ■ Concerns raised regarding wage inflation and worker shortages putting non-project businesses and service providers under financial strain ■ Concerns raised regarding potential long-term impacts on resource-based livelihoods, e.g., hunting, fishing and agriculture ■ Interests raised regarding the potential distribution of tax revenue generated from the Project
Emergency Management	■ Interest raised regarding adequacy of emergency preparedness and response plans ■ Interests raised regarding evacuation planning, response capacity and hospital readiness ■ Interests raised regarding ensuring the proponent coordinates with local emergency services ■ Interests raised regarding long-term site security and contractor roles ■
Employment and Training	■ Interests raised regarding importance in local hiring, youth scholarships and paid training pathways ■ Interests regarding defining “local” and “regional” as it relates to employment opportunities ■ Interests raised regarding a bursary or scholarship program for training local workforce ■ Interests raised regarding ensuring training and employment are accessible to all demographics
Environment - General	■ Concerns raised about duration or irreversibility of environmental effects
Environment – Water	■ Interests raised regarding whether there will be cooling water or thermal discharge into the Peace River ■ Concerns raised regarding Peace River water withdrawals, allocation and drought scenarios ■ Interests raised regarding water licensing limits and upstream dam coordination ■ Interests raised in understanding closed-loop cooling and discharge management ■ Interests raised regarding potential aquifer impact ■ Interests raised regarding river temperature, flow reduction and aquatic ecosystem changes ■ Concerns raised regarding contaminants (non-radioactive and radioactive) entering waterways ■ Concerns raised regarding management of competing water users and low-flow conditions
External Events/Hazards	■ Concerns raised regarding potential impacts of wildfires, oil and gas incidents, flooding and extreme cold conditions on the facility

Table 3.3-1: Preliminary Topics of Interest – Public and Stakeholders

Theme	Key Issue or Interest Identified
Fish/Fish Habitat	■ Interests raised regarding long-term monitoring of fish health and spawning
Human Health	■ Interests raised regarding understanding long-term health effects and monitoring ■ Concerns raised regarding radiation exposure and potential for release of carcinogens ■ Concerns raised regarding potential contamination of fish, wildlife, farmland, and food chains
Indigenous Knowledge	■ Interests raised regarding understanding of how the proponent is conducting meaningful engagement and incorporation of Indigenous knowledge ■ Interests raised regarding consultation and benefit-sharing opportunities
Indigenous Sites of Significance	■ Interests raised regarding mapping, setbacks, and consultation before making a siting decision ■ Concerns raised regarding protection of sacred and culturally significant sites
Indigenous Traditional Land and Resource Use	■ Interests raised regarding potential effects on traditional land use and food systems and long-term stewardship ■ Concerns raised regarding potential impacts on hunting, trapping, fishing and generational legacy ■ Interests raised regarding desire to protect Indigenous cultural identity
Infrastructure and Services	■ Concerns raised regarding potential impacts to local housing and price inflation ■ Interests raised regarding potential effects of increased housing demand on homelessness, seniors and low-income residents ■ Concerns raised about potential for housing oversupply after construction ■ Concerns raised regarding pressures on schools, hospitals, policing, healthcare and social services ■ Interests raised regarding sequencing, funding, and responsibility of infrastructure and services upgrades prior to workforce arrival ■ Interests raised regarding Peace River airport upgrades/reopening for commercial flights
Land and Resource Use	■ Interests raised regarding agricultural compatibility and land use within exclusion zones ■ Concerns raised regarding loss of agricultural land for facility footprint ■ Interests raised regarding desire to preserve “pristine farmland” ■ Concerns raised regarding about farmland loss and soil compaction ■ Concerns raised on the potential impacts to agricultural food pathways ■ Interests raised in understanding setbacks from wells, aquifers, and oil infrastructure

Table 3.3-1: Preliminary Topics of Interest – Public and Stakeholders

Theme	Key Issue or Interest Identified
Meteorological Conditions and Hazards	■ Concerns raised regarding steam plumes due to mechanical cooling and the potential effects on fog, frost, precipitation and winter ice formation ■ Interests raised regarding modelling local weather effects
Power Costs and Rates	■ Interests raised regarding electricity pricing, long-term contracts and cost to consumer ■ Interests raised in understanding cost of power comparison to natural gas and other forms of renewables
Powerlines	■ Interests raised regarding transmission expansion and power destination (local vs export) ■ Concerns raised regarding new transmission corridors and potential land impacts
Procurement/Business Opportunities	■ Interests raised regarding local procurement opportunities and clear contracting pathways ■ Interests raised regarding the need for early communication of vendor requirements ■ Interests raised regarding the desire for Indigenous and regional business inclusion
Project Need	■ Interests raised regarding whether Alberta requires additional baseload capacity ■ Interests raised regarding energy independence vs. interconnection with U.S. grid ■ Interests raised regarding if power will be supplied to potential AI Data Centres in the region ■ Interests raised regarding electricity demand projections, and export intentions
Project Phases and Schedule	■ Interests regarding timelines for siting decision and construction ■ Concerns raised regarding early-stage design uncertainty ■ Interests raised regarding a timeline for an operator to be selected
Radioactivity	■ Concerns raised regarding potential radiation exposure pathways ■ Concerns raised regarding airborne tritium, long-term waste radioactivity and dose modelling ■ Interests raised regarding potential production of medical isotopes

Table 3.3-1: Preliminary Topics of Interest – Public and Stakeholders

Theme	Key Issue or Interest Identified
Regulatory Process	■ Concerns raised regarding regulator distrust and outdated regulations ■ Interests raised regarding compliance with evolving international standards ■ Interests raised regarding understanding efficiencies in regulatory process that could improve timelines ■ Interests raised regarding the timeline for a federal government decision on the Project ■ Concerns raised regarding the region's stance as a "willing host" ■ Questions regarding whether local consent or plebiscites will influence federal decision-making ■ Interests raised in ensuring Impact Statement is adequately inclusive of community interests, concerns and priorities ■ Interests raised regarding how the federal and provincial government will collaborate on the Environmental Impact Assessment
Rights of Indigenous Peoples	■ Interests raised regarding consultation depth, consent, and potential veto authority from Indigenous Nations and Communities
Riparian/Wetlands	■ Interests raised regarding setbacks from wetlands ■ Concerns raised regarding Peace River arch and groundwater salinity
Community Resilience and Safety	■ Concerns raised regarding influx of workforce, out-migration, and long-term community destabilization ■ Concerns raised regarding community disruption, crime, and social stress ■ Concerns raised regarding long-term lifestyle change and loss of rural community character ■ Concerns raised regarding stress, division, erosion of local identity. ■ Interests raised regarding preserving quality of life and northern character ■ Interests raised regarding plans for integrating temporary workers into communities
Safety of Facility	■ Interests raised regarding understanding safety features of the facility ■ Interests raised regarding long-term safety upgrades and modernization ■ Interests raised regarding decommissioning plan and bonds
Security	■ Concerns raised regarding about extreme scenarios (e.g., war, terrorism, hacking, dam breach) ■ Interests raised regarding cybersecurity standards and oversight

Table 3.3-1: Preliminary Topics of Interest – Public and Stakeholders

Theme	Key Issue or Interest Identified
Seismic	■ Interests raised in understanding how fracking, kimberlite pipes and regional seismic history factor into facility design ■ Interests raised regarding maximum design-basis earthquake capacity ■ Interests raised regarding seismic tolerance, and geological stability
Site Evaluation	■ Interests raised regarding understanding the difference between screening vs detailed analysis on siting ■ Interests raised regarding data sources and use of Light Detection and Ranging (LiDAR) technology for geological studies
Siting/Selection	■ Concerns raised regarding potential impacts to agricultural land use and river proximity ■ Interests raised regarding distance between site options and access routes ■ Interests raised regarding understanding rationale for Peace River location
Species At Risk/Habitat	■ Interests raised regarding endangered species present in the region and mitigation plans ■ Interests raised regarding cumulative habitat fragmentation
Surface Water	■ Concerns raised regarding Peace River flows, allocation percentages and drought ■ Concerns raised regarding potential dam breach scenarios and downstream effects
Tailored Impact Statement Guidelines	■ Interests raised regarding how local feedback shapes TISG requirements ■ Interests raised regarding a desire for public feedback to be reflected in federal guidelines
Technology Selection	■ Interests raised regarding reactor type changes and plant parameter envelope approach ■ Interests raised regarding a desire to better understand the differences of the two potential technology options
Topography/Soil/Sediment	■ Interests raised regarding erosion, sediment transport, and soil contamination ■ Concerns raised regarding potential impacts to agricultural productivity ■ Interests raised regarding historical riverbank instability in the region
Transportation – Airports	■ Interests raised regarding potential airport upgrades and commercial viability ■ Interests raised regarding proponent's plans for workforce transport and regional connectivity
Transportation – Waste Management	■ Concerns raised regarding transport of nuclear materials through the region ■ Interests raised regarding tracking, regulation and accident risk

Table 3.3-1: Preliminary Topics of Interest – Public and Stakeholders

Theme	Key Issue or Interest Identified
Waste Management – Storage	■ Concerns raised regarding lack of viable and approved permanent waste repository in Canada for this Project ■ Interests raised regarding dry storage duration and long-term responsibility of management
Water Use/Water Supply Waterways	■ Interests raised regarding on-site storage ponds and reserve quantity
Wildlife/Wildlife Habitat	■ Concerns raised regarding potential impacts to wildlife due to habitat disruption ■ Concerns raised regarding long-term ecosystem disturbance and cumulative impacts

3.3.8 Future Public and Stakeholder Engagement Activities

Stakeholder Engagement activities for 2026 and beyond include:

- **Ongoing Meetings:** Energy Alberta will continue to be available to meet with interested stakeholder groups to present Project information and address any questions or concerns. Planned standing meetings will include a quarterly CAO update for local governments and regular delegation presentations to municipal councils.
- **Community Pop-ups:** Energy Alberta will continue to hold informal small group discussions in local venues as a means to connect with the public on the proposed Project, gather feedback and answer questions.
- **Community Information Sessions:** Energy Alberta will hold public engagement sessions as needed to share Project updates and to seek input into Project plans at key points in time.
- **Workshops:** Conduct topic-specific technical workshops that allow attendees to discuss the potential Project impacts, share their perspectives, and contribute to the planning process.
- **Socio-economic Working Group:** Energy Alberta plans to form a working group made up of local government representatives and social service providers to help inform the development of the socio-economic effects assessment.
- **Community Events:** Energy Alberta will continue to seek opportunities to participate in local community events where they provide an opportunity to engage directly with members of the public on the Project.

Stakeholder engagement activities will continue to adapt as additional input from the public and other interested parties is received on how they would prefer to be engaged.

3.4 Communications

The following summary for Communications includes the work that Energy Alberta has conducted since the outset of the Project through to early 2026, as well as plans for ongoing and upcoming communications initiatives. Our approach is guided by a commitment to transparency and accountability and a dedication to delivering open, honest, and frequent communications based on the following principles:

- **Inclusivity:** Use multiple channels and styles of sharing information to meet the needs of our diverse stakeholders and the public.
- **Relationship building**: Develop authentic and positive long-term relationships.
- **Respect:** Respect individual values, recognize the legitimacy of concerns and questions.
- **Responsiveness**: Provide timely feedback and information in response to questions or issues raised.
- **Adaptability**: Adjust approaches as the Project progresses and new information or feedback emerges.

Since the outset of the Project, Energy Alberta has implemented an integrated and multi-channel communications approach designed to ensure widely available, transparent information about Project planning, milestones, industry and technical information and opportunities for engagement. This approach includes digital channels (website and social media) to help us share information and tell stories about key topics, media relations to provide information and foster relationships with journalists and media outlets as well as information sharing by way of an e-newsletter and two-way communication through a Project information email and toll free phone line to receive and respond to inquiries from the general public.

Company Website (EnergyAlberta.com)

The website serves as the central source for all Project information, including news, updates, fact sheets, key documents, and engagement opportunities. The site is regularly updated with Project announcements and resources to inform stakeholders and the public about progress and next steps. The site also provides contact information, a procurement registry, a jobs registry and the ability to sign up for Energy Alberta's e- newsletter (The Power Source).

Since launching the initial website on December 19, 2024, and the more comprehensive version on February 20, 2025, Energy Alberta has welcomed more than 10,000 visitors to the site.

Content about the Peace River Nuclear Power Project on the website is presented by the following key sections and sub-sections. The content on the website is maintained to reflect the most current information and status of the Project:

- Project – Project Overview, Benefits, Regulatory
- Sustainability – Engagement, Indigenous Peoples, Environment, Safety
- News – News & Insights, Resources, Events
- About Us
- Contact Us

In addition to the main content on the website, information in our *News & Insights* sub-section is presented in narrative, or story format and a series of Fact Sheets are maintained in the *Resources* sub-section on key topics raised by stakeholders and Indigenous Nations & Communities. Over the reporting period this content included:

- 29 Web Stories and News Releases on a variety of topics with content aimed at reporting on our activities and providing Project updates. The narrative format often includes photos, video content and quotes from senior leadership to help provide information in an easy-to-read and narrative manner.
- Nine Fact Sheets in printable, PDF format on topics including *Project Overview, Nuclear Energy, Jobs and Procurement, Jobs and Procurement, Waste Management, Radiation Safety, Water Use, Land Use, Nuclear Safety* and *Community Resources*.

Project Email Address and Phone Line

A public email address info@energyalberta.com was established in order to provide a channel for stakeholders and those interested in the Project to send email through the website or their own email service. A toll-free phone number for the Project (1-800-913-1930) was launched in February 2026. This contact information is published on the Energy Alberta website and is on public materials including Fact Sheets and business cards.

Between January 2025 and February 2026, Energy Alberta responded to 89 emails to the Project email address.

Media Outreach & Relations

A dedicated media email address was established (Media@EnergyAlberta.com) to ensure timely responses to inquiries from journalists and media organizations, facilitating accurate and transparent reporting on the Project. Energy Alberta issues press releases and executive commentary on strategic developments, partnerships and the broader energy context to amplify understanding of Project goals.

In the reporting period, Energy Alberta received 48 media requests through the media inbox, responded to 35 questions or requests for information, and provided 13 interviews with senior leaders or subject matter experts. Spokespeople were also made available to media outlets during in-person engagement events and eight interviews were provided to radio stations and print outlets in the Peace River region. Content from these interviews or requests for information appeared in national and local news media.

Active Social Media Presence

Energy Alberta maintains active profiles on LinkedIn, X (formerly Twitter), and Facebook to share updates, announcements, and engage in dialogue with the broader public.

Facebook

In its first year on Facebook, Energy Alberta focused on building awareness, sharing Project information and creating space for constructive dialogue about the proposed Peace River Nuclear Power Project. A total of 62 posts were published, resulting in 187 new followers. This steady growth reflects increasing interest in Project updates, engagement activities and broader conversations about nuclear energy in Alberta.

LinkedIn

In its first year on LinkedIn, Energy Alberta established a strong presence among business, government and industry audiences while advancing awareness of the proposed Peace River Nuclear Power Project. Energy Alberta published 75 posts, maintaining a steady and consistent

content cadence. The page welcomed 1,482 new followers, with the largest concentrations in key economic and policy centres. This distribution reflects growing engagement from corporate leaders, policymakers and industry professionals across Canada.

X

In its first year on X, Energy Alberta used this platform to share timely updates and reinforce key messages related to the proposed Peace River Nuclear Power Project. A total of 59 posts were published, reflecting a consistent and active presence. The account welcomed 47 new followers, demonstrating continued interest in Project updates and broader energy conversations.

E-Newsletter - The Power Source

In 2025 Energy Alberta initiated an e-newsletter, *The Power Source*, to deliver key Project news, milestones, and engagement opportunities straight to subscribers' inboxes, enabling stakeholders to stay informed and receive updates on an ongoing basis. Past issues are also available in PDF format on the Resources page of the website.

Since 2025, six newsletters were distributed and published. As of January 31,2025, 1,071people are registered to receive regular newsletter updates. Sign-ups for *The Power Source* were collected at in-person engagement events and there is a box at the bottom of every page of the Energy Alberta website to "Join Our Mailing List" encouraging people to subscribe to receive email updates.

3.5 Assessments Relevant to the Project

There are no regional assessments as defined in Sections 92 and 93 of the IAA in the region near the Project.

The Strategic Assessment of Climate Change (SACC; ECCC 2020a) is a strategic assessment under Section 95 of the IAA and is relevant to the Project. This relates to the extent to which the Project hinders or contributes to the Government of Canada's (GOC) ability to meet its commitments in respect of climate change, such as the Paris Agreement, Canada's 2030 target, and the goal of Canada achieving net-zero emissions by 2050. The quantification of greenhouse gas (GHG) emissions per the SACC and its supporting guidance documents are presented in Section 7.8. In particular, descriptions will be provided on how the Project will help Canada achieve the 2050 net-zero carbon emissions target by contributing to decarbonization pathways.

There are no other strategic assessments as defined in Section 95 of the IAA that are relevant to the Project.

Indigenous Knowledge studies will be conducted as the Project progresses starting from the early stages throughout the Impact Assessment. These studies are essential so that the concerns and perspectives of Indigenous Nations and Communities are appropriately understood and addressed. Incorporating Indigenous perspectives can provide valuable insights into the local

environment, climate resilience, and sustainable development practices that align with the values of Indigenous Peoples. The use of Indigenous Knowledge will be integrated into environmental monitoring, impact assessment, and the design of mitigation strategies, so that the Project supports the interests of the Indigenous Nations and Communities in the region.

3.6 Other Relevant Studies

The following studies or plans may be relevant to the development of the Project:

- County of Northern Lights Municipal Development Plan Bylaw #10-61-270: This plan outlines the development guidelines and regulations for the County of Northern Lights, which includes one of the potential sites for the Project.
- Integrated Watershed Management Plan of the Peace and Slave Watersheds: This plan focuses on managing water resources in the Peace and Slave watersheds, ensuring sustainable use and protection of water quality.
- Peace River Water Use Planning: This plan addresses the use and management of water resources in the Peace River, which is crucial for the Project's water needs.
- Wood Buffalo National Park World Heritage Site Action Plan: This plan aims to protect and manage the natural and cultural heritage of Wood Buffalo National Park, which is located near the Project area.

These studies and plans help the Project development align with local development guidelines, sustainable water management practices, and environmental protection efforts.

4 PART C – PROJECT INFORMATION

4.1 Purpose of and Need for the Project

4.1.1 Purpose of the Project

The purpose of the Project is to provide the province of Alberta an additional electrical supply that will support Alberta's growing energy needs and contribute to the provincial economic growth, while supporting federal and provincial governments in meeting their GHG reduction goals. According to the Canada Electricity Advisory Council, electricity is poised to play a sizable role in the Canadian economy over the coming decades, driven by a demand for dependable and non-emitting energy sources, including nuclear power (GOC 2024c). In 2025 Canadian Nuclear Association (CNA) found that energy demands in Canada by 2050 will be 2.4 to 3 times the capacity that is available today (CNA 2025). This means that there is a need to develop at least 115 GW of new non-emitting baseload generation. Nuclear energy is a critical component of the solution to this challenge.

The Project plans to deploy four (4) nuclear power reactors. There are two reactor designs under consideration for the Project:

1) CANDU MONARK 1000MWe – produces 1,100MWe (gross output) or 1,000 MWe (net output) depending on the site conditions; and,

2) Westinghouse Electric Company (WEC) AP1000 Plant – produces 1,300 MWe (gross output), or 1,200 MWe (net output) depending on the site conditions.

Each reactor unit is expected to produce a net of 1,000MWe to 1,200 MWe sent to the electrical grid. This accounts for use of some power within the reactor facility. With four reactors on the site, the total gross capacity of is expected to be approximately 4,400MWe. However, licensing the total facility to 4,800MWe aligns with the licensed capacity of other nuclear power projects operating in Canada and allows for consideration of potential future efficiency improvements and additional contingencies.

This new facility expands on the existing oil sands and energy services capability to build a new Alberta-based supply chain and grow an extensive number of other specialized highly skilled workers within the province.

4.1.2 Need for Electricity

Canada and Alberta have committed to a net-zero power grid by 2050. At the same time, electricity demand growth expectations are increasing dramatically. The Alberta Electric System Operator's (AESO's) most recent Long-Term Outlook (https://www.aeso.ca/grid/grid-planning/forecasting/2024-long-term-outlook) is forecasting an approximately 50% average load growth and as much as 100% peak load growth under its high electrification scenario by 2050.

The AESO has also identified the need for dispatchable resources, especially non-emitting resources, in several recent publications. The 2023 Reliability Requirements Roadmap (https://www.aesoengage.aeso.ca/reliability-requirements-roadmap) identified the challenges that the grid was facing with the additions of variable, invertor-based resources such as wind and solar and the concurrent loss of large synchronous generation types through the coal phase-out and retirement of the larger inefficient coal to gas conversion units. The AESO's earlier Net-Zero Pathways Report (https://www.aeso.ca/assets/Uploads/net-zero/AESO-Net-Zero-Emissions-Pathways-Report.pdf) highlighted the capital investment required to meet the decarbonization objective and the critical role that dispatchable technologies play in a long-term fully decarbonized grid.

Most recently, on November 27, 2025, the governments of Alberta and Canada signed a Memorandum of Understanding (MOU) that committed them to the common objective of "increasing electrical generation for consumer and industrial use on Alberta's electricity grid, including meeting the needs of AI data centres, while simultaneously reaching net-zero greenhouse gas emissions for the electricity sector by 2050" (Canada-Alberta MOU 2025).

The advancement of the Project would advance the ability of Alberta to meet its decarbonization objectives while maintaining a safe, reliable baseload power and allowing room for renewables to operate in response to changing demand for electricity. Furthermore, the Project could support the provincial and federal governments' goal "to strengthen the ability of the western power markets to supply low carbon power to oil, LNG, critical minerals, agricultural, data centres and CCUS industries in support of their sustainability goals" (Canada-Alberta MOU 2025).

4.1.3 Need for Nuclear to Reach Net-Zero Emissions

With the adoption of the Paris Agreement (UNFCCC 2016) in December 2015, almost all Parties to the United Nations Framework Convention on Climate Change (UNFCCC) agreed to prepare Nationally Determined Contributions (NDCs) to reach net-zero by 2050 (ECCC 2020b). The NDCs are specific climate action plans and commitments that individual countries make to reduce GHG emissions and address climate change, depending on its unique circumstances and capabilities (UNFCCC 2016). These commitments were further enhanced during the 2021 United Nations Climate Change Conference (Conference of Parties [COP] 26). To reach this goal, GHG emissions from electricity generation must fall to nearly zero by the middle of this century, even as electricity needs worldwide continue to grow and expand in end-uses, such as transportation, heating and industrial energy use (ECCC 2020b).

Nuclear energy, with around 413 gigawatts of capacity operating in 32 countries, contributes to reducing GHG emissions and address climate change by avoiding 1.5 gigatonnes of global emissions and 180 billion cubic metres (billion m^3) of global gas demand a year (IEA 2024). While wind and solar photovoltaics are expected to lead the push to replace fossil fuels, they need to be complemented by dispatchable resources, such as nuclear power. Indeed, the potential for nuclear power to accelerate the transition to net-zero and improve global energy security was

endorsed by all G7 leaders in 2024 (GOC 2024d). As today's second largest source of low emissions power after hydropower, and with its dispatchability and growth potential, nuclear can help ensure secure, diverse low emissions electricity systems (IEA 2024).

Nuclear power provides about 10% of global electricity supply (IEA 2019); however, much more nuclear power is required to achieve the Net-Zero Emissions by 2050, based on the "Net-Zero Emissions Scenario". To get on track with the Net-Zero Emissions Scenario and to meet global electricity demands (which are expected to double over the next three decades [IAEA 2021]), global nuclear capacity needs to expand by about 15 gigawatts per year on average (just over 3% annual growth) to 2030, helping to maintain nuclear power's share of electricity generation at around 10% (IEA 2024). According to the International Atomic Energy Agency's (IAEA) projection, nuclear energy could contribute about 12% of global electricity by 2050 (IAEA 2021).

The Government of Canada is committed to achieving net-zero emissions by 2050. The *Canadian Net-Zero Emissions Accountability Act*, which became law in June 2021, enshrines in legislation Canada's commitment to achieve net-zero emissions by 2050. At the COP26, Canada further committed to a target of reducing emissions by 45% by 2030, and to achieving a net-zero emissions electricity sector by 2035 (GOC 2021b). These commitments are reiterated along with actions to achieve them in the Government of Canada's 2030 Emissions Reduction Plan (ECCC 2022) addressing economy-wide GHG reductions, in Powering Canada forward (NRCan 2023) addressing electricity sector decarbonization efforts, and in recent federal budgets highlighting clean energy investments. In each of these critical government documents, the importance of expanding nuclear power as a source of non-emitting electricity is highlighted.

Alberta is uniquely placed to take advantage of this developing sector due to its strong history of energy investment and high rates of public support for nuclear technology. According to research commissioned by the Canadian Nuclear Association, Alberta, Ontario and Saskatchewan stand out for notably positive views about nuclear power (CNA 2023). The Emissions Reduction and Energy Development Plan is Alberta's approach to enhance their position as a global leader in emissions reductions, clean technology and innovation, and sustainable resource development. Alberta's plan includes an aspiration to achieve a carbon neutral economy by 2050, and achieve 30% renewable energy by 2030, which includes the use of nuclear power (GOA 2024a).

4.1.4 Value Added and Economic Growth

As with nuclear power generally, the economic benefits of the Project will span across Canada. For instance, the growth of nuclear power in Canada represents an opportunity to continue growing Canada's nuclear industry and supply chain by creating and sustaining highly skilled jobs. Studies indicate that nuclear power plants create some of the largest economic benefits compared to other electric generating technologies due to their size and the number of workers needed to operate the plants (Nuclear Energy Institute 2012). Based on modelling completed by Navius Research (2023) for Clean Energy Canada, Canadian jobs in clean energy are predicted to grow 7%

a year, from 509,000 in 2025 to 2.7 million in a net-zero 2050. Jobs in Alberta's clean energy sector are predicted to grow 10% per year out to a net-zero 2050—the fastest of any province or territory (Navius Research 2023). Alberta is well positioned with a skilled labour pool and strong balance sheet to bring nuclear power to the province.

A macroeconomic assessment of the Project will be carried out as part of the socio-economic impact assessment, including a projection of number of jobs created in Alberta. However, the potential economic benefits of the Project can be projected based on two recent reports:

1) For the CANDU MONARK - in a 2024 report by the Conference Board of Canada. In this report, the economic benefits of deploying four (4) 1,000MWe-class CANDU MONARK reactors was assessed (CBC 2024). The CBOC report[1] describes the following economic benefits related to the deployment of four CANDU MONARK reactors:

   - Gross Domestic Product (GDP) boost over the 70-year life of a 4-unit Project;
   - A $40.9 billion boost to the Canadian GDP during construction and a $49.5 billion boost during operations;
   - A GDP impact of $6.6 billion per year, for a total estimated GDP impact of $502 billion during a 76-year operating period;
   - Deep integration with Canadian supply chains means that for every dollar spent GDP increases by $0.97. Including profit from the sale of electricity into the wholesale market increases this multiplier to $2.00;
   - The existing Canadian CANDU supply chain has a long legacy of supporting CANDU deployments globally. It is projected that each MONARK unit installed globally could increase GDP in Canada by $4.8 billion.
   - During the combined design and construction phases of the first deployment, 20,260 jobs per year on average will be created (direct, indirect and induced), this will include up to 8,000* direct jobs. The power plant will sustain approximately 1,1000** direct jobs per year over its 70-plus year operating life;
   - Additional labour income of $26.1 billion in design and construction phases, and $24.7 billion in the operation phase; and,
   - A $29.1 billion in additional tax revenue across all levels of government in Canada over the life of the Project.

1 The CBOC analysis does not include revenue from power sales.

* additional information provided by the vendors.

2) For the AP1000 – 2024 report by PricewaterhouseCoopers LLP (PwC). In this report, the economic benefits of deploying four (4) AP1000 reactors in Ontario was assessed (PwC 2024). The report describes the following key economic benefits:

   - Gross Domestic Product (GDP) boost over the 60-year life of a 4-unit Project;
   - A $28.7 billion boost to the Canadian GDP during a 16-year design and construction phase;
   - On an annual average basis $8.1 billion in GDP during operations. During a minimum operating period of 60 years the cumulative undiscounted economic footprint is estimated to be $485.3 billion in GDP
   - An additional $103.3 billion in labour income and $120.6 billion in total taxes in Canada, when taking into account direct, indirect, and induced effects.
   - As noted in the report focused on Ontario, investing in the AP1000 Project in Ontario will build up the Canadian supply chain for this reactor technology. This will bring future value to Canada as the supply chain will be called upon to support AP1000 developments around the world. This new Canadian supply chain has potential to support installations around the world furthering economic opportunities for Canada. It is estimated that each unit installed globally could provide $880 million in Canadian GDP due to the use of this newly created supply chain.
   - 7,910 full time equivalent jobs during the design and construction phase. Over 1,600* direct jobs over the operations of the facility; and 12,000 full time equivalent jobs (which includes direct, indirect and induced).

A 4,800 MWe net increase of nuclear power that would add approximately 15% to Alberta's existing energy capacity, and 30% of future power needs.

The growth of nuclear power in Canada also provides opportunities for partnerships with Indigenous Nations and Communities. These partnerships can provide new economic opportunities, the ability to develop new technical skills, and the enhancement of business capacity (H. Exner-Pirot and J. McCormick 2024).

In addition to providing reliable power to Alberta, nuclear reactors have the ability to co-produce medical isotopes.

The CANDU reactor's ability to co-produce medical isotopes, such as Cobalt-60, Lutetium-177, Yttrium-90, Helium-3, and Molybdenum-99 can support the global healthcare sector by providing essential materials for diagnostic imaging, cancer treatment, and sterilization of medical supplies. This capability not only enhances the value proposition of the nuclear power plant but also contributes potential social benefits, making it a dual-purpose facility that benefits both energy and health sectors. This also provides an opportunity for the province of Alberta to gain independency and security of medical isotopes for the province's health sector. CANDU reactor is the only power reactor in the world able to co-produce life-saving medical isotopes. For example, Ontario Canada's CANDU reactors alone currently produce 50% of the world's supply of cobalt-

60 which is used to sterilize 40% of the world's single-use medical devices. The CANDU reactor's online isotope harvesting system allows for extraction during power operations without any adverse impact on plant performance.

The AP1000 reactor can complement the isotope production of their current fleet through the ability to produce short-lived medical isotopes like Lutetium-177 and Stronium-90 using existing in-core systems. Westinghouse has partnered with Nordion to develop technology to facilitate the production of Low Specific Activity (LSA) Cobalt-60 in U.S. Pressurized Water Reactors (PWRs).

District heating is another potential benefit that the surrounding communities can take advantage of. For example, the Cernavoda Nuclear Power Plant in Romania is a two-unit CANDU6 nuclear facility that has been successfully supplying district heating for decades. The heat generated from the secondary water circuit is distributed through an extensive network of insulated water pipes to residential, commercial, and industrial buildings within the surrounding towns to supply hot water and space heating. This enables provision of consistent supply of heat, maintaining optimal indoor temperatures throughout the year while reducing reliance on fossil fuel, air pollutants, while lowering heating costs. This has the potential to create value added opportunities for intensive agriculture or other industrial activity near a nuclear power project in northern Alberta.

There are also various behind-the-meter nuclear power solutions that may be considered. Behind-the-meter involves generating electricity on-site using nuclear reactors to directly supply power to high-demand applications. Such solution could be implemented to provide electricity to the high-demand users during the off-peak hours without reducing the output of the nuclear power facility. There are potential cost savings by reducing extensive transmission infrastructure needs, keeping the operation at high capacity by generating round-the-clock energy, and providing additional economic opportunities. Some of the potential ideas include generation of green hydrogen using electrolysers, then storing or transporting it to the off-grid communities, co-location of data centers, and providing electricity to nearby high electricity demand facilities.

4.2 Impact Assessment Requirements

Impact Assessments are completed on projects identified as having the greatest potential for adverse environmental effects in areas of federal jurisdiction, and that are either listed as a “designated project” in the Physical Activities Regulations, or as “designated” by the federal Minister of Environment and Climate Change Canada (ECCC). The IAAC leads Impact Assessments for all designated projects under the IAA.

The Physical Activities Regulations define the physical activities that may be designated by the Government of Canada under the IAA. Section 27 of the Physical Activities Regulations identifies the following as a Designated Project, with respect to nuclear facilities:

> 27 *The site preparation for, and the construction, operation and decommissioning of, one or more new nuclear fission or fusion reactors if*
>
> *(b) that activity is not located within the licensed boundaries of an existing Class IA nuclear facility and the new reactors have a combined thermal capacity of more than 200 megawatts (thermal) (MWth).*

The Project has a proposed capacity of up to 4,800 Mwe, deriving from a combined thermal capacity of approximately 13,000 MWth, and will not be located on an existing nuclear site. Therefore, the Project is a "designated project" as described in subsection 27(b) of the Physical Activities Regulations [R-48].

In addition to the above, Section 28 of the Physical Activities Regulations identifies the following as a Designated Project, with respect to nuclear facilities:

> 28 *The construction and operation of either of the following:*
>
> *(a) a new facility for the storage of irradiated nuclear fuel or nuclear waste, outside the licensed boundaries of an existing nuclear facility, as defined in section 2 of the Nuclear Safety and Control Act, other than a facility for the on-site storage of irradiated nuclear fuel or nuclear waste associated with one or more new fission or fusion reactors that have a combined thermal capacity of less than 200 MWth;*
>
> *(b) a new facility for the long-term management or disposal of irradiated nuclear fuel or nuclear waste.*

The Project is therefore considered a "designated project" under Section 28 of the Physical Activities Regulations based on the fact that exclusion under 28 (a) is limited to facilities that are less than a combined thermal capacity of 200MWth.

4.3 Activities, Infrastructure, and Physical Works

The following activities, infrastructure, permanent or temporary structures, and physical works have been determined to be included in, and are associated with, at least one of the site preparation, construction, operation, and/or decommissioning phases of the Project. These phases are detailed in the following sections. Overarching all of these phases is the Integrated Management System (IMS).

4.3.1 Integrated Management System

An Integrated Management System (IMS) combines different management systems, such as quality, environment, engineering, procurement, and safety, into one unified framework. This approach makes processes more efficient and streamlined.

The IMS outlines how to implement compliance measures, continually improve processes, and promote a culture of health and safety. It includes program-level documents organized into categories that reflect the Canadian Nuclear Safety Commission (CNSC) safety and control areas and other regulatory interests.

To support the Project during the Integrated Assessment stage, the IMS includes the following elements:

- Supply Chain Management (including Contractor Oversight): Managing the supply chain and overseeing contractors.
- Site Evaluation: Assessing the suitability of the site.
- Engagement and Communication: Interacting with stakeholders and communicating Project details.
- Information/Document Management: Handling and organizing Project documents and information.
- Engineering and Design Authority: Overseeing engineering and design aspects.
- Project Management: Managing the overall Project.
- Performance Improvement: Continuously improving Project performance.
- Security: Ensuring the security of the Project.
- Human Resources: Managing personnel involved in the Project.

When applying for a Licence to Prepare the Site, additional elements are added to the IMS:

- Site Preparation: Preparing the site for construction.
- Environmental Management: Managing environmental aspects and impacts.
- Training: Providing training for personnel.
- Waste Management: Handling and disposing of waste.
- Safety Culture: Promoting a culture of safety within the Project.

As the Project progresses through future licensing stages, including construction, operations, and decommissioning, more elements will be added or revised. These may include:

- Interface Management: Managing interactions between different project components.
- Configuration Management: Controlling changes to the project configuration.
- Turnover: Managing the transition between project phases.
- Surveillance and Testing: Monitoring and testing project components.
- Maintenance and Ageing Management: Maintaining and managing the ageing of project components.
- Outage and Major Modification Management: Handling outages and major modifications.
- Nuclear Materials Safeguarding: Ensuring the security and control of nuclear materials.

In summary, the IMS provides a comprehensive framework that integrates various management systems to maintain efficiency, compliance, and continuous improvement throughout the Project's lifecycle.

4.3.2 Site Preparation

4.3.2.1 Activities

Once the License to Prepare Site is obtained, the following key activities will be undertaken as part of site preparation for the Project. This will also include the development of a detailed schedule so that all activities and infrastructure are undertaken and constructed in accordance with appropriate licensing requirements.

- Preparation of the License To Construct (LTC) application, including Preliminary Safety Analysis Report and other LTC supporting documents;
- Supply chain set-up and early contracting activities;
- Complete training material and planning, and design of training facilities, including simulator;
- Procurement and contracting of materials, equipment and services required for construction; and
- Initiate procurement of long-lead items for the plant.
- Land clearing;
- Site earthworks, including topsoil stripping and salvaging, grading, drilling, and excavations;
- Relocation or removal of existing structures and below-grade utilities;
- Blasting as required to prepare foundations of buildings;
- Preparation of temporary material laydown areas;

- Transportation of materials and equipment to site and temporary storage in laydown areas;
- Temporary onsite storage and management of materials and equipment;
- Operation of equipment, including cranes, heavy equipment and diesel generators;
- Temporary onsite fabrication facilities for production of concrete, structural steel members, piping, tubing, large cabling sections and conduits, and supporting components;
- Temporary onsite facilities for safe treatment, reduction and packaging of construction related waste (e.g., concrete washout);
- Management of conventional, hazardous waste generated by site preparation activities; and
- Deployment of environmental protection and mitigation measures, such as surface water run-off management, flood protection, and erosion controls.

4.3.2.2 Infrastructure – Non-Nuclear

Installation of non-nuclear infrastructure, foundations, and facilities including such things as:

- Installation of construction facilities for equipment assembly, warehouses, administration, and worker amenities;
- Excavations and tunnelling for the nuclear power plant buildings and facilities; and
- Excavations and installation of intake structures, piping and other facilities for the supply and storage of water to site.

4.3.3 Construction

The sequencing of the activities and construction infrastructure will be determined in further detail using engineering optimization processes and may not occur in the order presented below. This will include a detailed schedule so that all activities and infrastructure are undertaken and constructed in accordance with any appropriate licensing requirements.

4.3.3.1 Activities

The key activities undertaken as part of the site construction phase of the Project include the following:

- Continued procurement of all remaining nuclear power plant structures, systems, components, and materials;
- Civil and structural works for the foundations, including concrete pouring and reinforcement;
- Construction of the main plant buildings and all remaining supporting facilities;
- Installation of the nuclear structures, systems, and components (SSCs) and materials;
- Plan and conduct all required testing and inactive commissioning of all the nuclear SSCs to confirm they meet the required safety, functional, and performance standards;

- Prepare the License to Operate application, including development of the Final Safety Analysis Report and all supporting deliverables, to obtain the License to Operate (LTO) from the CNSC once the construction and commissioning works are completed;
- Prepare the comprehensive set of operational documentation, including operating procedures, maintenance programs and procedures, conduct of operations documentations, emergency and severe accident procedures, and emergency response plans; and
- Plan and prepare all required training programs, including for operations, maintenance, knowledge workers and contracting personnel; initiate training (note training of licenced operators and maintenance personnel must be complete prior to the LTO being granted).

4.3.3.2 Infrastructure – Non-Nuclear

Non-nuclear infrastructure for the Project includes the construction of:

- Permanent onsite and offsite roads or improvements, as required;
- Installation of on-site services and utilities, permanent for the plant as well as temporary additional facilities for construction, including:
  - communication infrastructure and systems, including internet and local area networks;
  - power supply and distribution;
  - natural gas pipeline; and
  - potable and sewer water management facilities;
- Permanent stormwater pond for stormwater management, dewatering and drainage facilities;
- Permanent water intake and processing infrastructure, including screenhouses, pumphouses and storage ponds;
- Permanent turbine building and installation of turbine generators for electricity production;
- Permanent security infrastructure, including fencing, lighting, and monitoring to protect the security of the site;
- Temporary concrete batch plant and crusher plant;
- Permanent maintenance hot and cold shops, and inspection facilities;
- Permanent laboratories and testing facilities;
- Permanent standby and emergency power supply generators;
- Permanent high-voltage transmission switchyard, including connections to power plant generator, as well as any interconnection infrastructure required within the facility fenceline to enable connection to a new 500kV provincial power transmission network (the required transmission line is not part of the scope of the Project);
- Permanent water storage ponds and fire protection water storage tanks;

- Permanent facilities for the management and storage of conventional waste including hazardous materials;
- Permanent warehouse facilities and laydown areas;
- Permanent underground infrastructure to support servicing the site (e.g., water, sanitary);
- Permanent ancillary facilities including parking lots (partially electrified, and unpaved), weigh scales, and weather station;
- Permanent administration building housing offices and other supporting functions;
- Permanent emergency response facilities for emergency preparedness;
- Permanent onsite training facilities with simulator; and
- Temporary worker's accommodations.

4.3.3.3 Infrastructure – Nuclear

Nuclear infrastructure includes construction of or other work related to:

- Permanent piles and foundations for reactor buildings and other structures;
- Construction of the permanent main plant structures including the reactor and reactor auxiliary buildings;
- The installation of the permanent nuclear reactor systems, including the electrical systems, cooling systems, safety systems, instrumentation and control, and connection with the cooling water supply infrastructure;
- Permanent control room and remaining support buildings;
- Permanent facilities for the management and storage of low- level and intermediate level radioactive waste; and
- Permanent facilities for the management and storage of used fuel.

4.3.4 Operations

The operations phase of the Project includes the activities and infrastructure detailed in the following sections. Licensing phases applicable to operations include Licensing Phase 3: Licence to Operate, which must be received prior to first fuel load and active commissioning.

4.3.4.1 Activities

The operation phase of the Project will include the following key activities:

- Confirm all personnel have undergone full training and are qualified for their roles, with continuous training programs in place;
- Nuclear (active) commissioning, including removal of guaranteed shutdown state, fuel loading, reactor startup and criticality testing, power escalation testing (e.g., critical and lower power,

higher power, and commercial operation) and extensive testing of safety systems and reactor performance;

- Completion of an operational readiness review to confirm that the plant is ready for safe operations including:
  - Safety analysis monitoring and fitness for service program;
  - Emergency preparedness, including the implementation of emergency response plans and facilities;
  - Implementation of security measures;
  - Continuous monitoring of radionuclide and non-radionuclide levels within and around the Project site;
  - Initiation of material safeguarding activities, such as fuel loading and handling irradiation;
- Regular inspection and maintenance of Project components and systems;
- Operation of primary and secondary/tertiary heat transport systems;
- Operation of cooling system infrastructure, including intakes, pumping systems, storage pond management, pipelines, draft cooling infrastructure (cooling towers), and water treatment and release;
- Operation of turbines for electrical generation;
- Operation of electrical power systems, including transformers, diesel generators, and emergency power;
- Operation of services and utilities, including sewage, stormwater, and domestic water services;
- Operation of safety and security systems, including emergency response systems, first aid stations, health check areas and on-site fire watch station;
- Operation of radiological laboratories to support routine monitoring and to categorize waste materials for proper processing;
- Provide permanent facilities for the management and storage of operational nuclear waste and used fuel, including on-site facilities for used fuel waste and provisions for packaging for eventual off-site long-term disposal; and
- Segregated management and storage of operational conventional, hazardous and low-level radioactive waste and operational intermediate and high-level nuclear waste.

4.3.4.2 Infrastructure

The infrastructure for the operations of the Project will include:

- Temporary and/or permanent structures and logistics infrastructure to support outage inspection and maintenance program activities; and
- Temporary and/or permanent structures and logistics infrastructure to support life extension (refurbishment and retube) activities.

4.3.5 Decommissioning

A Preliminary Decommissioning Plan (PDP) will be developed in early site licensing, prior to LTC application, and will be in place throughout the Project phases to effectively plan and execute the decommissioning activities. Prior to the execution of decommissioning, the PDP will be converted into a Detailed Decommissioning Plan, with all content updated to outline the specific steps, timelines, resources, and costs required for the site decommissioning process. The Detailed Decommissioning Plan will be submitted to CNSC for review and approval prior to any decommissioning activity being undertaken. This will provide an efficient transition from active operation to final closure and release from regulatory control, confirming that regulatory requirements have been met.

CNSC will be notified in writing prior to the shutdown of the facility. The timing of the decommissioning and the proposed decommissioning activities, applicable regulations and other considerations will be discussed with CNSC. The necessary permits and regulatory approvals are then obtained before commencing decommissioning activities. Note that as per the Project Schedule in Section 4.5.1, due to the staged commencement of commercial operations for each reactor unit, it is expected that decommissioning will also proceed in a staged manner, with the first operational unit commencing decommissioning first.

The licensing phases applicable to decommissioning are Licensing Phase 4: Licence to Decommission and Licensing Phase 5: Licence to Abandon.

4.3.5.1 Activities

The decommissioning phase of the Project includes the following key activities:

- Defueling program and completion of post-operational clean out of radioactive inventory to enable immediate decommissioning as the preferred strategy;
- Support systems shutdown;
- Used fuel handling and transfer to dry storage on-site in preparation for shipment to off-site disposal;
- Dismantling and decontamination of reactors, structures, components, and support systems in accordance with decommissioning program and waste management plan;

- Removal of surface contamination from facilities and equipment;
- Reclamation planning and closure of the site;
- Hand over management of intermediate and high-level radioactive waste to the Nuclear Waste Management Organization (NWMO) who are responsible for the safe, long-term management of such materials including used nuclear fuel (NWMO) including removal from site and transportation.;
- Transport of radioactive waste to long-term storage/disposal site;
- Ongoing decommissioning, demolition, reclamation, restoration, and abandonment activities for temporary and permanent structures to achieved desired end state of site and enable future reuse of the site;
- Restoration and remediation of the site to a condition suitable for alternative land use; and
- Application for the Licence to Abandon site once it can be demonstrated that the site no longer poses any radiological risk.

4.3.5.2 Infrastructure

The decommissioning phase of the Project will include the following infrastructure:

- Temporary facilities to support waste management, demolition, and abandonment; and
- Temporary laydown and security-fenced areas for use while conducting the decommissioning activities.

4.3.6 Labour Force

The Project construction and operational workforce estimates are conceptual at this time and will be dependent upon the reactor technology that is selected. Current design and construction job estimates are 5,000 to 8,000 workers at peak, and the full operations workforce is estimated to be between 1,600 and 2,700 workers. These estimates cover the range of labour for the two reactor technologies under consideration. Expanded regional activity will benefit local residents—as economies grow and diversify, both public and private sector services also tend to grow and diversify. However, increased activity levels could put some upward pressure on wages and prices and cause some other disruptions in local markets.

4.4 Project Production Capacity and Process

Energy Alberta is considering the deployment of either the CANDU MONARK or the AP1000 for the Project. Both reactors are described in the following section, in separate subsections where applicable. Where the description does not distinguish between the two reactors, it can be assumed that those subsections are applicable to both technology applications on site. Energy Alberta anticipates that the technology selection process will be completed prior to the Licence to Construct application being submitted to the CNSC.

The Project is estimated to have a production capacity of up to 4,800 MWe deriving from approximately 13,000 MWth. It is proposed to deploy four (4) 1,000MWe (CANDU MONARK) or 1,200MWe (AP1000)power reactors, with a total gross capacity of approximately 4,800 MWe. This is within the Project overall licensed capacity, allowing for any optimizations of the design for this site and potential future enhancements to optimize power output.

4.4.1 Maximum Production Capacity

4.4.1.1 CANDU MONARK

Based on currently estimated design parameters, each individual CANDU MONARK reactor produces a core thermal power output of approximately 3,000 MWth giving a total combined thermal capacity of 12,000 MWth for all four units. Note that these values are approximate and subject to change as the design is finalized for the site. The final output will be dependent on cooling water conditions at the site and the net output can be optimized by adjusting turbine and condenser design to suit site conditions, as well as by optimizing “house loads” (i.e., the electrical power required by the plant itself. Table 4.4-1 provides key production-related data for a 4-unit CANDU MONARK plant.

Table 4.4-1: Maximum Production Capacity for the Project with a CANDU MONARK Reactor

Description	Unit of Measure	MONARK Date
REACTOR		
Plant design life	Years	70
Core thermal power (generic)	MWth	3,000*
Calandria shell inside diameter	mm	8,500*
Number of fuel channels (generic)	Qty	480
FUEL		
Reference equilibrium core-average fuel discharge burn-up	MWd/MgU	7,800*
Number of elements per bundle	Qty	37 (or 43 for CANFLEX fuel)
Fuel bundle length	mm	500*
Bundles per fuel channel	Qty	12
CONTAINMENT		
Type	N/A	Pre-stressed concrete with steel liner
TURBINE GENERATOR		
Gross/net electric output	MW(e)	1,100†*/1,000‡*
Gross turbine generator efficiency	%	35*

Notes:
mm – millimetres; Qty – quantity; MWd/MgU - Megawatt-day per metric ton uranium.
* Values approximate and preliminary.
† Gross electrical output depends on cooling water temperature, cooling cycle, the turbine generator and condenser design.
‡ Net electrical output depends on electrical loads used by the plant itself.

4.4.1.2 AP1000

Based on currently estimated design parameters, each AP1000 reactor produces 3,415 MWth primary power, giving a total combined thermal capacity of 13,660 MWth for all four units. The final output will be dependent on cooling water conditions at the site, the net output that can be optimized by adjusting turbine and condenser design to suit site conditions, as well as by optimizing "house loads" (i.e., the electrical power required by the plant itself). Table 4.4-1 provides key production-related data for the 4-unit AP1000 plant.

Table 4.4-2: Maximum Production Capacity for the Project with an AP10000 Reactor

Description	Unit of Measure	AP1000
REACTOR		
Plant design life	Years	60
Core thermal power (generic)	MWth	3,415*
Inner diameter of reactor pressure vessel	cm	404
Number of fuel assemblies	Qty	157
Normal operating pressure	psia	2250
FUEL		
Reference equilibrium core-average fuel discharge burn-up	MWd/MgU	21,000
Number of fuel rods per assembly	Qty	264 (arranged 17 x 17)
Fuel rod length	meters	4.26
Fuel enrichment	%U235	2.35 – 4.45
CONTAINMENT		
Type	N/A	ASME Section III Class MC freestanding cylindrical steel vessel
TURBINE GENERATOR		
Gross/net electric output	MWe	1,000 - 1,200‡*
Gross turbine generator efficiency	%	35.1**

Notes:
mm – millimetres; Qty – quantity; MWd/MgU - Megawatt-day per metric ton uranium.
* Values approximate and preliminary.
† Gross electrical output depends on cooling water temperature, cooling cycle, the turbine generator and condenser design.
‡ Net electrical output depends on electrical loads used by the plant itself.
** Efficiency based on nominal data for reference plant, calculated as nominal turbine output divided by nominal NSSS thermal power. Actual efficiency will depend on the selected Turbine-Generator set.

4.4.2 Production Process Description

4.4.2.1 CANDU MONARK Overview

Th CANDU MONARK reactor is the newest model currently in development, based on the design, operating experience, and the best features of the 31 predecessors commercial CANDU reactors built around the world. CANDU technology, a Canadian innovation developed by Atomic Energy of Canada Limited (AECL) in the 1950s, is owned, manufactured, and designed in Canada. This technology has been deployed both domestically and internationally as shown in Table 4.4-3.

Table 4.4-3: Commercial CANDU Reactors Built Globally

Name	CANDU Model	Location	Capacity MW(e) (Gross)	In-Service Date
Pickering 1*	CANDU-500	Canada	542	1971
Pickering 2 *	CANDU-500	Canada	542	1971
Pickering 3 *	CANDU-500	Canada	542	1972
Pickering 4*	CANDU-500	Canada	542	1973
Bruce 1	CANDU 791	Canada	825**	1977
Bruce 2	CANDU 791	Canada	825**	1977
Bruce 3	CANDU 750A	Canada	805**	1978
Bruce 4	CANDU 750A	Canada	805**	1979
Point Lepreau	CANDU® 6	Canada	680	1983
Gentilly-2 *	CANDU® 6	Canada	675	1983
Wolsong 1*	CANDU® 6	South Korea	679	1983
Embalse	CANDU® 6	Argentina	648	1984
Pickering 5	CANDU-500	Canada	540	1983
Pickering 6	CANDU-500	Canada	540	1984
Pickering 7	CANDU-500	Canada	540	1984
Pickering 8	CANDU-500	Canada	540	1986
Bruce 5	CANDU 750B	Canada	840	1985
Bruce 6	CANDU 750B	Canada	870	1984
Bruce 7	CANDU 750B	Canada	840	1984
Bruce 8	CANDU 750B	Canada	840	1987
Darlington 1	CANDU 850	Canada	935	1990
Darlington 2	CANDU 850	Canada	935	1989
Darlington 3	CANDU 850	Canada	935	1991
Darlington 4	CANDU 850	Canada	935	1992
Cernavoda 1	CANDU® 6	Romania	706	1996
Wolsong 2	CANDU® 6	South Korea	715	1997
Wolsong 3	CANDU® 6	South Korea	715	1999
Wolsong 4	CANDU® 6	South Korea	715	1999

Table 4.4-3: Commercial CANDU Reactors Built Globally

Name	CANDU Model	Location	Capacity MW(e) (Gross)	In-Service Date
Qinshan 1	CANDU® 6	China	728	2002
Qinshan 2	CANDU® 6	China	728	2003
Cernavoda 2	CANDU® 6	Romania	706	2007

* Unit is no longer in operation.

** Electrical equivalent (electricity plus process steam).

The CANDU MONARK is a modern Generation III+ reactor design that builds on the knowledge and experience from existing operational CANDU nuclear power plants. It offers improvements in cost, safety, and performance, while keeping the advantages of the current fleet of CANDU plants, notably its passive and inherent safety features and its online capacity factor (i.e., amount of time it is actively generating electricity for the grid).

Like all CANDU reactors, the MONARK uses a modular horizontal fuel channel surrounded by a heavy water moderator. Its key innovations include a four-quadrant design for enhanced safety and on-power maintainability, built-in production capability for multiple varieties of medical isotopes, consideration of cogeneration and load following hydrogen production. It will have enhanced passive safety features, additional provisions to cool containment indefinitely following severe accident scenarios, and modularization which reduces construction time. The reactor is designed for easy maintenance, with enhanced health monitoring, making the plant more reliable. The entire plant, including the instrumentation and controls for normal operations benefit from the use of an integrated and enhanced digital strategy for selection and implementation of the platforms and networks used. These improvements are supported by existing knowledge and build on the traditional CANDU system features, like the simple fuel bundle design, on-power fuelling, and a separate low-temperature, low-pressure moderator with a backup means to provide cooling to the cooling water systems.

Online refuelling is a distinctive feature of CANDU reactors, allowing them to be refuelled while operating at full power. This capability enhances the reactor's efficiency and availability, as it eliminates the need for lengthy shutdowns during refuelling. This is a considerable operational advantage over other reactor types that require periodic shutdowns for refuelling. For oil and gas operations, data centres, and other industrial uses, this is particularly beneficial as it eliminates the need for grid power during refuelling outages, ensuring continuous operations.

The MONARK enhances safety margins and reliability, making plant operations easier and improving overall safety. It builds on proven safety systems of existing CANDU plants, such as the two independent shutdown systems, and adds new passive safety mechanisms.

The MONARK licensing program starts with its design, from the ground up, to comply with Canadian regulations. It builds on the 31 commercial CANDU predecessors – 22 constructed and operated safely in Canada. The CNSC has advised that a Vendor Design Review is not required for

MONARK due to CANDU's established design and licensing history. Therefore, MONARK is currently following an abridged review process. CANDU MONARK is capable of meeting licensing standards under the NSCA based on safety, environmental, security, and nuclear non-proliferation principles.

Capacity Factor

The capacity factor measures the actual output of a power plant compared to its maximum possible output. The CANDU MONARK lifetime capacity factor is expected to be 95% or better, and installed CANDU reactors have performed at over 90%. For example, Cernavodă's Unit 2 lifetime capacity factor is 93.7%, and Qinshan's is 90.8%. Online refuelling capability is only available with CANDU reactors, enabling stable supply of electricity.

Fuel

The CANDU MONARK features a 480-channel reactor core. It uses natural uranium as a fuel source. The CANDU MONARK design is based on the use of a modular horizontal fuel channel surrounded by a heavy water moderator, the same feature as in all CANDU reactors. It has the ability to refuel during operations.

Modular Construction

Modularization in various aspects of construction is anticipated to be an important part of the Project for either technology option selected. For MONARK, the approach to modularization is based on evaluating the overall project risk and benefit, building on experience from previous CANDU 6 projects. Key modularization decision drivers include safety, quality, cost, schedule, delivery logistics, and lifting requirements. The intent is to maximize the number of systems contained within a module, within economic constraints, so that the maximum amount of fabrication, assembly, testing, and pre-commissioning can be completed off-site prior to module delivery and installation. This is an important aspect of achieving project schedule milestones during construction execution on site.

The key advantages of this modularization approach include:

- Enhanced construction safety;
- Reduced on-site construction interface risks;
- Improve quality and productivity by shifting activities to offsite manufacturers; and,
- Opening opportunities for Alberta fabrication facilities.

4.4.2.2 AP1000 Overview

The AP1000 reactor is a scaled-up version of the AP600 reactor, which is a Westinghouse generation III+ Pressurized Water Reactor (PWR) design. The AP600 reactor was developed as part of the Advanced Light Water Reactor (ALWR) program sponsored by the U.S. Department of Energy and EPRI in the 1980's-90's, with the objective of designing a greatly simplified plant that meets regulatory requirements, exceeding the U.S. Nuclear Regulatory Commission (NRC) safety goals and ALWR Utility Requirements, and addressing past safety issues of nuclear power plants while being economically competitive. This was accomplished by dramatically simplifying plant systems and increasing plant safety via implementation of a passive safety system approach. During the AP600 design program, a comprehensive test program was carried out to verify plant components, passive safety system components, and containment behavior. When the test program was completed in 1994, the AP600 became the most thoroughly tested advance reactor design ever reviewed by the NRC. The test results confirmed the exceptional behavior of the passive systems. The AP600 plant design received design certification from the NRC in December 1999. The AP1000 reactor utilizes the same passive safety design approach as the AP600 reactor, but scaled up for improved economics. The AP1000 design confirmed applicability of the AP600 testing and analysis, while also performing additional testing where required. The Westinghouse AP Technology is an extensively tested and reviewed reactor technology. No less than 15 different test facilities for design basis accident testing were used to demonstrate passive core and containment cooling and to collect data for code validation for the AP Technology.

Westinghouse technology is the basis for more than half of the world's more than 430 operating nuclear power reactors, making Westinghouse technology the largest installed base of operating plants in the world with a net installed capacity of more than 198 GW electric. Throughout this extensive operational history, Westinghouse technology has demonstrated the highest levels of safety performance, and well as safety improvements.

In Canada, Westinghouse requested in November 2008 that a Phase 1 review of the AP1000 plant design be carried out. This was completed in January 2010 when the CNSC concluded that, "at an overall level, the design intent complied with the CNSC's regulatory requirements and expectations." In September 2012, Westinghouse and CNSC signed an agreement for a Phase 2 review. The Phase 2 review was completed in June 2013. The CNSC concluded that there are no fundamental barriers to licensing the AP1000 plant design in Canada.

The NRC unanimously voted approval of the AP1000 reactor design in December 2011. Similarly, the Office for Nuclear Regulation (ONR) in the United Kingdom issued a design acceptance confirmation and statement of design acceptability for the AP1000 plant design in March 2017. Successful completion of the rigorous review process signifies that the AP1000 plant is capable of meeting the high standards of safety, security and environmental protection within the United Kingdom.

To date, six (6) AP1000 plants have successfully been deployed, with nine (9) others under construction, with another five (5) under contract (Table 4.4-4).

Table 4.4-4: AP1000 Reactors Operating, in Construction and Contracted

Operating		
Country	**Site**	**Units**
USA	Vogtle	1&2
China	Haiyang	1&2
China	Sanmen	1&2
Under Construction		
China	Haiyang	3&4
China	Lainjiang	1&2
China	Lufeng	1
China	Sanmen	3&4
China	Xudaboa	1&2
Under Contract		
China	Lufeng	2
Poland	Lubiatowo-Kopalino	1-3
Ukraine	Kozloduy	7&8
Future Looking		
USA	Working to have 10 AP1000 reactors under construction by 2030	
Ukraine	9 units contracted	
India	6 units selected	
China	Haiyang	5&6
China	Guangxi Bailong	1&2

The AP1000 reactor's operational performance as compared to other currently commercially available advanced reactor technologies is shown in Table 4.4-5. The AP1000 plant ranks first in both operational availability factor and capacity factor among commercially available Generation III and III+ advanced reactor technologies.

Table 4.4-5: AP1000 Operational Performance Comparison

AP1000 Operational Performance (Lifetime Average)		
Reactor Technology	**Operational Availability**	**Capacity Factor**
AP1000 (Sanmen 1 and 2, Haiyang 1 and 2, Vogtle 3 and 4)	91.40%	88.87%
Korean APR1400 (Saeul 1 and 2, Barakah 1, 2 and 3)	88.43%	87.47%
European Pressurized Reactor (EPR)(Taisha 1 and 2, Olkiluoto 3)	81.10%	72.00%

Data Source: World Nuclear Association: https://world-nuclear.org/nuclear-reactor-database.

Capacity Factor

The AP1000 plant has a projected lifetime capacity factor of 93%. In 2019, the average capacity factor at operating plants was 88.8% - 92.1%, with the exception of Sanmen 2 which was shut down for repairs.

Fuel

The AP1000 core has 157 fuel assemblies. The fuel assemblies consist of 264 fuel rods in a 17x17 square array. The fuel rods consist of cylindrical, ceramic pellets of slightly enriched uranium dioxide. Fuel assemblies of three different enrichments (2.35, 3.40 & 4.45 wt. % U235) are used in initial core loading. Reloaded cores are anticipated to operate approximately 18 months between refueling. The standard refueling batch size is 64 assemblies per cycle for the standard 18-month fuel cycle.

Modular construction

For the AP1000 plant, large structural modules comprise the majority of the Containment internal structures and a significant portion of the Auxiliary Building. The submodules are fabricated off site, transported via truck (or rail or barge) and assembled on-site in the Module Assembly Building (MAB). Placement of the module significantly accelerates in-situ construction as compared to traditional reinforced concrete.

Two of the primary drivers of nuclear power plant construction costs are the cost of financing during construction phase and the substantial amount of skilled craft labour hours needed during construction. The AP1000 reactor's extensive use of construction modularization mitigates both of these drivers, yielding considerable capital savings and lower maintenance costs delivering safe, efficient, more economical nuclear power solutions across the world.

The AP1000 reactor's modular construction design further reduces the construction schedule and the construction risks, with work shifted to factories with their better quality and cost control as well as labor costs that are less than those at the construction site.

4.4.2.3 Plant Design

4.4.2.3.1 CANDU MONARK

The major nuclear systems of a MONARK plant are in the reactor building and the reactor auxiliary building (Figure 4.4-1). These nuclear systems include the following (Figure 4.4-2):

- Reactor assembly, consisting of a calandria with 480 channels of natural uranium fuel contained in the 37M (or CANFLEX) fuel bundle;
- Heat transport system with heavy water coolant in a two loop, figure-of-eight configuration with four steam generators, four heat transport pumps, four reactor outlet headers, and four reactor inlet headers;

- Fuel handling system, which includes two fuelling machines, each mounted on a fuelling machine bridge and columns, found at both faces of the reactor;
- Safety systems and complementary design features, including two shutdown systems, emergency core cooling system, emergency feedwater system (also referred to as the emergency heat removal system), containment system and associated safety support systems, Severe accident heat removal and recovery system and emergency containment filter venting system;
- Spent fuel handling and storage systems, including used fuel transfer system, spent fuel storage pond with capacity to store 10 years of spent fuel before dry fuel storage is required, spent fuel drying and container-loading facilities, and spent fuel dry storage container facilities; and
- Waste handling and storage systems (radioactive and non-radioactive) including waste sorting and assaying systems, processing and packaging facilities for safe offsite transport and onsite storage, and interim onsite radioactive waste storage, as required depending on availability of an offsite nuclear waste management installation.

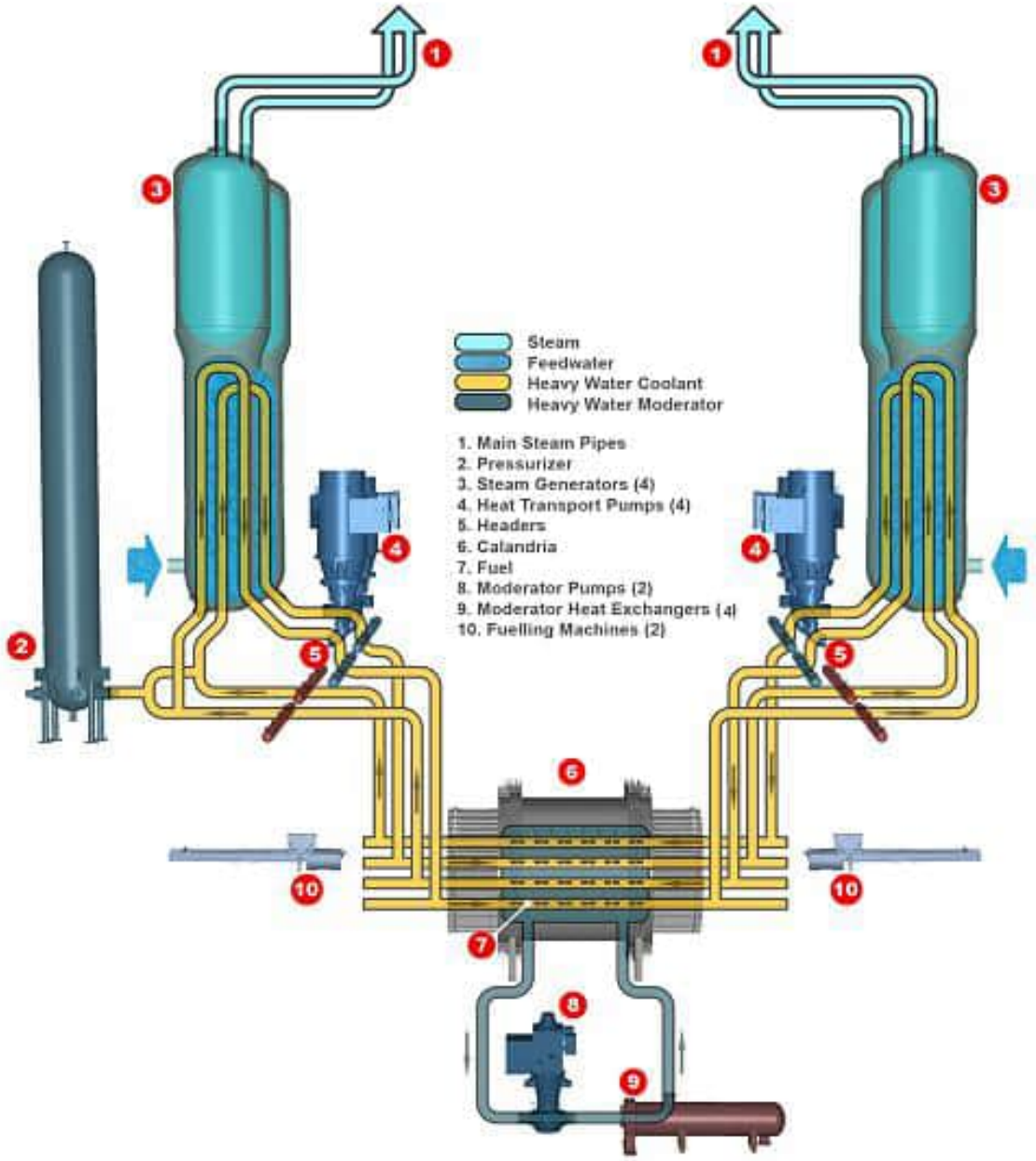


Figure 4.4-1: MONARK Nuclear Systems Schematic

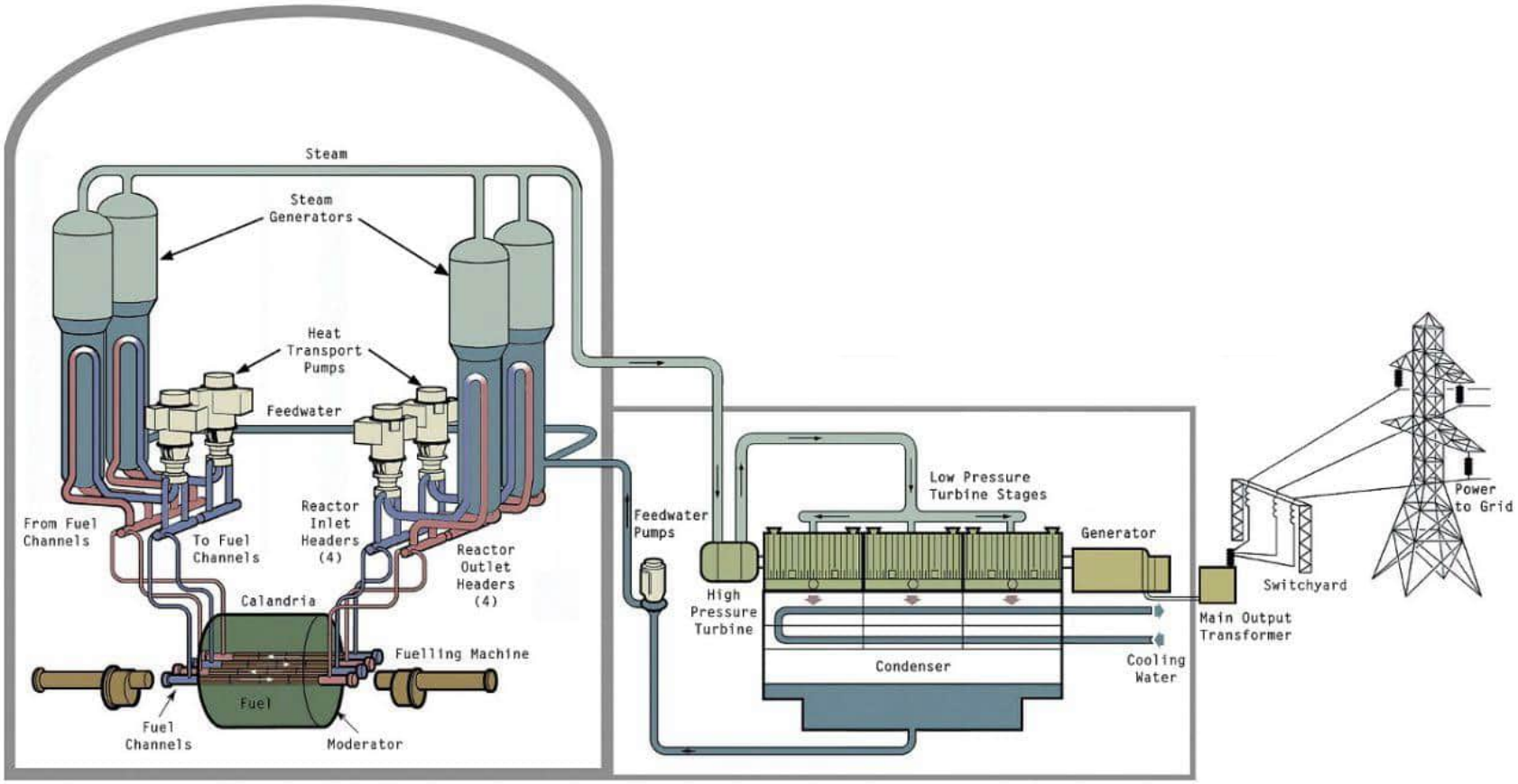


Figure 4.4-2: MONARK Reference Plant Arrangement

4.4.2.3.2 AP1000

One AP1000 reactor requires approximately 3,015 m^2. The reactor arrangement provides separation between safety-related and non-safety-related systems to preclude adverse interaction between safety-related and non-safety-related equipment. Separation between redundant, safety-related equipment trains and systems provides confidence that the safety design functions of the AP1000 PWR can be performed. In general, this separation is achieved by partitioning an area with concrete walls.

The AP1000 reactor general configuration (Figure 4.4-3) is arranged with the following principal building structures, each on its own basemat:

- Nuclear Island (the only Seismic Category 12 structure); Includes:
  - Containment/Shield Building
  - Auxiliary Building
- Turbine Building
- Annex Building
- Diesel Generator Building
- Radwaste Building

[2] "Seismic Category I" means the Structure, System, or Component is designed to withstand the effects of the design-basis "Safe Shutdown Earthquake" and remain functional. This is consistent with the requirements of CNSC RegDoc 2.5.2 which requires that safety-related SSC's be designed with withstand a Safe Shutdown Earthquake.

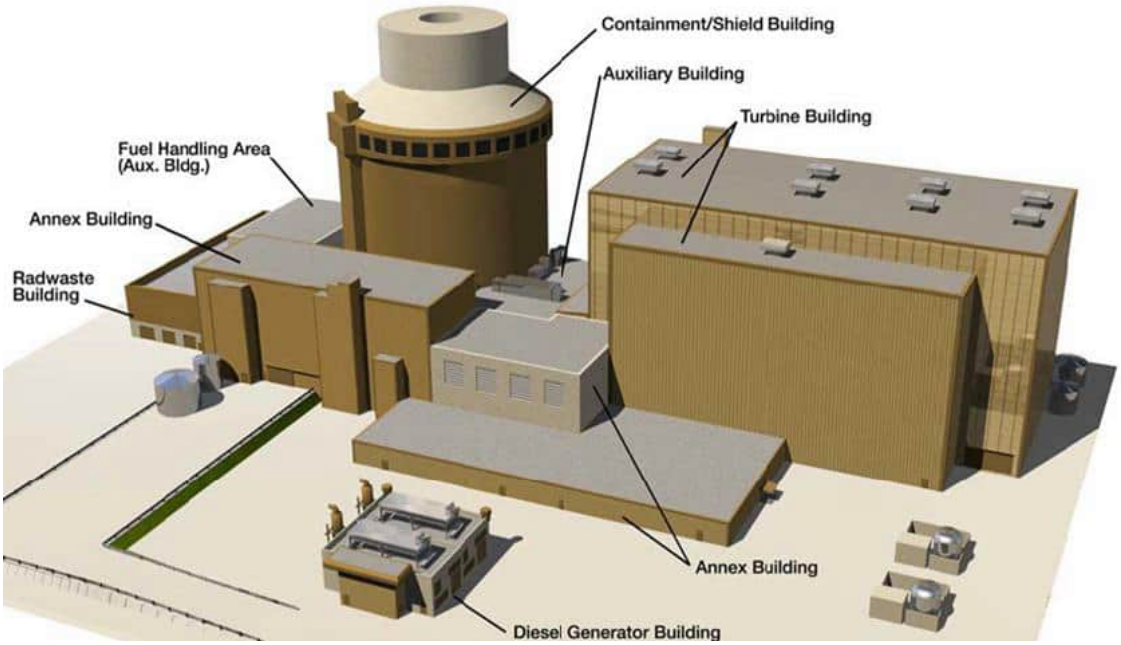


Figure 4.4-3: AP1000 General Configuration

The major nuclear systems of an AP1000 plant are in the containment/shield building and the auxiliary building (Figure 4.4-3). The nuclear systems include the following:

- The reactor core with 157 fuel assemblies (Figure 4.4-4);
- The fuel assemblies consist of 264 fuel rods in a 17x17 square array (Figure 4.4-5). The fuel rods consist of cylindrical, ceramic pellets of slightly enriched uranium dioxide, including three different enrichments (2.35, 3.40 & 4.45 wt. % U235). PWRs need to be shut down periodically to replace a portion of the spent fuel with fresh fuel. This process, known as refueling, typically occurs every 18-24 months.
- Heat transportation system is shown in Figure 4.4-6. For an AP1000 both cooling and moderation are provided by light water. The coolant is circulated by means of the Reactor Coolant System (RCS) which in turn exchanges heat with a Secondary Cooling System via steam generators. There are two steam generators, each connected to the reactor pressure vessel by a single hot leg and two cold legs. A pressurizer is connected to one of the hot legs and there are four reactor coolant pumps to provide circulation in the RCS. The main condenser deaerates the condensate and transfers heat that is unusable in the cycle to the circulating water system. The regenerative turbine cycle heats the feedwater, and the main feedwater system returns it to the steam generators.
- Fuel handling and storage system whereby new fuel is stored in a high-density rack which includes integral neutron absorbing material to maintain the required degree of subcriticality. The rack is designed to store fuel of the maximum design basis enrichment. The new fuel rack includes storage locations for 72 fuel assemblies.

- Safety systems include the Passive Core Cooling System (PXS), which is located within the containment vessel and provides direct cooling to the reactor to remove heat from the fuel and keep the reactor sub-critical; and the Passive Containment Cooling System (PCS) (Figure 4.4-7) whose primary function is to remove heat from the steel containment vessel and subsequently remove heat from air or steam inside containment.
- Spent fuel handling and storage systems which includes a spent fuel pool, fuel handling and storage system, spent fuel drying and container-loading facilities, and dry storage facility. The fuel handling machine is used in the movement of both new and spent fuel assemblies. The fuel handling machine is used to transfer new fuel assemblies from the new fuel storage rack into the spent fuel pool.
- Waste handling and storage systems (radioactive and non-radioactive) including waste sorting and assaying systems, processing and packaging facilities for safe offsite transport and onsite storage, and interim onsite radioactive waste storage, as required depending on availability of an offsite nuclear waste management installation.

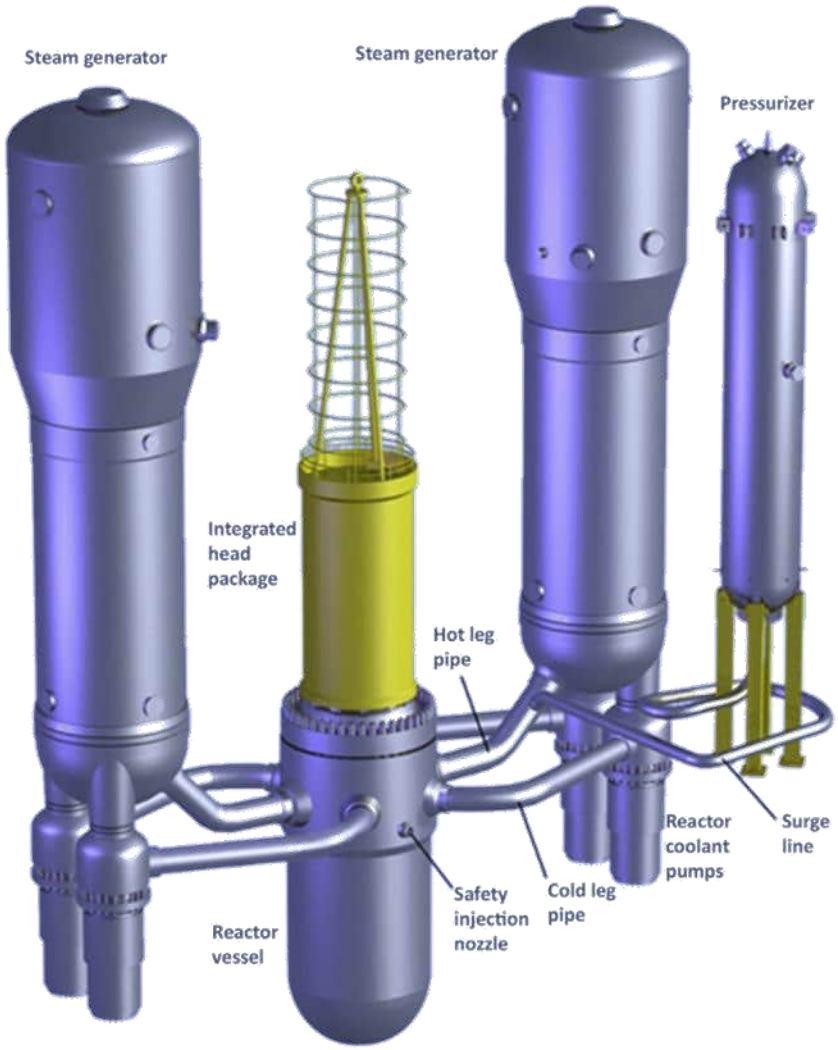


Figure 4.4-4: AP1000 Reactor Core

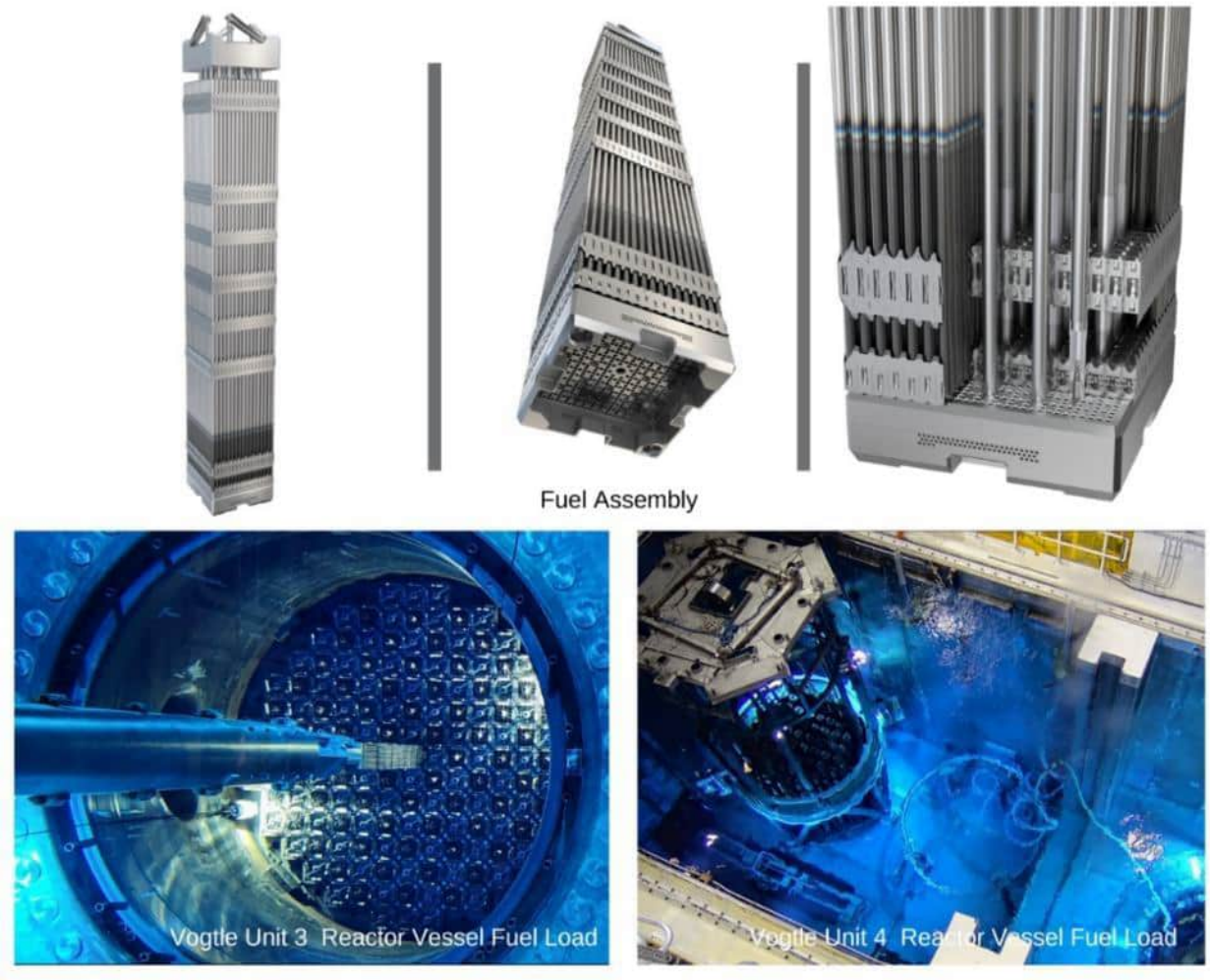


Figure 4.4-5: AP1000 Fuel Design

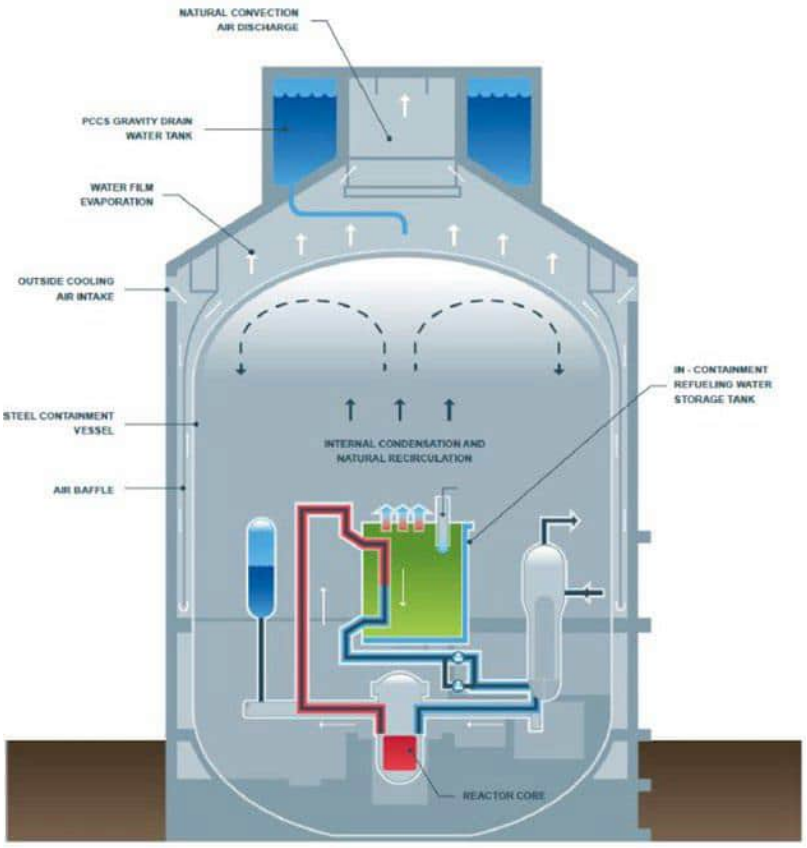


Figure 4.4-6: AP1000 Containment and Shielding Building

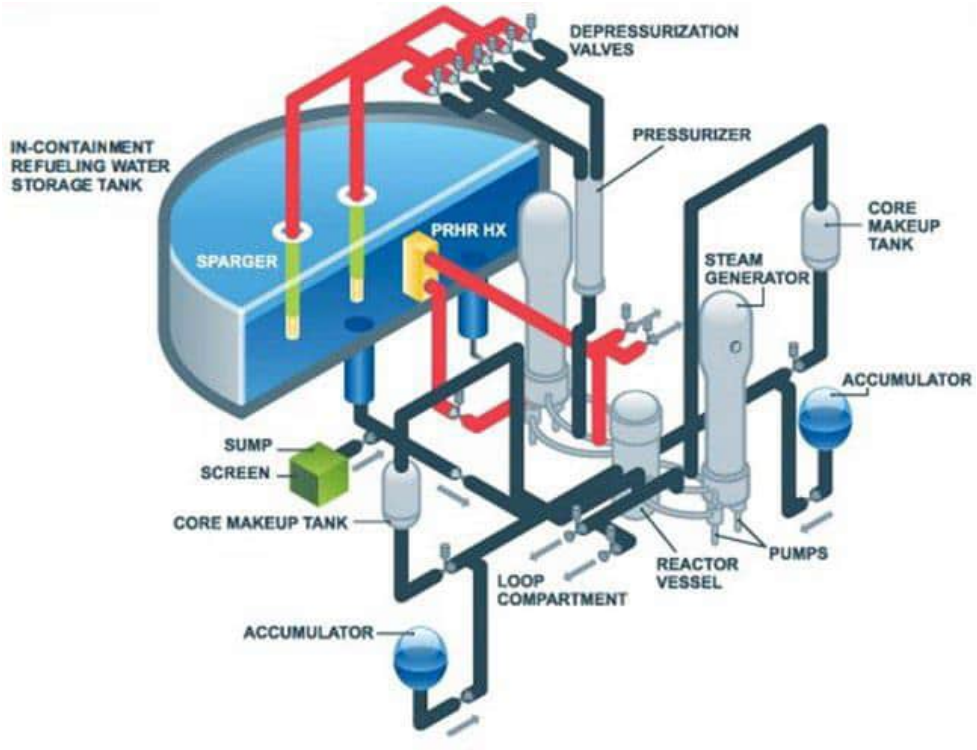


Figure 4.4-7: AP1000 Passive Containment Cooling System

4.4.2.4 Site Design Data

All buildings and structures important to safety are designed to accommodate a wide range of site characteristics including seismic conditions, geotechnical parameters, and metrological conditions.

4.4.2.4.1 Site Cooling Water Infrastructure

Cooling tower systems are proposed to be used for the Project. A once-through cooling water system is not workable for either of the potential sites since it is not acceptable to return that large amount of warmer water to the Peace River. The water supply from the Peace River is expected to be sufficient in providing adequate make-up water for the cooling water system losses through evaporation and blowdown drift. Currently a mechanical draft cooling tower design is proposed, however, additional studies are being completed to confirm the best available technology and design.

Each MONARK unit will have two (2) dedicated ‘banks’ of cooling tower systems and loops. One (1) bank acts as the “Normal Heat Sink” loop and one (1) is the “Essential Heat Sink” loop. The Normal Heat Sink loop will service the condenser and plant service cooling water systems during normal operation. Essential Heat Sink loop will serve the safety-classified essential service water systems

during normal and emergency operations. The two loops will be separated and the Essential Heat Sink loop components, process piping and instrumentation suitably protected appropriate to its safety class. The cooling water in both the steam generator/condenser loop within the plant or in the site cooling water systems and components is not radioactive and will not be exposed to radioactive substances. The site cooling water infrastructure diagram is shown on Figure 4.4-8.

Figure 4.4-8: Conceptual Site Cooling Water Infrastructure Diagram for CANDU MONARK Option

The AP1000 plant requires one set of cooling towers per unit to act as the Normal Heat Sink. Cooling water in the Circulating Water System (CWS) flows from the condenser to the cooling towers and back to transfer heat from the condenser to the cooling towers. The cooling water in the CWS is not radioactive and will not be exposed to radioactive substances. The AP1000 plant does not require essential heat sink cooling towers, as this function is performed by the passive safety features of the AP1000 design. The conceptual water infrastructure diagram for an AP1000 is shown in Figure 4.4-9.

Figure 4.4-9: Conceptual Site Cooling Water Infrastructure Diagram for AP1000 Option

Figure 4.4-10 provides a schematic of the site cooling water system process outside of the reactor power block for the CANDU MONARK. Figure 4.4-11 provides a schematic of the site cooling water system process outside the reactor power block for the AP1000.

Warm water from the plant condensers, and for the CANDU MONARK design also from the plant service cooling water system heat exchangers and essential service water from the reactor, is pumped to the cooling tower cells. Ambient air is drawn upward to cool the water. Water in the closed loop is checked for quality and treated to minimize fouling. As the water evaporates to the atmosphere, a blowdown stream is drawn off to support proper control of water chemistry. Fresh water make-up is continuously supplied to support the optimum water level and quality within the plant.

The make-up water requirement[3] is estimated to be a maximum of 1,300 L/s per MONARK unit, with normal expected usage to be approximately 1,025 L/s. This includes approximately 1,200 L/s (maximum)/1,000 L/s (normal expected) in the Normal Heat Sink loop and approximately 100 L/s (maximum)/25 L/s (normal expected) in the Essential Heat Sink loop, per MONARK unit. To support this water requirement, while protecting the Peace River water levels, water reservoirs are currently designed into the site layout. One (1) water reservoir per MONARK unit will supply both Normal Heat Sink and Essential Heat Sink make-up water. There will also be a connection from each reservoir to

[3] Note that all site water usage requirements are preliminary only and will be calculated and finalized as the site-specific design is developed throughout the Project phases.

the fire water system which will serve all buildings and facilities; this system is estimated to need an additional 70 L/s but only when in use (i.e., in the unlikely chance of an on-site fire).

The make-up water requirement for an AP1000 unit is estimated to be a normal rate of 1,173 L/s. The water reservoirs system described would also be utilized for AP1000 Plant Normal Heat Sink operation.

Each reservoir will have a capacity of approximately 2.5 million m^3. This volume will supply up to 1,350 L/s of water per unit over a 21-day period to support make-up water requirements for maximum Normal Heat Sink, Essential Heat Sink, and fire protection water needs. The reservoirs will be interconnected for both filling and supply to the water systems; this provides backup supply should any one reservoir or its filling and supply pipework have a fault. This reservoir capacity includes sufficient margin for this stage of the Project. The volume will be confirmed as technical and Project details evolve.

If the CANDU MONARK design is utilized there will be two additional smaller reservoirs on the site that will supply the Severe Accident Recovery and Heat Removal System (SARHRS) water. Each SARHRS reservoir services two units. Combined, these two reservoirs will have the capacity required to support the required mission period determined for the SARHRS system through accident progression and safety analysis. SARHRS is a forward-thinking safety feature complementing MONARK's inherent and passive safety features, providing a source of long-term cooling water that does not require an external-to-site mobile sources following severe accidents. These reservoirs are not realistically expected to be needed during the lifetime of the plant. As with the Normal and Essential cooling system make-up water, these reservoirs will be interconnected to provide redundancy. The volume will be confirmed as technical and Project details evolve. These reservoirs are not required for the AP1000 design due to its passive safety system design.

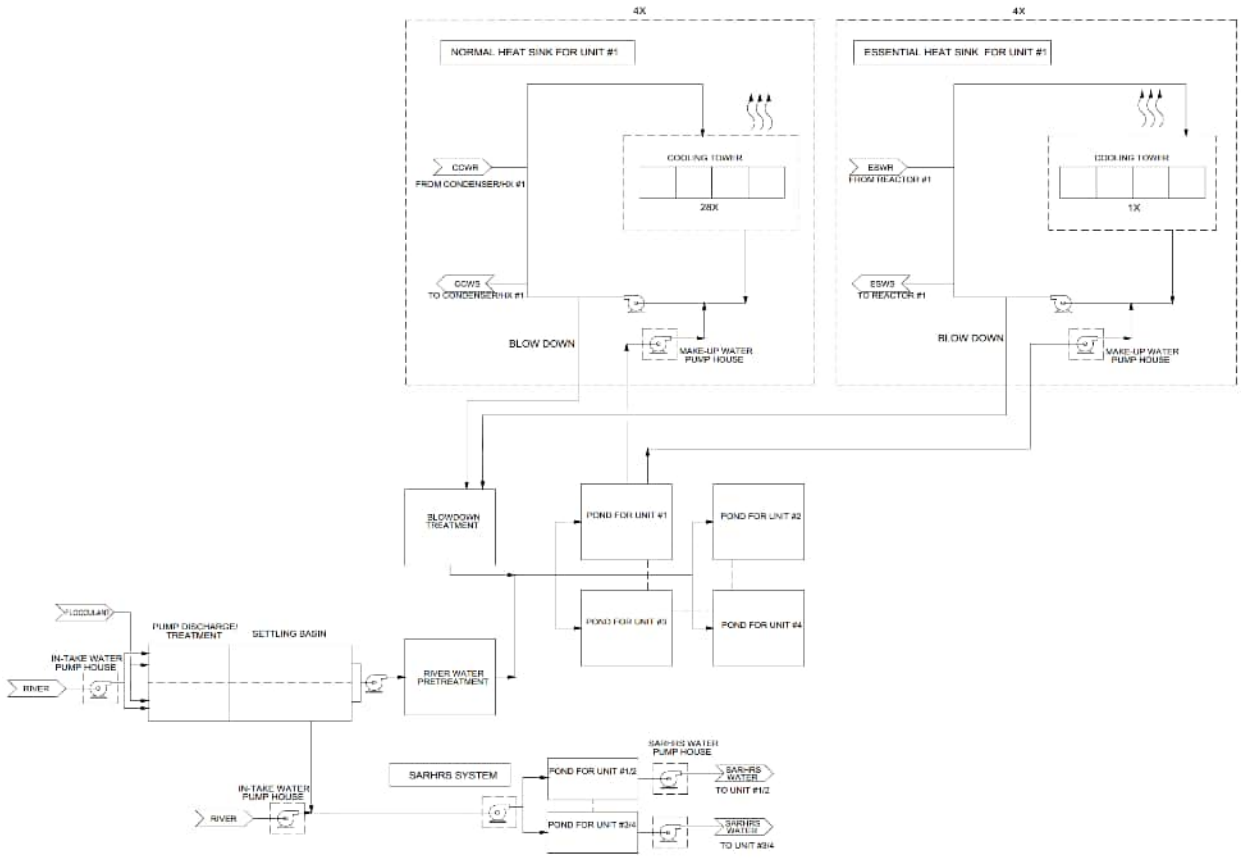
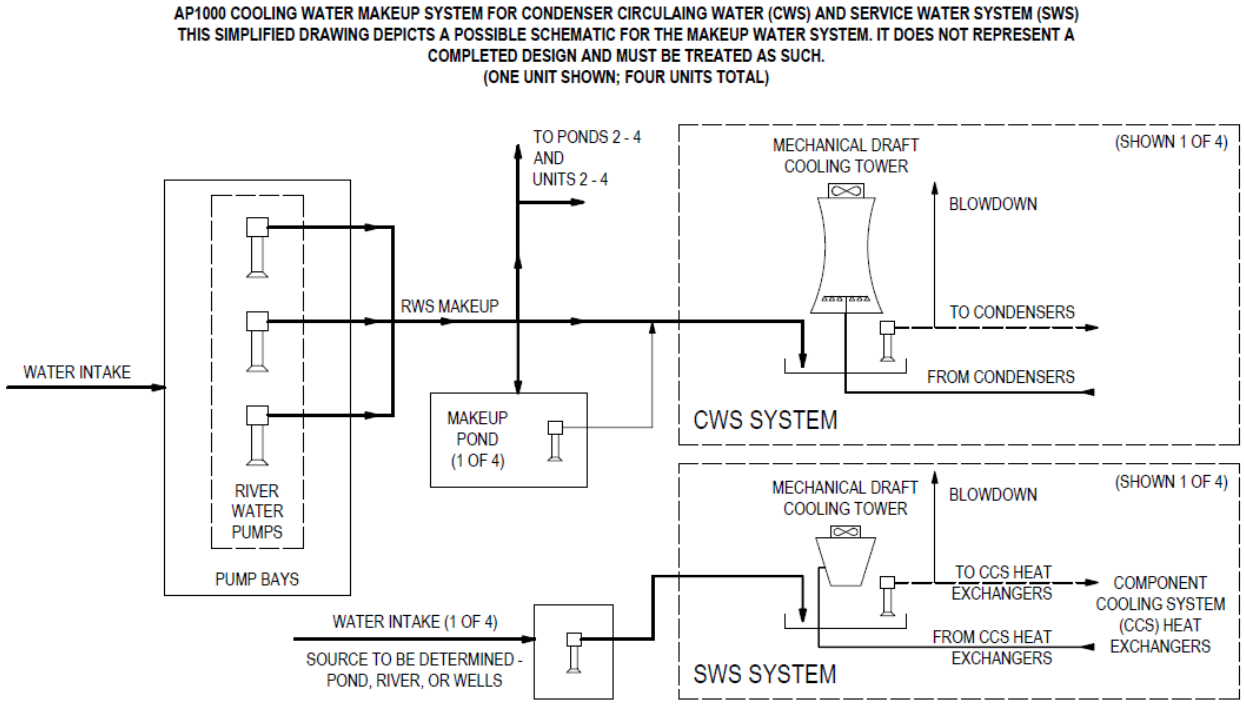


Figure 4.4-10: Cooling Water System Schematic for CANDU MONARK Reactor Option



NOTES:

1. THE AP1000 COOLING WATER MAKEUP SYSTEM FOR CONDENSER CIRCULATING WATER (CWS) AND SERVICE WATER SYSTEM (SWS) ARE NOT SAFETY RELATED.
2. THE INFORMATION PROVIDED HAS LIMITED APPLICABILITY AND SHOULD BE USED ONLY WITHIN THE DEFINED SCOPE OF THE PROJECT OR DOCUMENT.
3. ENSURE THAT ANY USE OUTSIDE THE INTENDED CONTEXT IS PROPERLY EVALUATED FOR RELEVANCE AND ACCURACY.
4. ALL WATER TREATMENT IS DONE BY THE COOLING TOWER CHEMICAL TREATMENT SYSTEM, WITH BLOWDOWN CONTROLLING THE SUSPENDED SOLIDS. THIS WOULD ELIMINATE THE NEED FOR THE SETTLING BASIN AND THE RIVER WATER PRETREATMENT SYSTEM. THIS FOLLOWS STANDARD INDUSTRY PRACTICE.

Figure 4.4-11: Cooling Water System Schematic for AP1000 Reactor Option

4.4.2.4.2 Design Basis Earthquake

The design basis earthquake is an engineering representation of the potential earthquake with the most severe effects applicable to the site, that has sufficiently low probability of being exceeded during the lifetime of the plant. . The seismic design, analysis, and qualification of systems, structures, and components (SSCs) important to safety are performed in accordance with the applicable requirements of CNSC REGDOC-2.5.2 and the CSA N289 series of standards, including provisions for seismic categorization, load combinations, seismic demand and capacity evaluation, and qualification of equipment and structures. These methodologies ensure that SSCs credited for accident prevention and mitigation remain capable of performing their intended safety functions during and following the DBE. Detailed analysis of the site will confirm whether any site-specific design adjustments are necessary to accommodate local seismic phenomena.

4.4.2.4.3 External Flooding

The Canadian regulatory requirements for flood protection apply to several stages in the design process, specifically for site evaluation, plant design, and safety analysis. The applicable regulations include REGDOC-1.1.1, -2.5.2, -2.4.1, and -2.4.2. The CNSC regulatory requirements on flood protection are aligned with IAEA guideline SSG-18, *Meteorological and Hydrological Hazards in Site Evaluation for Nuclear Installations*. Stormwater planning and design must also adhere to local and Provincial stormwater management (SWM) regulations and guidelines.

CANDU MONARK design features reduce the probability and severity of accidents, minimizing the occurrence and propagation of initiating events that could lead to events of greater severity and resulting challenges to safety systems. This includes requirements for protection against internal and external flooding.

The CANDU MONARK design flood level is defined at the plant grade level. In other words, the plant grade is located above any potential probable maximum flood level at site due to a variety of conditions including potential dam failure. Therefore, the systems, structures, and components important to safety in the CANDU MONARK plant are protected from flooding. Flooding of intake structures or service water systems (such as LPSW or PULSW) does not prevent safe operation of the plant, as these systems are designed to be isolated before water levels threaten critical equipment.

As part of stormwater management goals, a variety of options to manage peak flow increases would be utilized, including the use of dry storage pond(s). There is also opportunity to use runoff stored within the SWM system as an input to the make-up water ponds, which would perform the dual function of providing make-up water to mitigate evaporation, while managing excess surface run-off.

The maximum flood level assumed for AP1000 is the plant design grade elevation (or elevation 100'-0"). Actual grade will be a few inches lower to prevent surface water from entering doorways. Flooding of intake structures, cooling canals, or reservoirs or channel diversions does not prevent safe operation of the plant. In the instance of a design basis external flood, the AP1000 Standard Plant response is to stop all unnecessary plant evolutions (such as maintenance or testing) and close external portals.

4.4.2.4.4 High Wind and Tornado Protection

Severe winds, such as those generated by hurricanes and tornadoes, provide a natural threat to nuclear power plants via:

- Wind loading on a structure that may cause damage or collapse; and,
- Tornado missiles that have the potential to penetrate buildings and damage components.

Tornado protection is supplied for structures important to safety. CNSC REGDOC-2.5.2 requires that nuclear power plant design considers natural external hazards that could occur at the site, such as a tornado. The design basis tornado (DBT) is defined by the maximum wind speed and a maximum air pressure drop suitable to be considered conservative and bounding. Consistent with REGDOC-2.5.2 requirements, in the event of a DBT, areas and buildings that contain systems, structures, and components (SSCs) performing safety functions are protected by barriers and/or designed to withstand the effects of the tornado, including tornado missiles.

4.4.2.4.5 Other Events

CNSC REGDOC-2.5.2 requires that nuclear power plant design considers human-induced external hazards, including aircraft impact. Both the MONARK and AP1000 are designed so that areas and buildings that contain SSCs performing safety functions are capable of withstanding human-induced hazards, such as aircraft crash, explosions, hazardous gases, fire from offsite sources, and transportation accidents.

4.4.2.4.6 Exclusion and Emergency Planning Zones

To keep radiation exposure to the public within safe, allowable limits, all nuclear reactor sites in Canada are required to have an exclusion zone, also known as an exclusion area boundary (EAB). The EAB is required by the CNSC to accommodate requirements for evacuation, land usage, security, and environmental factors. The land within the EAB must be under the ownership and control of the site licence holder and all unauthorized persons are restricted from this zone. The MONARK plant is designed to be suitable for a site with a minimum exclusion zone of 500 m around each reactor building. This zone will be within the licenced site boundary fence.

In addition to the exclusion zone or EAB, all nuclear power plants are surrounded by larger controlled areas that dictate the actions to be taken during the highly unlikely event of an offsite release due to a severe accident. They allow for effective emergency management and protection of the public from potential radiation doses in highly unlikely accident conditions that must nevertheless be planned for. These emergency planning zones (EPZs) are defined by, and their sizes agreed with the provincial and municipal emergency response planning organizations during the licensing phases. The sizes of these planning zones are calculated based on the technology, safety systems design, and accident progression analysis that is specific to each plant type and location. As an example, the EPZ for the AP1000 reactors at Vogtle 3 and 4 is 16km. The CNSC addresses EPZs in REGDOC-2.10.1, where it states:

> *The term "designated plume exposure planning zone" is sometimes referred to as "primary zone", "urgent protective action zone" or "emergency planning zone". The size of the plume exposure planning zone is determined by the appropriate offsite authorities based on information in the planning basis and is typically sized in the range of 8 to 16 km.*

Alberta does not currently have nuclear power, so these zones are not defined yet. As an example, the Province of Ontario Provincial Nuclear Emergency Response Plan (PNERP) Master Plan (Ontario 2024) defines the following zones for nuclear facility emergency planning. Note that the actual zonal sizes and boundaries for each designated nuclear installation are specified in the relevant site-specific implementing plans of the PNERP.

- **Automatic Action Zone (AAZ):** The zone immediately surrounding the reactor facility where pre- planned protective actions are to be implemented by default based on reactor facility conditions with the aim of preventing or reducing the occurrence of severe accident effects off-site. These are mostly response actions for on-site plant personnel.
- **Detailed Planning Zone (DPZ):** The zone immediately surrounding and if necessary (depending on the event progression), encompassing the AAZ where pre-planned protective actions are implemented as needed based on reactor facility conditions, dose modelling, and environmental monitoring. An increased level of emergency planning and preparedness is undertaken within this area because of its proximity to the potential hazard.
- **Contingency Planning Zone (CPZ):** The zone around a nuclear installation beyond the DPZ where contingency planning and arrangements are made in advance, so that during a nuclear emergency, protective actions can be extended beyond the DPZ as required to reduce potential for exposure. Generally, this is the zone for which planning and preparedness is carried out to confirm there are measures against exposure to a radioactive plume.

- **Ingestion Planning Zone (IPZ):** The zone around a nuclear installation within which it is necessary to plan and prepare measures against exposure from the ingestion of radioactive material. Specifically, the IPZ is a pre-designated area surrounding a reactor facility where plans or arrangements are made to:
  a) protect the food chain
  b) protect drinking water supplies
  c) restrict consumption and distribution of potentially contaminated produce, wild-grown products (including mushrooms and game), milk from grazing animals, rainwater, animal feed
  d) restrict distribution of non-food commodities until further assessments are performed

For existing reactors in Canada, because the plants are largely the same design, the zones were consistently defined and sized by the relevant local and provincial organizations. However, the same sizes of the zones are not expected to be required for new modern reactor designs. In particular, for modern nuclear power plant designs, technology improvements have been made that incorporate more features such as passive and inherent safety systems to "practically eliminate" core melt and offsite releases. With this claim, certain emergency response planning requirements would be eliminated, as is the need for several provisions to mitigate the consequences from certain more critical event conditions.

Per the CNSC (CNSC 2015):

> *"There are no legislative or regulatory requirements for EPZ sizing in Canada and therefore no restrictions currently in place on minimum EPZ size. EPZ and other planning actions should be undertaken in relation to the risks associated with the specific technology. As such, results from safety analyses (i.e., the probabilistic safety analysis) in combination with the protection strategy used by offsite planners will determine the EPZ size. This is consistent with the overall methodologies documented by the IAEA."*

As the site-specific design stage progresses, the required zones for the Project are expected to be calculated, with analysis justifying their sizes, and agreed with the province of Alberta and local municipal emergency planning organizations.

4.4.2.5 Site Layout

A conceptual visualization of four 1,000 MWe CANDU MONARK reactors configured as a pair of twin units is shown in Figure 4.4-12.

A conceptual visualization of four 1,200 MWe AP1000 reactors configured as a pair of twin units is shown in Figure 4.4-13.

The final Project site layout will be determined once a reactor technology is selected.

Figure 4.4-12: Peace River Nuclear Power Project CANDU MONARK Plant Visual Representation

Figure 4.4-13: Peace River Nuclear Power Project AP1000 Plant Visual Representation

Figures 4.4-14 to 4.4-16 are based on a CANDU MONARK and are provided for illustration and are conceptual, but they generally apply to both technologies under consideration.

The major buildings and structures and proposed site boundary associated with the overall site arrangement for the two twin-unit arrangement are shown in Figure 4.4-13, depending upon the technology chosen.

The basic arrangement of the power block consists of reactor buildings, reactor auxiliary buildings, turbine buildings, service building, main control building, maintenance building, and safety diesel generator buildings as shown in Figure 4.4-14 and Figure 4.4-15. The main plant facilities for each twin-unit of the plant are listed below, with quantities shown in parentheses if more than one.

- Reactor Buildings (2);
- Reactor Auxiliary Buildings (2);
- Turbine Buildings (2);
- Main Control Building;
- Service Building;
- Maintenance Building*;
- Plant Service Water and Condenser Cooling Water Pumphouse;
- Essential Service Water Pumphouse;
- Diesel Generator Buildings (a total of five buildings, of which four have safety support functions);
- Main Switchyard;
- Water Treatment Facility*; and
- Auxiliary and Ancillary Structures*.

** Note: The reference MONARK plant is comprised of a single twin-unit plant which shares some common systems, marked with * in the list above. The proposed four-unit (i.e., a pair of twin-units) configuration for the Project will allow for further sharing of services and optimization. Optimal sharing of common buildings such as maintenance buildings, storage and systems such as the water treatment plant, liquid treatment, gas systems will be designed into the final four-unit site.*

The land boundary options for the Project site are proposed but are not finalized at this time. A four-unit plant layout will require a minimum boundary dimension of approximately 1.6 km x 4.0 km (1.0 mile x 2.5 miles). The proposed parcel of land accommodates this boundary, which includes the EAB (i.e., exclusion zone; Figure 4.4-14). An alternative suggested site layout showing the plant main power generating buildings rotated into a north-south orientation on the same minimum land area is shown for information and comparison purposes only in Figure 4.4-16. This alternative might be preferred depending on the final location of the grid and municipal road connections. As the site-specific design progresses and the land available and dedicated to the Project has been

finalized, the actual site layout will be finalized. The final site layout will take into account key criteria for optimizing site layout with specific placement of the various plant facilities that takes into consideration site-wide environmental and radiological safety, plant performance, and security and safeguarding.

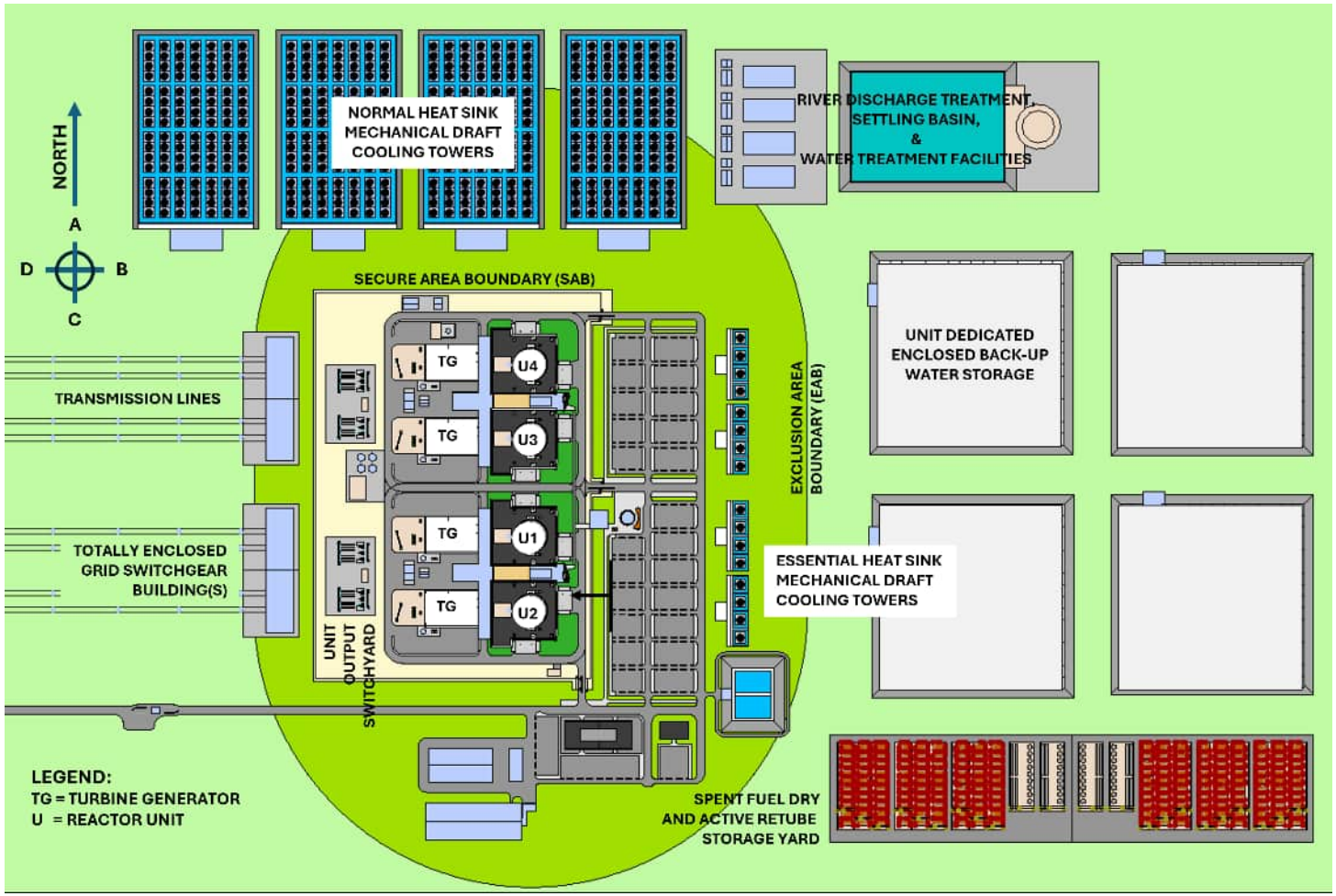


Figure 4.4-14: Four Unit MONARK Site Arrangement

* illustrative only, provided as an example layout based on the CANDU MONARK and expected to generally apply to both reactor technologies under consideration.
Note: overlaid on 640 hectare (1 mile x 2.5 mile) grid based on the Alberta Township Survey system used to define legal land descriptions.

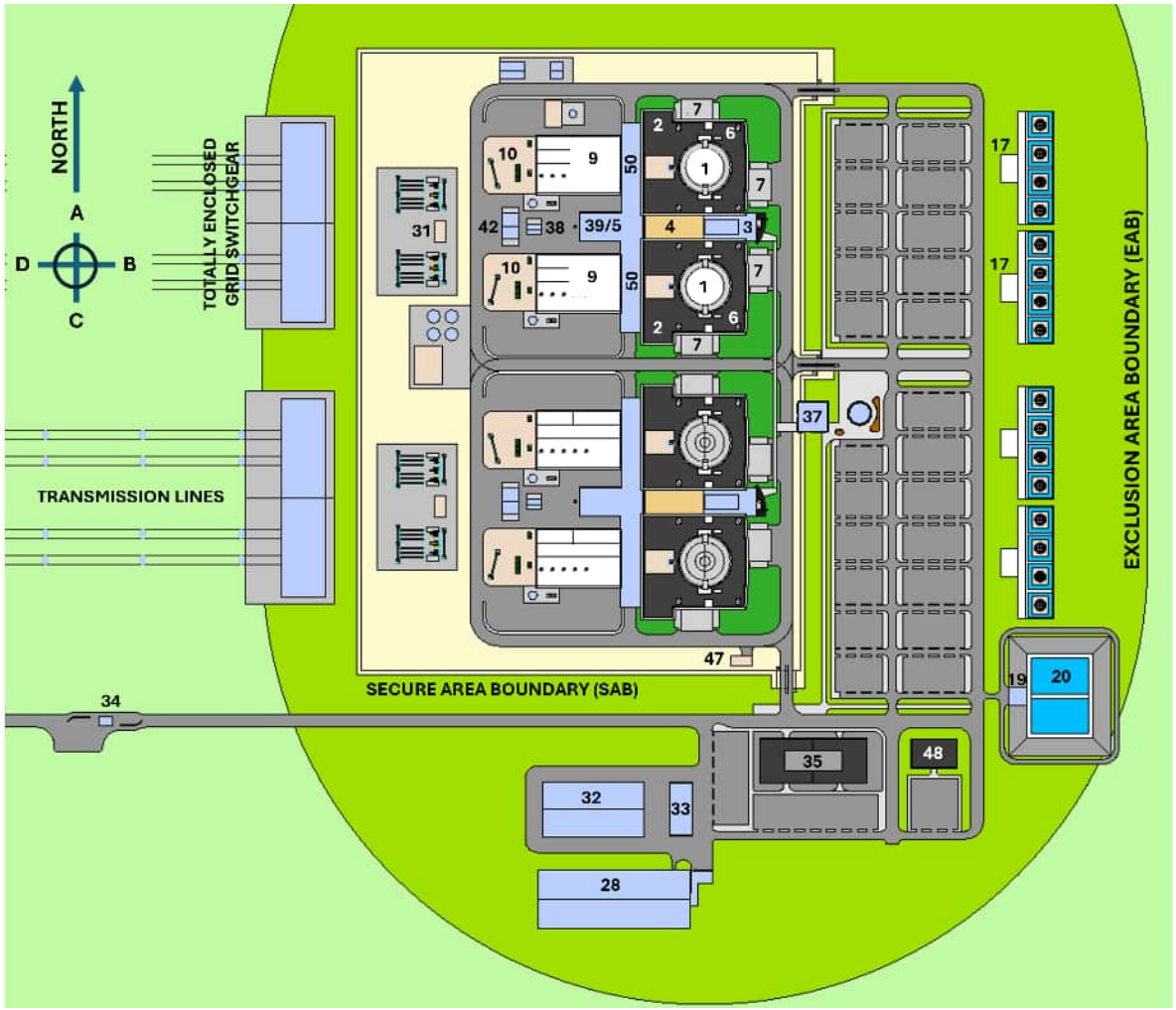


Figure 4.4-15: Four Unit CANDU MONARK Arrangement Close-up and Main Facilities Legend

* illustrative only, provided as an example layout based on the CANDU MONARK and expected to generally apply to both reactor technologies under consideration.

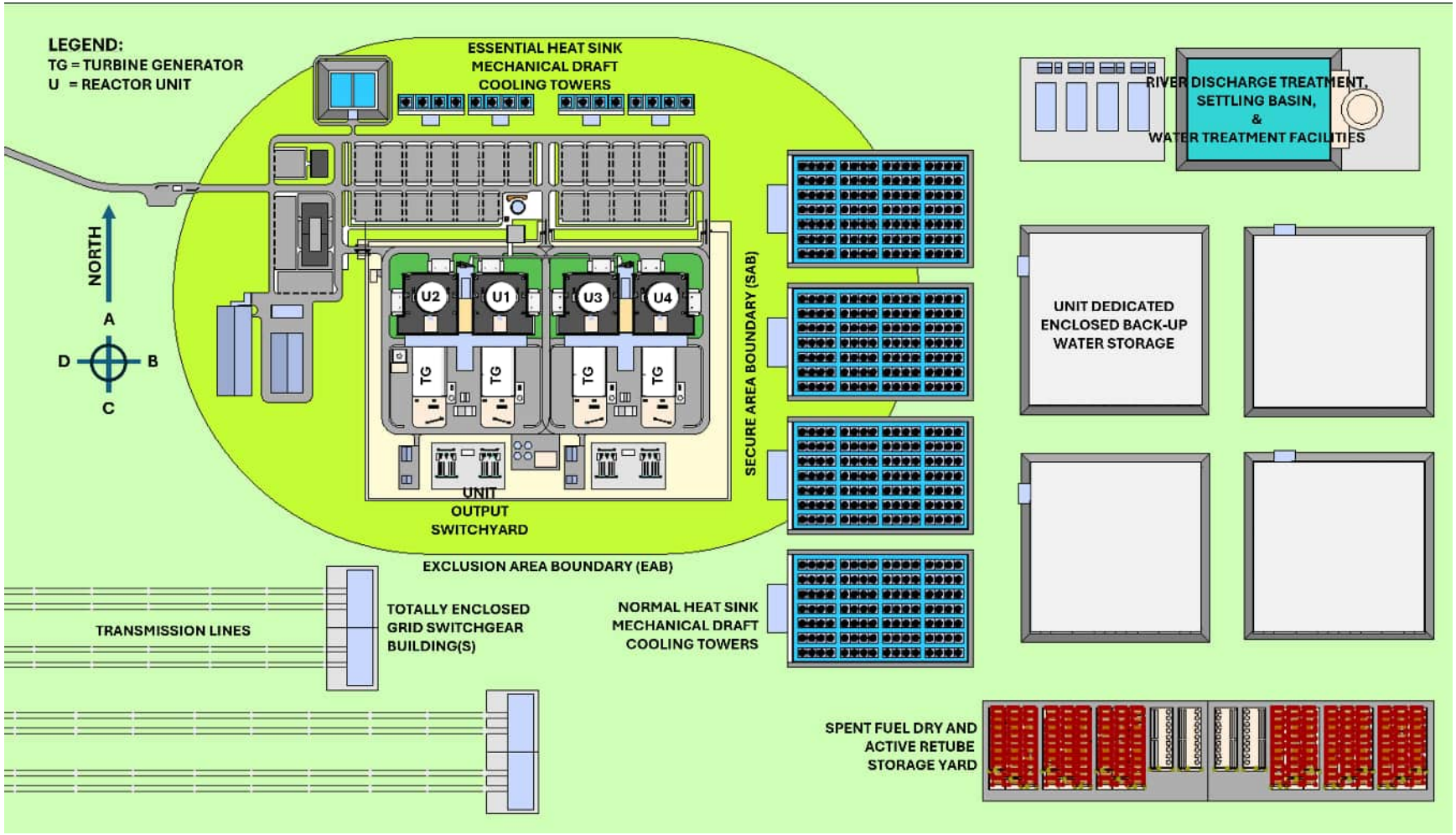


Figure 4.4-16: Four Unit CANDU MONARK Alternate Arrangement – Power Block Rotate 90 Degrees

* illustrative only, provided as an example layout based on the CANDU MONARK and expected to generally apply to both reactor technologies under consideration.

4.5 Preliminary Project Timelines

4.5.1 Project Schedule

The base case for the Project contemplates the sequential construction of all four units as shown in the Overall Project Schedule (Figure 4.5-1). The timing of units 3 and 4 will be assessed during the execution of the Project, and such timing may change based on the future provincial power demand and economic climate.

The schedule below, for the purpose of the Impact Assessment, shows the execution of the Project for the development of four consecutive units as the bounding case for the Impact Assessment. The Project is expected to take approximately 10 to 12 years from Project start to operation of the first unit with the subsequent units coming online approximately 3 years after one another based on current average estimates for the various stages. Operation is anticipated to occur for approximately 60 to 70 years per unit (depending on the reactor technology) plus 20 years to decommission the units and abandonment thereafter.

The schedule shown in Figure 4.5-1 is based on the presently projected mean duration for building four (4) AP1000 or four (4) CANDU MONARK units. It assumes that each unit will be constructed consecutively without any interruptions or pauses, including those for grid infrastructure upgrades. It also anticipates meeting a three-year federal government target to complete the Integrated Assessment and securing the necessary financing at the appropriate time. The Project schedule is subject to change.

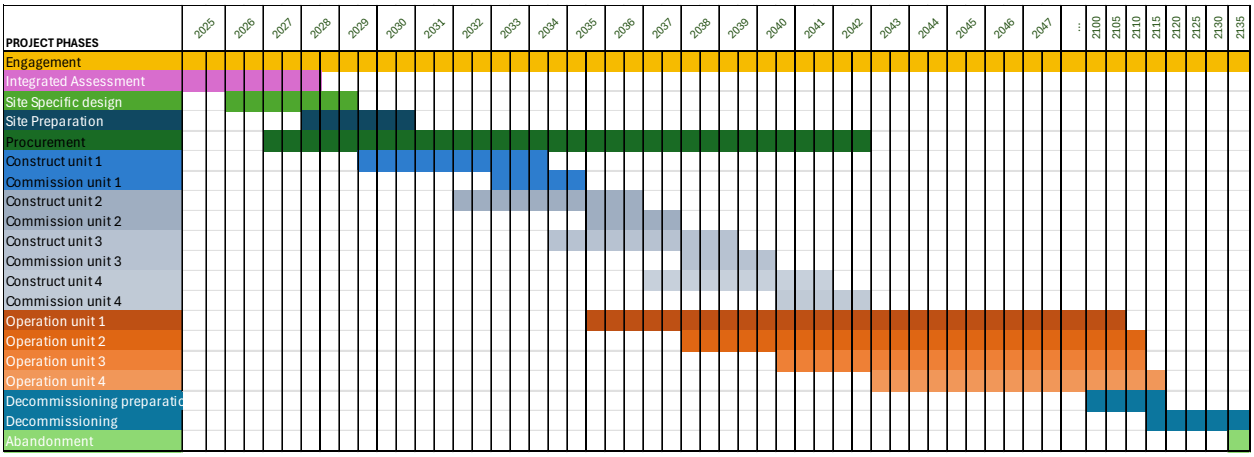


Figure 4.5-1: Overall Project Schedule

4.5.2 Project Stages

The Project stages are based on an estimated average duration that are expected for this Project.

Integrated Assessment
Approximately 3.5 years (2025 – 2028)

- Initial Planning
- Site Selection
- Impact Assessment
- Licensing Phase 1: Obtain Licence to Prepare Site

Site Preparation
Approximately 3 years (2028 – 2030)

- Site Preparation
- Licensing Phase 2: Obtain Licence to Construct

Construction
Approximately 11-13 years (2029– 2041)

- Construct and Commission Units
- Licensing Phase 3A: Obtain Licence to Operate

Operation
Approximately 70 years per unit (2035 – 2115)

- First Fuel
- Licensing Phase 3B: Maintain Licence to Operate
- Plant Operation
- Fuel Safe Storage

Decommissioning
Approximately 20 years (2115 – 2135)

- Licensing Phase 4: Obtain Licence to Decommission
- Decommission Facilities

Abandonment
Thereafter

- Licensing Phase 5: Obtain Licence to Abandon

4.6 Alternative Means of Carrying Out the Project

"Alternative means", is defined by the IAAC as the various projects that are technically and economically feasible, including using best available technologies, and the effects of those means. There are several alternative means that are being considered for carrying out the Project. These alternatives will be identified as the planning and design of the facility proceeds. The Impact Assessment for the Project will play a major part in identifying the preferred alternative means. Currently, it is anticipated that the following alternative means will be considered in the Impact Assessment:

- Alternative locations for the Project site;
- Alternative layouts of the various facilities within the Project site;
- Alternative workforce accommodations;
- Switchyard designs; and
- Radioactive waste management strategies.

4.6.1 Alternative Locations

Previous work conducted in 2009 (Golder, 2009) was used to inform the regional siting process to identify potential siting areas of interest that meet the minimum size requirements with a very high degree of environmental, social and technical suitability. From this work in 2009, two candidate sites were identified (Figure 2.1-1 and Figure 2.1-2).

- Option 1 sited on the west bank of the Peace River, approximately 30 km north of the Town of Peace River, in the County of Northern Lights; and
- Option 2 is sited on the east side of the Peace River, also approximately 30 km north of the Town of Peace River, in the Northern Sunrise County.

A siting evaluation is underway to validate that these two candidate sites are suitable for deploying up to four large reactors including water storage pond(s) switch yard and ancillary infrastructure requiring approximately 640 ha of land to contain the footprint of the main plant. The goal of this siting evaluation is to select an appropriate location for the proposed nuclear installations, so that the site characteristics can effectively accommodate engineering protective measures against both natural and human-induced hazards from external events. This approach provides a high margin of insurance that a sufficient level of safety can be achieved.

The siting evaluation is still ongoing; therefore, Part C &D Location Information and Context will provide information on both site options being considered.

4.6.2 Alternative Site Layouts

The current preliminary site layout (Figure 4.4-14) demonstrates the minimal land area needed for the Project site. An alternative generic site layout with the “power block” (main power generation buildings) rotated 90º is shown in Figure 4.4-16. The actual site layout will be optimized once the land available and dedicated to the Project has been finalized, as well as the selection of the reactor technology is complete. At that time, design of the site will consider key criteria for optimization of the layout and specific placement of the various plant facilities; such criteria include site-wide environmental and radiological safety, plant performance, proximity to required supporting infrastructure (e.g., the Peace River, roads, high-voltage corridor and local distribution station), and security and safeguarding.

4.6.3 Alternative Workforce Accommodations

Alternative accommodations for workers refer to different housing options provided for workers involved in the Project. These accommodations provide that workers have a safe and comfortable place to stay while working on the Project. The options may include:

- Temporary Housing: Portable units or trailers set up near the project site for workers to live in during the construction phase.
- Rental Properties: Renting houses or apartments in nearby towns or communities for workers.
- Hotels and Motels: Arranging for workers to stay in local hotels or motels.
- Worker Camps: Establishing dedicated camps with facilities such as dining halls, recreation areas, and medical services.

Alternatives for workforce accommodations will be a key discussion topic when engaging with Indigenous Nations and Communities, and local municipal and regional villages, towns, counties and municipal districts.

4.6.4 Alternative Technologies

The means of delivering the proposed maximum output of 4,800 MWe could alternatively be delivered via an alternate reactor design other than the AP1000 and the CANDU MONARK.

Like the MONARK reactor, the Enhanced CANDU 6 (EC6) reactor is also rooted in the successful CANDU 6 design deployed globally. The EC6 shares similar key safety and efficiency features found in prior CANDU technology and also offers many of the same improvements over the precursor CANDU 6 as the CANDU MONARK plant. The gross electrical power for an updated EC6 design would be greater than 750Mwe per unit using a modern improved turbine generator.

These six units would have an effective approximate combined land area requirement for the power block of approximately 13 ha. This makes its power density 340 MWe/ha. Note that some efficiencies through sharing of common systems is still possible in the final site detailed design. However, the increased power density is not expected to exceed 380 MWe/ha. Comparing this to the MONARK plant design, the combined land area requirements for the power block for four units is approximately 9.5 ha giving it a power density of 460 MWe/ha.

Similarly, the small modular reactor (SMR) design concepts that are currently being considered globally for other new build nuclear projects, would also provide the same benefits of nuclear power to the Project. However, their land requirement for the same gross electrical output is even greater than the CANDU EC6 plant (i.e., their power density is even less favourable). This is because SMRs are inherently designed to be a single-unit, self-contained plant, with little to no ability to share common services between multiple units on one site. This makes multiple unit land requirements even less optimal. To meet the same gross electrical output for this Project would require 15 SMR reactors. Based on publicly available data, this number of units would require a minimum of 15 ha for the power block. This puts the power density at the most 300 MWe/ha, potentially lower.

For these reasons noted, the AP1000 and CANDU MONARK are the preferred reactor technologies under consideration for the Project.

4.6.5 Alternative Switchyard Design

Project specific transmission infrastructure includes the substation and switchyard requirements to safely and reliably connect the Project to the provincial grid, together with newly built 500KV transmission lines extending the existing grid in a robust fashion to the powerplant. These two transmission components are integral to, and the minimum requirement to safely and reliably connect the new power plant to the provincial grid. Early transmission studies and connection configuration options are being undertaken to determine the preferred transmission connection alternatives. The final design, routing and approvals will follow the Alberta Utilities Commission and Alberta Transmission Regulation process for new high voltage transmission infrastructure development.

The current preliminary site layout (Figure 4.4-14) shows the current planned design of enclosed switchyards.

An alternative to an enclosed switchyard design is an open design. The open design is a simpler arrangement and can be simpler and cheaper to construct; however, there are many advantages of the enclosed design, including:

- **Increased Safety and Environmental Protection**: Enclosures provide additional protection against accidental contact and damage to the equipment from environmental hazards. It also protects the surrounding environment from any hazards generated by the equipment, including hazards to wildlife.
- **Reliability**: Enclosed equipment is less susceptible to weather conditions such as rain, snow, and dust, which can improve the reliability and longevity of the equipment.
- **Space Efficiency**: Indoor switchgear typically occupies less space compared to outdoor setups.
- **Lower Maintenance Costs**: Being protected from the elements, enclosed equipment requires less maintenance. Also, maintenance can be conducted easily and safely in a protected environment, leading to lower health and safety risk and shorter maintenance task times in inclement weather.
- **Enhanced Security**: Enclosures can provide an additional level of security against vandalism and unauthorized access.

4.6.6 Alternative Waste Management

The Project will include studies to assess the best available technique(s) for the treatment of both non-radioactive and radioactive waste. It is expected that those techniques will include the normal municipal disposal of non-radioactive wastes for the site, as well as an industrial facility.

The types of waste that will be produced will be divided into a number of waste categories which are suitable for compaction, incinerable or non-processible wastes. The largest volume of waste on the operating site will be non-radioactive and low-level radioactive waste generated during normal operations. Waste types and their quantities are discussed in Section 7.9.

The chosen waste management strategy is based on the application of the waste hierarchy and using a waste-led design approach.

- **Avoidance** – several means are used in the design to prevent the generation of activation products which include the choice of materials that can withstand high temperatures, radiation, and corrosive environments. The design also allows the avoidance of multiple handling of nuclear wastes which would generate further contaminated materials.
- **Minimization** – various minimization methods will be incorporated into the design and waste processing facilities for the plant, including reducing the quantity of non-radioactive wastes through standard waste reduction practices, decontamination where possible to reduce the classification of wastes as active, and core principles such as concentrate, contain, sort, and segregate different waste types to minimize the volume of active wastes (in general) and higher active wastes (within radioactive waste streams). This also includes the minimization and management of secondary nuclear waste generation by the segregation of other wastes, exempt, and out of scope wastes.

- **Recycling** – a comprehensive recycling program for materials which can be segregated and recycled such as metals, plastics and electrical components.
- **Reuse** – for example, through the reuse/refurbishment of components rather than their disposal or further generation of electricity from the heat generated from incineration of combustible materials.
- **Disposal** – This is the least preferred option and will only be considered when there are no alternatives.

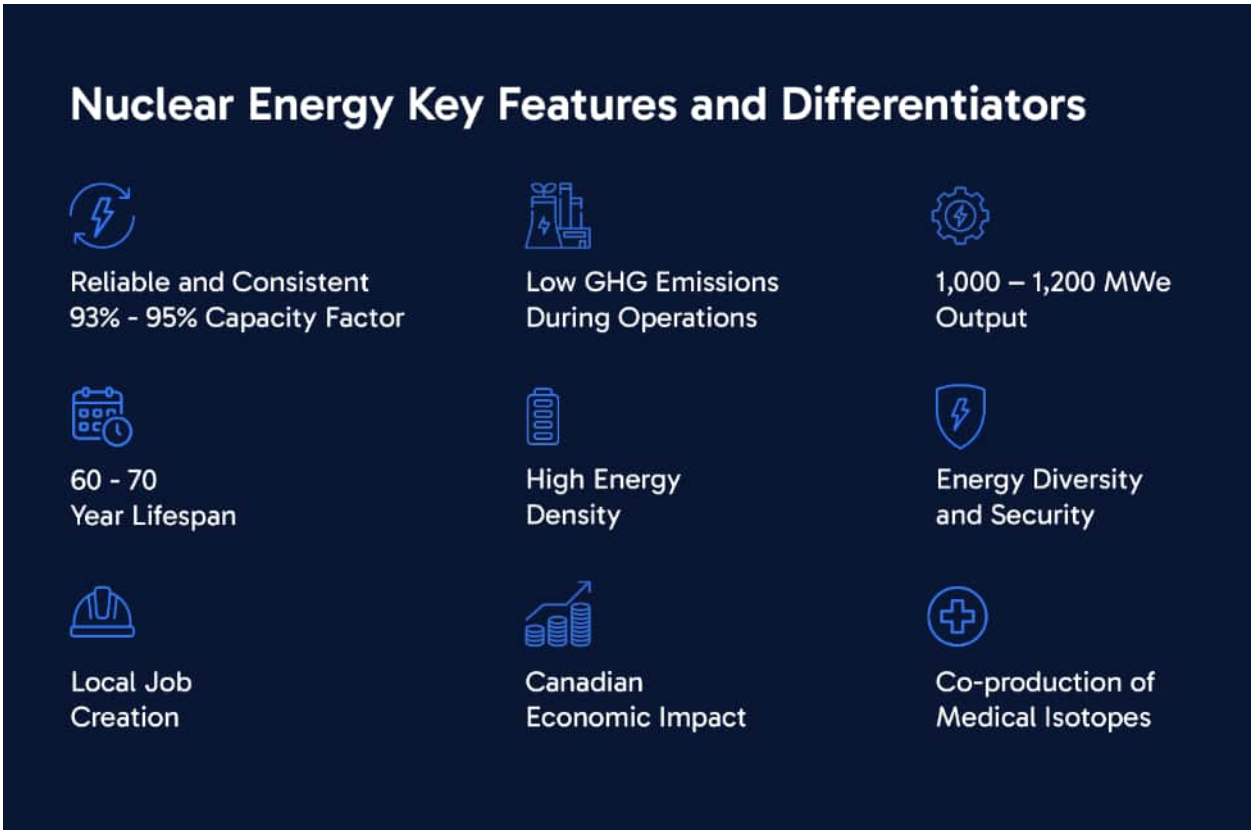
Alternatives considered for non-radioactive waste processing and disposal include the packaging and safely disposing of wastes into municipal waste disposal facilities (where appropriate) or through specialized conventional waste processing facilities (where required). Although this is expected for most non-radioactive wastes, some conventional wastes may be processed on the site if considered best available technique.

The alternative to the chosen means of radioactive waste processing and interim storage on the site, would be to package and ship off-site all radioactive wastes or a certain portion of the radioactive waste streams (e.g., low-level radioactive wastes). Since Alberta does not currently operate any dedicated nuclear waste management (i.e., processing and storage) facilities and shipping wastes to Ontario where such facilities exist is considered to introduce undue risk and cost to the Project, this alternative was not chosen.

4.7 Potential Alternatives to the Project

Alberta's economic and energy future requires a diverse electricity grid that can meet high demand periods (GOA 2024a). Nuclear energy stands out as a premier choice for modern energy solutions, offering a blend of high reliability, compact design, and environmental sustainability. With impressive lifetime capacity factors exceeding 93% % nuclear energy provides a reliable and consistent electricity supply, minimizing downtime and maximizing output. Nuclear energy facilities' small footprint make them an ideal option to increase energy density, allowing for efficient land use without compromising on power generation capabilities.

Furthermore, nuclear energy produces stable electricity, providing a dependable energy source that can support both residential and industrial needs. Most notably, nuclear reactors operate with zero GHG emissions during electricity generation, contributing to the reduction of carbon footprints and supporting global efforts towards achieving net-zero emissions.



To meet Alberta's growing energy needs while reducing GHG emissions, solar and wind energy are two notable alternatives. These non-emitting sources of electricity are integral to Alberta's plans to decarbonize the grid. However, when considering reliable, long-term baseload generation to meet the forecasted electricity demand, large nuclear power remains the best and most proven option.

4.7.1 Solar Power

Footprint: Solar power requires much larger footprint. A solar farm that generates 1 MW electricity requires approximately 5 – 10 acres of land, which is means that solar power needs approximately 22,000 acres – 44,000 acres (8,900 ha – 17,800 ha) of land required to generate 4,400 MW. This is as opposed to approximately 640 ha for the same 4,400 MW capacity of a 4-unit nuclear energy facility with cooling ponds and cooling towers (actual land area depends on final site-specific layout but is within this order of magnitude). Extensive use of land for a solar farm causes disruptions to the hosting communities such as discussed in the next point.

Land Use and Aesthetics: Solar farms require large areas of land, which can lead to the displacement of agricultural activities or natural habitats. This can be particularly concerning in rural areas where land is a valuable resource. Additionally, the visual impact of vast arrays of solar panels can be considered unsightly by some community members.

Environmental Impact: The construction and maintenance of solar farms can disrupt local ecosystems. This includes the potential for soil erosion, habitat loss for wildlife, and the use of water resources for cleaning the panels. Moreover, the production and disposal of solar panels involve hazardous materials, which can pose environmental and health risks if not managed properly.

Intermittent Energy Supply: Solar energy is dependent on sunlight, which means it is not available at night and can be less reliable during cloudy or rainy days. This intermittency can pose challenges for maintaining a stable energy supply and may require additional infrastructure for energy storage or backup power sources. In Alberta, the average capacity factor of a solar farm is less than 20%. Considering the conditions in the Peace River region, such as available sunlight during the winter months, snow, and cloudy days, the capacity factor can further drop, increasing risks of blackouts due to unreliable power supply. The reactor technologies under consideration for the Project have lifetime capacities of 93%+, and such figures are not impacted by the local conditions.

Economic Concerns: While solar farms can create jobs during the construction phase, the long-term employment opportunities are relatively limited. Additionally, the initial investment and maintenance costs can be high, which might not be feasible for all communities.

Lifecycle Reliability: Solar panels lifespan is less than 40 years, and the performance of the system will naturally degrade over time with degradation of its components, while nuclear reactors have a lifespan of 60 to 70 years of consistent power output.

4.7.2 Wind Power

Footprint: Wind power also requires a large footprint A wind farm that generates 1 MW electricity requires approximately 2 – 40 acres of land depending on variety of factors, which is equivalent to approximately 8,800 acres - 176,000 acres (3,560 ha – 71,250 ha) of land required to generate 4,400 MW. This is as opposed to approximately 640 ha for the same 4,400 MW 4-unit nuclear energy facility with cooling ponds and cooling towers (actual land area depends on final site-specific layout but is within this order of magnitude). Wind farms on flat land areas will require more land due to lower wind speeds and they will require further spacing between the wind turbines. This extensive footprint causes disruptions to the hosting communities such as discussed in the next point.

Land Use: Wind farms require large areas of land, which can lead to the displacement of agricultural activities or natural habitats. This can be particularly concerning in rural areas where land is a valuable resource.

Wildlife Impact: The presence of wind turbines can pose risks to local wildlife, particularly birds and bats, which may collide with the turbine blades. This can lead to a decline in local wildlife populations.

Visual Impact and Noise: Wind turbines can be considered unsightly by some community members, especially in scenic or rural areas. Additionally, the noise generated by the turbines can be a source of disturbance for nearby residents.

Intermittent Energy Supply: Wind energy is dependent on wind conditions, which means it is not always available. This intermittency can pose challenges for maintaining a stable energy supply and may require additional infrastructure for energy storage or backup power sources. In Alberta, the average capacity factor of a wind farm is around 30-40%. The reactor technologies under consideration for the Project have lifetime capacities of 93%+, and such figures are not impacted by the local wind conditions.

Economic Concerns: While wind farms can create jobs during the construction phase, the long-term employment opportunities are relatively limited. Additionally, the initial investment and maintenance costs can be high, which might not be feasible for all communities.

Lifecycle Reliability: Wind farm lifespan is less than 25-30 years, with continual degradation of the system components leading to decreasing performance and catastrophic failure of considerable size components far above the ground, causing risk to nearby wildlife and people. The ongoing effective inspection and maintenance of such infrastructure during extreme weather conditions can be challenging. Nuclear reactors have lifespan of 60 to 70 years of consistent power output.

5 PART C & D – LOCATION INFORMATION AND CONTEXT

5.1 Proposed Location of the Project

5.1.1 Geographical Location

There are two possible options being considered for the Project site. Option 1 is sited on the west bank of the Peace River, approximately 30 km north of the Town of Peace River, in the County of Northern Lights (Figure 2.1-1). The approximate centre of the Option 1 Project site is located at coordinates:

- Universal Transverse Mercator (UTM) (NAD Zone 11V) 486153.4793E 6259545.727N; and
- Latitude/longitude 56°28'48.6050"N,117°13'29.3137"W.

Option 2 is sited on the east side of the Peace River, also approximately 30 km north of the Town of Peace River, in the Northern Sunrise County (Figure 2.1-2). The approximate centre of the Option 2 Project site is located at coordinates:

- UTM (NAD Zone 11V) 493197.3452E 6251806.1099N; and
- Latitude/longitude 56°24'38.8351"N, 117°06'36.8835"W.

The Project site during the operations phase will cover 6.4 squared kilometers (km2) in area or approximately 640 ha. This is the minimum area required for the site. This area would be fenced and contain the reactors and all the supporting plant facilities required during operations, as well as encompassing the exclusion area boundary . The Project site is situated in a predominantly agricultural area and does not contain any major water bodies. The site is generally flat and has historically been used for agricultural purposes. The site is located on a plateau, approximately 210 m above the Peace River.

With regards to the proposed location options and provincial and local response organization EPZs, as noted in Section 4.4.2.4.6, the definition and size of the required EPZs is unknown at this time and will be developed as part of the design and licensing activities for the Project. However, noting definitions and sizes for the existing Canadian nuclear power generating stations zones, neither location option would require any interprovincial emergency planning coordination.

Early transmission studies and connection configuration options are being undertaken to determine the preferred transmission connection alternatives. The final design, routing and approvals will follow the Alberta Utilities Commission and Alberta Transmission Regulation process for new high voltage transmission infrastructure development.

5.1.2 Site Maps

Mapping provided in this IPD includes:

- Project Location (Figure -1);
- Site Context – Project Site (Figure 2.1-1 and Figure 2.1-2);
- Conceptual Site Layout (Figure 4.4-6);
- Location of Local Communities(Figure 5.1-1);
- Watershed, Watercourses and Waterbodies (Figure 5.1-2);
- Nearby Seasonal-use Properties (Figure 5.1-3); and
- First Nation Reserves and Métis Settlements associated with the preliminary list of Potentially Impacted Indigenous Nations and Communities (Figure 5.1-4)

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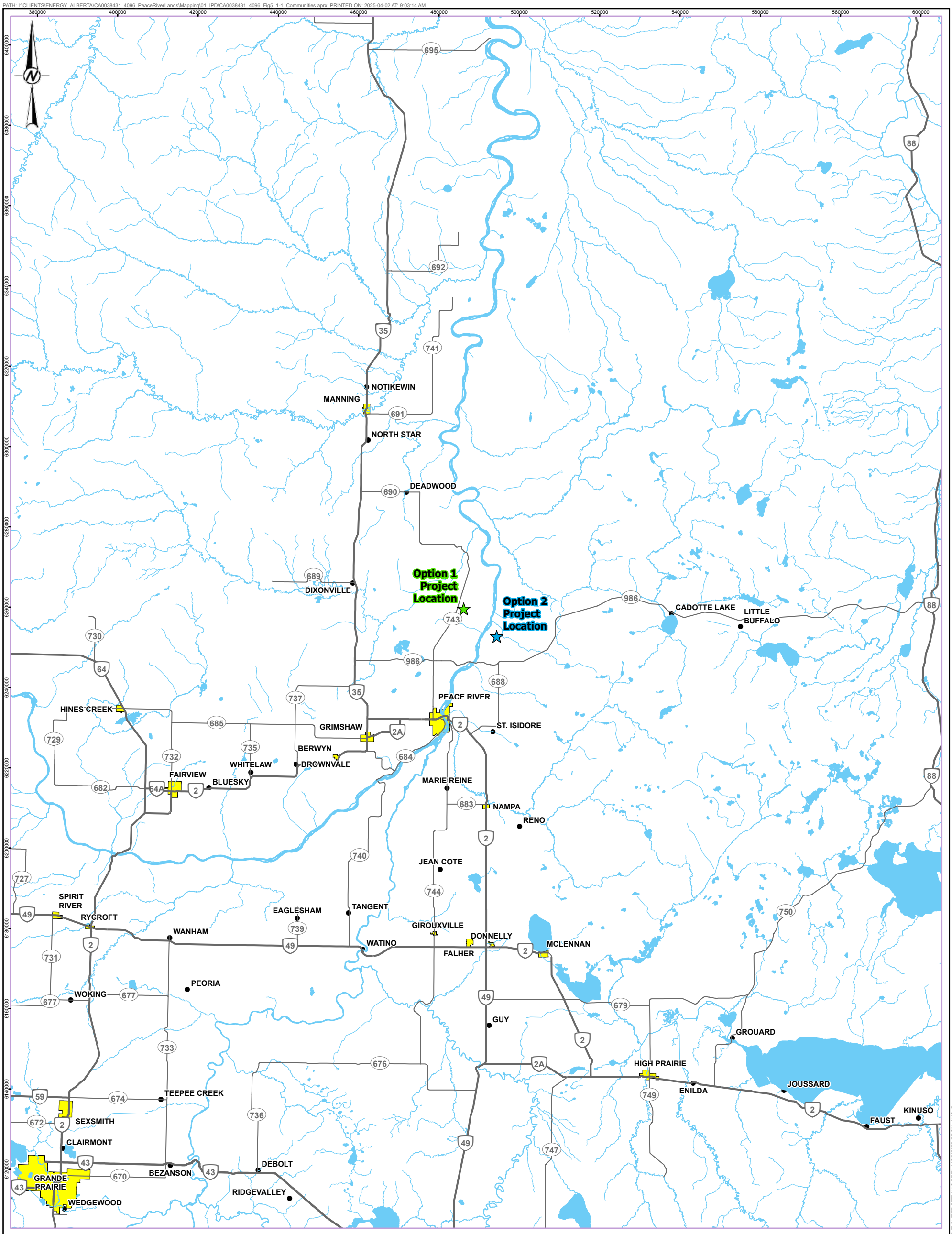

LEGEND

- HAMLET
- OPTION 1 PROJECT LOCATION
- OPTION 2 PROJECT LOCATION
- PRIMARY HIGHWAY
- SECONDARY HIGHWAY
- WATERCOURSE
- POPULATED PLACE
- WATERBODY

0 20 40

1:900,000 KILOMETRES

NOTE(S)

1. PROJECTED COORDINATE SYSTEM: NAD 1983 UTM ZONE 11N

REFERENCE(S)

CLIENT
ENERGY ALBERTA

PROJECT
PEACE RIVER NUCLEAR POWER PROJECT

TITLE
LOCATION OF LOCAL COMMUNITIES

CONSULTANT

YYYY-MM-DD	2025-04-02
DESIGNED	MJ
PREPARED	KW
REVIEWED	CB
APPROVED	MM

PROJECT NO.	CONTROL	REV.	FIGURE
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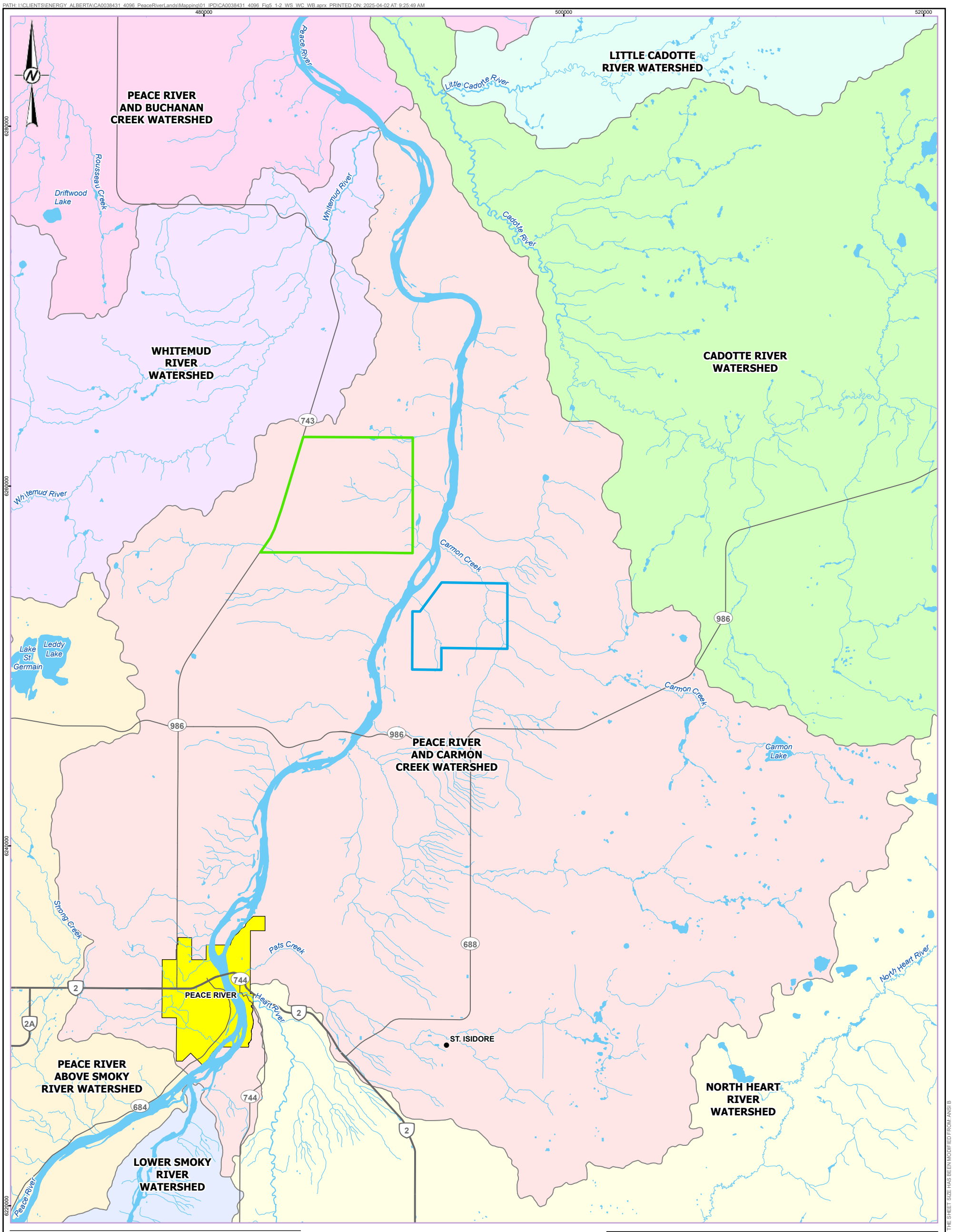

LEGEND

- HAMLET
- PRIMARY HIGHWAY
- SECONDARY HIGHWAY
- WATERCOURSE
- OPTION 1 SITING AREA OF INTEREST
- OPTION 2 SITING AREA OF INTEREST
- POPULATED PLACE
- WATERBODY

WATERSHED

- CADOTTE RIVER
- LITTLE CADOTTE RIVER
- LOWER SMOKY RIVER
- NORTH HEART RIVER
- PEACE RIVER ABOVE SMOKY RIVER
- PEACE RIVER AND BUCHANAN CREEK
- PEACE RIVER AND CARMON CREEK
- WHITEMUD RIVER

0 5 10
1:200,000 KILOMETRES

NOTE(S)
1. PROJECTED COORDINATE SYSTEM: NAD 1983 UTM ZONE 11N

REFERENCE(S)

CLIENT
ENERGY ALBERTA

PROJECT
PEACE RIVER NUCLEAR POWER PROJECT

TITLE
WATERSHED, WATERCOURSES AND WATERBODIES

CONSULTANT
wsp

YYYY-MM-DD	2025-04-02
DESIGNED	MJ
PREPARED	KW
REVIEWED	CB
APPROVED	MM

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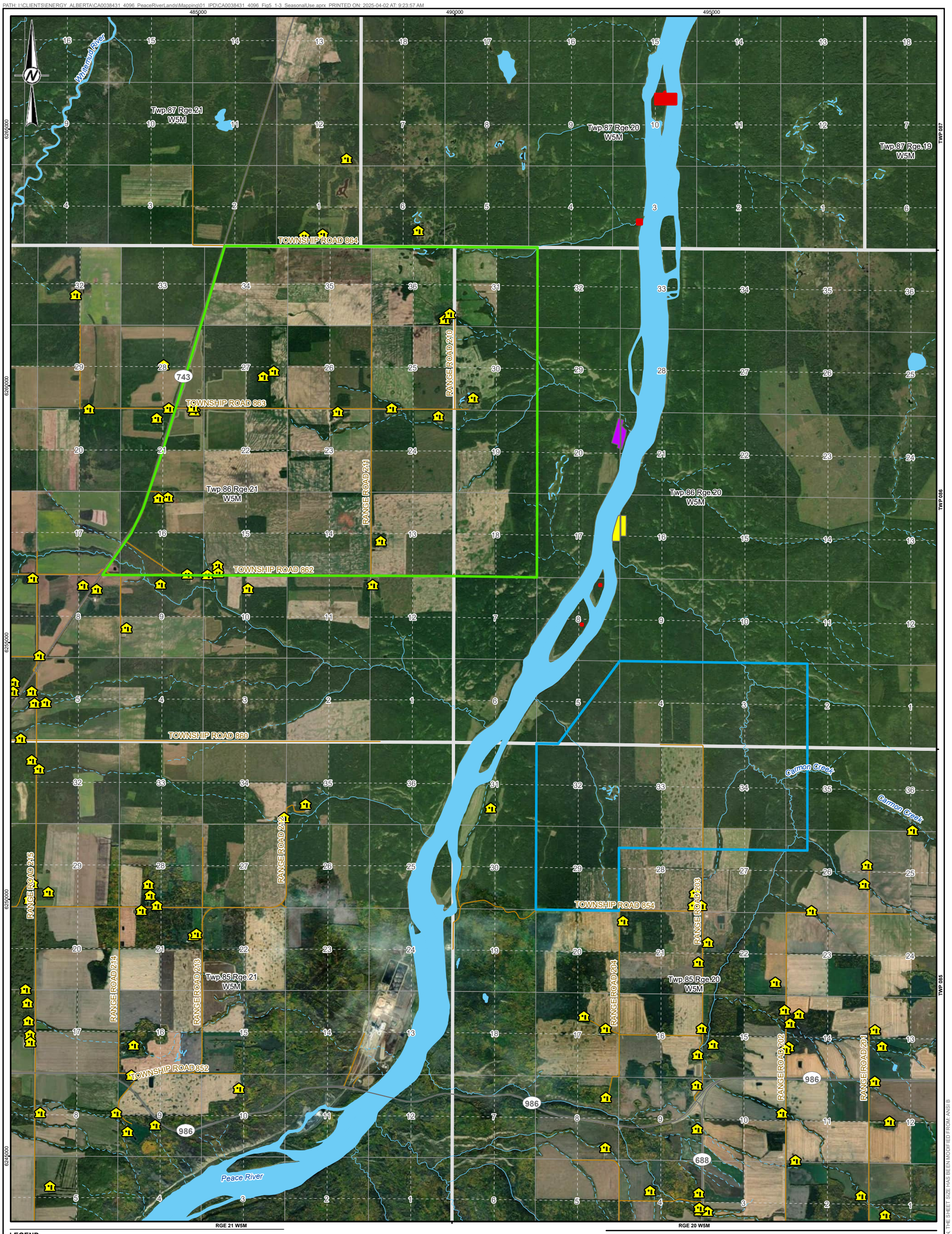

LEGEND

- POTENTIAL PERMANENT RESIDENCE
- SECONDARY HIGHWAY
- LOCAL ROAD
- WATERCOURSE
- OPTION 1 SITING AREA OF INTEREST
- OPTION 2 SITING AREA OF INTEREST
- WATERBODY

RECREATION DISPOSITONS

- WEBERVILLE COMMUNITY FOREST ASSOCIATION MODEL FOREST
- PEACE RIVER BOATING ASSOCIATION CAMPSITE AND PICNIC AREA
- RECREATIONAL COTTAGE

0 1.5 3

1:70,000 KILOMETRES

REFERENCE(S)

1. RESIDENCES DERIVED FROM THE ALBERTA BIODIVERSITY MONITORING INSTITUTE 2021 HUMAN FOOTPRINT.
2. BASE DATA MAY BE OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED, ALTALIS LTD. © GOVERNMENT OF ALBERTA 2024. ALL RIGHTS RESERVED, OR S&P GLOBAL INC. IMAGERY COPYRIGHT © 20210920 ESRI AND ITS LICENSORS. SOURCE: EARTHSTAR GEOGRAPHICS. USED UNDER LICENSE, ALL RIGHTS RESERVED.
3. PROJECTED COORDINATE SYSTEM: NAD 1983 UTM ZONE 11N

CLIENT
ENERGY ALBERTA

PROJECT
PEACE RIVER NUCLEAR POWER PROJECT

TITLE
NEARBY SEASONAL-USE PROPERTIES

CONSULTANT

wsp

YYYY-MM-DD	2025-04-02
DESIGNED	MS
PREPARED	KW
REVIEWED	CB
APPROVED	MM

PROJECT NO.	CONTROL	REV.	FIGURE
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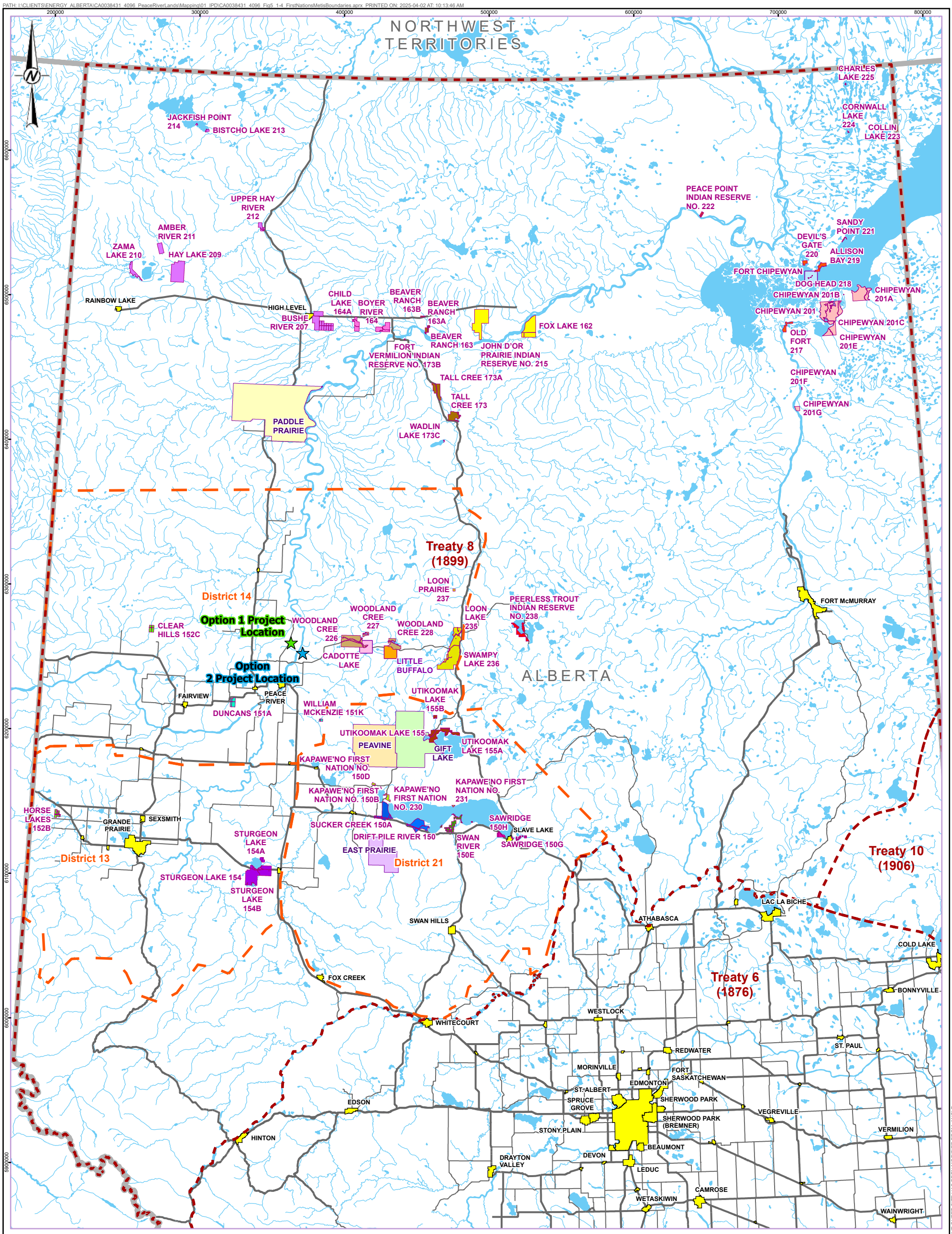

LEGEND

- OPTION 1 PROJECT LOCATION
- OPTION 2 PROJECT LOCATION
- PRIMARY HIGHWAY
- SECONDARY HIGHWAY
- WATERCOURSE
- POPULATED PLACE
- TREATY BOUNDARY
- WATERBODY

INDIGENOUS RESERVE

- ATHABASCA CHIPEWYAN FIRST NATION
- BEAVER FIRST NATION
- DENE THA' FIRST NATION
- DRIFTPILE CREE NATION
- DUNCAN'S FIRST NATION
- HORSE LAKE FIRST NATION
- KAPAWE'NO FIRST NATION
- LITTLE RED RIVER CREE
- LOON RIVER FIRST NATION
- LUBICON LAKE BAND
- MIKISEW CREE FIRST NATION
- PEERLESS TROUT FIRST NATION
- SAWRIDGE FIRST NATION
- STURGEON LAKE CREE NATION
- SUCKER CREEK FIRST NATION
- SWAN RIVER FIRST NATION
- TALLCREE TRIBAL GOVERNMENT
- WHITEFISH LAKE FIRST NATION
- WOODLAND CREE FIRST NATION

MÉTIS SETTLEMENT

- CADOTTE LAKE MÉTIS
- EAST PRAIRIE MÉTIS
- FORT CHIPEWYAN MÉTIS
- GIFT LAKE MÉTIS
- OTIPEMISIWAK MÉTIS GOVERNMENT
- PADDLE PRAIRIE MÉTIS
- PEAVINE MÉTIS

0 50 100
1:2,500,000 KILOMETRES

NOTE(S)

1. PROJECTED COORDINATE SYSTEM: NAD 1983 10TM AEP FOREST
2. OTIPEMISIWAK MÉTIS GOVERNMENT CONSISTS OF DISTRICTS 14, 21 & 13 (MÉTIS NATION OF ALBERTA). BOUNDARIES ARE APPROXIMATE.

REFERENCE(S)

CLIENT
ENERGY ALBERTA

PROJECT
PEACE RIVER NUCLEAR POWER PROJECT

TITLE
FIRST NATION RESERVES AND MÉTIS SETTLEMENTS ASSOCIATED WITH THE PRELIMINARY LIST OF POTENTIALLY IMPACTED INDIGENOUS NATIONS AND COMMUNITIES

CONSULTANT
wsp

YYYY-MM-DD	2025-04-02
DESIGNED	LH
PREPARED	KW
REVIEWED	CB
APPROVED	MM

PROJECT NO. CA0038431.4096 | CONTROL | REV. 0 | FIGURE 5.1-4

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5.1.3 Legal Description of Land

The Project site is not located on federal Crown lands. Access to the Peace River for water intake infrastructure may interact with provincial Crown lands. The legal description for the Project site options is presented in Table 5.1-1. This does not include water intake infrastructure currently as more detailed local investigations will be required to identify suitable locations and access to the Peace River.

Table 5.1-1: Legal Descriptions for the Project Site

Meridian	Range	Township	Section	Quarter Section	Description
Option 1					
5	21	86	14	NE	NE-14-86-21-5
5	21	86	14	SE	SE-14-86-21-5
5	21	86	14	SW	SW-14-86-21-5
5	21	86	14	NW	NW-14-86-21-5
5	21	86	15	NE	NE-15-86-21-5
5	21	86	15	SE	SE-15-86-21-5
5	21	86	15	SW	SW-15-86-21-5
5	21	86	21	SE	SE-21-86-21-5
5	21	86	21	SW	SW-21-86-21-5
5	21	86	22	NE	NE-22-86-21-5
5	21	86	22	SE	SE-22-86-21-5
5	21	86	22	SW	SW-22-86-21-5
5	21	86	23	NE	NE-23-86-21-5
5	21	86	23	SE	SE-23-86-21-5
5	21	86	23	SW	SW-23-86-21-5
5	21	86	23	NW	NW-23-86-21-5
5	21	86	14	SW	SW-14-86-21-5
5	21	86	15	NE	NE-15-86-21-5
5	21	86	15	SE	SE-15-86-21-5
Option 2					
5	20	85	29	NE	5-20-85-29-NE
5	20	85	29	SE	5-20-85-29-SE
5	20	85	29	SW	5-20-85-29-SW
5	20	85	29	NW	5-20-85-29-NW
5	20	85	32	NE	5-20-85-32-NE
5	20	85	32	SE	5-20-85-32-SE
5	20	85	32	SW	5-20-85-32-SW
5	20	85	32	NW	5-20-85-32-NW

Table 5.1-1: Legal Descriptions for the Project Site

Meridian	Range	Township	Section	Quarter Section	Description
5	20	85	33	NE	5-20-85-33-NE
5	20	85	33	SE	5-20-85-33-SE
5	20	85	33	SW	5-20-85-33-SW
5	20	85	33	NW	5-20-85-33-NW

Note: The Alberta Township Survey system (ATS) is a grid dividing the province into equal-sized squares. The ATS designates land as being west of the 4th Meridian, 5th Meridian or 6th Meridian, and between these meridians are a series of columns called ranges and rows called townships both six miles wide. The term township also describes the six-mile by six-mile square formed when the range and township lines intersect. These townships are further divided into 36 sections, each measuring one-mile by one-mile. A section can be further divided into quarters (NE, NW, SE, SW). Legal descriptions are written as in the follow example: NE-14-86-21-5 – northeast quarter of section 14, township 86, range 21, west of the 5th Meridian.

5.1.4 Proximity to Residences and Communities

5.1.4.1 Option 1

The closest community to the Project is the Town of Peace River, approximately 28 km southwest by road of the Project (21 km directly). The nearest First Nation Reserve is Duncan's 151A, approximately 70 km southwest by road (51 km directly) from the Project.

The next closest First Nation Reserves are Woodland Cree 226 (74 km east of the Project by road [31 km directly]), William McKenzie 151K (78 km southeast by road [52 km directly]), and Woodland Cree 277 (85 km northeast of the Project by road [46 km directly]). Duncan's First Nation and Woodland Cree First Nation are signatories to Treaty 8 (Woodland Cree First Nation 2015). Cadotte Lake Métis Nation is the closest Métis community (93km east of the Project by road [57km directly]). Peavine Métis Settlement is the nearest Métis settlement (175 km southeast of the Project by road [67 km directly]). The next closest Métis settlement is Gift Lake Métis Settlement (210 km southeast of the Project by road [82 km directly]).

The proximity to potential residences and communities are presented in Table 5.1-2 and Table 5.1-3.

Table 5.1-2: Potential Permanent Residences to Option 1

Type	Approximate Distance (m)	Direction From the Project Site
Potential Permanent Residence	29	S
Potential Permanent Residence	73	S
Potential Permanent Residence	103	E
Potential Permanent Residence	109	N
Potential Permanent Residence	123	N
Potential Permanent Residence	245	SE
Potential Permanent Residence	294	E
Potential Permanent Residence	294	W

Table 5.1-2: Potential Permanent Residences to Option 1

Type	Approximate Distance (m)	Direction From the Project Site
Potential Permanent Residence	318	SW
Potential Permanent Residence	325	S
Potential Permanent Residence	453	N
Potential Permanent Residence	474	W
Potential Permanent Residence	585	NW
Potential Permanent Residence	713	N
Potential Permanent Residence	754	N
Potential Permanent Residence	881	SW
Potential Permanent Residence	906	NE

Table 5.1-3: Nearest Communities Within 100 km of Option 1

Type	Name	Approximate Distance (km)	Approximate Distance by Road (km)	Direction From the Project Site
Town	Peace River	21	28	SW
Hamlet	Dixonville	27	53	NW
Hamlet	St. Isidore	28	46	SE
First Nation Reserve	Woodland Cree 226	31	74	E
Hamlet	Deadwood	32	45	NW
Town	Grimshaw	35	47	SW
Hamlet	Marie Reine	42	51	S
Village	Berwyn	45	59	SW
First Nation Reserve	Woodland Cree 227	46	85	NE
Village	Nampa	46	59	S
Hamlet	Cadotte Lake	48	82	E
Hamlet	North Star	48	70	NW
First Nation Reserve	Duncans 151A	51	70	SW
First Nation Reserve	William Mckenzie 151K	52	78	SE
Town	Manning	53	77	NW
Hamlet	Brownvale	53	69	SW
Hamlet	Reno	53	73	SE
Hamlet	Notikewin	60	83	NW
Hamlet	Jean Cote	62	75	S
First Nation Reserve	Woodland Cree 228	63	107	E
Hamlet	Whitelaw	64	84	SW

Table 5.1-3: Nearest Communities Within 100 km of Option 1

Type	Name	Approximate Distance (km)	Approximate Distance by Road (km)	Direction From the Project Site
Hamlet	Little Buffalo[4]	65	100	SE
Métis Settlement	Peavine Métis Settlement	67	175	SE
Hamlet	Bluesky	74	96	SW
Town	Falher	77	96	S
Village	Girouxville	78	89	SW
Hamlet	Tangent	78	95	SW
Town	Fairview	79	105	SW
Village	Donnelly	81	96	S
Métis Settlement	Gift Lake Métis Settlement	82	210	SE
Hamlet	Eaglesham	84	135	SW
Hamlet	Watino	84	112	SW
Town	Mclennan	85	108	SE
Village	Hines Creek	85	110	SW
First Nation Reserve	Clear Hills 152C	93	148	West
First Nation Reserve	Swampy Lake 236	98	151	SE

5.1.4.2 Option 2

The closest community to the Project is the town of St. Isidore, approximately 23 km south by road of the Project (19 km directly).

The nearest First Nation Reserve is Woodland Cree 226, approximately 49 km northeast from the Project by road (27 km directly). Woodland Cree First Nation and Duncan's First Nation are signatories to Treaty 8 (WCFN 2015). The next closest First Nation Reserves are Woodland Cree 227 (59 km northeast of the Project by road [43 km directly]), Duncan's 151A (78 km southwest of the Project by road [51 km directly]), and Woodland Cree 228 (82 km northeast of the Project by road [59 km directly]). Cadotte Lake Métis Nation is the closest Métis community (70km east of the Project by road [52km directly]) Peavine Métis Settlement is the nearest Métis settlement (160 km southeast of the Project by road [57 km directly]). The next closest Métis settlement is Gift Lake Métis Settlement (195 km southeast of the Project by road [73 km directly]).

The proximity to potential residences are presented in Table 5.1-4 and communities in Table 5.1-5.

[4] Lubicon Lake Band's reserve lands include the Hamlet of Little Buffalo. The federal government database used to develop these tables does not include boundaries for Lubicon Lake Band #453. Energy Alberta will work with the Nation to attain proper mapping during the Impact Statement phase.

Table 5.1-4: Potential Permanent Residences to Option 2

Type	Approximate Distance (m)	Direction From the Project Site
Potential Permanent Residence	294	SE
Potential Permanent Residence	953	W

Table 5.1-5: Nearest Communities Within 100 km of Option 2

Type	Name	Approximate Distance (km)	Approximate Distance by Road (km)	Direction From the Project Site
Town	Peace River	15	39	SW
Hamlet	St. Isidore	19	23	S
First Nation Reserve	Woodland Cree 226	27	49	NE
Town	Grimshaw	34	56	SW
Hamlet	Marie Reine	35	56	SW
Hamlet	Dixonville	37	61	NW
Village	Nampa	37	44	S
Hamlet	Deadwood	42	80	NW
First Nation Reserve	William Mckenzie 151K	42	60	SE
First Nation Reserve	Woodland Cree 227	43	59	NE
Hamlet	Reno	43	58	SE
Village	Berwyn	44	68	SW
Hamlet	Cadotte Lake	44	57	NE
First Nation Reserve	Duncans 151A	51	78	SW
Hamlet	Brownvale	54	81	SW
Hamlet	Jean Cote	55	70	SW
Métis Settlement	Peavine Métis Settlement	57	160	SE
Hamlet	North Star	58	97	NW
First Nation Reserve	Woodland Cree 228	59	82	NE
Hamlet	Little Buffalo[5]	61	74	NE
Town	Manning	63	105	NW
Hamlet	Whitelaw	65	96	SW
Hamlet	Notikewin	70	111	NW
Village	Girouxville	70	88	SW
Town	Falher	71	81	SW
Village	Donnelly	72	81	S
Hamlet	Tangent	73	103	SW

[5] Lubicon Lake Band's reserve lands include the Hamlet of Little Buffalo. The federal government database used to develop these tables does not include boundaries for Lubicon Lake Band #453. Energy Alberta will work with the Nation to attain proper mapping during the Impact Statement phase.

Table 5.1-5: Nearest Communities Within 100 km of Option 2

Type	Name	Approximate Distance (km)	Approximate Distance by Road (km)	Direction From the Project Site
Métis Settlement	Gift Lake Métis Settlement	73	195	SE
Town	Mclennan	75	93	SE
Hamlet	Bluesky	76	108	SW
Hamlet	Watino	79	111	SW
Hamlet	Eaglesham	81	134	SW
Town	Fairview	82	117	SW
Village	Hines Creek	91	118	SW
Hamlet	Guy	92	98	S
First Nation Reserve	Swampy Lake 236	93	126	E
First Nation Reserve	Utikoomak Lake 155B	98	192	SE
First Nation Reserve	Kapawe'no First Nation No. 150D	98	145	SE

5.1.5 Proximity to Land Used for Traditional Purposes by Indigenous Peoples of Canada

Both Option 1 and Option 2 sites are situated within an area covered under Treaty 8, signed in 1899. Based on current knowledge, including documentation publicly available (GOC 2024a), the proponent understands that the Project is located on lands that may have been used previously for traditional purposes. A preliminary list of Indigenous Nations and Communities that may have traditional land use history or interest in the Project are identified in Section 3.2.1. Details related to First Nation Reserves and Métis Settlements associated with the preliminary list of Indigenous Nations and Communities are presented in Table 5.1-6.

Table 5.1-6: First Nation Reserves and Métis Settlements associated with the preliminary list of Potentially Impacted Indigenous Nations and Communities

Indigenous Nations and Communities (in alphabetical order)	Reserves or Settlements	On-Own Reserve Population (2025)	Off-Reserve Population (2025)	Total Population[(a)]
Athabasca Chipewyan First Nation	Chipewyan Indian Reserve 201	35	1,265	1,533
	Chipewyan Indian Reserve 201A			
	Chipewyan Indian Reserve 201B			
	Chipewyan Indian Reserve 201C			
	Chipewyan Indian Reserve 201D			
	Chipewyan Indian Reserve 201E			
	Chipewyan Indian Reserve 201F			
	Chipewyan Indian Reserve 201G			
Beaver First Nation	Boyer 164	456	898	1,389

Table 5.1-6: First Nation Reserves and Métis Settlements associated with the preliminary list of Potentially Impacted Indigenous Nations and Communities

Indigenous Nations and Communities (in alphabetical order)	Reserves or Settlements	On-Own Reserve Population (2025)	Off-Reserve Population (2025)	Total Population[(a)]
	Child Lake 164A			
Cadotte Lake Métis	Cadotte Lake Métis	n/a	n/a	n/a
Dene Tha' First Nation	Amber River 211	2,109	1,129	3,302
	Bistcho Lake 213			
	Bushe River 207			
	Hay Lake 209			
	Jackfish Point 214			
	Upper Hay River 212			
	Zama Lake 210			
Driftpile Cree Nation	Drift Pile River 150	988	2,192	3,228
Duncan's First Nation	Duncan's IR 151A	141	259	402
	William McKenzie IR 151K			
East Prairie Métis	East Prairie Métis Settlement	n/a	n/a	310
Fort Chipewyan Métis	Fort Chipewyan Métis	n/a	n/a	n/a
Gift Lake Métis	Gift Lake Part A Métis Settlement	n/a	n/a	625
	Gift Lake Part B Métis Settlement	n/a	n/a	n/a
Horse Lake First Nation	Clear Hills IR 152C	517	901	1,432
	Horse Lake IR 152B			
Kapawe'no First Nation	Kapawe'no First Nation 150B	138	343	491
	Kapawe'no First Nation 150C			
	Kapawe'no First Nation 150D			
	Kapawe'no First Nation 229			
	Kapawe'no First Nation 230			
	Kapawe'no First Nation 231			
Little Red River Cree Nation	Fox Lake 162	5,255	755	6,699
	Garden Creek Indian Settlement			
	John D'or Prairie 215			
Loon River First Nation	Loon Lake 235	588	131	747
	Loon Prairie 237			
	Swampy Lake 236			
Lubicon Lake Band	Little Buffalo Indian Settlement	126	386	839

Table 5.1-6: First Nation Reserves and Métis Settlements associated with the preliminary list of Potentially Impacted Indigenous Nations and Communities

Indigenous Nations and Communities (in alphabetical order)	Reserves or Settlements	On-Own Reserve Population (2025)	Off-Reserve Population (2025)	Total Population[(a)]
Mikisew Cree First Nation	Allison Bay 219	177	2,502	3,281
	Charles Lake 225			
	Collin Lake 223			
	Cornwall Lake 224			
	Devil's Gate 220			
	Dog Head 218			
	Old Fort 217			
	Peace Point 222			
	Sandy Point 221			
Otipemisiwak Métis Government	Otipemisiwak Métis Government	n/a	n/a	n/a
Paddle Prairie Métis	Paddle Prairie Métis Settlement	n/a	n/a	551
Peavine Métis	Peavine Métis Settlement	n/a	n/a	387
Peerless Trout First Nation	Peerless Trout 238	65	151	1,113
Sawridge First Nation	Sawridge 150G	46	651	706
	Sawridge 150H			
Sturgeon Lake Cree Nation	Sturgeon Lake 154	1,543	2,307	3,894
	Sturgeon Lake 154A			
	Sturgeon Lake 154B			
Sucker Creek First Nation	Sucker Creek 150A	782	2,508	3,326
Swan River First Nation	Assineau River 150F	448	1,272	1,745
	Swan River 150E			
Tallcree Tribal Government	Beaver Ranch 163	567	926	1,556
	Beaver Ranch 163A			
	Beaver Ranch 163B			
	Fort Vermilion 173B			
	Tall Cree 173			
	Tall Cree 173A			
	Wadlin Lake 173C			

Table 5.1-6: First Nation Reserves and Métis Settlements associated with the preliminary list of Potentially Impacted Indigenous Nations and Communities

Indigenous Nations and Communities (in alphabetical order)	Reserves or Settlements	On-Own Reserve Population (2025)	Off-Reserve Population (2025)	Total Population[a]
Whitefish Lake First Nation #459	Ukitoomak Lake 155	1,416	1,465	3,221
	Ukitoomak Lake 155A			
	Ukitoomake Lake 155B			
Woodland Cree First Nation	Cadotte Lake Indian Settlement	879	393	1,323
	Woodland Cree 226			
	Woodland Cree 227			
	Woodland Cree 228			

Note:
CIRNAC 2023 Population numbers for First Nations are for registered members in 2024 (GOC 2011). Population numbers for Métis settlements are from 2021 Statistics Canada census.

a) Use with caution. Includes registered population on own reserve, on other reserves, on own Crown land, on other Band Crown land, on No Band Crown land, and off-reserve.

5.1.6 Proximity to Federal Lands

As noted in Section 5.1.4 above, there are First Nations reserves located within 100 km of the Project sites. Energy Alberta is dedicated to fostering enduring, respectful relationships with Indigenous Nations and Communities in Canada that contribute to enabling Indigenous self-determination, sustainable development and lasting economic opportunities.

5.2 Physical and Biological Environment Overview

The following overview of the existing conditions for Option 1 and Option 2 sites are based primarily on existing information sources. The information is sufficient to provide a general description of each potential site, including key and sensitive environmental conditions that may be relevant to the Project. A more detailed description of the existing environment, including specific field investigations and studies, will be carried out as part of the Impact Assessment conducted for the Project.

5.2.1 Atmospheric Environment

5.2.1.1 Climate

Both site options are located within the moderate continental climatic zone characterized by short, moderately warm summers and long, cold winters. Meteorological information for the Peace River area is available from Environment Canada's weather office and is collected from their weather station located at the Peace River Airport (latitude of 56°13' N, longitude of 117°27' W, and elevation of 570.9 m). The recorded mean annual temperature for Peace River Airport is 1.2 degrees Celsius (°C). The coldest month is January, with a mean temperature of -16.0°C. The warmest month is July, with a mean temperature of 16.3°C (GOC 2024e).

Monthly precipitation values in the Peace River area range from 15.5 millimetres (mm) to 62.4 mm, with a total annual mean precipitation of 348.2 mm. The greatest amount of precipitation falls in June and July in the form of rain (GOC 2024e).

The prevailing winds blow from a southwesterly direction, with strong westerly and west-southwesterly components. Wind speeds are fairly consistent throughout the year. The mean wind speed, from 1955 to 2024, was 3.49 metres/second (m/s), with calms (<0.5 m/s) occurring less than 1% of the time. Wind speeds between 0.5 and 2.1 m/s occurred 25.0% of the time, and between 2.1 to 3.6 m/s about 25.2% of the time (GOC 2024e).

Visibility in the Peace River area is less than 1 km for less than 1% of the year, usually during the winter months. Most of the year (95% of the time), the visibility is greater than 9 km, with highest visibility in the months of May and July (GOC 2024e).

5.2.1.2 Air Quality

It is assumed that the local air quality is typical of a rural, agricultural area (Jacques Whitford Limited 2006). In the Peace River Valley, there are several emission sources, including oil production projects (i.e., Shell Canada Limited's Carmon Creek Project, and Husky Oil Operations Ltd.), the pulp and paper mill (Daishowa-Marubeni International Ltd.), and residential activity in the towns (i.e., Town of Peace River, Town of Grimshaw, Village of Berwyn).

Option 1 and Option 2 sites are both located in the Peace River Area Monitoring Program (PRAMP). The PRAMP area includes Peace County, and the southern parts of Northern Lights County and Northern Sunrise County. The closest continuous ambient air monitoring station is near Grimshaw, Alberta, which is approximately 40 km southwest of the Option 1 and Option 2 sites. The Grimshaw Station measures ambient concentrations of sulphur dioxide, total reduced sulphur, hydrocarbons, oxides of nitrogen, ozone, fine particulate matter, wind speed and direction, temperature, humidity, pressure, and calculated Air Quality Health Index.

The *2023 Annual Data Report* (PRAMP 2024) summarizes the regional air quality. In the summer of 2023, air quality was impacted by widespread wildfire smoke, where 687 exceedances of the 1-hour Alberta Ambient Air Quality Guideline (AAQG) and 71 exceedances of the 24-hour AAQG for fine particulate matter were detected. The Grimshaw Station recorded the highest particulate matter concentrations in Alberta due to the location of wildfires and the pattern of smoke dispersion. Other substances that peaked during wildfire events were methane and non-methane hydrocarbons, volatile organic compounds, and acrolein.

In 2023, sulphur dioxide and nitrogen dioxide ambient concentrations were below the Alberta Ambient Air Quality Objectives. Sulphur dioxide concentrations measured at the Grimshaw Station are among the lowest concentrations in Alberta and nitrogen dioxide concentrations are comparable to similar sized population centres as Grimshaw.

There were no odour complaints recorded within the PRAMP network in 2023.

An ambient radon monitoring program will be carried out as part of the detailed site investigation program. Radon detectors will be deployed at various locations chosen to represent the local conditions. The detail ambient radon monitoring program including monitoring approaches, monitoring locations, and results will be presented as part of the Impact Assessment.

5.2.1.3 Noise

The sources of noise in the Peace River Valley are mainly natural, such as wind or waves on the Peace River (Jacques Whitford Limited 2006). The Option 1 and Option 2 sites are in rural agricultural areas. Anthropogenic sources of noise include vehicle, boat and aircraft traffic, industry operations, and oil and gas production.

5.2.2 Geological and Hydrogeological Environment

With regards to this section, the regional study area (RSA) extends 5 km past the siting area of interest (i.e., Option 1 and Option 2). A stratigraphic log is available on Figure 5.2-1, which outlines the sequencing of the surficial and bedrock geology.

5.2.2.1 Surficial Geology

Within the RSA, it is expected that the surficial sediments overlying bedrock will consist of glacial moraine (till), glaciolacustrine deposits, colluvial deposits, eolian deposits, and organic deposits. The surficial geology is presented on Figure 5.2-2.

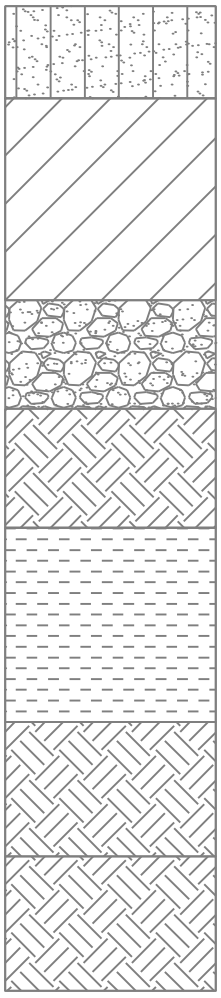
Southwest of Option 1 is the presence of pre-glacial Grimshaw gravels. These are isolated gravel deposits that are an important source of groundwater in the area. Based on information presented in Slomka et al. (2018) the deposits consist of three large lobes and four smaller ones that are located southwest of the RSA. Gravels from these deposits are not expected to be underlying either LSA (Slomka et al. 2018).

5.2.2.1.1 Option 1

Within the Option 1 site, the surficial sediments are expected to be dominantly glaciolacustrine deposit with glacial moraine (till) (Leslie and Fenton 2001). Based on mapping, surficial sediments are expected to be approximately 40 m thick on the western side of the site, increasing in thickness to the east (Atkinson et al. 2020).

5.2.2.1.2 Option 2

The sediments underlying Option 2 are anticipated to be similar to the Option 1 site sediments. The key difference is the thickness increases to 90 m or more (Atkinson et al. 2020). Closer to the Peace River, colluvial and/or eolian type deposits are expected as indicated on Figure 5.2-2.



SAND AND SILT

TILL

BASAL SAND AND GRAVEL
BURIED VALLEY GRAVELS

BEDROCK
DUNVEGAN FORMATION
(ERODED ON WEST BANK OF PEACE RIVER VALLEY)

SHALE
SHAFTESBURY FORMATION

BEDROCK
PEACE RIVER FORMATION

BEDROCK
SPIRIT RIVER FORMATION

NOT TO SCALE

CLIENT
ENERGY ALBERTA

PROJECT
PEACE REGION NUCLEAR PLANT PROJECT

TITLE
STRATIGRAPHIC COLUMN - PEACE RIVER VALLEY

CONSULTANT

YYYY-MM-DD	2024-08-27
PREPARED	AH
DESIGN	JMC
REVIEW	NC
APPROVED	MM

PROJECT No.	CONTROL	Rev.	FIGURE
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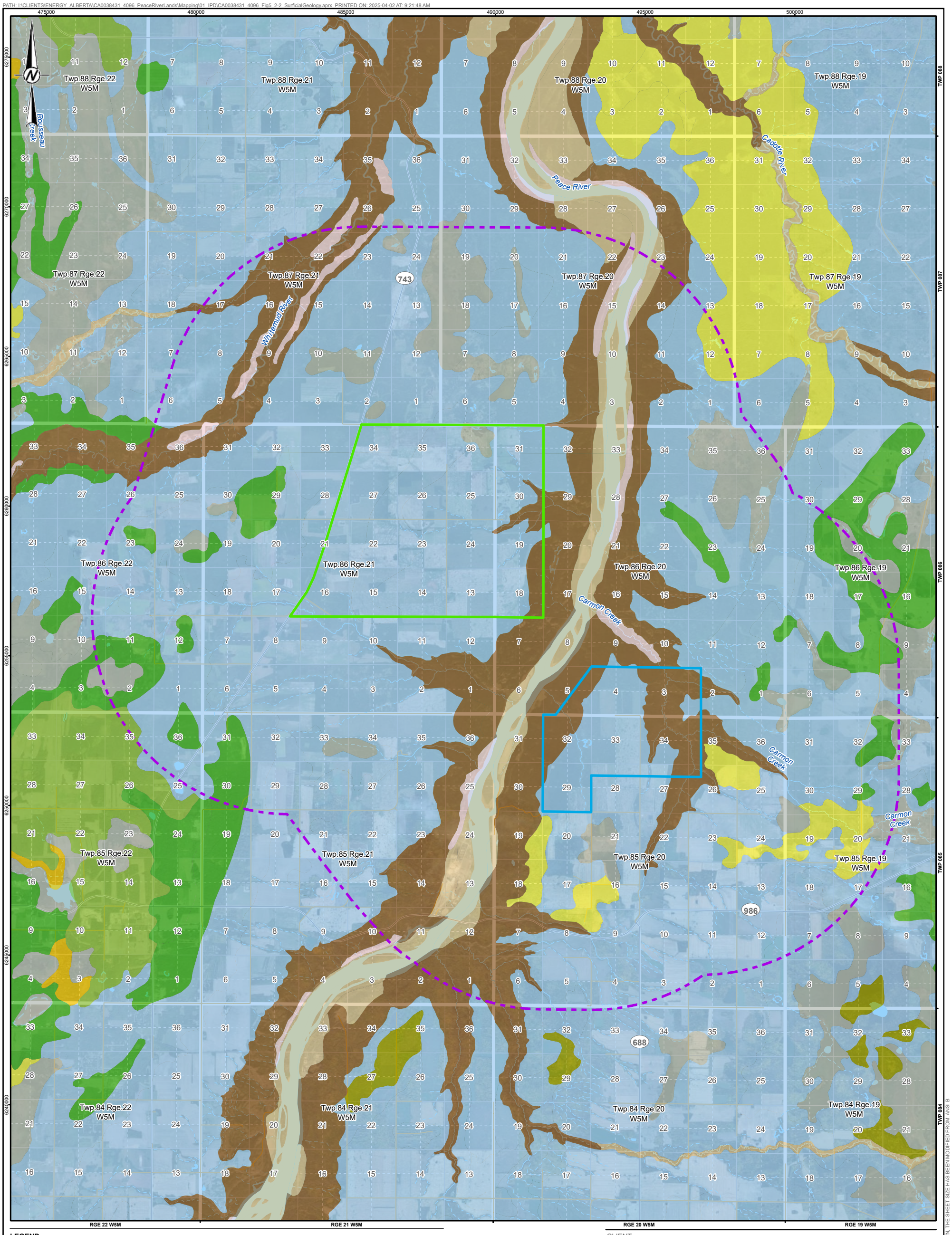

LEGEND

- WATERCOURSE
- OPTION 1 SITING AREA OF INTEREST
- OPTION 2 SITING AREA OF INTEREST
- REGIONAL STUDY AREA
- WATERBODY

SURFICIAL GEOLOGY

- ORGANIC DEPOSITS (O)
- COLLUVIAL DEPOSITS (C)
- FLUVIAL DEPOSITS (F)
- EOLIAN DEPOSITS (E)
- GLACIOLACUSTRINE DEPOSITS (LG)
- GLACIOFLUVIAL DEPOSITS (FG)
- MORAINE (M)
- FLUTED MORAINE (MF)
- STAGNANT ICE MORAINE (MS)
- BEDROCK (R)

0 2 4

1:120,000 KILOMETRES

NOTE(S)

1. PROJECTED COORDINATE SYSTEM: NAD 1983 UTM ZONE 11N

REFERENCE(S)

SURFICIAL GEOLOGY OBTAINED FROM ALBERTA GEOLOGICAL SURVEY.

CLIENT
ENERGY ALBERTA

PROJECT
PEACE RIVER NUCLEAR POWER PROJECT

TITLE
SURFICIAL GEOLOGY - PEACE RIVER VALLEY

CONSULTANT
wsp

YYYY-MM-DD	2025-04-02
DESIGNED	MS
PREPARED	KW
REVIEWED	CB
APPROVED	MM

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038431.4096		0	5.2-2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm

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5.2.2.2 Bedrock Geology

The bedrock geology in the RSA, in descending order, consists of the Dunvegan Formation, Shaftesbury Formation, Peace River Formation, and the Spirit River Formation.

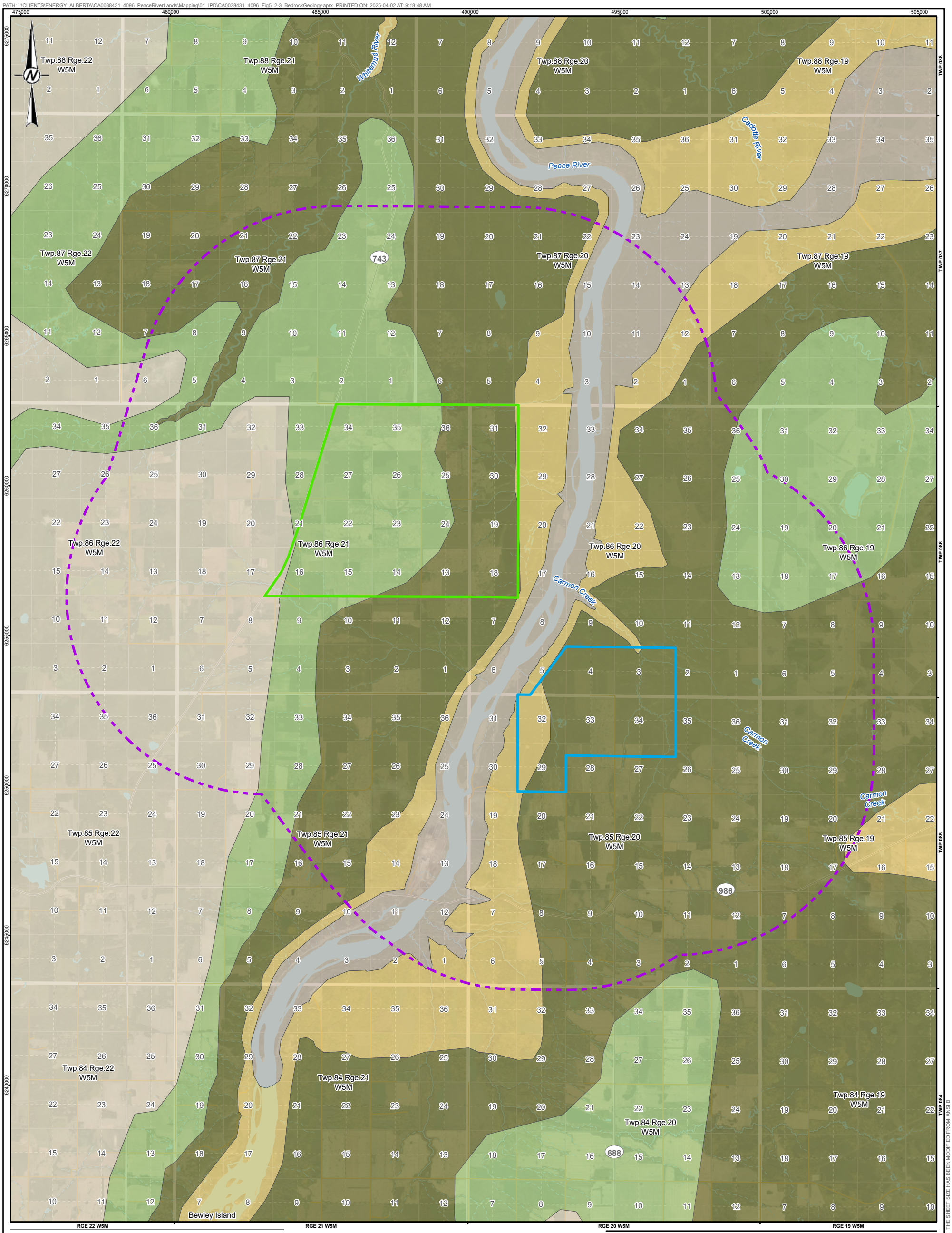
- The Dunvegan Formation consists of marine and non-marine sediments, including deltaic sandstone and thin beds of shale, limestone, and coal (CSPG 1981).
- The mid-cretaceous Shaftesbury Formation is a friable, dark marine shale with thin bentonitic streaks and occasional ironstone (CSPG 1981). It is the dominate bedrock formation in the region and ranges in thickness from 170 m to 400 m.
- The Peace River Formation is a lower Cretaceous unit that consists of marine shale and sand underlying continental sand (Wadell 1957). Within the region, the Peace River Formation is not as prevalent, only being exposed in the Peace River Valley where the overlying formations have been eroded away.
- The Spirit River Formation is made up of clayey sandstone, shales, siltstones lithic greywacke with some coal beds (CSPG 1981). Like the latter, the Spirit River Formation is only exposed in the thalweg of the Peace River.

5.2.2.2.1 Option 1

The bedrock at Option 1 consists mainly of the Shaftesbury Formation, with the Dunvegan Formation present along the western boundary of the LSA (Prior et al. 2013, Figure 5.2-3). The Dunvegan Formation is not mapped on Figure 5.2-3 inside the LSA and therefore is not likely present in most of the LSA. The uppermost bedrock transitions to the Shaftesbury Formation as you move towards the Peace River where the Dunvegan Formation has been eroded by the Peace River Valley (Prior et al. 2013).

5.2.2.2.2 Option 2

Like Option 1, the dominant upper most bedrock unit at Option 2 is the Shaftesbury Formation, transitioning to the Peace River Formation in the northwest corner of the site (Prior et al. 2013).



LEGEND

- WATERCOURSE
- OPTION 1 SITING AREA OF INTEREST
- OPTION 2 SITING AREA OF INTEREST
- REGIONAL STUDY AREA
- WATERBODY

BEDROCK GEOLOGY

- DUNVEGAN FORMATION
- PEACE RIVER FORMATION
- SPIRIT RIVER FORMATION
- LOWER SHAFTESBURY AND WESTGATE FORMATIONS
- UPPER SHAFTESBURY, FISH SCALES AND BELLE FOURCHE FORMATIONS

0 2 4
1:120,000 KILOMETRES

NOTE(S)

1. PROJECTED COORDINATE SYSTEM: NAD 1983 UTM ZONE 11N

REFERENCE(S)

BEDROCK GEOLOGY OBTAINED FROM ALBERTA GEOLOGICAL SURVEY.
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CLIENT
ENERGY ALBERTA

PROJECT
PEACE RIVER NUCLEAR POWER PROJECT

TITLE
BEDROCK GEOLOGY

CONSULTANT
wsp

YYYY-MM-DD	2025-04-02
DESIGNED	MS
PREPARED	KW
REVIEWED	CB
APPROVED	MM

PROJECT NO. CONTROL: CA0038431.4096
REV.: 0
FIGURE: 5.2-3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B
25mm
0

5.2.2.3 Hydrogeology

5.2.2.3.1 Aquifers

Within the RSA, the main aquifers are the Grimshaw Gravel and Basal Gravel aquifers that are part of the Buried Valley hydrogeological region. These aquifers within the RSA are known as the Grimshaw gravels, intermediate terrace (more recently referred to as the Old Fort gravel), and the Shaftesbury gravels. The intermediate terrace lies at the base of the Old Fort strath. The Shaftesbury gravel lies at the base of the Shaftesbury strath, which is the floor of the bedrock valley (Slomka et al. 2018). West of the site locations, the hydrogeological region transitions to the regional uplands (Figure 5.2-4). Alluvial gravel and sand deposits along the Peace River are the surficial aquifers in the RSA. The formations of the Dunvegan and Peace River are the bedrock formations of interest that may act as deeper aquifers in the RSA.

Option 1

At Option 1, there is potential for buried basal aquifers (intermediate terrace and Shaftesbury) that have been mapped (Figure 5.2-4) within the site and may be present at a deeper elevation in other areas, particularly within the Peace River Valley. In addition, there are several water wells in the RSA near Option 1 that would support the presence of these aquifers. There is currently no mapping available to indicate a bedrock aquifer in the site; however, as indicated above, the Dunvegan and Peace River Formations may contain thin sand and sandstone beds that are water bearing (Leslie and Fenton 2001).

Option 2

Based on Hartman et al. (2023), there is the potential for the presence of basal material that infilled the buried valleys below Option 2, shown as the Buried Valley Aquifer on Figure 5.2-4. As noted above, these basal aquifers are described as the intermediate terrace and the Shaftesbury gravel (Slomka et al. 2018). In addition, there are several water wells in the RSA near Option 2 that would support the presence of these aquifers. There is currently no mapping available to indicate a bedrock aquifer in the site; however, as indicated above, the Dunvegan and Peace River Formations may contain thin sand and sandstone beds that are water-bearing (Leslie and Fenton 2001).

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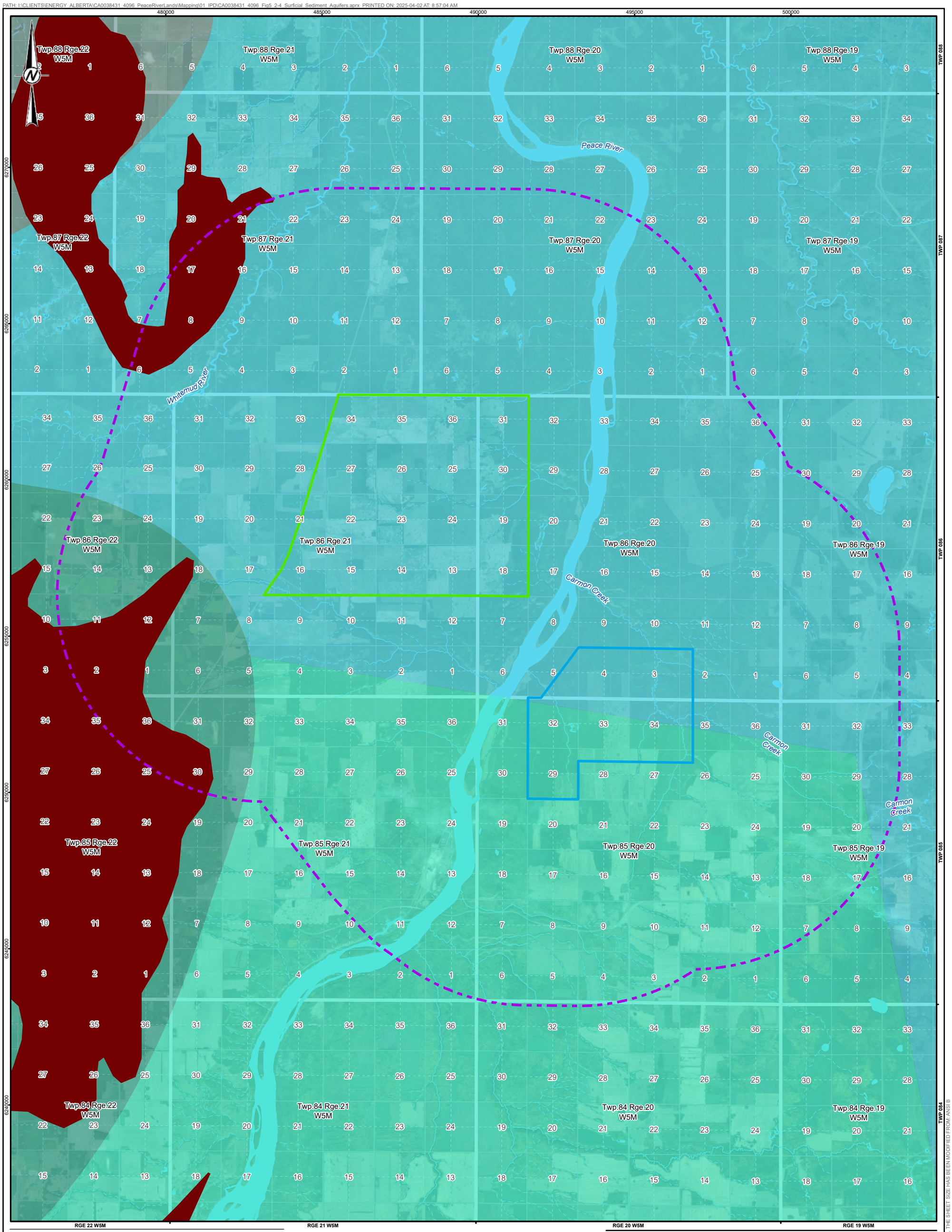

LEGEND

- WATERCOURSE
- GRIMSHAW GRAVEL
- OPTION 1 SITING AREA OF INTEREST
- OPTION 2 SITING AREA OF INTEREST
- REGIONAL STUDY AREA
- WATERBODY

AQUIFERS

- KNOWN BURIED VALLEY
- KNOWN PLAINS/UPLAND
- POTENTIAL BURIED VALLEY
- POTENTIAL PLAINS/UPLAND

0 2 4

1:115,000 KILOMETRES

NOTE(S)

1. PROJECTED COORDINATE SYSTEM: NAD 1983 UTM ZONE 11N

REFERENCE(S)

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CLIENT
ENERGY ALBERTA

PROJECT
PEACE RIVER NUCLEAR POWER PROJECT

TITLE
SURFICIAL SEDIMENT AQUIFERS

CONSULTANT

wsp

YYYY-MM-DD	2025-04-02
DESIGNED	MS
PREPARED	KW
REVIEWED	CB
APPROVED	MM

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038431.4096		0	5.2-4

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

0 25mm

5.2.2.3.2 Local Groundwater Users

A search of information from the Alberta Water Well Database was completed in September 2024 for the RSA. Detailed information can be found on Figure 5.2-5 and in Appendix B.

A total of 26 water wells are located within the Option 1 RSA; 39 water wells are located within the Option 2 RSA; and 3 water wells are located in both RSAs. Since the 3 wells located in both RSAs are closer to Option 2, they are discussed as part of the Option 2 RSA. Of the total identified wells, the following well uses are identified:

- 36 are labelled as domestic and/or stock wells
- 13 as industrial wells
- 7 as observation wells
- 6 as unknown
- 3 as monitoring wells
- 2 as municipal wells
- 1 other well (undefined)

The withdrawal wells are the main wells of focus as they have the potential to be groundwater sources for local communities or private landowners and should be properly accounted for to eliminate any risk for the users in the area.

Option 1

Of the 29 wells in the Option 1 RSA, 3 well records have noted screened completion depths, and their depth ranges are as follows:

- 0 – 9.9 m BGS: 2 Wells
- 10 – 19.9 m BGS: 1 Wells

Based on the depth of the well screens and mapping information, the wells are likely completed in the basal sediments or sandstone sediments.

Option 2

Within the Option 2 RSA of the 42 well records, there are a total of 17 water wells with screened/perforated completion depths. Ranges for bottom of screen depths are as follows:

- 0 – 9.9 m BGS: 1 Wells
- 10 – 19.9 m BGS: 7 Wells
- 20 – 29.9 m BGS: 6 Wells
- 30 – 39.9 m BGS: 3 Wells

Based on the depth of the well screens, mapping information, and drilling reports, it appears that the wells are likely completed in the basal sediments.

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6270000 6260000 6250000 6240000

Twp.88 Rge.22 W5M
Twp.88 Rge.21 W5M
Twp.88 Rge.20 W5M
Twp.88 Rge.19 W5M
Twp.87 Rge.22 W5M
Twp.87 Rge.21 W5M
Twp.87 Rge.20 W5M
Twp.87 Rge.19 W5M
Twp.86 Rge.22 W5M
Twp.86 Rge.21 W5M
Twp.86 Rge.20 W5M
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Twp.84 Rge.21 W5M
Twp.84 Rge.20 W5M
Twp.84 Rge.19 W5M

TWP 088 TWP 087 TWP 086 TWP 085 TWP 084

Peace River
Jean Caotte R.
Whitemud River
Carmon Creek

743 986 688

399975 400033 399973 357203 359395 359235 398526 359396 398524 359245 359244 497610 492656 359241 359242 495172 359243 359394 359233 359232 359234 492655 359240 359231 340185 398522 398521 365010 365009 359118 359119 9516131 9516044 398394 398396 398392 398340 351372 398391 398388 9516027 9516023 9516025 9516026 9516024 9516028 492647 492646 398384 398387 359124 359122 359125 359121 359120 359123 398378 398380 398366 398369

RGE 22 W5M RGE 21 W5M RGE 20 W5M RGE 19 W5M

LEGEND

- GROUNDWATER WELL
- WATERCOURSE
- OPTION 1 SITING AREA OF INTEREST
- OPTION 2 SITING AREA OF INTEREST
- REGIONAL STUDY AREA
- WATERBODY

0 2 4
1:115,000 KILOMETRES

NOTE(S)
1. PROJECTED COORDINATE SYSTEM: NAD 1983 UTM ZONE 11N

REFERENCE(S)
GROUNDWATER WELLS OBTAINED FROM GOVERNMENT OF ALBERTA, ALBERTA WATER WELL INFORMATION DATABASE (OR BASELINE WATER WELL TEST DATABASE). RETRIEVED 20240719, FROM HTTP://GROUNDWATER.ALBERTA.CA/WATERWELLS/D/. BASE DATA MAY BE OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED, ALTALIS LTD. © GOVERNMENT OF ALBERTA 2024. ALL RIGHTS RESERVED, OR S&P GLOBAL INC. IMAGERY COPYRIGHT © 20210920 ESRI AND ITS LICENSORS. SOURCE: EARTHSTAR GEOGRAPHICS. USED UNDER LICENSE, ALL RIGHTS RESERVED.

CLIENT
ENERGY ALBERTA

PROJECT
PEACE RIVER NUCLEAR POWER PROJECT

TITLE
GROUNDWATER WELLS WITHIN 5.0 KM REGIONAL STUDY AREA OF SITE OPTIONS

CONSULTANT
wsp

YYYY-MM-DD	2025-04-02
DESIGNED	MS
PREPARED	KW
REVIEWED	CB
APPROVED	MM

PROJECT NO. CONTROL: CA0038431.4096
REV.: 0
FIGURE: 5.2-5

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B
25mm
0

5.2.2.4 Seismicity

This section summarizes published records of historical seismicity and seismic hazard in the region around the Option 1 and 2 Project sites. The summary of historical seismicity focuses on earthquakes with moment magnitudes (M_w) of 4.0 and greater because well-engineered structures do not typically suffer damage due to earthquakes smaller than M_w 4.0, although this is not an absolute rule. Various measures of magnitude exist but for this summary all magnitudes are converted to M_w using the equations provided by Halchuk et al. (2015).

Based on catalogues of historical seismicity for the last several decades from Natural Resources Canada (NRCan), there are 712 earthquakes that are attributed to natural tectonic activity within a radius of approximately 300 km around the Option 1 and 2 Project sites. This is based on records dated prior to March 14, 2025, with an original catalogue magnitude of 2.5 or greater. Thirty-six of these earthquakes have a moment magnitude (M_w) of 4.0 or greater, with the largest event being a M_w 5.4 earthquake on April 14, 2001, about 165 km west-southwest of the Option 1 and 2 sites.

Much of the natural historical seismicity within and around the region is located within or near the Canadian Rocky Mountains and the associated foothills, to the west and southwest of the Option 1 and 2 sites (

Figure 5.2-6). The Rocky Mountains are an area of relatively young and tectonically active continental crust, located near the eastern limit of the Canadian Cordillera (Mazzotti et al. 2008). By comparison, the Option 1 and 2 sites and the surrounding areas to the north and east are within the Interior Plains of Canada (Bostock 2014) that comprise ancient (more than 1 billion years old) crystalline basement rock of the North American Craton. These areas are relatively seismically quiescent compared to areas of younger continental crust.

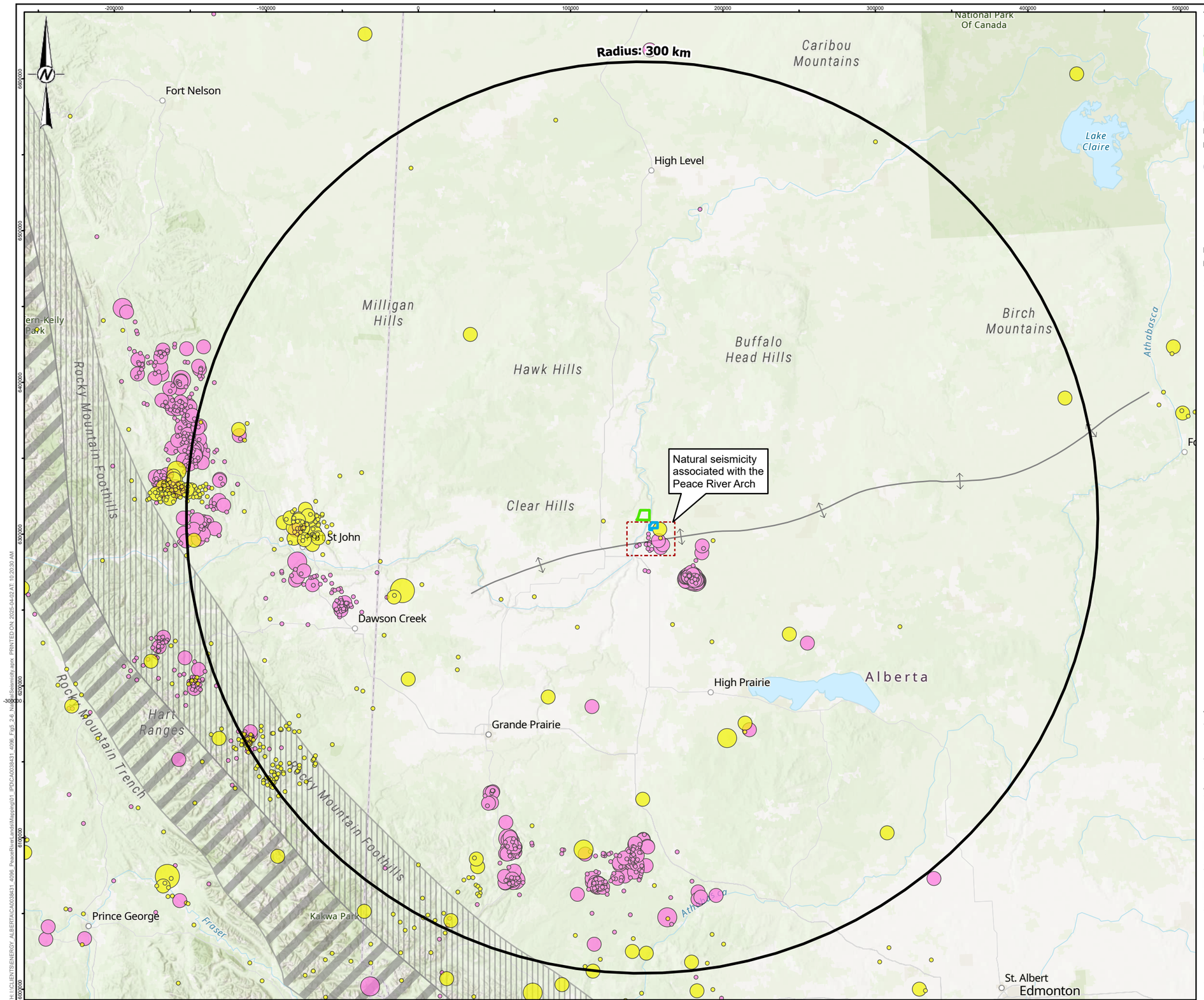
There are also a number of natural historical earthquakes located away from the Rocky Mountains and nearer to the Option 1 and 2 sites (

Figure 5.2-6). These earthquakes are interpreted to be associated with the Peace River Arch (Alberta Geological Survey 2020), which is a large cratonic uplift structure within the Interior Plains that formed in the latest Proterozoic (about 550 million years ago) and disturbed the surrounding rocks, leading to the formation of numerous faults in the region (O'Connell et al. 1990).

Natural Resources Canada provides a separate catalogue of historical seismicity interpreted to be induced by anthropogenic activities. Within about 300 km of the Option 1 and 2 sites, this induced earthquake catalogue includes 504 earthquakes with an original catalogue magnitude of 2.5 or greater since 2016 (Figure 5.2-7), of which 22 have a M_w 4.0 or greater. The largest recorded induced earthquake in the region is a M_w 5.1 event on November 30, 2022, about 50 km and 40 km southeast of the Option 1 and Option 2 sites, respectively. Numerous M_w 4+ foreshocks and aftershocks preceded and followed this earthquake. The November 30 mainshock was initially described by the Alberta Geological Survey as 'natural tectonic activity' (Alberta Energy Regulator

2022), but a later study by Schulz et al. (2023) attributed the event to underground wastewater injection associated with petroleum operations. Most other induced earthquakes are located with the Rocky Mountains foothills area and are spatially correlated with the locations of recent and ongoing hydrocarbon production activities, primarily in the Montney and Duvernay geological units near Fort St John, British Columbia, and Fox Creek, Alberta, respectively (Rodríguez-Pradilla et al. 2022).

The relative tectonic stability of the Interior Plains is reflected in the seismic hazard values published as part of the 2020 National Building Code of Canada (NRCC 2022). Mean horizontal peak ground acceleration (PGA) at various annual exceedance probabilities are listed for the Option 1 and 2 sites as retrieved from NRCan (2021). The values shown are calculated for a seismic ground condition represented by a time-averaged shear-wave velocity across the upper 30 m below ground surface (i.e., V_{S30}) of 450 m/s, equivalent to Site Class C.



LEGEND

- 300 KM FROM PEACE REGION NPP
- OPTION 1 SITING AREA OF INTEREST
- OPTION 2 SITING AREA OF INTEREST
- PEACE RIVER ARCH AXIS
- ROCKY MOUNTAINS
- ROCKY MOUNTAIN FOOTHILLS

NATURAL EARTHQUAKES (PRE-2011; HALCHUK ET AL. 2015)

MAGNITUDE (M_W)

- ≥ 5.0
- 4.0 TO 4.9
- 3.0 TO 3.9
- < 3.0

NATURAL EARTHQUAKES (2011-2025; NRCAN 2025)

MAGNITUDE (M_W)

- 4.0 TO 4.9
- 3.0 TO 3.9
- < 3.0

0 50 100

1:2,500,000 KILOMETRES

REFERENCE(S)

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PROJECTED COORDINATE SYSTEM: NAD 1983 UTM ZONE 11N

CLIENT
ENERGY ALBERTA

PROJECT
PEACE RIVER NUCLEAR POWER PROJECT

TITLE
NATURAL SEISMICITY IN THE PEACE RIVER NUCLEAR POWER PROJECT REGION

CONSULTANT

YYYY-MM-DD	2025-04-02
DESIGNED	NC
PREPARED	KW
REVIEWED	CB
APPROVED	MM

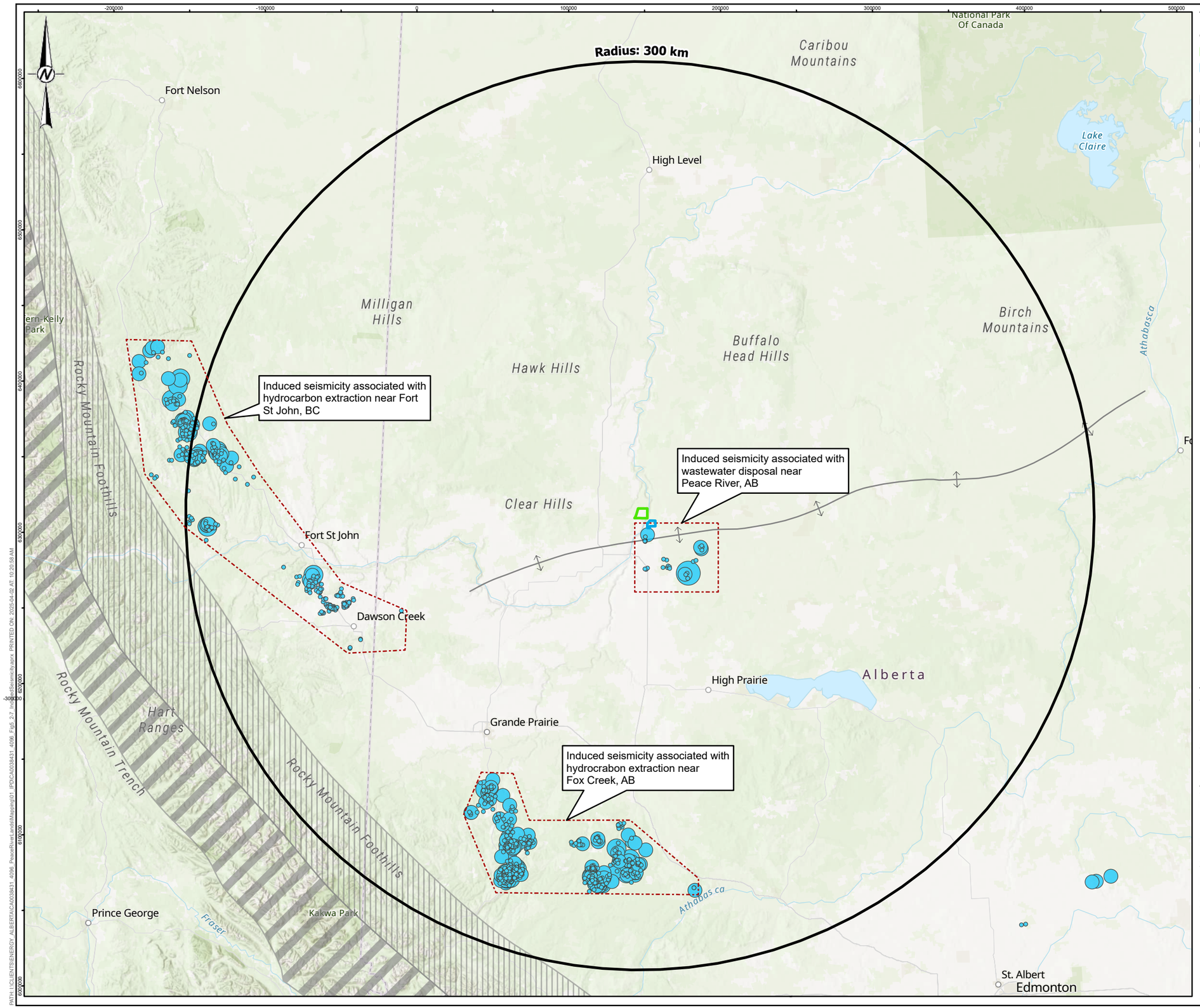
PROJECT NO.	CONTROL	REV.	FIGURE
CA0038431.4096		0	5.2-6

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm

0

PATH: I:\CLIENTS\ENERGY_ALBERTA\CA0038431_4096_PeaceRiverLandsManaging\01_IPD\CA0038431_4096_Fig5_2-6_NaturalSeismicity.aprx PRINTED ON: 2025-04-02 AT: 10:20:30 AM



LEGEND

- 300 KM FROM PEACE REGION NPP
- OPTION 1 SITING AREA OF INTEREST
- OPTION 2 SITING AREA OF INTEREST
- PEACE RIVER ARCH AXIS
- ROCKY MOUNTAIN FOOTHILLS
- ROCKY MOUNTAINS

INDUCED EARTHQUAKES (2016-2025; NRCAN 2025)

MAGNITUDE (M_W)

- ≥ 5.0
- 4.0 TO 4.9
- 3.0 TO 3.9
- < 3.0

0 50 100

1:2,500,000 KILOMETRES

REFERENCE(S)

TOPOGRAPHIC MAP © ESRI AND ITS LICENSORS. USED UNDER LICENSE, ALL RIGHTS RESERVED. 2016-2024 INDUCED EARTHQUAKES © NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED. NRCAN 2025. NATIONAL EARTHQUAKE DATABASE (NEDB) BULLETIN – INDUCED. ACCESSED VIA: HTTPS://WWW.EARTHQUAKESCANADA.NRCAN.GC.CA/STNDON/NEDB-BNDS/BULLETIN-EN.PHP [MARCH 14, 2025]. HALCHUK S, ALLEN TI, ROGERS GC, ADAMS J. 2015. SEISMIC HAZARD EARTHQUAKE EPICENTRE FILE (SHEEF2010) USED IN THE FIFTH GENERATION SEISMIC HAZARD MAPS OF CANADA; GEOLOGICAL SURVEY OF CANADA, OPEN FILE 7724. HTTPS://DOI.ORG/10.4095/296908. 21 P. OTHER BASE DATA OBTAINED FROM GEOLOGICAL SURVEY OF CANADA.
PROJECTED COORDINATE SYSTEM: NAD 1983 UTM ZONE 11N

CLIENT
ENERGY ALBERTA

PROJECT
PEACE RIVER NUCLEAR POWER PROJECT

TITLE
INDUCED SEISMICITY IN THE PEACE RIVER NUCLEAR POWER PROJECT REGION

CONSULTANT

YYYY-MM-DD	2025-04-02
DESIGNED	NC
PREPARED	KW
REVIEWED	CB
APPROVED	MM

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038431.4096		0	5.2-7

Table 5.2-1: Mean Peak Horizontal Ground Acceleration from the 2020 National Building Code of Canada at Various Annual Exceedance Probabilities for the Peace River Nuclear Power Project Region

Probability of Exceedance		Mean PGA (g)	
% in 50 years	Annual	Location 1 Site	Location 2 Site
40% in 50 years	1/100	0.00405	0.00408
10% in 50 years	1/475	0.0194	0.0195
5% in 50 years	1/975	0.0340	0.0343
2% in 50 years	1/2,475	0.0652	0.0658

Source: NRCan 2021.

Note: V_{S30} = 450 m/s.

% = percent; PGA = peak ground acceleration.

The seismic hazard at the Option 1 and 2 sites is relatively low based on the national-level seismic hazard assessment results from NRCan (Table 5.2-1). However, CNSC regulations (REGDOC-1.1.1) require that a site-specific seismic hazard assessment (SSSHA) is undertaken for the final Project site once selected, to inform the seismic design of the site facilities. REGDOC-1.1.1 states that the SSSHA should be undertaken in accordance with the requirements of the latest version of the Canadian Standards Association (CSA N289.2), including:

- Geological and seismological investigations performed for the site, site vicinity, and region including investigation for secondary earthquake effects;
- Development of seismic hazard models including source characterization;
- Probabilistic evaluation of seismic hazard on reference site condition; and
- Probabilistic evaluation of seismic hazard considering local site conditions.

5.2.3 Surface Water Environment

5.2.3.1 Hydrology

5.2.3.1.1 Peace River

The Peace River is the major river in the area (Figure 5.1-2). It flows in a north-easterly direction, originating from Williston Reservoir (located approximately 170 km upstream of the Alberta/British Columbia border) to its confluence with the Athabasca River in Wood Buffalo National Park in northwestern Alberta. The confluence of the Smoky (the largest major tributary in the area) and Peace River is directly upstream of the Town of Peace River. The Williston Reservoir, formed by the building of the Bennett Dam, was filled from 1968 to 1971. The Peace Canyon dam is located 20 km downstream of the Bennett Dam. The Peace River has been regulated by British Columbia Hydro since 1972.

Peace River flows are measured by the Water Survey of Canada approximately 25 km upstream of the Project at Station 07HA001: Peace River at Peace River located at the Town of Peace River. WSC Station 07HA001: Peace River at Peace River is representative of conditions near the Project because no major tributaries join the Peace River between the Town of Peace River and the Project. Drainage area upstream of the Peace River at Peace River (07HA001) Water Survey of Canada station is 194,000 km^2 (WSC 2024). The flow (i.e., discharge) fluctuates from a winter low of about 199 cubic metres per second (m^3/s) to over 10,000 m^3/s in June, with a mean annual discharge of 1,846 m^3/s. The range of long term recorded discharge for 1915 to 2024 is shown in Figure 5.2-8. The long term mean annual total discharge volume recorded was 58.3 billion m^3. The highest annual discharge was 90.9 billion m^3 in 1996, (which was a wet year) and Williston Reservoir was partially drawn down to facilitate the repair of a sinkhole. The lowest annual total discharge volume recorded was 29.1 billion m^3 in 1968 during the first year of filling the Williston Reservoir. The long term recorded discharge volume for 1915 to 2024 is shown in Figure 5.2-9.

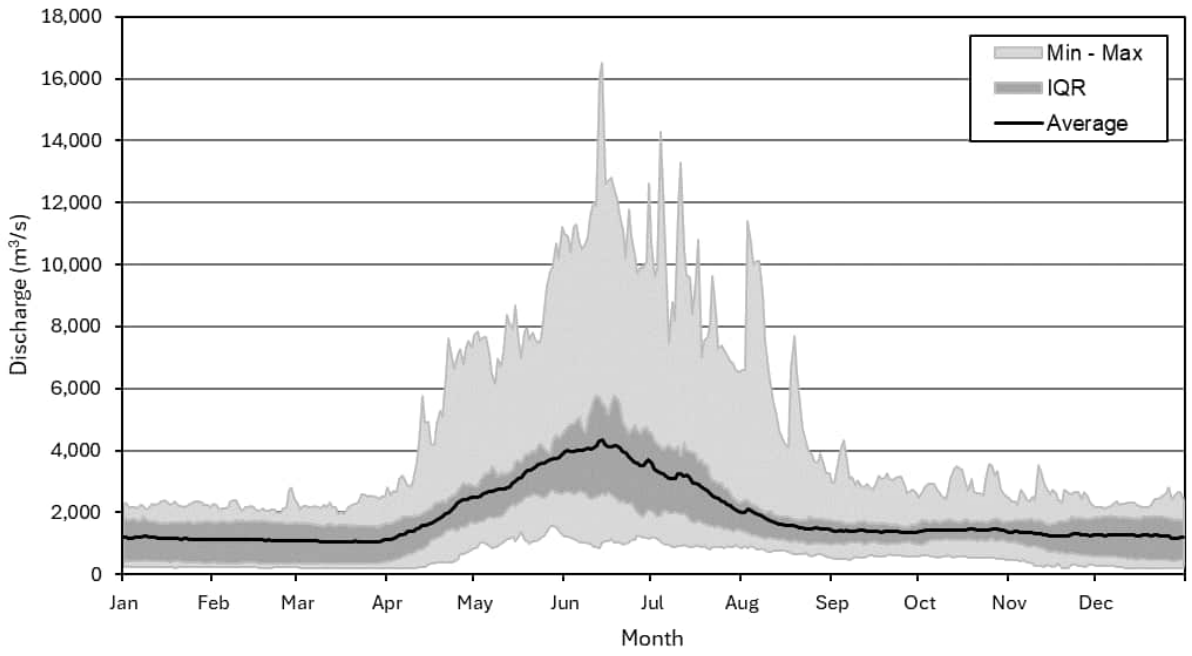


Figure 5.2-8: Long Term Discharge Record 1915 to 2024 for Peace River at Peace River (07HA001)

Note: IQR = interquartile range (25th to 75th percentile).

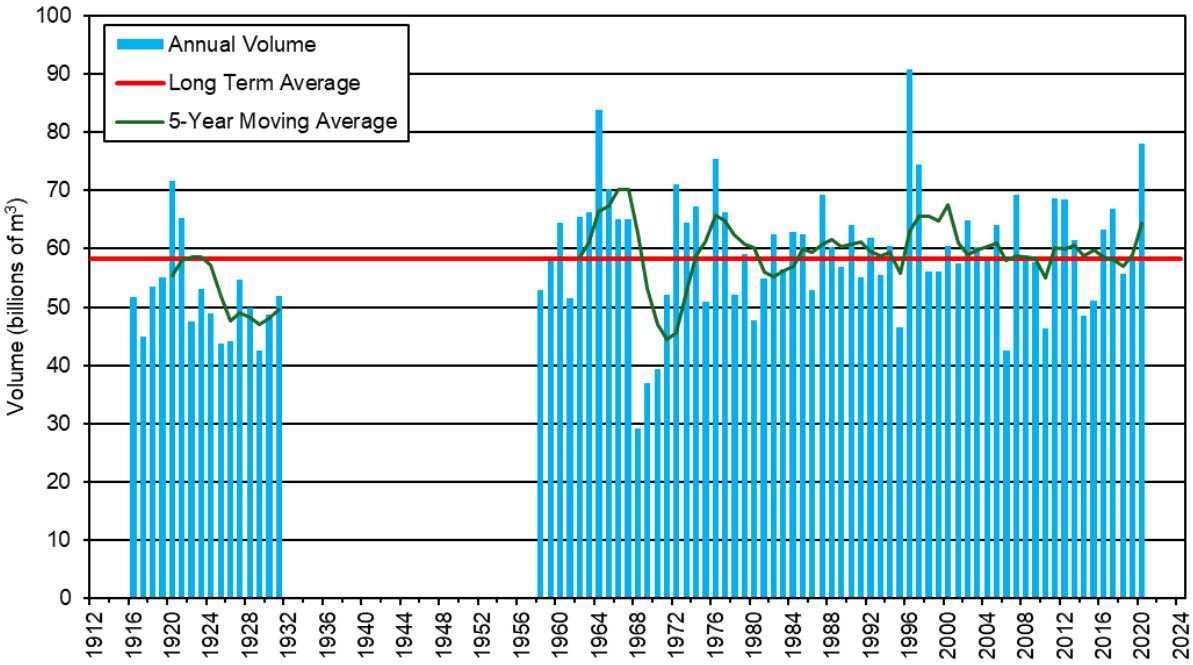


Figure 5.2-9: Long Term Discharge Volume Record 1915 to 2024 for Peace River at Peace River (07HA001)

5.2.3.1.2 Smoky River

The Smoky River is an unregulated tributary that meets up with the Peace River just upstream of Peace River, AB. The drainage area upstream of the Smoky River at Watino (07GJ001) Water Survey of Canada station is 50,300 km^2 (WSC 2024). The flow fluctuates from a winter low of about 20.7 m^3/s to over 2,000 m^3/s in June, with a mean annual discharge of 344 m^3/s. The range of long term recorded discharge for 1915 to 2024 is shown in Figure 5.2-10. The long term mean annual total discharge volume recorded was 10.9 billion m^3. The highest annual discharge was 18.4 billion m^3 in 1965, which was a wet year. The lowest annual total discharge volume recorded was 5.34 billion m^3 in 2006, which was a dry year. The long term recorded discharge volume for 1915 to 2024 is shown in Figure 5.2-11.

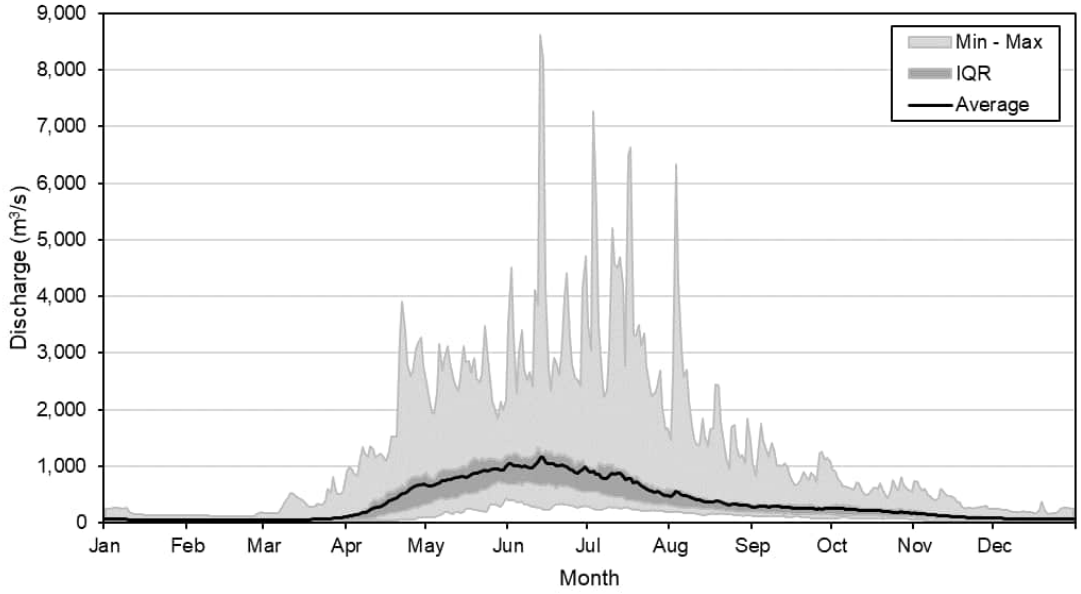


Figure 5.2-10: Long Term Discharge Record 1915 to 2024 for Smoky River at Watino (07GJ001)

Note: IQR = interquartile range (25th to 75th percentile).

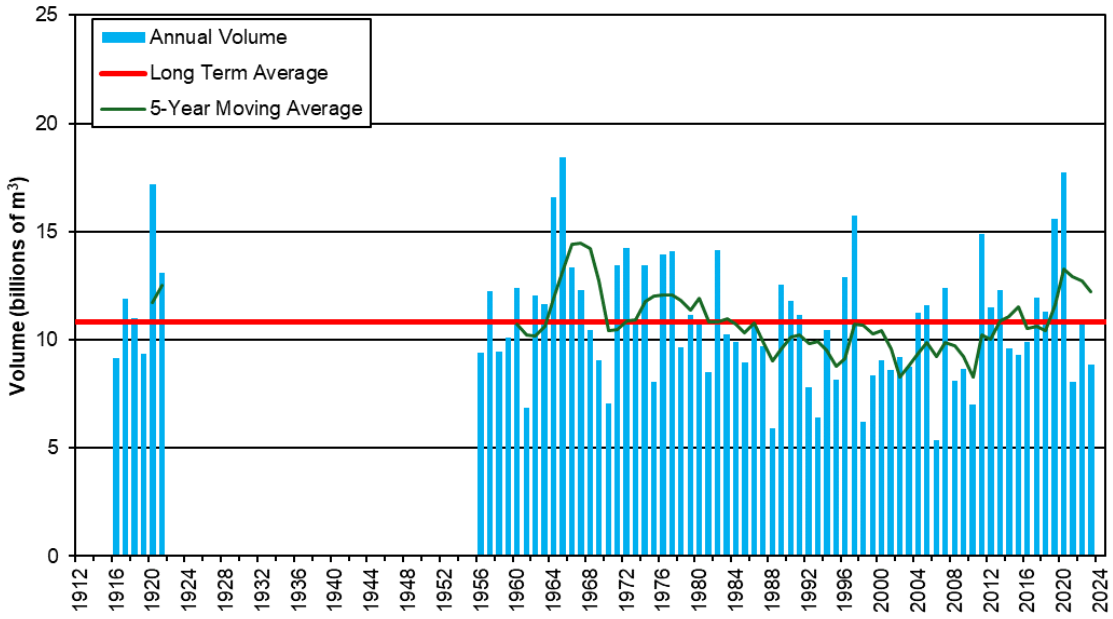


Figure 5.2-11: Long Term Discharge Volume Record 1915 to 2024 for Smoky River at Watino (07GJ001)

5.2.3.2 Surface Water Quality

Point source inputs to the Peace River in the vicinity of the alternate Project sites include effluent discharges from the Town of Peace River and the bleached kraft pulp mill operated by Daishowa-Marubeni International Ltd. Non-point source inputs include those from agricultural practices, oil and gas exploration, pipelines, and forestry activities. The Smoky River enters the Peace River upstream of the Town of Peace River (between Shaftsburry and Peace River). Long-term water quality monitoring stations in the vicinity of the alternate Project sites include the Peace River upstream of Smoky River (AB07FD0135), Smoky River at Watino (AB07GJ0010), Peace River above confluence of Whitemud River (AB07HA0230), and Peace River at Fort Vermilion (AB07HF0010) (GOA 2024b). The station Peace River above confluence of Whitemud River (AB07HA0230), located 50 km downstream of the Project, is the closest station downstream of the Project on the Peace River and most representative publicly available long term monitoring station for conditions in the Peace River adjacent to the Project.

Water quality data reviewed for this middle reach of the Peace River (i.e., immediately upstream of the Smoky River confluence to Fort Vermillion) showed that the concentrations of most water quality parameters increased with distance downstream, though remained relatively low (Table 5.2-2 and Table 5.2-3). Chronic water quality guidelines for the protection of aquatic life (GOA 2018) have been exceeded for some metals at all stations and for some nutrients at some stations (e.g., nitrogen species and elevated phosphorus concentrations) from 1988 to 2024 (Table 5.2-2 and Table 5.2-3). The large volume of water in the Peace River assimilates existing sources of nutrient and organic wastes.

Water quality of the upper, middle and lower reaches of the Peace River has also been assessed as part of the Alberta River Water Quality Index (GOA 2017a). From 1996 to 2016, the Smoky/Peace River stations have consistently received index ratings of 'good', except for 2011 and 2012 when the downstream Peace River station rated 'fair'. The lower scores were likely due to higher summer precipitation throughout the basin and the resulting higher flows as recorded by the Water Survey of Canada in the river (GOA 2017a). Seasonal and annual variation has been observed for parameter concentrations and runoff events associated with rainfall and snowmelt, which can lead to additional loading of non-point source contaminants to rivers.

The Peace River has a relatively high sediment load that tend to be highest in spring, with declines in the summer and fall. Suspended sediment concentrations (and turbidity) regularly exceed the Canadian Water Quality Guidelines for Aquatic Life (Jacques Whitford Limited 2006).

Table 5.2-2: Water Quality Summary Statistics for Select Parameters in the Peace River and Smoky River Upstream of the Project Sites, 1988 to 2024

Parameter	Unit	Peace River Upstream of Smoky River (AB07FD0135)[a]				Smoky River at Watino (AB07GJ0010)[a]			
		Median	Minimum	Maximum	% Above Guideline[a]	Median	Minimum	Maximum	% Above Guideline[b]
Temperature	°C	6.2	-0.5	20	-	4.7	-1.0	22	-
pH	unitless	8.1	7.2	9.0	-	8.0	6.8	9.1[(ca)]	0.5
Dissolved oxygen	mg/L	12	8.7	15		11	6.9	15	-
Total dissolved solids	mg/L	120	48	270	-	210	92	370	-
Total suspended solids	mg/L	13	<1.0	7,500	-	14	<0.4	6,100	-
Chloride	mg/L	<1.0	<0.5	3.3	-	3.1	0.30	31	-
Nitrate	mg-N/L	0.053	<0.003	0.67	-	0.036	<0.003	1.1	-
Total ammonia	mg-N/L	<0.05	0.010	0.27	-	0.040	<0.01	0.41[(Ca)]	0.2
Total phosphorus	mg-P/L	0.016	<0.003	4.9	-	0.022	<0.003	3.0	-
Chlorophyll a	mg/m^3	1.3	0.070	6.4	-	0.80	0.080	18	-
Total cadmium	mg/L	0.000044	0.0000060	0.0035[(Aa,Ca)]	16	0.000041	0.0000020	0.0040[(Aa,Ca)]	15
Total copper	mg/L	0.0013	0.00060	0.14[(Aa,Ca)]	12	0.0022	<0.0002	0.053[(Aa,Ca)]	20
Total lead	mg/L	0.00037	0.000019	0.062[(Ca)]	18	0.00097	0.000074	0.10[(Ca)]	16
Total mercury	mg/L	0.0000020	<0.00000008	0.00049[(Aa,Ca)]	22	0.0000067[(Ca)]	<0.00000008	0.00024[(Aa,Ca)]	16
Total nickel	mg/L	0.0014	<0.000005	0.16[(Ca)]	1.0	0.0024	<0.000005	0.073[(Ca)]	1.0
Total uranium	mg/L	0.0052	0.00033	0.0066	-	0.00068	0.00035	0.0076	-
Total zinc	mg/L	0.0033	0.00040	0.33[(Ca)]	11	0.0068	<0.0001	0.19[(Ca)]	14

Notes:
(a) Long-term monitoring station water quality data from the GOA Water Quality Data Portal (GOA 2024b).
(b) % above guideline represents the percentage of results above chronic guidelines for the protection of aquatic health (GOA 2018).
(Aa) concentration is higher than the acute aquatic life guideline (GOA 2018).; (Ca) concentration is higher than the chronic aquatic life guideline (GOA 2018).
% = percentage;°C = degrees Celsius; - = no guideline or no exceedances; mg/L = milligrams per litre; mg-N/L = milligrams as nitrogen per litre; mg-P/L = milligrams as phosphorus per litre; mg/m^3 = milligrams per cubic metre; GOA = Government of Alberta.

Table 5.2-3: Water Quality Summary Statistics for Select Parameters in the Peace River Downstream of the Project Sites, 1988 to 2024

Parameter	Unit	Peace River above Whitemud River (AB07HA0230)[a]				Peace River at Fort Vermilion (AB07HF0010)[a]			
		Median	Minimum	Maximum	% Above Guideline[a]	Median	Minimum	Maximum	% Above Guideline[b]
Temperature	°C	4.7	-0.4	21	-	2.8	-0.6	23	-
pH	unitless	8.1	6.3(Ca)	9.6(Ca)	4.0	7.9	6.9	9.4(Ca)	1.0
Dissolved oxygen	mg/L	11	8.5	15	-	12	5.4(Ca)	15	0.6
Total dissolved solids	mg/L	130	68	190	-	136	88	298	-
Total suspended solids	mg/L	15	<1.0	1,300	-	19	<0.4	6,800	-
Chloride	mg/L	1.1	<1.0	7.5	-	1.4	<0.5	20	-
Nitrate	mg-N/L	0.055	<0.003	3.0(Ca)	1.0	0.060	<0.003	0.47	-
Total ammonia	mg-N/L	<0.015	<0.01	0.080	-	0.020	<0.01	0.33	-
Total phosphorus	mg-P/L	0.017	<0.003	<3.0	-	0.021	<0.003	4.5	-
Chlorophyll a	mg/m^3	1.5	<0.3	9.8	-	1.3	0.14	9.1	-
Total cadmium	mg/L	0.000040	<0.000002	0.0010(Ca)	12	0.000065	0.0000050	0.0040(Aa,Ca)	21
Total copper	mg/L	0.0014	0.00061	0.020(Aa,Ca)	12	0.0020	0.00010	0.080(Aa,Ca)	23
Total lead	mg/L	0.00048	0.000025	0.019(Ca)	12	0.00084	0.000018	0.074(Ca)	23
Total mercury	mg/L	0.0000024	0.00000049	<0.0001(Aa,Ca)	18	0.0000059(Ca)	0.00000014	0.00024(Aa,Ca)	18
Total nickel	mg/L	0.0014	0.00022	0.025	-	0.0019	0.00013	0.10(Ca)	0.9
Total uranium	mg/L	0.00055	0.00044	0.0024	-	0.00058	0.00026	0.0080	-
Total zinc	mg/L	0.0026	0.00040	0.060(Ca)	5.0	0.0064	0.00047	0.25(Ca)	16

Notes:

(a) Long-term monitoring station water quality data from the GOA Water Quality Data Portal (GOA 2024b).

(b) % above guideline represents the percentage of results above chronic guidelines for the protection of aquatic health (GOA 2018).

(Aa) concentration is higher than the acute aquatic life guideline (GOA 2018).; (Ca) concentration is higher than the chronic aquatic life guideline (GOA 2018).

% = percentage;°C = degrees Celsius; - = no guideline or no exceedances; mg/L = milligrams per litre; mg-N/L = milligrams as nitrogen per litre; mg-P/L = milligrams as phosphorus per litre; mg/m^3 = milligrams per cubic metre; GOA = Government of Alberta.

5.2.3.3 Fish and Fish Habitat

The Project location has been sited to avoid water bodies that have the potential to provide fish habitat. Apart from the Peace River, which will be used to support water requirements for the Project, a review of the Alberta Environment and Protected Areas (AEPA) Fish and Wildlife Management Information System (FWMIS; AEPA 2024a) water layer database shows several small tributaries to the Peace River overlap with Option 1 and one named watercourse, Carmon Creek, including its tributaries, and one unnamed tributary to the Peace River overlap with the proposed footprint of Option 2. A review of existing fish capture information was completed using the FWMIS internet mapping tool (AEP 2024) with a search area that included the entirety of all watercourses crossed by the Project. FWMIS fish capture records in Carmon Creek document small-bodied forage species including Brook Stickleback (*Culaea inconstans*), and sport fish including Northern Pike (*Esox Lucius*) and Walleye (*Sander vitreus*). No records of fish presence are available for the unnamed tributaries overlapping with Option 1, and the unnamed tributary to Peace River that overlaps with Option 2; however, fish and fish habitat may still be present within these waterbodies and will require further investigation.

More broadly, the Project is located within the Peace River watershed. The headwaters of the Peace River originate in British Columbia, and it flows through Alberta to its confluence with the Athabasca River and ultimately drains to the Arctic Ocean via the Mackenzie River system in the Northwest Territories. The Peace River in northeastern British Columbia is regulated by a system of three hydroelectric dams: the W.A.C. Bennett Dam, Peace Canyon Dam, and the Site C Dam, which form an integrated system for upstream flow regulation.

Reduced mean annual peak flows and diurnal fluctuations in flow contribute to alteration of habitat and fish communities (Prowse and Conly 1996), including:

- Altered temperature regime that has permitted cold-water species to extend their downstream limit of distribution;
- Reduced capacity to transport sediments, which contributes to channel narrowing and altered habitats in some areas of the river;
- Ice regime that restricts the availability of overwintering habitat; and
- Diurnal fluctuations in water level that reduces availability of habitats.

The Peace River near the Project is a large permanent watercourse with a broad channel form and generally irregular meander pattern with frequent permanent islands. The Peace River in the vicinity of the Project is a Class C watercourse with a Restricted Activity Period (RAP) from April 16 to July 15 (ASRD 2006). Shallow side channels, snyes, and backwaters associated with sandbars near are generally common throughout the Peace River in the vicinity of the Project; riverbanks are generally steep, terraced and eroding, and generally comprised of fine materials. The Peace River has a seasonally high sediment load that typically is the highest in spring and declines in summer and

fall. Suspended sediment concentrations (and turbidity) regularly exceed the Canadian Water Quality Guidelines for Aquatic Life (Jacques Whitford Limited 2006).

Existing fish inventory and fish habitat information for the Peace River was obtained from a desktop review of the AEPA FWMIS (AEPA 2024a). The spatial extent of this database review included an approximately 10 km long section of the Peace River, spanning 5 km upstream and 5 km downstream of the proposed Project. The 5 km search area within the Peace River (i.e., approximately 5 km upstream from the Project to approximately 5 km downstream from the Project) was selected for the desktop review because it encompasses the largest section of the Peace River that can be queried within the FWMIS database, which allows up to a 6 km radius search. This search distance is typically sufficient to represent the expected fish species present within the Peace River near the Project and identify any other waterbodies with records of fish within the 5 km buffer.

A total of 32 fish species have been documented within the Peace River, 12 of which have been documented within 5 km upstream and 5 km downstream of the Project (Table 5.2-4; AEPA 2024a). Sportfish species that have been found in the vicinity of the Project include Burbot (*Lota lota*), Goldeye (*Hiodon alosoides*), Northern Pike, Mountain Whitefish (*Prosopium williamsoni*), Walleye, and Yellow Perch *(Perca flavescens*). Large-bodied, non-sport fish species include Longnose Sucker (*Catostomus catostomus*) and White Sucker (*Catostomus commersonii*). Small-bodied/forage fish species include Flathead Chub (*Platygobio gracilis*), Lake Chub (*Couesius plumbeus*), Spottail Shiner (*Notropis hudsonius*), and Trout-Perch (*Percopsis omiscomaycus*).

The unnamed watercourse overlapped by the Project in Option 2 is not considered within the potential range or critical habitat for any federally listed species. The Project is not anticipated to impact aquatic species at risk.

Table 5.2-4: Fish species documented in the Peace River and within 5 km upstream and 5 km downstream of the Project

Common Name	Scientific Name	Documented in the Peace River	Documented in the Peace River within 5 km of Project
Arctic Grayling	***Thymallus arcticus***	**Yes**	**No**
Bull Trout (Western Arctic populations)	***Salvelinus confluentus***	**Yes**	**No**
Brook Stickleback	*Culaea inconstans*	Yes	Yes
Burbot	*Lota lota*	Yes	Yes
Emerald Shiner	*Notropis atherinoides*	Yes	No
Flathead Chub	*Platygobio gracilis*	Yes	Yes
Finescale Dace	***Chrosomus neogaeus***	**Yes**	**No**
Fathead Minnow	*Pimephales promelas*	Yes	No
Goldeye	*Hiodon alosoides*	Yes	Yes

Table 5.2-4: Fish species documented in the Peace River and within 5 km upstream and 5 km downstream of the Project

Common Name	Scientific Name	Documented in the Peace River	Documented in the Peace River within 5 km of Project
Kokanee	*Oncorhynchus nerka*	Yes	No
Lake Chub	*Couesius plumbeus*	Yes	Yes
Lake Trout	***Salvelinus namaycush***	**Yes**	**No**
Lake Whitefish	*Coregonus clupeaformis*	Yes	No
Longnose Dace	*Rhinichthys cataractae*	Yes	No
Longnose Sucker	*Catostomus catostomus*	Yes	Yes
Largescale Sucker	***Catostomus macrocheilus***	**Yes**	**No**
Mountain Whitefish	*Prosopium williamsoni*	Yes	Yes
Ninespine Stickleback	***Pungitius pungitius***	**Yes**	**No**
Northern Redbelly Dace	***Phoxinus eos***	**Yes**	**No**
Northern Pike	*Esox lucius*	Yes	Yes
Northern Pikeminnow	***Ptychocheilus oregonensis***	**Yes**	**No**
Pearl Dace	***Margariscus margarita***	**Yes**	**No**
Prickly Sculpin	*Cottus asper*	Yes	No
Redside Shiner	*Richardsonius balteatus*	Yes	No
Rainbow Trout (Athabasca River populations)	*Oncorhynchus mykiss*	Yes	No
Slimy Sculpin	*Cottus cognatus*	Yes	No
Spoonhead Sculpin	***Cottus ricei***	**Yes**	**No**
Spottail Shiner	*Notropis hudsonius*	Yes	Yes
Trout-perch	*Percopsis omiscomaycus*	Yes	Yes
Walleye	*Sander vitreus*	Yes	Yes
White Sucker	*Catostomus commersoni*	Yes	Yes
Yellow Perch	*Perca flavescens*	Yes	No

Note:
Fish Species in **bold** are listed within provincial and/or federal species at risk lists.

Species at risk are discussed in Section 5.3.

5.2.4 Terrestrial Environment

5.2.4.1 Terrain and Soil

5.2.4.1.1 Option 1

The Option 1 study area is located in the Cadotte Plain Physiographic District, which is part of the Peace River Lowland (Pettapiece 1986). The Cadotte Plain is described as veneers and blankets of glaciolacustrine sediments overlying undulating till. The landscape within the Option 1 is level to gently undulating; however, the northwestern corner of Option 1 is adjacent to the steep slopes of the Peace River Valley.

5.2.4.1.2 Option 2

The Option 2 is located in the Manning Plain Physiographic District, which is part of the Peace River Lowland (Pettapiece 1986). The Manning Plain is characterized by level glaciolacustrine sediments and undulating glaciofluvial sediments. The landscape within Option 2 is gently sloping from the west to the east and towards the Peace River Valley.

5.2.4.2 Vegetation

The Option 1 and Option 2 sites are in the Dry Mixedwood Natural Subregion of the Boreal Forest Natural Region of Alberta (Downing and Pettapiece 2006). This subregion is generally characterized as having low relief, with level to undulating surfaces. Vegetation within this subregion is transitional between the Central Parkland and Central Mixedwood Subregions, with community types common to all three. Aspen (*Populus tremuloides*) is an important species, occurring in both pure and mixed stands. Balsam poplar (*Populus balsamfina*) occurs on moister sites, usually in depressions or along streams, but may occur in upland aspen forests. White spruce (*Picea glauca*) and balsam fir (*Abies balsamea*) can be expected to replace aspen and balsam poplar as stands mature; however, frequent fire seldom permits this to occur and pure deciduous stands are common in the southern part of the Dry Mixedwood Subregion. Mixedwood forests generally contain a mosaic of deciduous forest patches with species typical of each mosaic occurring through the stand. Dry, open and sandy upland areas are dominated by jack pine (*Pinus banksiana*). Peatlands are dominated by black spruce (*Picea mariana*) and tamarack (*Larix larvina*).

A total of 101 rare vascular plant species and 65 rare non-vascular plants potentially occur in the Boreal Forest (Moss 1983, Gould 2006). Species at risk are discussed in Section 5.3.

Over 50% of the Peace River and central Alberta portions of the Dry Mixedwood Natural Subregion have been cultivated (Alberta Parks 2014). Consequently, because Option 1 and Option 2 sites are predominantly agricultural land, non-native and other invasive species are likely present at both sites.

5.2.4.3 Wildlife and Wildlife Habitat

Several terrestrial wildlife may occur in the region. Most wildlife species in the region depend primarily on forested habitats. There is a prevalence of agricultural development and lack of contiguous tracts of forest in the area surrounding the Project. As such, wildlife use of the Option 1 and Option 2 sites are likely limited to species tolerant of anthropogenic disturbance (e.g., mice, coyotes, deer, corvid species) and most forest inhabited wildlife species are not expected to make use of the two options for the Project site.

Key Wildlife and Biodiversity Zones (KWBZ) are within 2 km of the Project Option 1 (to the east) and overlap with the western portion of Project Option 2 (GOA 2024c). The KWBZs are considered by a combination of key winter ungulate habitat and habitat with higher potential for biodiversity (GOA 2015) and are often associated with river valleys.

5.2.4.3.1 Option 1

Project Option 1 intersects grizzly bear (*Ursus arctos*) Support Zone. The Support Zone is intended to help maintain grizzly bears, particularly females and females with cubs, with home ranges that only partially occur in the Recovery Zone (AEP 2020). The Recovery Zone is comprised of Core and Secondary Areas, where Core Areas are areas of high habitat value and generally low mortality risk, and Secondary Areas are areas of good habitat reflecting the broader range of grizzly bear habitat. The Support Zone considers the 20-year history of grizzly bear occurrences, habitat potential, topographical relief, conflict potential, and proximity to a Recovery Zone (AEP 2020).

5.2.4.3.2 Option 2

Option 2 does not overlap sensitive terrestrial wildlife species ranges. An approximate 1 km buffer was applied to the Option 2 site during the FWMIS searches (GOA 2024a).

5.3 Species At Risk

Federal and provincial species at risk are discussed below for fish, vegetation, birds and migratory birds and wildlife.

5.3.1 Fish

Ten of the fish species documented within the Peace River system are listed within the provincial and/or federal species at risk lists. However, none of the fish species documented within 5 km of the Project are federally listed under the *Species at Risk Act* (SARA) or provincially listed (AEPA 2023) as ‘Endangered’, ‘Threatened’, or of ‘Special Concern’.

In the whole of the Peace River system, Arctic Grayling (*Thymallus arcticus)* are provincially designated as ‘May Be at Risk’ according to the General Status of Alberta Wild Species (AEPA 2023) but are not listed federally under SARA. Lake Trout (*Salvelinus namaycush*) are provincially designated as ‘Sensitive’ (AEPA 2023) but are not listed federally under SARA. Bull Trout (*Salvelinus confluentus;* Western Arctic populations) are provincially designated as ‘At Risk’ according to the

General Status of Alberta Wild Species (AEPA 2023) and are federally listed as 'Special Concern' by SARA.

Bull Trout (Western Arctic Populations) have been documented in the Peace River, but they have been found to be confined to the upstream reaches of the river. Their current known range does not extend to within 5 km of the proposed Project (Rodtka 2009), and no critical habitat has been identified in the Peace River downstream of the Town of Peace River (DFO 2024).

Rainbow Trout (*Oncorhynchus mykiss;* Athabasca River populations) are provincially designated as 'At Risk' for populations within the Athabasca River according to the General Status of Alberta Wild Species (AEPA 2023) and the Athabasca River population is listed federally as 'Endangered' by SARA. Although Rainbow Trout populations occur in the upper Peace River system in British Columbia, native Rainbow Trout in Alberta are found only in the upper Athabasca River watershed (DFO 2020). Rainbow Trout in Alberta found outside of the upper Athabasca River are introduced populations and are listed as 'Secure' (AEPA 2023). No critical Rainbow Trout habitat has been identified in the Peace River (DFO 2024).

5.3.2 Vegetation

Federally, SARA and the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assesses the status of species of Special Conservation Concern (SCC) in Canada. Nine candidate species identified by COSEWIC may occur in Alberta's Boreal Forest. Based on records contained in the Alberta Heritage Information Centre Database maintained by Alberta Sustainable Resource Development, there are no documented occurrences of listed plant species within both Option 1 and Option 2 sites (Rintoul 2008; Meijer 2008), likely because they are located predominantly on agricultural lands.

5.3.3 Birds and Migratory Birds

The Project is in the Dry Mixedwood Natural Subregion of the Boreal Forest Natural Region of Alberta, a diverse natural environment that contains a variety of species of wildlife (Alberta Parks 2014; Natural Regions Committee 2006). There are several bird species that are identified as SCC that could occur in the Dry Mixedwood Natural Subregion. Wild vertebrate species in Alberta are assessed in Alberta by the Endangered Species Conservation Committee and Scientific Subcommittee (GOA 2024c).

Several bird species considered as "sensitive" likely reside in the region (e.g., trumpeter swan (*Cygnus buccinator*) at Lac Cardinal). A comprehensive list of SCC that potentially occur within Option 1 and Option 2 sites will be identified and described in detail in the Impact Assessment conducted for the Project, after appropriate bird and bird habitat surveys are completed.

Based on records contained in the FWMIS (AEPA 2024a) no "sensitive" bird species ranges overlap the Option 1 site. An approximate 1 km buffer around the Project study area was applied to the Option 1 sites during the FWMIS searches as this focuses study efforts on the area affected by the Project and accounts for activity restriction setback distances for potential species at risk in the Project area.

Based on records contained in the FWMIS (AEPA 2024a), the Option 2 boundary is approximately 4 and 9 km from sharp-tailed grouse (*Tympanuchus phasianellus*) sensitive range to the northeast and southwest, respectively (GOA 2024c). Therefore, sharp-tailed grouse breeding habitats (e.g., dancing grounds or leks) may occur within the Option 2 site, pending suitable habitat conditions. Trumpeter swan observations (presence) have also historically been recorded on the site (GOA 2024c). Trumpeter swan is considered "Sensitive" in Alberta (GOA 2002). An approximate 1 km buffer around the Project study area was applied to the Option 2 sites during the FWMIS searches. This focuses study efforts on the area affected by the Project and accounts for activity restriction setback distances for potential species at risk in the Project site. The Project site is situated in a predominantly agricultural area and does not contain any major water bodies. The site is generally flat and has historically been used for agricultural purposes.

5.3.4 Wildlife and Wildlife Habitat

Provincially, species at risk are species listed with general and detailed status rankings by the Alberta Endangered Species Conservation Committee and Scientific Subcommittee. These species are listed as 'Threatened', 'Endangered', or 'Special Concern' under Schedule 1 of SARA, or are recommended to be listed under SARA by COSEWIC (GOA 2024a).

The provincial *Wildlife Act* allows for the creation, management, and protection of wildlife areas for wildlife research activities, or for conservation or interpretation of wildlife. These wildlife areas preserve habitats that are critical to migratory birds and other wildlife species, particularly those that are at risk (GOA 2024d). The *Wildlife Act* also protects the important habitat features (e.g., occupied mammal dens, bat hibernacula, and natural mineral licks) and other wildlife species, such as species listed as 'Endangered' or 'Threated' under the *Wildlife Act*, big game animals (e.g., deer and bears), furbearing mammals (e.g., beavers and foxes), bats, and amphibians. Activities may be prohibited that could be harmful to species and to their habitat, unless a permit is issued indicating the permitted activity (GOA 2024c).

Federally, COSEWIC assesses the status of SCC in Canada and recommends species to the Minister of ECCC for listing under SARA. Under SARA, it is illegal to destroy the critical habitat of species at risk that are listed as 'Threated' or 'Endangered' under the Schedule 1 of SARA. Additionally, under SARA, critical habitat is defined as the habitat that is necessary for the survival or recovery of listed Extirpated, Endangered, or Threatened species, and that is identified as critical habitat in a recovery strategy or action plan (GOC 2016). In general, SARA only applies to federal lands. In Canada, most species of birds are protected under the *Migratory Birds Convention Act*, 1994 (MBCA), which is outlined further in Section 7.2.2.

There are no records of federally or provincial listed species or SCC in Option 1 and Option 2 sites. An approximate 1 km buffer was applied to both the Option 1 and Option 2 sites during the FWMIS (AEPA 2024a) searches. Project Option 2 does not intersect sensitive species ranges (AEP 2020).

For Option 1, there is potential for bats of the *Myotis spp*. to occur in the area. Option 1 is within little brown myotis (*Myotis lucifugus*) and northern myotis (*Myotis septentrionalis*) range in Alberta (AEPA 2024b). The Endangered listing of these species in Alberta is based on anticipated declines from White Nose Syndrome. A Recovery Plan has recently been developed to protect the highest priority habitats: hibernacula and maternity roosts (referred to as 'essential roosts') (AEPA 2024b). Where hibernacula or hibernacula habitat are identified, maintenance of surrounding habitat (e.g., foraging) is required and is accomplished through guidelines, such as setting buffers zones to protect habitat, along with timing restrictions for activities that could negatively affect hibernating bats (AEPA 2024b).

Option 1 also overlaps with grizzly bear Support Zone (AEP 2020). The Support Zone is intended to help maintain grizzly bears, particularly females and females with cubs, with home ranges only partially in the Recovery Zone (AEP 2020). The Recovery Zone is comprised of Core and Secondary Areas, where Core Areas are areas of high habitat value and generally low mortality risk, and Secondary Areas are areas of good habitat reflecting the broader range of grizzly bear habitat. The Support Zone considers the 20-year history of grizzly bear occurrences, habitat potential, topographical relief, conflict potential, and proximity to a Recovery Zone (AEP 2020). Grizzly bear is federally listed as 'Special Concern' under Schedule 1 of SARA.

The Chinchaga caribou range is approximately 30 km to the northwest of the Project Option 1, and the Red Earth caribou range is approximately 90 km to the east of Project Option 1 and approximately 85 km northeast of the Project Option 2 (GOA 2017b).

5.4 Land and Resource Use

5.4.1 Traditional Land and Resource Use

Energy Alberta acknowledges that Indigenous Peoples have a long and close (stewardship) relationship with the land and can provide valuable knowledge about the local environment. IAAC and CNSC provide guidance to support the inclusion of Indigenous Knowledge into the Impact Assessment process in accordance with guiding principles and requirements for confidentiality.

Traditional Land and Resource Use is a key valued component of the Impact Assessment process. Inclusion of Indigenous Knowledge is also an important step in the reconciliation process between Canada and Indigenous Peoples. IAAC advises that proponents consider if their project will have an impact on harvesting areas where traditional lifestyles are practised through activities such as hunting, trapping, fishing, and gathering (IAAC, 2024). IAAC also advises that impact assessment practitioners work with Indigenous Nations and Communities to identify (and map out) how the project could interact with their traditional territory; keeping in mind that the practice of Indigenous

rights can be fluid and should consider many variables IAAC, 2024). The following considerations may assist in identifying the importance of the Project site to Indigenous Nations and Communities:

- It is located within the Indigenous community's traditional territory.
- The Indigenous community claims the area is important.
- The intensity and frequency of traditional and cultural uses in the area.
- The diversity of traditional and cultural uses and experiences in the area.
- The uniqueness of the area to the cultural practices.
- The role the place holds in the community's history and culture (IAAC, 2024).

Energy Alberta will provide opportunities for Indigenous Nations and Communities to determine potential impacts of the Project to changes to access to lands, loss of traditional lands, and ability to hunt, fish, gather, and/or trap, as well as the ability to practise traditional culture, through submitting their own Traditional Land and Resource Use (TLRU) studies to help inform the Impact Assessment process. Energy Alberta recognizes that Indigenous Knowledge (IK) provided by Indigenous Nations and Communities provides meaningful input into the Impact Assessment process, particularly in evaluating impacts to traditional land use, but it also informs on how Indigenous Nations and Communities wish to be included into the Impact Assessment process. The TLRU/IK reports tend to include maps of areas and locations of cultural importance, descriptions of areas and locations of cultural importance and mitigation recommendations. Results of individual Indigenous group's TLRU/IK studies will be analyzed and reported in a manner that is acceptable to the community conducting the study.[6]

Data on TLRU will be sourced solely from the Indigenous Nations and Communities who are potentially impacted by the Project. The Project is located within Treaty 8 territory and Métis Nation of Alberta territory. The IPD is informed by previous IK and TLRU studies and hearing testimony provided by Indigenous Nations and Communities, however, these sources are not intended to replace IK and TLRU for this Project.

[6] As engagement continues and project development advances, the Proponent may request permissions from the Indigenous Nations and communities to provide and include maps of their traditional territories in the IS, if relevant and appropriate. In cases where Indigenous Nations and communities maintain a level of confidentiality surrounding their traditional territories and activities, data sharing agreements may be required. The Proponent also recognizes that traditional territories evolve with time and that the documentation of their territories requires effort and resources and, subsequently, some Indigenous Nations and communities may not yet have a fully defined map of their territory.

Energy Alberta will seek to understand and respect Indigenous governance, rights, protocols, policies, and practices when requesting access to Indigenous Knowledge and gaining permission to use Indigenous Knowledge. Energy Alberta is also engaging with Indigenous Nations and Communities, to determine potential impacts of the Project to health and socio-economic conditions, physical and cultural heritage, as well as the current use of lands and resources for traditional purposes. Use of data provided in TLRU/IK studies will align with OCAP® principles of Ownership, Control, Access, and Possession as outlined by the First Nations Information Governance Centre. Energy Alberta understands that building and maintaining relationships between proponents and Indigenous Nations and Communities help provide that Impact Assessments are effectively informed by IK through every phase of the process. Energy Alberta will work with Indigenous Nations and Communities and knowledge holders to:

- Determine the community protocols and expectations regarding the conduct of Indigenous Knowledge studies to determine how the research is to be conducted and how information will be used;
- Work with the Indigenous Nations and their designated representative to determine how permission will be obtained from a participating Indigenous Nation or knowledge holders;
- Identify how and what Indigenous Knowledge may be useful for Project design, Impact Assessment process, impact prediction and mitigation;
- Determine expectations for handling, sharing, and incorporating Indigenous Knowledge studies; and
- Identify possibilities for scoping the study in a manner that may also contribute to broader goals and priorities of the Indigenous Nation.

5.4.1.1 Traditional Territory

The Indigenous Nations and Communities identified as being potentially impacted by the Project were selected on the basis of:

- Proximity to Project;
- Which Treaty or Government the Group adheres to;
- Potential overlap of the Project with traditional territory;
- Previous interest in nuclear projects; and
- Participation in engagement on the Project to date.

5.4.1.2 Treaty 8

Treaty No. 8 was signed on 21st June 1899 in Northern Alberta, near present-day Grouard Alberta, and includes 41 First Nations. The Treaty territory covers an area of approximately 841,487 km^2 and includes northern Saskatchewan, northern Alberta, and parts of British Columbia and the Northwest Territories (Madill 1986). Several adhesions were signed in the following years. The rights specified under Treaty No. 8 are protected under Section 35 of the *Constitution Act, 1982*.

When Treaty 8 was negotiated, the text of the written terms and conditions was essentially the same as Treaty 7, with some allowances to reflect local conditions. There was also recognition given the assumption that some of the Indigenous Peoples in the Treaty area might wish to continue traditional economic activities such as hunting, fishing, and trapping, and to resist being restricted to reserve lands. The government at the time made assurances not to force substantial changes to their way of life and that Indigenous Peoples of Treaty 8 would be permitted to hold their land collectively in reserves or 'in severally'; which meant that Indigenous families could have their own small reserve, apart from the other families in the band (Fumoleau 1975). The most important Treaty provisions to the Indigenous communities were the protection of hunting, fishing, gathering, and trapping rights. Oral history from Indigenous Elders indicates that Treaty Eight would not have been signed if the Indigenous Peoples had not been assured that their traditional economy and freedom of movement would be guaranteed (Fumoleau 1975).

Treaty No. 8 permits signatory Nations to "pursue their usual vocations of hunting, trapping, and fishing throughout the tract surrendered" (CIRNAC 2013). Many Treaty 8 Nations assert that the Treaty terms include oral promises made at the time of signing, which should have been documented in the text. As highlighted in *Mikisew Cree First Nation v. Canada*, Treaty No. 8 encompasses promises beyond traditional land use, including "continuity in traditional patterns of economic activity" (SCC 2005).

While Treaty No. 8 does not explicitly mention practices such as gathering or cultural pursuits, these activities are reasonably equivalent or incidental to the expressed Treaty No. 8 harvesting rights. These rights, which sustained Indigenous livelihoods before the Treaty's signing, continue similarly today (SCC 1990a, 1990b, 1996, 1999a, 1999b). Section 12 of the *Natural Resource Transfer Agreement* guarantees the rights of Treaty First Nations in Alberta to take game and fish for food during all seasons of the year on unoccupied Crown lands and on any other lands to which they have a right of access (Alberta 2003).

This list of Treaty 8 Nations was developed in early 2025 and reflects information available to Energy Alberta at the time. As Energy Alberta progresses through the engagement and Impact Assessment process this list may change.

Treaty 8 Nations identified as potentially effected by this Project include:

1) Athabasca Chipewyan First Nation
2) Beaver First Nation
3) Dene Tha' First Nation
4) Driftpile Cree Nation
5) Duncan's First Nation
6) Horse Lake First Nation
7) Kapawe'no First Nation
8) Little Red River Cree Nation
9) Loon River First Nation
10) Lubicon Lake Band #453
11) Mikisew Cree First Nation
12) Peerless Trout First Nation
13) Sawridge First Nation
14) Sturgeon Lake Cree Nation
15) Sucker Creek First Nation
16) Swan River First Nation
17) Tallcree Tribal Government
18) Whitefish Lake First Nation
19) Woodland Cree First Nation

5.4.1.3 Métis Communities

The list of Métis communities listed below was developed in early 2025 and reflects information available to Energy Alberta at the time. As Energy Alberta progresses through the engagement and Impact Assessment process this list may change.

Specific Métis Communities identified as potentially impacted by the Project include:

1) East Prairie Métis Settlement
2) Gift Lake Métis Settlement
3) Cadotte Lake Métis Nation
4) Paddle Prairie Métis Settlement
5) Peavine Métis Settlement
6) Fort Chipewyan Métis Nation

Otipemisiwak Métis Government (formerly the Métis Nation of Alberta) signed a self-government agreement in 2023, the Agreement recognizes that the Métis Citizens within Alberta have an inherent right to self-government recognized and affirmed by Section 35 of the *Constitution Act* (1982). OMG and has restructured its previous six regions into 22 newly defined districts grouped into five territories (MNA 2023a).

Harvesting activities for the Métis people of the North Saskatchewan and Lower Athabasca River Territories encompass hunting, trapping, fishing, and plant gathering throughout their area. Specific locations include the Athabasca, Firebag, Clearwater, Richardson, Marguerite, and House rivers; Diane, Namur, Gardiner, McClellan, Mariana, and Crow lakes; Poplar Point and Big Point; and the Birch Mountain Wilderness area (Bishop Law 2012; NGTL 2014, 2015). Big Point is also recognized as a sacred site (Bishop Law 2012).

Métis people from these territories have noted that development in these areas has altered habitats and impaired access, affecting their ability to conduct traditional activities (Bishop Law 2012). They have expressed concerns about potential effects of further development, including increased contaminants affecting the safe use of harvested resources, the creation of barriers impeding traditional activities, impacts on historic and cultural sites near development areas, and the declining ability to engage in traditional activities, which limits the transmission of cultural practices and knowledge to younger generations (Bishop Law 2012; NGTL 2023; NGTL 2014, 2015).

5.4.1.4 Overview of Indigenous Nations and Communities' Potential Topics of Interest

For the purposes of the IPD, a scan of existing community led Indigenous Knowledge studies from potentially effected Indigenous Nations and Communities was conducted. Of all the Indigenous Nations and Communities identified in the IPD, all engaged in traditional activity on the land and primarily within their traditional territory. A level representation of concerns expressed in these studies are included in the preliminary list of topics of interest for Indigenous Nations and Communities presented in Section 3.2.3.

5.4.2 Agriculture

Agricultural data is sourced from Statistics Canada, which divides areas by agricultural census regions. The Project is located in Census Agricultural Region 7 of Alberta. Within this region, agriculture and farmland data is available for the following municipalities: Municipal District (MD) of Northern Lights No. 22, MD of Peace No. 135, MD of Clear Hills No. 21, MD of Fairview No. 136, Birch Hills County, Northern Sunrise County, and MD of Smoky River No. 130.

Since 2006, the number of farms and the total land area in these seven municipalities has fluctuated (Statistics Canada 2007, 2017, 2022a). In 2006, there were 2,373 farms. This number decreased to 1,905 farms in 2011 and further to 1,595 farms in 2016, before slightly increasing to 1,785 farms in 2021.

A similar trend is observed in the total farm area. In 2006, the total farm area was 1,286,293 ha. This decreased to 805,179 ha in 2011, then increased to 809,342 ha in 2016, and further to 1,162,945 ha in 2021. From 2016 to 2021, both the number of farms and land area have increased for the municipalities, which highlights the importance of agriculture within the region.

Additionally, in 2021, the operating revenues (excluding forest products) of the seven municipalities totalled over $809 million, which account for approximately 27.4% of the total operating revenue of the province ($22,215,643,470) (Statistics Canada 2022b). The main crop types produced in the region include barley, canola, wheat, and oats, all of which are showing an increase of production from 2016 to 2021. Livestock also plays a prominent role in the region's landscape. The total number of cattle and calves in the region increased by 22.0% in 2021 from 2016, while the number of pigs has increased by 570.0%.

5.4.3 Tourism

There are a diverse range of activities being promoted within the region. The County of Northern Lights and the Northern Sunrise County have provincial parks, lakes, and local museums (Mighty Peace Tourism 2025). Activities include hiking, hunting, horseback riding, camping, bird watching, and golfing. During the winter, the region offers snowshoeing, cross country skiing, snowboarding, sledding, ice fishing, and watching northern lights.

5.5 Cultural Resources

5.5.1 Option 1

Currently, there are no known historical resources sites recorded in the "Listing of Historic Sites" (ACSW, April 1st, 2024), previously recorded archaeological sites, or the study areas of previous Historic Resource Impact Assessment (HRIA) studies within the Option 1 area. Option 1 is located predominantly within agricultural lands, clear of forest cover. However, it is possible that areas of these lands are native vegetation (e.g., native prairie). In addition, terrain features associated with former Glacial Lake Peace are located within this study area. There is the potential that intact historic resources may be located within this study area.

Due to the scope of the Project, a Historical Resources Overview (HRO) will be submitted with a Historic Resource application to Alberta Arts Culture and Status of Women (ACSW) that provides a desktop analysis of the preferred Project's potential to impact any known or unknown historical resources that may be present, along with recommendations for additional studies, if warranted. Pending the review of the HRO, ACSW will issue a 'Schedule A' document which will detail the *Historical Resources Act* (HRA) requirements or conditions which must be fulfilled for the Project to receive HRA clearance.

The document will include comments on the need for archaeological and paleontological studies and, in some cases, a requirement for Indigenous Nations and Community participation in field programs or interviews related to possible cultural sites within the Option 1 site. It is anticipated that ACSW will minimally require a Historical Impact Assessment for moderate and high potential zones within the Option 1 site.

5.5.2 Option 2

Currently, there are known historical resources sites recorded in the "Listing of Historic Sites" (ACSW, April 1st, 2024) within the Option 2 site. Lands within 4,5,12 and 13 of 29-85-20-W5M and 12 of 20-85-20-W5M have a Historic Resource Value (HRV) of 5p. This listing is a high paleontological resource sensitivity zone and designates lands with high potential to contain a paleontological resource.

Archaeological site HcQg-1 is located within NW-20-85-W5M. This archaeological site has an HRV of 0 and is assessed as unlikely to require further study. The study area for two previous HRIA's are located within Option 2. Permit 84-071 was for the HRIA of the Peace River In-Situ Pilot Project Water Supply Line (Van Dyke 1984). Permit 85-033 was for the HRIA of the Alberta Natural Gas Company Ltd. Gas supply line to Shell Peace River Expansion Project (Loveseth 1985). Although previous studies have been conducted within the study area, there remain unassessed areas of land with the potential to contain an unrecorded intact historic resource. These high potential lands include elevated terrain features in close proximity to hydrological features within intact forest.

5.6 Socio-Economic Environment

The Project is situated in the County of Northern Lights (Option 1) or Northern Sunrise County (Option 2) and is surrounded by several municipalities consisting of MDs, counties, and towns. These include the MD of Peace No. 135, Town of Grimshaw, Clear Hills County, MD of Fairview No. 136, Town of Fairview, Birch Hills County, Northern Sunrise County, Town of Peace River, MD of Smoky River No. 130, and Town of Falher (Figure 5.6-1). For the purposes of this section, the term 'region' will be used to encompass the Option 1 and Option 2 sites, along with the surrounding MDs, counties, towns, Indigenous reserves, and Métis settlements. The nearest central hub to this region is the City of Grande Prairie, which is approximately 200 km away from the Project site.

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RAINBOW LAKE
HIGH LEVEL
Bushe River
Hay River
Boyer River
Dunlop River
Little Buffalo River
Basset Lake
Bede Creek
Bear River
MACKENZIE COUNTY
Haig River
Fontas River
Wabasca River
Cautley Creek
Keg River
Mikkwa River
Wadlin Lake
Kemp River
Botha River
COUNTY OF NORTHERN LIGHTS
ALBERTA
Buffalo River
Chinchaga River
Meikle River
Hotchkiss River
Peace River
Wolverine River
Cache Creek
Bison Lake
Panny River
Lafond Creek
Sawn Lake
Doig River
Notikewin River
Haig Lake
Loon River
Osborn River
CLEAR HILLS COUNTY
Little Cadotte River
NORTHERN SUNRISE COUNTY
MUNICIPAL DISTRICT OF OPPORTUNITY NO. 17
Option 1 Project Location
Option 2 Project Location
Clear River
Whitemud River
Cadotte River
Eureka River
Cadotte Lake
Montagneuse River
Lubicon Lake
Lubicon River
Hines Creek
PEACE RIVER
Cardinal Lake
Heart River
MUNICIPAL DISTRICT OF PEACE NO. 135
FAIRVIEW
MUNICIPAL DISTRICT OF FAIRVIEW NO. 136
Utikuma River
Hamelin Creek
Ksituan River
Lac Magloire
Bearhead Creek
South Heart River
Utikuma Lake
Nipisi River
Nipisi Lake
SADDLE HILLS COUNTY
MUNICIPAL DISTRICT OF SPIRIT RIVER NO. 133
BIRCH HILLS COUNTY
Kimiwan Lake
Pouce Coupé River
MUNICIPAL DISTRICT OF SMOKY RIVER NO. 130
Saddle (Burnt) River
Little Smoky River
Winagami Lake
Bad Heart River
Lesser Slave Lake
Puskwaskau River
MUNICIPAL DISTRICT OF LESSER SLAVE RIVER NO. 124
Beaverlodge River
SEXSMITH
BIG LAKES COUNTY
COUNTY OF GRANDE PRAIRIE NO. 1
Bear Lake
GRANDE PRAIRIE
Puskwaskau Lake
West Prairie River
East Prairie River
Driftpile River
Redwillow River
MUNICIPAL DISTRICT OF GREENVIEW NO. 16
Sturgeon Lake
Snipe Lake
Swan River
Wapiti River
Pelican Lake
Goose River

LEGEND

- HAMLET
- OPTION 1 PROJECT LOCATION
- OPTION 2 PROJECT LOCATION
- PRIMARY HIGHWAY
- SECONDARY HIGHWAY
- WATERCOURSE
- INDIGENOUS RESERVE
- METIS SETTLEMENT
- MUNICIPAL DISTRICT BOUNDARY
- WATERBODY

0 25 50
1:1,250,000 KILOMETRES

NOTE(S)
1. PROJECTED COORDINATE SYSTEM: NAD 1983 UTM ZONE 11N

CLIENT
ENERGY ALBERTA

PROJECT
PEACE RIVER NUCLEAR POWER PROJECT

TITLE
SOCIO-ECONOMIC REGIONAL CONTEXT

CONSULTANT
wsp

YYYY-MM-DD	2025-04-02
DESIGNED	MJ
PREPARED	KW
REVIEWED	CB
APPROVED	MM

PROJECT NO. CA0038431.4096 | CONTROL | REV. 0 | FIGURE 5.6-1

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5.6.1 Population

The region is undergoing a population decline and has an older demographic than the provincial average, with most municipalities having a higher proportion of residents aged 65 and older compared to the provincial average. In 2024, most municipalities report estimated populations of less than 5,000 people, with the exception of the Town of Peace River with a population of 7,102 (Statistics Canada 2022a). The change of region populations is shown in Table 5.6-1.

The majority of the municipalities experienced a population decline between 2019 and 2024, with decreases ranging from 0.9% (Northern Sunrise County) to 8.1% (Peace No. 135). This is in contrast to the 10.8% growth that occurred at the provincial level. Population growth occurred in the other four municipalities, ranging from 1.5% (Birch Hills County) to 8.0% (Falher). The Town of Peace River experienced 5.3% population growth during this period. The median age of the population for most of the municipalities are slightly older than the province (38.4 years), ranging from 38.8 years (Town of Grimshaw) to 44.4 years (Town of Fairview, MD of Smoky River No. 130, and Town of Falher) (Statistics Canada 2022a).

The MD of Clear Hills No. 21 and Town of Peace River are the only municipalities with a younger median age of 30.6 years and 35.6 years, respectively, compared to the provincial median age of 38.4 years. The older median ages are likely due to the larger proportion of the population aged 65 years and over (i.e., retirement age) in the majority of the region. Most municipalities have retirement populations that exceed the provincial average of 14.8%, with the exception of Clear Hills County and Town of Peace River (13.8% and 12.1%, respectively). People of working age (aged 15 to 64 years old) make up most of the population which varies from 55.6% (Clear Hills County) to 67.6% (Town of Peace River) within each municipality. The working age population of the municipalities is comparable to the provincial average of 66.2%.

Table 5.6-1: Region Population (2019-2024)

Municipality	Year						Change (2019 to 2023)	
	2019	2020	2021	2022	2023	2024	#	%
Birch Hills County	1,506	1,496	1,567	1,557	1,547	1,529	23	1.5
Clear Hills	3,222	3,198	3,100	3,080	3,084	3,086	-136	-4.2
Fairview No. 136	1,546	1,554	1,626	1,603	1,615	1,629	83	5.4
Falher	1,012	1,016	1,037	1,034	1,050	1,093	81	8.0
Grimshaw	2,678	2,618	2,687	2,652	2,598	2,646	-32	-1.2
Northern Lights County	4,405	4,331	4,248	4,156	4,104	4,080	-325	-7.4
Northern Sunrise County	1,836	1,798	1,764	1,765	1,827	1,820	-16	-0.9
Peace No. 135	1,710	1,711	1,620	1,603	1,580	1,572	-138	-8.1
Peace River	6,745	6,745	6,853	6,741	6,882	7,102	357	5.3
Smoky River No. 130	1,977	1,951	1,960	1,906	1,890	1,893	-84	-4.2

Source: GOA 2024e.

The majority of the municipalities in the region have a larger Indigenous population than the provincial average (6.8%). The Indigenous population ranges from 3.8% (MD of Smoky River No. 130) to 20.7% (County of Northern Lights), surpassing the provincial average of 6.8% (Statistics Canada 2022a). The Indigenous population in the region is predominantly Métis, followed by First Nations, and a small minority of Inuit in the County of Northern Lights (0.5%). The largest Métis population among the municipalities is found in the MD of Northern Lights No. 22 (16.1%) followed by the MD of Peace No. 135 (11.1%). The largest Indigenous population among the municipalities is found in town of Peace of River (8.8%).

5.6.2 Education

The region has five school districts (SD) – Peace River SD No. 10, Northland SD No. 61, Peace Wapiti SD No. 76, High Prairie SD No. 48, and the Conseil Scolaire du Nord-Ouest, which operate about 94 schools and centres for elementary and secondary school education. The Northwestern Polytechnic, a post-secondary institution, operates across campuses in the Town of Fairview and Grande Prairie. The institution offers programs for apprenticeship and pre-employment trades training, diploma and certificates, and university transfers (Northwestern Polytechnic 2025). Another educational institution close to the region is the Northern Lakes College in Grande Prairie, which offers programs for apprenticeship in carpentry, electrical, and welding (Northern Lakes College 2025). The closest institute to obtain a bachelor's degree or higher is the Athabasca University in which the main campus is in Athabasca, approximately 400 km away from Option 1 and Option 2 sites. Athabasca University offers courses online and through distance education, allowing flexibility for students to work in any location (GOA 2025b).

The region exhibits educational attainment levels that fall below the provincial averages. Across the region, a higher proportion of the population aged 15 and older lacks any form of certificate, diploma, or degree, with figures ranging from 19.9% (MD of Smoky River No. 130) to 49.6% (Clear Hill County), in contrast to the provincial average of 15.5% (Statistics Canada 2022a). High school is the most common level of highest education, varying from 27.5% (MD of Peace No. 135) to 37.3% (Birch Hills County), which is comparable to the provincial average of 28.8%.

Obtaining an apprenticeship or trades education is more common in the region, with higher levels of attainment than the provincial average (8.7%) in almost every municipality. The higher levels of apprenticeship attainment may have contributed to the workforce in the top industries in the region such as agriculture, resource extraction, and construction. College attainment is near or exceeds the provincial average in the majority of municipalities, with the exception of Clear Hills County, where attainment level for college is 10.1%.

All municipalities report lower attainment for bachelor's degree or higher education compared to the province (25.6%), varying from 3.8% (Clear Hills County) to 16.6% (Town of Peace River). The distance and access to educational institutions for college and university programs may have contributed to the lower levels of attainment for college and bachelor's degree or higher. In addition, the type of industry available in the region may not necessarily require a bachelor's degree or higher education.

When considering the provincial average for both men and women, the region still has lower educational attainment levels compared to the province. A larger proportion of men in the majority of the municipalities were without certificates, diplomas, or degrees, compared to women for the same metric (Statistics Canada 2022a). The Town of Peace River is the only municipality where a higher percentage of women lack certificates, diplomas, or degrees compared to men (21.2% and 20.5%, respectively). This is also seen at the provincial level (16.4% and 14.6%, respectively). Both men and women represent a higher percentage of the population without certificates, diplomas, or degrees compared to the province (16.4% and 14.6%, respectively).

Secondary education is the highest level of education for most of the region, but there are still differences between men and women. In over half of the municipalities, a higher percentage of women have obtained a high school education compared to men. Provincially, the rates for both men and women are 28.8%. Most municipalities exceed this provincial rate for either men or women, except for the County of Northern Lights (27.1% for men), MD of Peace No. 135 (23.3% for men), Clear Hills County (23.1% for men), Town of Fairview (28.5% for men) and Northern Sunrise County (27.9% for men and 27.8% for women), which fall below the provincial average.

Across the region, a higher percentage of men have completed apprenticeships compared to women. Men are more likely than women to achieve this level of education in the region, with differences ranging between two (Town of Falher) to over six times more men than women (MD of Clear Hills No. 21). For men, the percentages range from 13.1% (Clear Hills County) to 24.8% (MD of Peace No. 135). For women, the percentages range from 2.0% (Clear Hills County) to 7.4% (Town of Falher). This pattern is consistent with the provincial data, where 13.9% of men and 3.7% of women have completed apprenticeships as their highest level of education. The proportion of men achieving this metric is higher in almost every municipality than the provincial average (13.9%), with the exception of the Clear Hills County (13.1%). Trades education is less common for women in the region as the majority of municipalities have lower rates of women achieving this metric than the provincial average (3.7%).

Women have higher rates in college-level education (ranging from 14.1% [Clear Hills County] to 28.6% [Town of Grimshaw]) compared to men (ranging from 6.0% [Clear Hills County] to 17.1% [Northern Sunrise County and MD of Smoky River No. 130]). This pattern is reflected provincially as well (21.3% and 14.9%, respectively). The majority of men's college attainment level is below the provincial average, whereas women surpass the provincial average.

Similarly, women have higher rates of attaining a bachelor's degree or higher (ranging from 5.1% [Clear Hills County] to 18.9% [Town of Peace River]) compared to men (ranging from 2.0% [Clear Hills County] to 14.4% [Town of Peace River]). This trend is consistent with the province as there is a higher percentage of women compared to men with bachelor's degree or higher education (27.8% and 23.4%, respectively). The men and women in the region are less likely to pursue a bachelor's degree or higher-level education, with rates of attainment well below the provincial averages.

5.6.3 Health

Alberta is divided into seven regional health corridors and the municipalities are located within the Northwest corridor (GOA 2025a). Prior to November 2024, the region was organized as health care zones and the municipalities were located within the North Zone. The North Zone was further divided into Local Geographic Areas (LGA), in which the Project site fell within the Peace River LGA. Healthcare information is provided for the Peace River LGA for the 2020/2021 years as more recent information is not available. Community level health data for the Indigenous communities is not available as the data is only available at the provincial or national level.

The social determinants of health are the range of personal, social, economic, and environmental factors that determine individual and population health. The main determinants of health include income and social status; employment and working conditions; education and literacy; childhood experiences; physical environments; social supports and coping and skills; healthy behaviours; access to health services; biology and genetic endowment; gender; culture; and race/racism (GOC 2025). For Indigenous Peoples in Canada, the social determinants of health cause widespread negative effects on physical, mental, and community well-being (CAP Department of Research 2025). These determinants include federal policies that impose socio-economic disparities, intergenerational trauma from residential schools, modern colonialism that perpetuates disparities via child welfare and criminal justice systems, and structural determinants that shape health outcomes.

Health inequalities for Indigenous populations are also often underestimated due to a lack of disaggregated identity data collection. Data on health for Indigenous Peoples will be discussed in greater detail for the Impact Assessment. Data at the provincial level is provided for context, however not available publicly at the level of each Indigenous Nation or geographical region. Indigenous Peoples in Alberta are impacted more by cancers caused by infectious agents (viruses and bacteria) compared to non-Indigenous Peoples. These cancers include cervical, liver, and stomach (AFNIGC 2023). Life expectancy for Indigenous men and women in Alberta have fallen in recent years from 2015 to 2021, falling from 67 to 60 years for Indigenous men and 73 to 66 years for Indigenous women (APTN 2023). By 2023, the average life expectancy for Indigenous Albertans was 62.8 years, compared to 81.9 years for non-Indigenous Albertans. Contributors to this difference are the disproportionate effects of COVID-19 harms and opioid deaths on Indigenous Albertans (Statistics Canada 2024a). The mortality rate was 4.5 times higher for Indigenous

Peoples in Canada compared to the general population, and rates of unintentional opioid poisoning deaths are over eight times higher among Indigenous Albertans than non-Indigenous Albertans (AFNIGC 2024).

In 2020, hypertension was the most common chronic disease in the Peace River LGA, with a prevalence rate of 21.4 per 100 population, closely matching the provincial rate of 20.6 (GOA 2022). This was followed by diabetes (8.7), ischemic heart disease (4.9), and chronic obstructive pulmonary disease (4.0%), all of which had higher rates than the provincial rates of 8.3, 4.0, and 2.9, respectively. The Peace River LGA reported higher mortality rates per 100,000 population for all causes of death compared to the provincial average (973.8 vs. 700.3). The primary causes of death were neoplasms, diseases of the circulatory system, and external causes (injury), with rates of 260.9, 251.6, and 124.0, respectively, all exceeding the provincial rates of 178.2, 191.1, and 57.1. Between 2011 to 2020, the Peace River LGA reported a life expectancy of 78.0 years compared to provincial rate of 81.7 years.

5.6.4 Infrastructure and Services

5.6.4.1 Infrastructure

The Town of Manning, located in the County of Northern Lights, operates a Regional Water Treatment Plant with reservoirs to the west and north of the town (Town of Manning 2025a). Water is sourced from the Notikewin River, the River Pump House, West Reservoir, and North Reservoir. In 2017, the facility supplied a daily maximum of 2058 m^3 with an average of 1165 m^3 of water for treatment. Additionally, the Town of Manning has a wastewater collection and treatment system handling 2261 m^3 of sewage daily, with a 68,440 m^3 retention capacity over 30 days. The MD of Peace No. 135 encompasses five water cooperatives: Shaftesbury Water Co-op (connected to Peace River's supply), Weberville Water Co-op, East Grimshaw Water Co-op, West Grimshaw Water Co-op, and Griffin Creek Water (MD of Peace River 2025a). Other regions, such as the MD of Fairview, Birch Hills County, Northern Sunrise County, and MD of Smoky River No. 130, also provide water and sewer services to their own jurisdictions (MD of Fairview 2025; Birch Hills County 2025; Northern Sunrise County 2025a; MD of Smoky River 2025).

5.6.4.2 Health Services

The region has five health facilities located in the Town of Peace River, Town of Grimshaw, Town of McLennan in MD of Smoky River No. 130, Town of Fairview, and Town of Manning in the County of Northern Lights (AHS 2025a). These facilities provide Community Health Services, Emergency Departments, Hospitals, Primary Care Networks, Addiction and Mental Health Services, and Continuing Care. The Town of Peace River offers all these services and is the only facility in the region with a Cancer Care Centre. Grande Prairie also has similar health facilities providing the same services.

Services specific to Indigenous Peoples are offered through Indigenous Wellness Core programs in the Town of Peace River and Town of McLennan (AHS 2025b). Indigenous Wellness Core program

partners with Indigenous Peoples and communities in providing accessible and culturally appropriate services for First Nations, Métis, and Inuit Peoples. The program aims to support cultural awareness and sensitivity, helps patient navigate through the healthcare system, provides referrals to addiction and mental health supports, and monitors the health of the Indigenous population in northern Alberta. In addition, the program can support Indigenous patients and families throughout their hospital stay, connect to health services and programs in their home communities, and work with communities to create partnerships in aspects of public health and chronic disease management.

Information gathered was taken from Indigenous communities' website and publicly available information found in August 2024. The following communities have health centres within their communities: Woodland Cree First Nation (WCFN 2024), Whitefish Lake First Nation (WLFN 2024), Driftpile Cree Nation (DCN 2024), Kapawe'no First Nation (KFN 2024), Swan River First Nation (SRFN 2024), Sturgeon Lake Cree Nation (SLFN 2024), and Horse Lake First Nation (AHS 2023). Peavine Métis and Gift Lake Métis offer Indigenous Wellness Core programs in their communities in collaboration with Alberta Health Services (AHS 2025b). Some information about health centres in Duncan First Nation, Lubicon Lake First Nation, Loon River First Nation, and Sucker Creek First Nation is available publicly, but it is unclear whether these centres are still operational (Inform Alberta 2024). There is no information available for any health centres within the Sawridge First Nation.

Health centres in Indigenous communities may offer health counselling, education, and treatment (Inform Alberta 2024). Depending on the community, there are different services available which may include promotion of healthy living, illness prevention, immunization, hearing and vision assessment, caring for seniors, home visits for postnatal surgery, counselling and treatment for sexually transmitted infections, referrals to other health professionals, pregnancy testing and birth control counselling, as well as offering health education programs in schools.

5.6.4.3 Emergency and Protective Services

The County of Northern Lights has a regional fire hall located in the Town of Manning. The service area reaches from the Town of Manning to north to the Keg River, east to the Peace River, west to the British Columbia and Alberta border, and south to Dixonville (Town of Manning 2025b). The fire coverage area is about 2,800 km^2 while the rescue coverage area is about 19,000 km^2. The MD of Peace River No. 135 has fire halls and equipment in hamlets of Brownvale, Berwyn, and Strong Creek (MD of Peace River 2025b).

The County of Northern Lights and Town Manning has also established a Municipal Emergency Management Agency and Disaster Services Joint Agency. Both agencies develop and execute municipal programs to prepare and respond to emergencies and disasters (Town of Manning 2025b). Clear Hills County partners with Alberta Health Services for Emergency Medical Services (EMS). EMS provides ambulance services in the Clear Hills County and its surrounding areas, reaching up to the border of Alberta and British Columbia, Dunvegan River, and to the edge of MD of Fairview, Worsley and Cleardale (Clear Hills County 2025).

Police services are operated by Royal Canadian Mounted Police (RCMP) in the region (Town of Manning 2025b; MD of Peace River 2025b; Clear Hills County 2025).

5.6.4.4 Transportation

The County of Northern Lights, the MD of Peace No. 135, and the Town of Peace River are connected to outlying communities by a series of provincial highways(Figure 5.6-2). Highway 35 runs north-south in through the County of Northern Lights and the Town of Manning to the Town of Grimshaw in the MD of Peace No. 135. East of Grimshaw, Highway 2A leads to the Town of Peace River, the largest centre in the region. In Northern Sunrise County, Highway 2 runs north-south from the Town of Peace River to the MD of Smoky River No. 130, where it becomes Highway 49. Highway 2, west of Grimshaw, leads west into the Town of Fairview in MD No. 136, where it ties into Highway 64, which then runs north and west in the Clear Hills County. Access to Birch Hills County is primarily by Highway 49 and Secondary Highway 740. Canadian National (CN) Railway also connects the region through railways and stations in the Town of Falher, Town of Peace River, and Town of Manning, which further connect to the northern and southern areas of the region (CN 2025). Access to the Project site is provided from Highway 743, which runs north-south, immediately west of the Town of Peace River.

The County of Northern Lights owns and operates its airport (Manning Municipal Airport), located north of the Town of Manning. The presence of a modern air terminal provides an efficient service for passenger flights. The airport underwent a redevelopment in 2006, adding three new aircraft taxiways and an asphalt section that optimized the area for parking of smaller aircraft and facilitating aircraft movement (County of Northern Lights 2025). Additionally, the region has the Spirit River Airport, primarily used for medical services, dusting applications, and general aviation activities (Spirit River 2025). Furthermore, the Grande Prairie Airport offers direct flights to Calgary and Edmonton (Grande Prairie Airport 2024).

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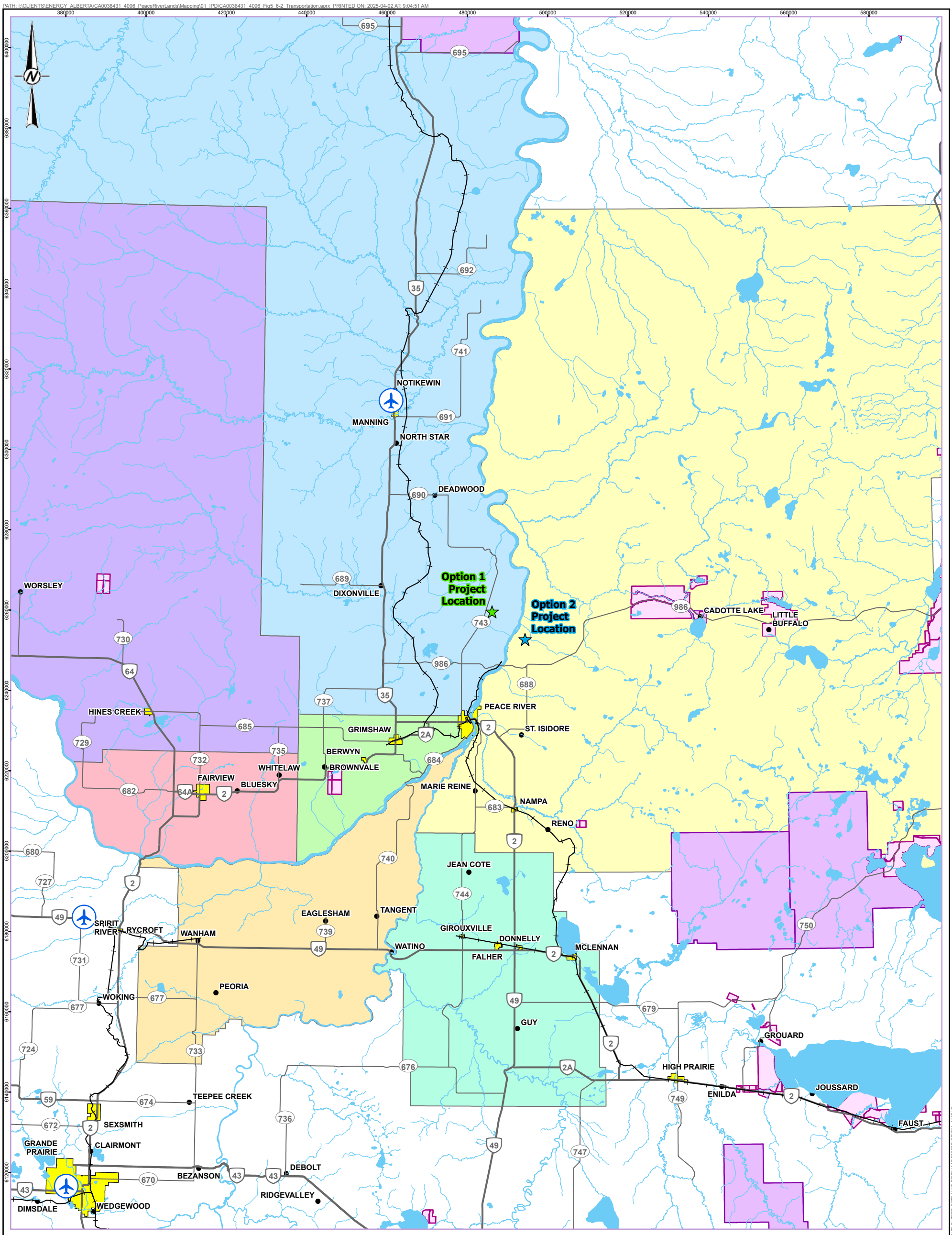

LEGEND

- AIRPORT
- HAMLET
- OPTION 1 PROJECT LOCATION
- OPTION 2 PROJECT LOCATION
- PRIMARY HIGHWAY
- SECONDARY HIGHWAY
- RAILROAD
- WATERCOURSE
- INDIGENOUS RESERVE
- METIS SETTLEMENT
- POPULATED PLACE
- WATERBODY

MUNICIPAL DISTRICT BOUNDARY

- BIRCH HILLS COUNTY
- CLEAR HILLS COUNTY
- COUNTY OF NORTHERN LIGHTS
- MUNICIPAL DISTRICT OF FAIRVIEW NO. 136
- MUNICIPAL DISTRICT OF PEACE NO. 135
- MUNICIPAL DISTRICT OF SMOKY RIVER NO. 130
- NORTHERN SUNRISE COUNTY

0 20 40
1:900,000 KILOMETRES

NOTE(S)
1. PROJECTED COORDINATE SYSTEM: NAD 1983 UTM ZONE 11N

REFERENCE(S)
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CLIENT
ENERGY ALBERTA

PROJECT
PEACE RIVER NUCLEAR POWER PROJECT

TITLE
TRANSPORTATION OF PROJECT SITE

CONSULTANT
wsp

YYYY-MM-DD	2025-04-02
DESIGNED	MS
PREPARED	KW
REVIEWED	CB
APPROVED	MM

PROJECT NO. CA0038431.4096 | CONTROL | REV. 0 | FIGURE 5.6-2

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5.6.5 Economy

Agriculture, forestry, hunting, and fishing make up the majority of the economic base of the region, well above the provincial average (2.8%) (Statistics Canada 2022a). In addition, the region has several well-developed secondary industry bases, contributing uniquely to the overall economy. For instance, the economy of County of Northern Lights is driven by industries such as forestry, agriculture, oil and gas, and resource extraction. The county hosts a lumber mill, oil and gas plants, a pulp mill, transportation services, oilfield services, and industrial storage facilities. It is a contributor to the industry, generating over $27 billion annually and accounting for 36% of Alberta's natural gas production and 50% of its crude oil production (County of Northern Lights 2024).

Agriculture is also the main economic base in MD of Peace No. 135. Its total farmland is 92,488 ha of which most area is used for grain farming, mixed farming, game farming, cattle farming, and beekeeping. There is also an expanding volume of oil and gas activity in the area (MD of Peace River 2025b).

Northern Sunrise County's economy is similarly based on oil and gas, forestry, agriculture, and tourism (Northern Sunrise County 2025b). The county is home to the Peace Oil Sands, one of Alberta's four major deposits, containing 130 billion barrels of bitumen. Forestry is a key industry, with active forest management practices in place to maintain healthy forest regeneration. The county has four forest management agreements and thousands of acres of timber, attracting businesses like Boucher Bros. Ltd sawmills and other logging and service companies. Additionally, Northern Sunrise County boasts over 21,000 km^2 of agricultural land, a grain terminal with a capacity of 44.5 metric tons, and direct access to the CN Railway. Tourism is also promoted, with nearly 24 hours of daylight during the summer months, ideal for camping, fishing, wildlife watching, and other outdoor activities.

The MD of Smoky River No. 130 and the Town of Falher are two of the five members of the Smoky River Region. The Smoky River Regional Economic Development's key industries include agriculture, apiculture, and transportation services. In 2016, the MD of Smoky River No. 130 had 289 farm families cultivating a total of 545,973 acres (Smoky River Regional Economic Development 2024). Due to the extensive farmable land, the region hosts the Smoky Applied Research Development Association, which conducts research and provides recommendations to promote sustainable agricultural production. Apiculture is another prevalent economic base in the Smoky River Region with 3.75 million pounds of honey produced each year. Additionally, the highways intersecting the Smoky River Region offer routes to major provincial centres, and the presence of the CN Railway yard depot enhances the region's transportation capabilities.

Clear Hills County also has agriculture and oil and gas as their economic base (GOA 2024g). Similarly, agriculture is a key industry in other municipalities like the MD of Fairview No. 136, Clear Hills County, and Birch Hills County. This is evidenced by their establishment of Agricultural Service Boards, which aim to support and strengthen the local agricultural sector.

5.6.6 Labour Force

Reflecting the region's diverse labour force in 2021, the industries of agriculture, forestry, fishing, and hunting employed a prominent portion of the workforce across most municipalities, ranging from 3.3% (Town of Grimshaw) to 50.0% (Birch Hills County), which is above the provincial average of 2.8% (Statistics Canada 2022a). The Town of Peace River was an exception, reporting a slightly lower employment rate in the agricultural, forestry, fishing, and hunting industries at 2.6%. The health care and social assistance industry emerged as the next largest employer, employing between 3.6% (Birch Hills County) and 17.3% (Town of Fairview) of the populations within their municipalities. The third largest industry is the retail trade industry, which accounted for employment rates ranging from 3.2% (MD of Smokey River No. 130) to 15.9% (Town of Peace River). The construction industry is also prominent, which accounted for 4.3% (Town of Falher) to 13.8% (Town of Grimshaw) of total employment across all municipalities.

In 2021, the labour force from the municipalities ranged from 475 to 3,690. The participation rates in the municipalities ranges from 57.0% (Birch Hills County) to 72.7% (MD of Smoky River No. 130). The majority of the region has participation rates below the provincial participation rate range of 68.0% (Statistics Canada 2022a). Similarly, the employment rate in the municipalities ranges from 56.0% (Birch Hills County) to 68% (MD of Smoky River No. 130), with Alberta around the middle range of 60.2%. The unemployment rates are close, if not, lower in the majority of the municipalities compared to the provincial unemployment rate of 11.5% in 2021. By 2023, the provincial rate had settled to 5.9% (Statistics Canada 2024b)[7].

Men had higher participation in the labour force compared to women. The participation rate is higher for men (61.1% [Birch Hills County] to 79.9% [Clear Hills County] compared to women in most of the region except the Town of Falher (64.9% for men and 67.6% for women) (Statistics Canada 2022a). In more than half of the region, men's participation rates fall below the provincial average (72.6%). This pattern is similar with women, where most of the region fall below the provincial average (63.5%). The unemployment rate is lower for men (0.0% [Birch Hills County] to 14.7% [Clear Hills County]) compared to women (0.0% [Birch Hills County] to 11.6% [MD of Peace No. 135]) in most of the region, with the exception of Northern Sunrise County (7.6% for men and 4.1% for women), Town of Peace River (8.1% for men and 7.5% for women), and Town of Falher (12.5% for men and 10.9% for women). In most of the region, men's unemployment rates are below the provincial average (11.4%), except the Town of Grimshaw (14.7%) and Town of Falher (12.5%). In contrast, with women, all municipalities have lower unemployment rates than the provincial average in 2021 (11.7%). In 2023, the provincial unemployment rates have dropped to 6.0% for men and 5.8% for women (Statistics Canada 2024b)[8]. In 2020, the median income and average income in the majority of municipalities was below the provincial median ($41,600) and average ($60,850) (Statistics Canada 2022a). The Town of Grimshaw and Town of Peace River have only slightly higher median income

[7] The 2023 unemployment rates for the municipalities in the region are not publicly available but will be updated in the EA.

[8] The 2023 unemployment rates for the municipalities in the region are not publicly available but will be updated in the EA.

($45,200 and $43,600, respectively) than the provincial median income ($41,600), while the rest of the municipalities have lower median incomes. The Northern Sunrise County reports the highest average income with $63,100, slightly higher than the provincial average of $60,850, whereas the Town of Peace River matched the provincial average. The economy of Northern Sunrise County is built by the province's strongest economic drivers: oil and gas, forestry, agriculture, and tourism (Northern Sunrise County 2025b). This economic foundation likely contributes to Northern Sunrise County having the highest average income, surpassing the provincial average. The average incomes in the other municipalities were lower, between $53,300 (County of Northern Lights and MD of Peace No. 135) and $57,200 (MD of Smoky River No. 130).

In 2020, men earned more than women, but both genders had incomes below the provincial average (Statistics Canada 2022a). In most of the region, men have lower median employment income ($27,600 [Clear Hills County] to $50,000 [Town of Fairview]) compared to the province ($51,600), with exception of Town of Grimshaw (($63,600), Town of Peace River ($59,200) and Town of Falher ($53,600). The median income of women ($14,500 [Clear Hills County] to $32,800 [Town of Peace River]) in all of the region falls behind the provincial average ($33,600). For all of the regions, men have higher median income compared to women. Men also have lower average income ($45,800 [Clear Hills County] to $67,000 [MD of Smoky River No. 130]) compared to the provincial average ($72,700), with exception of Northern Sunrise County ($76,600) and Town of Peace River ($73,000). The average income of women ($29,950 [Clear Hills County] to $48,400 [Town of Peace River]) also falls behind the provincial average ($49,160). For all of the regions, men have higher average income compared to women.

6 PART E – FEDERAL, PROVINCIAL, TERRITORIAL, AND MUNICIPAL INVOLVEMENT AND EFFECTS

6.1 Federal Funding

The Project is currently receiving funding from the Government of Canada through the Natural Resources Canada (NRCan) Electricity Pre-Development Program. This program is expected to continue to provide funding during the pre-development phase of work for the Project. There is potential for future federal funding, but this has not been confirmed at this time.

6.2 Federal Lands

The Project will be constructed on lands owned by Energy Alberta. There will be no federal lands used for the purpose of carrying out the Project.

6.3 Federal, Provincial, and Municipal Jurisdictional Requirements

A number of agencies and regulators potentially have powers, duties, or functions in relation to the assessment of the Project's potential environmental impacts. Specific legislation and regulations are listed, as applicable. Energy Alberta will confirm any approval requirements with these agencies and regulators in the future.

6.3.1 Federal Requirements

Under the *Nuclear Safety and Control Act*, nuclear power facilities are federally regulated by the CNSC requiring each phase of the facility's lifecycle to be licensed. In accordance with the IAA, the construction and operation of a Class IA nuclear facility, as well as facilities for the storage and disposal of nuclear waste, constitutes a "designated project" as described in subsection 27(b) of the Physical Activities Regulations". The CNSC and IAAC will collaborate in completing an Impact Assessment. The following outline the federal legislation and regulations known to have applicability to the Project.

- CNSC
  - Nuclear Safety and Control Act
  - General Nuclear Safety and Control Regulations
  - Nuclear Non-Proliferation Import and Export Control Regulations
  - Safeguards Regulations
  - Radiation Protection Regulations
  - Class I Nuclear Facilities Regulations
  - Packaging and Transport of Nuclear Substances Regulations, 2015
  - Nuclear Security Regulations

- Canadian Nuclear Safety Commission Cost Recovery Fees Regulations
- Canadian Nuclear Safety Commission Rules of Procedures (GOC 2000b)
- Canadian Nuclear Safety Commission By-Laws (GOC 2000a)

- Impact Assessment Agency of Canada
  - *Impact Assessment Act*
- Other federal agencies legislation and regulations
  - Fisheries and Oceans Canada
    - *Fisheries Act*
  - Environment and Climate Change Canada
    - *Strategic Assessment of Climate Change (ECCC 2020a)*
    - *Canadian Environmental Protection Act*
    - *Species at Risk Act*
    - *Migratory Birds Convention Act, 1994*
    - *Migratory Birds Regulations*
  - Parks Canada
  - Indigenous Services Canada
  - Women and Gender Equality Canada
  - Natural Resource Canada
    - *Explosives Act (to be determined)*
  - Health Canada
  - Transportation Canada
    - *Aeronautics Act*
    - *Canadian Navigable Waters Act*

6.3.2 Provincial and Local Government Requirements

The need for Environmental Assessments (EAs) in Alberta is determined by Alberta's *Environmental Protection and Enhancement Act*. The EA (Mandatory and Exempted Activities) Regulation defines which activities are mandatory (Schedule 1) and will require an EA report, or which activities are excluded (Schedule 2) and do not require one. According to the EA (Mandatory and Exempted Activities) Regulation, the Project is listed as 'mandatory' under item (k) in Schedule 1 and will require an EA report. More specifically, Schedule 1 provides:

> "*The construction, operation or reclamation of…*
>
> *(*k) a thermal electrical power generating plant that uses non-gaseous fuel and has a capacity of 100 megawatts or greater;"

The following provincial agencies and regulators potentially have powers, duties, or functions in relation to the assessment of the Project's potential environmental effects. Specific legislation and regulations are listed, as applicable. Energy Alberta will confirm any approval requirements with these agencies and regulators in the future.

- Alberta Environment and Protected Areas
  - *Environmental Protection and Enhancement Act*
  - *Water Act*
  - *Alberta Wetland Policy (GOA 2013)*
  - *Wildlife Act*
  - *Fisheries (Alberta) Act*
  - *Weed Control Act*
  - *Weed Control Act Regulation*
  - *Public Lands Act*
  - *Environmental Assessment (Mandatory and Exempted Activities) Regulation*
  - *Activities Designation Regulation*
- Alberta Arts, Culture and Status of Women
  - *Historical Resources Act*
- Alberta Utilities Commission
  - *Hydro and Electric Energy Act*

- Alberta Aboriginal Consultation Office
- Alberta Transportation and Economic Corridors
- Alberta Emergency and Disaster Planning
  - *Emergency Management Act*
- Alberta Jobs, Economy and Trade
  - *Occupational Health and Safety Act*
  - *Occupational Health and Safety Regulation*
  - *Occupational Health and Safety Code (GOA 2024f)*

There are currently no known impact assessment requirements for local governments.

7 PART F – POTENTIAL EFFECTS OF THE PROJECT

The objectives of this section are to present a summary of the potential key environmental areas of concern, and to link these to the pathways through which Project components and activities can potentially impact the environment (i.e., biophysical and socio-economics), including:

- effects related to federal legislation
- potential changes to the environmental on lands outside of Alberta and Canada
- potential impacts to Indigenous communities
- potential impacts to Indigenous community health, social and economics
- potential impact to other components of the biophysical and social environment

7.1 Approach to Determining Potential Effects

The Project has the potential to interact and affect the biophysical and socio-economic environments of the region. For an interaction to occur there must be a source (i.e., a Project component, works, or activity) that interacts with biophysical and socio-economic environments (Figure 7.1-1).

Figure 7.1-1: Project-Environment Interactions

The preliminary screening was conducted by reviewing the potential interactions and identifying areas with the potential for concern. This was completed by constructing a Project environment interactions matrix that identified potential interactions among key Project facilities/activities and environmental components (i.e., atmospheric, geological, hydrogeological, surface water, terrestrial, and socio-economic environments, as well as land and resource use) for each planning envelope. Table 7.1-1 provides a preliminary summary of the potential interactions and the pathway for effects with the biophysical and socio-economic environments. The components that are not marked with ✔ in the table are not expected to have an interaction with a key Project components and/or activity.

These interactions are used to guide the design of scientifically robust baseline programs to describe the existing environment and studies to assess environmental impacts. The list of interactions provided is based on current Project information and design detail and it is expected that the interactions and level of detail will evolve during the Project design, engagement and Impact Assessment processes.

Table 7.1-1: Potential Interactions between the Project and the Biophysical and Socio-Economic Environment

Project Phase	Key Project Component/Activity[a]	Atmospheric Environment				Geological and Hydrogeological Environment		Aquatic Environment			Terrestrial Environment				Ambient Radioactivity		Social Environment				
		Air Quality	Climate	Noise	Visual Aesthetics	Geology	Hydrogeology	Hydrology	Surface Water Quality	Fish and Fish Habitat	Terrain and Soils	Vegetation, Riparian and Wetlands	Birds and Migratory Birds	Wildlife and Wildlife Habitat	Human Health	Ecological Health	Cultural and Heritage Resources	Indigenous Land and Resource Use	Other Land and Resource Use	Economy	Community Well-being
Site Preparation and Construction	Land clearing, site preparation, and construction of facilities and infrastructure,	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓
	Site traffic, transportation of personnel and materials to and from the site	✓	✓	✓					✓	✓	✓	✓	✓	✓				✓	✓	✓	✓
	Construction of buildings and infrastructure, including piles and foundations	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓				✓	✓	✓	✓
	Installation of services and utilities onsite	✓	✓	✓					✓	✓	✓	✓	✓	✓				✓	✓	✓	✓
	Management and storage of conventional, hazardous and low-level radioactive waste	✓	✓	✓					✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
	Onsite fabrication of concrete, structural steel, piping, tubing, and conduits, and supporting components	✓	✓	✓					✓	✓	✓	✓	✓	✓				✓	✓	✓	✓
	Operation of site preparation and construction equipment	✓	✓	✓					✓	✓	✓	✓	✓	✓				✓	✓	✓	✓
	Excavations, horizontal and/or vertical tunnelling for the reactor building	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓
	Onsite and offsite road development or improvements	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓
	Water intake and discharge infrastructure							✓	✓	✓		✓	✓	✓			✓	✓	✓		✓
	Installation of turbine generators	✓	✓	✓	✓						✓	✓	✓	✓				✓	✓	✓	✓
	Construction and operation of water management systems	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓
	Installation of security infrastructure	✓	✓	✓							✓	✓	✓	✓				✓	✓	✓	✓

Table 7.1-1: Potential Interactions between the Project and the Biophysical and Socio-Economic Environment

Project Phase	Key Project Component/Activity[a]	Atmospheric Environment				Geological and Hydrogeological Environment		Aquatic Environment			Terrestrial Environment				Ambient Radioactivity		Social Environment				
		Air Quality	Climate	Noise	Visual Aesthetics	Geology	Hydrogeology	Hydrology	Surface Water Quality	Fish and Fish Habitat	Terrain and Soils	Vegetation, Riparian and Wetlands	Birds and Migratory Birds	Wildlife and Wildlife Habitat	Human Health	Ecological Health	Cultural and Heritage Resources	Indigenous Land and Resource Use	Other Land and Resource Use	Economy	Community Well-being
Operations	Site traffic, transportation of personnel and materials to and from the site	✓	✓	✓					✓	✓	✓	✓	✓	✓				✓	✓	✓	✓
	Nuclear commissioning and reactor operation	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓				✓	✓	✓	✓
	Management of conventional, hazardous and nuclear waste	✓							✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
	Operation of water management systems (e.g., ditches, storm ponds, drainages)							✓	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓
	Operation of cooling system infrastructure	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓
	Water treatment and discharge	✓	✓					✓	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓
	Power generation, including diesel generators and turbines	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓				✓	✓		✓
	Additional infrastructure (e.g., roads, maintenance shops, offices)	✓	✓	✓	✓					✓	✓	✓	✓					✓	✓	✓	✓
	Progressive reclamation	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓
Decommissioning	Site traffic, transportation of personnel and materials to and from the site	✓	✓	✓					✓	✓	✓	✓	✓	✓				✓	✓	✓	✓
	Decommissioning and demolition of site infrastructure	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓
	Storage of radioactive waste	✓							✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
	Transport of radioactive waste to long-term storage/disposal site	✓	✓	✓									✓	✓				✓	✓	✓	✓
	Reclamation and remediation of the site	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓

Notes:
(a) = Project components/activities do not include implementation of environmental design features and/or mitigation measures

✓ = interaction is anticipated (i.e., negative or positive interaction) prior to the implementation of environmental design features and/or mitigation measures; blank = no interaction is anticipated.

7.2 Changes Related to Federal Legislation

The following sections consider changes that, as a result of the Project, may be caused to:

- fish and fish habitat, as defined in subsection 2(1) of the *Fisheries Act*;
- aquatic species, as defined in subsection 2(1) of SARA (marine plants); and
- migratory birds, as defined in subsection 2(1) of the MBCA.

The following provides examples of anticipated interactions and mitigation measures. This list of interactions will be expanded upon through engagement with Indigenous Nations and Communities, the public, and regulators. Environmental design features and mitigation will also require input from Indigenous Nations and Communities, the public, and regulators. The Impact Statement will provide a comprehensive assessment of the potential changes with implementation of environmental design features and mitigations, and monitoring programs to validate the impact assessment predictions.

7.2.1 Fish and Fish Habitat and Aquatic Species at Risk

Fisheries and Oceans Canada (DFO) is responsible for issuing an Authorization under Section 35(2) of the *Fisheries Act* and Species at Risk Permit as defined in subsection 2(1) of SARA, if required. The *Fisheries Act* provides legal protection of fish and fish habitat in Canada. Section 34.4(1) of the *Fisheries Act* prohibits causing the death of fish by means other than fishing and Section 35(1) states that no person shall carry on any work, undertaking, or activity that results in harmful alteration, disruption, or destruction (HADD) of fish habitat. Any Project work below the high-water mark of a water body that has the potential to cause the death of fish (other than fishing) and/or results in the HADD of fish habitat that does not fall under the DFO codes of practice requires review by DFO.

Subject to certain exceptions, Section 36(3) of the federal *Fisheries Act* prohibits any person from depositing or permitting the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance may enter such water. Section 38(6) imposes a duty to minimize any adverse effects that result, or may reasonably be expected to result, from the unlawful deposit of a deleterious substance. Under Section 38(5) every person shall notify an inspector of the unlawful deposit of a deleterious substance, without delay. Any death of fish or HADD must be authorized by DFO to avoid the contravention of Sections 34.4(1) and 35(1) of the federal *Fisheries Act*. Section 34.3(4) of the federal *Fisheries Act* prohibits a person from obstructing free passage of fish.

Review of the DFO Aquatic Species at Risk Map (DFO 2024) did not identify any species at risk or critical habitat in the vicinity of the Project in either Option 1 or Option 2. The unnamed watercourse overlapped by the Project in Option 2 is not considered within the potential range or critical habitat for any federally listed species. The Project is not anticipated to impact aquatic species at risk. The Peace River in the vicinity of the Project is also not considered within the potential range or critical habitat for federally listed species and there is low risk of a species with an Endangered or Threatened designation under SARA to occur within the vicinity of the Project (DFO 2024). Therefore, it is not expected that a permit under SARA will be required to conduct Project activities within the Peace River that could affect an aquatic species at risk.

As part of the conservative approach taken in the Impact Assessment, potential changes are considered prior to mitigation. For this Project is expected that best practices and standard mitigation will prevent changes or reduce the risk of impacts to fish habitat. Examples of potential changes and associated mitigations related to Fish and Fish Habitat and Aquatic Species at Risk are provided in Table 7.2-1.

Table 7.2-1: Potential Changes to Fish and Fish Habitat and Aquatic Species at Risk

Project Phase	Potential Change to the Environment Prior to Mitigation	Standard Mitigation Examples
Site Preparation	■ Land activities may alter stream channels and riparian zones, disrupting fish spawning habitat and habitat connectivity. ■ Land clearing may result in alteration and/or loss of fish habitat from changes to water and sediment quality due to site water run-off and increased erosion. ■ Land clearing may disrupt natural drainage patterns resulting in changes to fish habitat due to decreased flow rates in the Peace River. ■ Operation of site preparation equipment may result in alteration and/or loss of fish habitat from changes to water and sediment quality due to site water run-off and increased erosion. ■ Site traffic and transportation of personnel and materials to site may result in alteration and/or loss of fish habitat from changes to water and sediment quality due to site water run-off and increased erosion. ■ Improper management and storage of conventional and hazardous waste may result in alteration of fish habitat and/or fish mortality due to changes to water and sediment quality.	■ Implement water management systems to control/divert/collect on-site water. ■ To the extent practical, work in sensitive areas (i.e., erosive soils, wetland features, and fish habitats) would be scheduled to avoid periods that may result in high flow volumes and/or increase erosion and sedimentation (e.g., spring freshet). ■ Implement dust suppression techniques such as watering of roads during dry and windy conditions. ■ Conventional and hazardous waste would be managed, stored and disposed of according to federal and provincial regulations.

Table 7.2-1: Potential Changes to Fish and Fish Habitat and Aquatic Species at Risk

Project Phase	Potential Change to the Environment Prior to Mitigation	Standard Mitigation Examples
Construction	■ Construction activities may alter stream channels and riparian zones, disrupting fish spawning habitat and habitat connectivity. ■ Construction activities and road development may disrupt natural drainage patterns resulting in changes to fish habitat due to decreased flow rates in the Peace River. ■ Installation of the water intake infrastructure may result in a loss of fish habitat and/or cause fish mortality. ■ Installation of the water pipeline may result in changes to the stability of the shoreline. ■ Site water run-off and erosion may result in alteration and/or loss of fish habitat from changes to water and sediment quality. ■ Water required for construction may result in changes to fish habitat due to decreased flow and water levels in the Peace River. ■ Site traffic and transportation of personnel and materials to site may result in alteration and/or loss of fish habitat from changes to water and sediment quality due to dust deposition. ■ Construction of buildings and infrastructure, and installation of services and utilities onsite may result in alterations to fish habitat from changes in surface water and sediment quality due to dust deposition. ■ Construction activities such as blasting may result in temporary sensory effects (i.e., noise) and mortality to fish (i.e., vibration). ■ Improper management and storage of conventional and hazardous waste may result in alteration of fish habitat and/or fish mortality due to changes to water and sediment quality.	■ To the extent practical, construct work areas to avoid critical or sensitive habitat (e.g., riparian zones) following best practices and regulatory requirements. ■ Implement DFO's Measures to Avoid Causing Harm to Fish and Fish Habitat (DFO 2019b) to minimize potential effects on aquatic resources. ■ Erosion and sediment control measures would be installed, inspected and properly maintenance. ■ Implement water management systems to control/divert/collect on-site water. ■ Water intakes or pumps will be appropriately designed and installed to prevent entrainment or impingement of fish. ■ Implement dust suppression techniques such as watering of roads during dry and windy conditions. ■ Limit vehicle speed on unpaved site roads to reduce fugitive dust. ■ Follow DFO's Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters for setback distances. ■ Conventional and hazardous waste would be managed, stored and disposed of according to federal and provincial regulations.

Table 7.2-1: Potential Changes to Fish and Fish Habitat and Aquatic Species at Risk

Project Phase	Potential Change to the Environment Prior to Mitigation	Standard Mitigation Examples
Operations	■ Site water run-off and erosion may result in alteration and/or loss of fish habitat from changes to water and sediment quality. ■ The operation of water treatment facilities and the management of wastewater and site water runoff can influence hydrological processes, including water quantity and flow dynamics, and therefore, affect fish and fish habitat. ■ Water required for operations (e.g., mechanical draft cooling) may result in changes to fish habitat due to decreased flow and water levels in the Peace River. ■ Changes in water temperature and quality resulting from the operation of the nuclear facility can impact habitat quality and fish health. ■ Site traffic and transportation of personnel and materials to site may result in alteration and/or loss of fish habitat from changes to water and sediment quality due to dust deposition. ■ Improper management and storage of conventional and hazardous waste may result in alteration of fish habitat and/or fish mortality due to changes to water and sediment quality.	■ Erosion and sediment control measures would be installed, inspected and properly maintenance. ■ Recycle and reuse process water to reduce freshwater intake from the Peace River to the extent practical. ■ Maintain site drainage and water containment and conveyance structures on site. ■ Wastewater will be treated and tested before being discharged to the environment. ■ Implement progressive reclamation and revegetation of disturbed areas no longer required. ■ Implement dust suppression techniques such as watering of roads during dry and windy conditions. ■ Conventional and hazardous waste would be managed, stored and disposed of according to federal and provincial regulations.
Decommissioning	■ Operation of equipment may result in alteration and/or loss of fish habitat from changes to water and sediment quality due to site water run-off and increased erosion.	■ Develop and implement a Preliminary Decommissioning Plan. ■ All construction/demolition materials will be removed from the site once work is complete. ■ Disturbed areas will be reclaimed and revegetated. ■ Post-closure inspections and monitoring will be completed.

7.2.2 Migratory Birds

The MBCA protects migratory birds by protecting their nests and individuals of the species. The MBCA applies to most migratory birds. Birds that are not protected under the MBCA are grouse, quail, pheasants, ptarmigan, hawks, owls, eagles, falcons, cormorants, pelicans, crows, common raven (*Corvus corax*), jays, kingfishers, and some species of blackbirds.

The 2022 update to the Migratory Birds Regulations under the MBCA protects the active and inactive nests of 18 species, including pileated woodpecker (*Dryocopus pileatus*). Pileated woodpecker roosting and feeding cavities are not protected under the updated Migratory Birds Regulations. Pileated woodpecker nests require registration through ECCC's Abandoned Nest Registry (GOC 2022a) and confirmation of non-occupancy by any migratory bird over 36 months prior to removal of the tree containing the nest cavity (GOC 2022b).

As part of the conservative approach taken in the Impact Assessment, potential changes are considered prior to mitigation. For this Project is expected that best practices and standard mitigation will prevent changes or reduce the risk of impacts to migratory birds. Examples of potential impacts, and associated mitigations, related to migratory birds is provided in Table 7.2-2.

Table 7.2-2: Potential Changes to Migratory Birds

Project Phase	Potential Change to the Environment Prior to Mitigation	Standard Mitigation Examples
Site Preparation	■ Land clearing may result in loss and/or alteration of soils and vegetation, which can affect the abundance of migratory bird habitat. ■ Vegetation removal may result in the destruction of nests, eggs, and individual migratory birds. ■ Operation of site preparation equipment may result in sensory disturbance (e.g., presence of people, air traffic, lights, dust, smells, noise), which can affect the quality of migratory bird habitat. ■ Site water run-off and erosion may result in changes to the quality of migratory bird habitat. ■ Improper management and storage of conventional and hazardous waste may result in changes to the quality of migratory bird habitat and/or mortality.	■ Optimize the use of cleared areas for Project activity and use existing infrastructure (e.g., roads), where practical. ■ Avoid restricted activity periods, to the extent practical, to limit effects on nesting migratory birds during sensitive time periods. If sensitive periods cannot be avoided, pre-clearing wildlife sweeps will be completed. ■ Implement water management systems to control/divert/collect on-site water. ■ To the extent practical, work in sensitive areas (e.g., erosive soils, wetland features) would be scheduled to avoid periods that may result in high flow volumes and/or increase erosion and sedimentation (e.g., spring freshet). ■ Implement dust suppression techniques such as watering of roads during dry and windy conditions. ■ Conventional and hazardous waste would be managed, stored and disposed of according to federal and provincial regulations.

Table 7.2-2: Potential Changes to Migratory Birds

Project Phase	Potential Change to the Environment Prior to Mitigation	Standard Mitigation Examples
Construction	■ Installation of the water intake infrastructure may result in changes to migratory bird habitat. ■ Water required for construction may result in changes to migratory bird habitat due to decreased flow and water levels in the Peace River. ■ Operation of construction equipment may result in sensory disturbance (e.g., presence of people, air traffic, lights, dust, smells, noise), which can affect the quality of migratory bird habitat. ■ Site water run-off and erosion may result in changes to the quality of migratory bird habitat. ■ Site traffic and transportation of personnel and materials to site may result in increased mortality to migratory birds. ■ Improper management and storage of conventional and hazardous waste may result in changes to the quality of migratory bird habitat and/or mortality.	■ Avoid restricted activity periods, to the extent practical, to limit effects on nesting migratory birds during sensitive time periods. If sensitive periods cannot be avoided, pre-clearing wildlife sweeps will be completed. ■ Use and maintain noise suppression (i.e., mufflers) on vehicles and inspect regularly to make sure they are functioning properly. ■ To the extent practical, work in sensitive areas (e.g., erosive soils, wetland features) would be scheduled to avoid periods that may result in high flow volumes and/or increase erosion and sedimentation (e.g., spring freshet). ■ Limit vehicle speed on unpaved site roads to reduce fugitive dust. ■ Implement water management systems to control/divert/collect on-site water. ■ Implement progressive reclamation and revegetation of disturbed areas no longer required. ■ Conventional and hazardous waste would be managed, stored and disposed of according to federal and provincial regulations.

Table 7.2-2: Potential Changes to Migratory Birds

Project Phase	Potential Change to the Environment Prior to Mitigation	Standard Mitigation Examples
Operation	■ Operational activities may result in sensory disturbance (e.g., presence of people, air traffic, lights, dust, smells, noise), which can affect the quality of migratory bird habitat. ■ The operation of water treatment facilities and the management of wastewater and site water runoff can influence hydrological processes, including water quantity and flow dynamics, and therefore, affect migratory bird habitat. ■ Water required for operations (e.g., mechanical draft cooling) may result in changes to migratory bird habitat due to decreased flow and water levels in the Peace River. ■ Site water run-off and erosion may result in changes to the quality of migratory bird habitat. ■ Improper management and storage of conventional and hazardous waste may result in changes to the quality of migratory bird habitat and/or mortality.	■ Use and maintain noise suppression (i.e., mufflers) on vehicles and inspect regularly to make sure they are functioning properly. ■ Recycle and reuse process water to reduce freshwater intake from the Peace River to the extent practical. ■ Limit vehicle speed on unpaved site roads to reduce fugitive dust. ■ Implement water management systems to control/divert/collect on-site water. ■ Wastewater will be treated and tested before being discharged to the environment. ■ Implement progressive reclamation and revegetation of disturbed areas no longer required. ■ Conventional and hazardous waste would be managed, stored and disposed of according to federal and provincial regulations.
Decommissioning	■ Operation of equipment may result in sensory disturbance (e.g., presence of people, air traffic, lights, dust, smells, noise), which can affect the quality of migratory bird habitat. ■ Site water run-off and erosion may result in changes to the quality of migratory bird habitat.	■ Develop and implement a Preliminary Decommissioning Plan. ■ All construction/demolition materials will be removed from the site once work is complete. ■ Disturbed areas will be reclaimed and revegetated. ■ Post-closure inspections and monitoring will be completed.

7.3 Changes Related to the Biophysical Environment

The biophysical environment includes components such as air quality, groundwater, surface water, terrain and soils, vegetation, and wildlife and wildlife habitat. Table 7.3-1 provides examples of anticipated interactions and mitigation measures with the biophysical environment. This list of interactions will be expanded upon through engagement with Indigenous Nations and Communities, the public, and regulators. Environmental design features and mitigation will also require input from Indigenous Nations and Communities, the public, and regulators. The Impact Statement will provide a comprehensive assessment of the potential changes with implementation of environmental design features and mitigations, and monitoring programs to validate the impact assessment predictions.

Table 7.3-1: Potential Changes to the Biophysical Environment

Project Phase	Potential Change to the Environment Prior to Mitigation	Standard Mitigation Examples
Site Preparation	■ Land clearing may cause: □ increased air quality and fugitive dust emissions, and acoustic levels □ loss and/or alteration of soils and vegetation, and wildlife habitat □ injury or mortality to animals with low mobility (e.g., turtles, denning Burrowing owls) □ introduction and spread of noxious, exotic, and/or invasive plant species ■ Excavation, drilling, and land clearing activities may alter the permeability and flow of groundwater, affecting recharge rates and aquifer storage. ■ Operation of site preparation equipment may cause: □ increased air quality and fugitive dust emissions, and acoustic levels □ sensory disturbance (e.g., presence of people, air traffic, lights, dust, smells, noise) to wildlife and nearby residences ■ Site water run-off and erosion may cause: □ changes in surface water and sediment quality □ loss and/or alteration of soils and vegetation, wetlands and wildlife habitat ■ Improper management and storage of conventional and hazardous waste: □ changes in surface water and sediment quality □ loss and/or alteration of soils and vegetation, and wildlife habitat □ injury or mortality to wildlife	■ Optimize the use of cleared areas for Project activity and use existing infrastructure (e.g., roads), where practical. ■ Implement dust suppression techniques such as watering of roads during dry and windy conditions. ■ Avoid restricted activity periods, to the extent practical, to limit effects on wildlife during sensitive time periods. If sensitive periods cannot be avoided, pre-clearing wildlife sweeps will be completed. ■ To the extent practical, work in sensitive areas (e.g., erosive soils, wetland features) would be scheduled to avoid periods that may result in high flow volumes and/or increase erosion and sedimentation (e.g., spring freshet). ■ Implement water management systems to control/divert/collect on-site water. ■ Conventional and hazardous waste would be managed, stored and disposed of according to federal and provincial regulations.
Construction	■ Installation of the water intake infrastructure may cause: □ loss and/or alteration of riparian and wildlife habitat ■ Operation of construction equipment may cause: □ sensory disturbance (e.g., presence of people, air traffic, lights, dust, smells, noise) to wildlife and nearby residences □ introduction and spread of noxious, exotic, and/or invasive plant species ■ The excavation for the reactor building may require dewatering to lower the water table near the excavation. thereby changing the flow rate of groundwater. ■ Water required for construction may cause: □ changes to water quantity and flow dynamics in the Peace River □ changes to wetlands and riparian areas, and wildlife habitat ■ Site traffic and transportation of personnel and materials to site may cause: □ changes to water, soils, vegetation, and wildlife habitat quality from dust deposition □ increased mortality to wildlife from vehicle collisions ■ Construction activities and road development may cause: □ disruptions to natural drainage patterns and infiltration rates ■ Site water run-off and erosion may cause: □ changes in surface water and sediment quality □ loss and/or alteration of soils and vegetation, and wildlife habitat ■ Improper management and storage of conventional and hazardous waste: □ changes in surface water and sediment quality □ loss and/or alteration of soils and vegetation, and wildlife habitat □ injury or mortality to wildlife	■ Avoid restricted activity periods, to the extent practical, to limit effects on nesting migratory birds during sensitive time periods. If sensitive periods cannot be avoided, pre-clearing wildlife sweeps will be completed. ■ Use and maintain noise suppression (i.e., mufflers) on vehicles and inspect regularly to make sure they are functioning properly. ■ To the extent practical, work in sensitive areas (e.g., erosive soils, wetland features) would be scheduled to avoid periods that may result in high flow volumes and/or increase erosion and sedimentation (e.g., spring freshet). ■ Implement dust suppression techniques such as watering of roads during dry and windy conditions. ■ Limit vehicle speed in accordance with conditions (e.g., wildlife use of road, road conditions, grade, weather, and loads on vehicle). ■ Implement water management systems to control/divert/collect on-site water. ■ If dewatering is required for the excavation of the reactor building, the infiltration water that is pumped out will be treated and tested before being discharged to the environment. ■ Implement progressive reclamation and revegetation of disturbed areas no longer required. ■ Conventional and hazardous waste would be managed, stored and disposed of according to federal and provincial regulations.

Project Phase	Potential Change to the Environment Prior to Mitigation	Standard Mitigation Examples
Operation	■ The operation of water treatment facilities and the management of wastewater and site water runoff may cause: □ changes to the hydrological processes, including water quantity and flow dynamics □ changes to water and sediment quality □ changes to the quality of riparian areas, and wildlife habitat ■ Water required for operations (e.g., mechanical draft cooling) may cause: □ changes to water quantity and flow dynamics in the Peace River □ changes to wetlands and riparian areas, and wildlife habitat ■ Operational activities may cause: □ sensory disturbance (e.g., presence of people, air traffic, lights, dust, smells, noise) to wildlife and nearby residences ■ Site traffic and transportation of personnel and materials to site may cause: □ changes to water, soils, vegetation, and wildlife habitat quality from dust deposition □ increased mortality to wildlife from vehicle collisions ■ Site water run-off and erosion may cause: □ changes in surface water and sediment quality □ loss and/or alteration of soils and vegetation, and wildlife habitat ■ Improper management and storage of conventional and hazardous waste may cause: □ changes in surface water and sediment quality □ loss and/or alteration of soils and vegetation, and wildlife habitat □ injury or mortality to wildlife □ attraction of wildlife to the Project site and increase the potential for human-wildlife interactions	■ Avoid restricted activity periods, to the extent practical, to limit effects on nesting migratory birds during sensitive time periods. If sensitive periods cannot be avoided, pre-clearing wildlife sweeps will be completed. ■ Use and maintain noise suppression (i.e., mufflers) on vehicles and inspect regularly to make sure they are functioning properly. ■ To the extent practical, work in sensitive areas (e.g., erosive soils, wetland features) would be scheduled to avoid periods that may result in high flow volumes and/or increase erosion and sedimentation (e.g., spring freshet). ■ Implement dust suppression techniques such as watering of roads during dry and windy conditions. ■ Limit vehicle speed in accordance with conditions (e.g., wildlife use of road, road conditions, grade, weather, and loads on vehicle). ■ Implement water management systems to control/divert/collect on-site water. ■ Wastewater will be treated and tested before being discharged to the environment. ■ Recycle and reuse process water to reduce freshwater intake from the Peace River to the extent practical. ■ Implement progressive reclamation and revegetation of disturbed areas no longer required. ■ Conventional and hazardous waste would be managed, stored and disposed of according to federal and provincial regulations. ■ Domestic waste (e.g., food) would be collected and stored in wildlife proof containers.
Decommissioning	■ Operation of equipment may result in sensory disturbance (e.g., presence of people, air traffic, lights, dust, smells, noise), which can affect the quality of migratory bird habitat. ■ Site water run-off and erosion may result in changes to the quality of migratory bird habitat.	■ Develop and implement a Preliminary Decommissioning Plan. ■ All construction/demolition materials will be removed from the site once work is complete. ■ Disturbed areas will be reclaimed and revegetated. ■ Post-closure inspections and monitoring will be completed.

7.4 Changes Related to the Socio-Economic Environment

There are many types of potential interactions that could occur between the Project and the broader public community, including Indigenous Nations and Communities. Population change from Project employment opportunities can place strain on services and pressure on community infrastructure, even if a portion of the population influx is temporary. Given that the Project will be situated in an environment of small rural towns and communities, and requires a sizable construction and operations workforce, Project interactions with socio-economic components are expected. These include the interactions related to the health, social, and economic context, including public health impacts, community well-being, access to services, healthcare infrastructure, employment opportunities, income distribution, housing affordability, economic sustainability, environmental factors, and social equity. Completion of the IS will provide a comprehensive review of the expected interactions including an assessment of both the positive and negative effects. Measures to maximize positive effects and minimize and manage negative socio-economic effects will be identified in the IS. Temporary worker's accommodation facilities will most likely be needed and could mitigate some effects typically associated with population influx. However, workers accommodation camps and the presence of a temporary workforce also have the potential to disrupt communities. Locations of workers accommodations, potential impacts and impact management will be discussed with communities through engagement activities.

7.4.1 Health, Social, and Economic Factors

There are considerable potential positive effects on the economy within the region. These activities create employment opportunities for local residents, ranging from skilled labour for construction to specialized technicians for operation and maintenance. Additionally, the demand for goods and services stimulates local businesses, including suppliers of construction materials and heavy equipment rental companies. The influx of workers and increased economic activity can also boost local infrastructure development, such as roads and utilities, further enhancing the region's economy. Furthermore, decommissioning and restoration activities provide ongoing employment opportunities and support local businesses involved in environmental remediation and waste management.

The Project will create job opportunities, stimulating economic growth, and improving livelihoods within the community over multiple decades. Nuclear energy production also provides a reliable and consistent source of electricity, contributing to energy security and reducing dependence on fossil fuels. This transition to clean energy produces minimal GHG emissions, supporting objectives for addressing the influence of climate change and its adverse effects.

Conversely, during construction, an influx of workers could increase demand on housing and services. Construction may also generate noise, dust and vibrations that may affect community quality of life. In addition, operations may cause some members of the community to be less satisfied with living in their community, as an operating reactor may influence their feelings of safety and security. Completion of the IS will provide a comprehensive review of the expected interactions including an assessment of both the positive and negative effects on the health, social, and economic factors in the region.

7.4.2 Recreational Land Use

The Project may have a potential effect on recreational land use that could result from land acquisition, restrictions on activities in close proximity to the facility, and changes to the local landscape. Changes in land use could lead to the decline of recreational opportunities or alterations to existing recreational amenities, influencing the overall recreational experience for local residents and visitors. However, the Project has the potential to positively influence recreational areas by creating employment opportunities and drawing new users to the surrounding area, generating funding for conservation initiatives, and stimulating local economies.

Northern Alberta offers many recreational activities year-round, with diverse opportunities for leisure and enjoyment during both summer and winter seasons. By carefully considering both the challenges and opportunities, the Project has the potential to contribute positively to recreational land use and community well-being. The IS will identify and evaluate potential effects and will build an understanding of the importance of communities' land and water use to support the development of appropriate mitigation plans and activities associated with recreational land use.

7.4.3 Gender-Based Analysis Plus

A Gender-Based Analysis Plus (GBA+) framework will be developed and applied to the Project to align with requirements of the IAA and guidance found in the Practitioner's Guide to Federal Impact Assessments under the IAA (IAAC 2021).

The GBA+ is an analytical process that identities who is impacted by a project and assesses how they may experience impacts differently, in order to develop mitigation measures to address these differential impacts. The guidance refers to diverse population groups within the general population and within communities by sex, gender, age, ethnicity, indigeneity, socio-economic status, health status, and any other community-relevant identity factors.

Canadian research has highlighted the links between resource development projects and risks of gender-based violence and sexual harassment for Indigenous, Métis, and Inuit women in Canada (MMIWG 2019; PIWC 2021). It is standard in social impact assessment to consider how a project may affect different groups that are historically excluded or more vulnerable to a project's adverse effects. GBA+ involves engaging with diverse groups in communities to identify potential impacts and risks and to develop mitigation measures collaboratively.

To support GBA+, socio-economic data collected for the Impact Assessment will be sufficiently disaggregated to support the analysis of disproportionate effects as per GBA+ intersectional approach. Qualitative information, including on equality, diversity and inclusion, and related to gender-based violence, economic participation, discrimination and unfair treatment, will be collected from studies and consultations. Effects will be described based on both data collected and concerns expressed through engagement with Indigenous Nations and Communities. At a minimum, future socio-economic baseline studies will:

- Describe how community members differ in access to resources, opportunities and services;
- Describe how diverse groups could experience more negative effects or receive fewer benefits related to the Project;
- Describe mitigation and enhancement measures to address differential impacts; and
- Describe management plans to support protected communities and vulnerable members as part of the Impact Assessment.

7.5 Federal Lands or Lands Outside of Alberta

The Project is located in Alberta and no changes to the environment, in another province, or outside of Canada, or on federal lands are anticipated. The Project is located along the Peace River, which is part of the Great Slave Lake Drainage system and flows through Alberta to the Northwest Territories. Potential impacts will be further assessed in the IS.

7.6 Impacts to Indigenous Peoples

Potential impacts to the environment can be intricately linked to potential impacts to Indigenous and Treaty Rights and way of life, specifically those social or environmental changes that may alter the physical and cultural ways that Indigenous Nations and Communities interact with and relate to the environment.

The potential impacts on Indigenous Nations and Communities, encompassing physical and cultural heritage, current land and resource use for traditional purposes, and the significance of any historical, archaeological, paleontological, or architectural elements, is currently not available. This information will be provided as soon as it becomes available or is obtained through Indigenous engagement activities, to the extent that Indigenous Nations and Communities are willing to share such information publicly.

7.6.1 Traditional Land and Resource Use

Indigenous Nations and Communities with potential historical land and resource use or interest in the Project are identified in Section 3.2.1.

The majority of the Project site for both Option 1 and Option 2 is located on agricultural land and does not take place on federal Crown lands. Within the immediate area of the Project site,

activities including traffic, lights, and noise can influence the quality of wildlife habitat and wildlife use of the landscape. These changes also have the potential to affect the use of the regional area for hunting, fishing, plant gathering, and other cultural uses. The water use infrastructure for the Project will be within and adjacent to the Peace River and has the potential to cross provincial Crown land with natural vegetative cover. The Impact Assessment will determine if the Project has the potential to result in regional impacts on water quality or quantity, wildlife and fish habitat, landscapes, and other features of the environment that are important to Indigenous use of, and relationship with, the land. Cumulative impacts are expected to be important to potentially affected Indigenous Nations and Communities, as will the continued ability to transfer cultural knowledge to youth.

Energy Alberta is committed to engaging with Indigenous Nations and Communities in the area, including support for community led studies such as TLRU, IK and/or country food studies to fully understand past and present uses of lands and resources.

7.6.2 Cultural Resources

Historic resources are protected in Alberta by the HRA which is administered by ACSW. The Listing of Historic Resources (Listing) identifies lands that contain or are believed to contain historic resources. HRA approval is required for most projects with footprints that overlap with the Listing. Projects that require the completion of an Impact Assessment or require approval by the Canadian Energy Regulator or Alberta Utilities Commission require HRA approval, regardless of the presence of listed lands.

Alberta HRA approval will therefore be required for the Project to attain regulatory approval. This may include the assessment, mitigation, and clearance of archaeological, paleontological, historic, and cultural (traditional use) locations that may be present.

7.7 Impacts to the Health, Social, and Economic Conditions of Indigenous Peoples

Health, social, and some economic impacts on Indigenous communities are often a result of population change in the region driven by economic development. Generally, data in the region of the Project show that the economy is relatively small, not as diversified as the provincial economy, and weighted to primary and resource development sectors. Secondary activities appear closely tied to the primary sector and are directly affected by it. Unemployment rates are slightly lower than for Alberta. Historically, population growth in the region has been relatively modest, seeing declines in most communities. By comparison, Alberta's population grew 3.67% from 2022 to 2023 and 4.41% from 2023 to April 2024.

Indigenous Nations and Communities could be affected by an increase in demand for health services, childcare services and housing, as a result of population change in the region and in Indigenous communities. Costs of consumables could increase with rapid population increase

and resulting increased demand, which can affect food security and health. Temporary workers accommodations can bring new employment and procurement opportunities but also require management planning to limit negative interactions between workers and communities.

In addition, people may have changed perceptions of risk and feelings of personal security and well-being related to the presence of a nuclear facility in proximity to Indigenous Nations and Communities. Over time, and with ongoing engagement with communities, people are expected to become more knowledgeable of nuclear energy generally, and the Project, thus becoming more comfortable living in its vicinity. An operator in Ontario has used independent polling to survey residents and communities neighbouring a nuclear facility on their perceptions of safety. Results of surveys have shown a high percentage of respondents are confident that the nuclear facility is operating safely. The mitigating factors in improving perceptions of nuclear energy are related to providing information on how nuclear energy is regulated in Canada, regular engagement with communities, and providing jobs locally, whereby residents obtain experience working at a nuclear facility and raise awareness of safe operations.

The Project is expected to have a stimulative impact on the region, as employment opportunities are created, and commodities and services are purchased by the Project. Many of the jobs created during construction and operations require skilled personnel and hence offer above average income opportunities for workers. It is expected that in-migration will fill many of the more highly skilled direct positions. However, it should be noted that the 8-to-12-year construction period will allow for substantial training opportunities for local residents and a number of previous out-migrations from the region can be reasonably expected to return, including Indigenous People that have been living off reserve, or in other communities.

Additional work is required to fully predict at both the local and national scale the construction and operations workforce estimates beyond the Canada wide numbers described in the 2024 report by the Conference Board of Canada (CBC 2024). Early estimates of the Project construction workforce is estimated in the order of 5,000 to 6,500 workers at peak. The upper end of this estimate is comprised of 4,600 direct trades, 750 construction support and warehousing, 1,150 non-manual, planning and other support. The full operations workforce of between 2000 and 3000 workers, including indirect contractors. This staffing estimate is based on a typical 2-unit AP1000 project with a 12-month stagger between construction start. Extending this estimate to a 4-unit site will be developed during the course of the Impact Statement investigations.

Expanded regional activity will benefit local residents as economies grow and diversify, both public and private sector services also tend to grow and diversify. However, increased activity levels could put some upward pressure on wages and prices and cause some other disruptions in local markets.

The proponent is committed to engaging with Indigenous Nations and Communities to identify opportunities for employment, contracting, and procurement of goods and services in all stages of Project development, thus resulting in positive economic benefits for Indigenous Nations and Communities. Additionally, the proponent is supportive of economic partnerships with Indigenous Nations and Communities.

7.8 Greenhouse Gas Emission Estimates

Nuclear power emits just a few grams of carbon dioxide (CO_2) equivalent per kilowatt hour (kWh) of electricity produced. Based on the United Nations (UN) Intergovernmental Panel on Climate Change (IPCC) study, this equates to 12g CO_2 equivalent/kWh for nuclear (World Nuclear Association 2024).

The net GHG emissions associated with the Project will be evaluated as part of the Impact Assessment. However, limited information is currently available to estimate GHG emissions for each phase of the Project. As such, expected emission sources, as well as an explanation on how emissions could be estimated for each Project phase, is presented below.

Table 7.8-1 provides a summary of expected emissions sources for each Project phase. This list provides typical emissions sources that may be expected during each phase of the Project; however, it should not be considered exhaustive. Additional emission sources may exist and will be identified (as required) throughout the assessment stage of the Project.

Table 7.8-1: Expected GHG Emission Sources - By Project Stage

Project Stage	Expected GHG Emission Sources
Site Preparation and Construction	■ Land clearing (one-time vegetation loss and annual carbon sink loss); ■ Mobile emission sources (e.g., heavy-duty excavation equipment); and ■ Stationary emission sources (e.g., contractor trailer generators).
Operation	■ Mobile emission sources (e.g., light-duty maintenance truck); ■ Stationary emission sources (e.g., utility emissions such as electricity usage and natural gas); and ■ Facility testing emissions (nuclear and/or non-nuclear).
Decommissioning	■ Mobile emission sources (e.g., heavy-duty demolition equipment); and ■ Stationary emission sources (e.g., contractor trailer generators).

The GHG emissions from the Project during the Site Preparation and Construction, the Operation and Decommissioning phases have been estimated using the U.S. EPA AP-42 emission factors (U.S. EPA 2024), and other source information derived for early plant parameter data. The estimated GHG emissions for the Project during the Site Preparation and Construction phase are provided in Table 7.8-2. GHG emissions expected during this phase including emissions from on-site combustion equipment and on-site roads. The estimated GHG emissions for the Project during the Operations and Maintenance phase are provided in Table 7.8-3.

Note that the site preparation and construction phase timelines given in Section 4.5.1 and the data provided in Table 7.8-2 are very preliminary estimates and subject to change; as such, only two years of site preparation and three years of construction data are included in Table 7.8-2. Additional work as part of the IS will be required to provide a realistic estimate by year total emissions during each phase of the Project.

The estimations provided in the tables are considered over-estimates because they are based on conservative assumptions such as the operating hours for all equipment are continuous and the amount and type of equipment required for construction of each unit is the same. However, it is also assumed that the site preparation and construction equipment used will comply with emissions regulations in place at the time the Project proceeds and will be serviced so that there are no unexpected emission-increasing faults or features. Similarly, the natural gas emergency generators and auxiliary steam boilers will be state-of-the-art equipment and will comply with emissions regulations in place at the time the Project proceeds.

Table 7.8-2: Annual Greenhouse Gas Emissions – Site Preparation and Construction Phase

Source	Emission Rate (tonnes/y)				
	Site Preparation		Construction		
	Year 1	Year 2	Year 3	Year 4	Year 5
Carbon Dioxide (CO_2)					
Parking Lot Tailpipe	31	31	297	297	290
Haul Truck Tailpipe	856	505	614	614	316
Paved Road Tailpipe	138	100	475	475	400
Stationary Equipment	-	1211	1733	1733	523
Non-Road Tailpipe	376	400	586	586	302
Total	1401	2247	3705	3705	1831
Methane (CH_4) – given as equivalent CO_2 values					
Parking Lot Tailpipe	0.1	0.1	0.9	0.9	0.9
Haul Truck Tailpipe	0.4	0.2	0.3	0.3	0.1
Paved Road Tailpipe	0.1	0.1	1.0	1.0	0.9
Stationary Equipment	0.0	1.7	2.4	2.4	0.7
Non-Road Tailpipe	0.2	0.2	0.3	0.3	0.2
Total	**0.8**	**2.3**	**4.8**	**4.8**	**2.8**
Total CO_2 (eq) tonnes	**1402**	**2249**	**3710**	**3710**	**1834**

Table 7.8-3: Annual Greenhouse Gas Emissions – Operation Phase

Source	CO_2 (tonnes/y)	CH_4 (as CO_2 [e])) (tonnes/y)	Total CO_2 (eq) (tonnes/y)
Emergency Power Generator	893	-	**893**
Auxiliary Steam Boiler	1315	0.1	**1315**
On-Site Roads	52	0.0	**52**
Site Total	**2260**	**0.1**	**2260**

The GHG emissions for the Project will be more concisely estimated using methodology consistent with the SACC Draft Technical Guide developed by ECCC (GOC 2021a).

The GHG emissions associated with land-use change will only include CO_2 and methane (CH_4), following the proposed method for estimation. The CO_2 emissions from land-use change include the annual carbon sink loss and the one-time loss of carbon from land clearing activities. The land disturbance emissions during site preparation activities will be calculated using the method described in the 2006 IPCC Volume 4, Chapter 2 (IPCC 2006). The calculation of the total carbon stored annually, and therefore lost with the removal of vegetation, will be calculated based on Equation 2.9 and Equation 2.10 (Tier 1) in Section 2.3.1.1.A of the 2006 IPCC Volume 4, Chapter 2 (IPCC 2006). The CH_4 emissions from annual sink loss will be calculated using Equation 7.12 from Chapter 7 of the IPCC 2019 Refinement to the 2006 IPCC Guidelines for National GHG Inventories (IPCC 2019). This calculation methodology is consistent with methodology provided in the IPCC 2019 Refinement to the 2006 IPCC Guidelines for National GHG Inventories (IPCC 2019) and the Draft Technical Guide Related to the SACC (GOC 2021a).

The GHG emissions associated with construction activity related emissions will consider all mobile and stationary sources associated with construction. Once construction duration, schedule, and the types and number of equipment expected on site is known, construction related emission can be estimated.

The GHG emissions associated with the operations phase will be estimated for the Project. This will include yearly operation emissions and total operation emissions over the operational lifespan of the Project, which will be estimated using the expected energy output of the nuclear power facility. Emissions from decommissioning and safe storage phase are expected to be minimal but will be considered later when more detailed information is available on schedule, duration, and decommissioning activities.

In alignment with the SACC, an upstream GHG assessment will only be conducted if estimated annual emissions exceed the thresholds put forth in Section 5, Table 15 of the SACC ECCC 2020a. However, it is important to note as a proposed non-emitting energy Project, this undertaking would strongly support Canada's strategic energy transition objective and goal of achieving net-zero emissions by 2050. In addition, this proposed Project aligns with the Government of Alberta's Emissions Reduction and Energy Development Plan and will be strategic in Alberta's energy transition and emission reduction aspirations (GOA 2024a). Throughout the assessment stage of this proposed Project, net-missions will be considered against Canada's objective of becoming net-zero by 2050.

7.9 Waste and Emissions

The following section outlines potential waste and emissions that may occur as a result of the Project to the air, in or on water, and in or on land, during any phase of the Project. Emissions and waste management options including handling, disposal, and storage will be further assessed and evaluated in the Impact Assessment.

7.9.1 Atmospheric Emissions

The potential air emissions that may occur as a result of the Project during all phases are listed below. See also Section 7.8.

Site Preparation and Construction: Criteria air contaminants may be released to the atmosphere from construction vehicles and equipment exhaust, fossil fuel power generation, and any explosive used in blasting, including the following:

- oxides of nitrogen (NO_x)
- sulphur dioxide (SO_2)
- carbon monoxide (CO)
- carbon dioxide (CO_2)
- particulate matters (PM) (i.e., total suspended particulates [TSP], particulate matter with a nominal diameter of 10 microns or less [PM_{10}], and particulate matter with a nominal diameter of 2.5 microns or less [$PM_{2.5}$])
- fugitive dust from site preparation and construction activities (e.g., road dust, earth moving activities, crushing, blasting)

Operations: Air emissions that may be emitted during operations may include the following:

- NOx
- SO_2
- CO_2
- PM
- hydrazine
- morpholine
- ammonia
- radiological emissions (typical radioactive materials monitored in terms of atmospheric release from CANDU and AP1000 reactors are tritium, Iodine-131, Carbon-14, noble gases and radioactive particulates)

Decommissioning: The air emissions expected from the Project decommissioning are similar to those from the site preparation and construction, with the addition of radiological emissions (specific radionuclides (primarily Carbon 14 and Tritium) /radionuclide groups dependent upon the chosen reactor technology).

7.9.2 Liquid Effluents

The potential liquid effluents that may occur as a result of the Project during all phases are listed below. These include contaminants of potential concern (COPC) and may be released to the environment through accident or malfunction.

Site Preparation and Construction: The following are typical liquid waste products during site preparation and construction:

- **Concrete Washout**: Water containing cement, sand, and other materials, created as a result of cleaning concrete mixers and tools.
- **Wastewater**: Water that may contain other materials, created as a result from site dewatering, equipment cleaning, run off during weather events, and other construction activities.

In addition, the following may be waste products when there is excess or leftover material after site preparation or construction activity. These are also COPC that may be released to the terrestrial and/or aquatic environment through accident or malfunction of equipment, processes, etc.

- **Coatings and Chemicals**: Liquid substances such as paints, solvents, adhesives, sealants.
- **Drilling Fluid / Mud:** Water, oil, synthetic or polymer-based liquids (e.g., bentonite).
- **Machinery related fuels, oils, lubricants**: Substances such as gasoline, transmission fluids, hydraulic, engine and gear oils, greases, coolants, etc.

- **Agricultural chemicals**: Chemicals such as herbicides (e.g., Glyphosate, 2,4-D), insecticides (e.g., Permethrin, Cypermethrin), rodenticides (e.g., Bromadiolone, Difenacoum) and fungicides (e.g., Chlorothalonil, Mancozeb).

Operations: The following are the typical liquid waste products produced during operation:

- Alum
- Ammonia
- Sodium Hypochlorite
- Wastewater (potable and sanitary)
- Radiological effluents (specific radionuclides/radionuclide groups dependent upon the chosen reactor technology)

In addition, the following liquids are used during operations and may be COPC.

- Machinery related fuels, oils, lubricants: Substances such as gasoline, transmission fluids, hydraulic, engine and gear oils, greases, coolants, etc.
- Equipment related corrosion inhibitors: Substances such as morpholine, hydrazine.
- Other potential waste products/contaminants: Chlorides, sulphates, chromium, copper, total dissolved and suspended solids, liquids containing waste heat.

Decommissioning: Typically, waste products during decommissioning will include those listed in other phases, with addition of process liquids.

7.9.3 Solid Wastes

The potential solid wastes that may occur as a result of the Project during all phases are listed below. These include COPC and may be released to the environment through accident or malfunction.

Site Preparation and Construction: The following are the typical solid waste products produced during site preparation and construction:

- **Concrete**: Broken or leftover concrete.
- **Wood Scraps**: Off-cuts and unused pieces of lumber from framing and other woodwork.
- **Metal Scraps**: Leftover or discarded metal pieces from structural components and fittings including rebar.
- **Drywall and Insulation**: Off-cuts and waste from installing drywall and insulation materials.
- **Plastic Waste**: Materials such as PVC pipes, packaging, and insulation.

Quantities are unknown at this time but is it typical to assume a certain small percentage of the overall quantity of material used for construction will be waste.

Operations: The following are the typical solid waste products produced during operations:

- **Water treatment related:**
  - Spent Filters and Membranes
  - Spent Resin and Activated Carbon
  - Other items like sludge, sand, charcoal
- **Electrical related**: Items such as spent batteries from the power supply distribution system, electronics.
- **Household/domestic waste:** Items like personal protective equipment, packaging materials, maintenance consumables, glass, plastic, metal, cardboard, paper, wood, organics and food wastes (e.g., compost).
- **Radiological waste**: Items classified as low-, intermediate-, and high-level radiological waste.

Decommissioning: In addition to the suitable separated, assayed and packaged spent fuel and radioactive wastes from the decommissioning activities, the following are the typical conventional solid waste products produced during site decommissioning:

- Concrete
- Other general conventional waste safe for landfill or other normal municipal disposal

7.10 Sustainability

The IAA has several provisions that reference sustainability and how it is considered in the Impact Assessment process. One of the purposes of the IAA is to foster sustainability and respect the rights of Indigenous Peoples and to apply the precautionary principle (IAAC 2021, Paragraph 6 (1) (a) and the preamble of the Act and subsection 6(2)).

The Impact Statement will include an analysis of the extent to which the Project contributes to sustainability, either positively or negatively. The analysis will be qualitative but may draw on quantitative data. Engagement with Indigenous Peoples, the public, and other interested parties will be used to develop a framework for the sustainability assessment and to identify sustainability concepts and factors that should be considered based on the values, priorities, and needs of those engaged.

The sustainability framework will provide a clear and transparent process for evaluating the ecological resilience of potentially affected renewable resources as indicators of productive capacity. Project-related impacts identified in the Impact Assessment will be used in the sustainability assessment to determine whether those impacts will have a positive or negative effect on the identified key values and issues. Examples of renewable resources include aquatic systems, water supply, fish species, wetland, timber resources and others. Effects from the biophysical and socio-economic disciplines will be considered in the sustainability assessment as relevant.

8 REFERENCES

8.1 Government Acts and Regulations

Activities Designation Regulation. Alta Reg 276/2003 under the Environmental Protection and Enhancement Act. Current to January 17, 2025. Edmonton AB: Alberta King's Printer. https://kings-printer.alberta.ca/1266.cfm?page=2003_276.cfm&leg_type=Regs&isbncln=9780779850648.

Aeronautics Act. R.S.C., 1985, c. A-2. Last amended December 18, 2018; current to January 22, 2025. Ottawa ON: Minister of Justice. https://laws-lois.justice.gc.ca/eng/acts/a-2/index.html.

Canada-Alberta Memorandum of Understanding (MOU). 2025. Canada-Alberta Memorandum of Understanding | Prime Minister of Canada. [accessed November 27, 2025].

Canadian Environmental Protection Act, 1999. S.C. 1999, c. 33. Last amended December 16, 2024; current to January 22, 2025. Ottawa ON: Minister of Justice. https://laws-lois.justice.gc.ca/eng/acts/c-15.31/FullText.html.

Canadian Navigable Waters Act. R.S.C., 1985, c. N-22. Last amended November 27, 2024; current to January 22, 2025. Ottawa ON: Minister of Justice. https://laws-lois.justice.gc.ca/eng/acts/n-22/.

Canadian Net-Zero Emissions Accountability Act. S.C. 2021, c. 22. Last amended March 31, 2023; current to January 22, 2025. Ottawa ON: Minister of Justice. https://www.laws-lois.justice.gc.ca/eng/acts/C-19.3/index.html.

Canadian Nuclear Safety Commission Cost Recovery Fees Regulations. SOR/2003-212 under the Nuclear Safety and Control Act. Last amended June 12, 2015; current to January 22, 2025. Ottawa ON: Minister of Justice. https://laws-lois.justice.gc.ca/eng/regulations/SOR-2003-212/index.html.

Canadian Nuclear Safety Commission. REGDOC-2.5.2. Design of Reactor Facilities: Nuclear Power Plants. https://www.cnsc-ccsn.gc.ca/eng/acts-and-regulations/regulatory-documents/published/html/regdoc2-5-2/

Canadian Nuclear Safety Commission. REGDOC-2.10.1. Nuclear Emergency Preparedness and Response. https://www.cnsc-ccsn.gc.ca/eng/acts-and-regulations/regulatory-documents/published/html/regdoc2-10-1/

Canadian Standards Association (CSA). N289 Series. https://www.csagroup.org/store/search-results/?search=N289

Class I Nuclear Facilities Regulations. SOR/2000-204 under the Nuclear Safety and Control Act. Last amended September 22, 2017; current to January 22, 2025. Ottawa ON: Minister of Justice. https://laws.justice.gc.ca/eng/regulations/SOR-2000-204/page-1.html.

Environmental Assessment (Mandatory and Exempted Activities) Regulation. Alta Reg 111/1993 under the Environmental Protection and Enhancement Act. Current to February 25, 2025. Edmonton AB: Alberta King's Printer. https://kings-printer.alberta.ca/1266.cfm?page=1993_111.cfm&leg_type=Regs&isbncln=9780779846092&display=html.

Environmental Protection and Enhancement Act. RSA 2000, c E-12. Last amended December 5, 2024; current to December 12, 2024. Edmonton AB: Alberta King's Printer. https://kings-printer.alberta.ca/1266.cfm?page=E12.cfm&leg_type=Acts&isbncln=9780779851249&display=html.

Explosives Act. R.S.C., 1985, c. E-17. Last amended February 26, 2015; current to January 22, 2025. Ottawa ON: Minister of Justice. https://laws-lois.justice.gc.ca/eng/acts/E-17/index.html.

Fisheries Act. R.S.C. 1985, c. F-14. Last amended August 28, 2019; current to June 12, 2023. Ottawa, ON: Minister of Justice. https://laws-lois.justice.gc.ca/eng/acts/f-14/.

Fisheries (Alberta) Act. RSA 2000, c F-16. Last amended December 15, 2022; current to December 15, 2022. Edmonton AB: Alberta King's Printer. https://kings-printer.alberta.ca/1266.cfm?page=F16.cfm&leg_type=Acts&isbncln=9780779839353.

General Nuclear Safety and Control Regulations. SOR/2000-202 under the Nuclear Safety and Control Act. Last amended June 12, 2015; current to January 22, 2025. Ottawa, ON: Minister of Justice. https://laws-lois.justice.gc.ca/eng/regulations/SOR-2000-202/index.html.

Historical Resources Act. RSA 2000, c. H-9. Last amended December 9, 2020; current to November 16, 2022. Edmonton AB: Alberta King's Printer. https://kings-printer.alberta.ca/1266.cfm?page=H09.cfm&leg_type=Acts&isbncln=9780779837267.

Hydro and Electric Energy Act. RSA 2000, c H-16. Last amended December 15, 2022; current to March 6, 2024. Edmonton AB: Alberta King's Printer. https://kings-printer.alberta.ca/1266.cfm?page=H16.cfm&leg_type=Acts&isbncln=9780779846245.

Impact Assessment Act. S.C. 2019, c. 28, s. Last amended November 27, 2024; current to January 22, 2025. Ottawa ON: Minister of Justice. https://www.laws-lois.justice.gc.ca/eng/acts/I-2.75/page-1.html.

Information and Management of Time Limits Regulations. SOR/2019-283 under the Impact Assessment Act. Last amended September 18, 2024; current to January 22, 2025. Ottawa ON: Minister of Justice. https://laws.justice.gc.ca/eng/regulations/SOR-2019-283/index.html.

Migratory Birds Convention Act, 1994. S.C. 1994, c. 22. Last amended December 12, 2017; current to April 1, 2024. Ottawa ON: Minister of Justice. https://laws-lois.justice.gc.ca/eng/acts/m-7.01/.

Migratory Birds Regulations, 2022. SOR/2022-105 under the Migratory Birds Convention Act, 1994. Last amended October 4, 2024; current to January 22, 2024. Ottawa ON: Minister of Justice. https://laws-lois.justice.gc.ca/eng/regulations/SOR-2022-105/index.html.

Nuclear Non-Proliferation Import and Export Control Regulations. SOR/2000-210 under the Nuclear Safety and Control Act. Last amended May 13, 2010; current to January 22, 2025. Ottawa ON: Minister of Justice. https://laws-lois.justice.gc.ca/eng/regulations/sor-2000-210/index.html.

Nuclear Safety and Control Act. S.C. 1997, c.9. Last amended January 1, 2017; current to January 22, 2025. Ottawa ON: Minister of Justice. https://laws-lois.justice.gc.ca/eng/acts/N-28.3/index.html.

Nuclear Security Regulations. SOR/2025-219 under the Nuclear Safety and Control Act.. Ottawa ON: Minister of Justice. https://laws.justice.gc.ca/eng/regulations/SOR-2025-219/index.html

Occupational Health and Safety Act. SA 2020, c. O-2.2. Last amended December 7, 2023; current to December 7, 2023. Edmonton AB: Alberta King's Printer.https://kings-printer.alberta.ca/1266.cfm?page=O02P2.cfm&leg_type=Acts&isbncln=9780779845408.

Occupational Health and Safety Regulation. Alta Reg 184/2021 under the Occupational Health and Safety Act. Current to February 25, 2025. Edmonton AB: Alberta King's Printer. https://kings-printer.alberta.ca/1266.cfm?page=2021_184.cfm&leg_type=Regs&isbncln=9780779826803.

Packaging and Transport of Nuclear Substances Regulations, 2015. SOR/2015-145 under the Nuclear Safety and Control Act. Current to January 22, 2025. Ottawa ON: Minister of Justice. https://laws-lois.justice.gc.ca/eng/regulations/SOR-2015-145/index.html.

Physical Activities Regulations. SOR 2019-285 under the Impact Assessment Act. Last amended March 27, 2023; current to January 22, 2025. Ottawa ON: Minister of Justice. https://laws-lois.justice.gc.ca/eng/regulations/SOR-2019-285/FullText.html.

Public Lands Act. RSA 2000, c P-40. Last amended December 5, 2024; current to December 12, 2024. Edmonton AB: Alberta King's Printer.https://kings-printer.alberta.ca/1266.cfm?page=P40.cfm&leg_type=Acts&isbncln=9780779850778.

Radiation Protection Regulations. SOR/2000-203 under the Nuclear Safety and Control Act. Last amended January 1, 2021; current to January 22, 2025. Ottawa ON: Minister of Justice. https://laws-lois.justice.gc.ca/eng/regulations/sor-2000-203/index.html.

Safeguards Regulations. REGDOC-2.13.1, Safeguards and Nuclear Material Accountancy under the Nuclear Safety and Control Act; current to February 21, 2017. Ottawa ON: Minister of Justice. https://www.cnsc-ccsn.gc.ca/eng/acts-and-regulations/consultation/comment/regdoc2-13-1/

Species at Risk Act. S.C. 2002, c.29. Last amended November 27, 2024; current to January 22, 2025. Ottawa ON: Minister of Justice. https://laws.justice.gc.ca/eng/acts/S-15.3/.

Water Act. RSA 2000, c W-3. Last amended December 5, 2024; current to December 12, 2024. Edmonton AB: Alberta King's Printer. https://kings-printer.alberta.ca/1266.cfm?page=W03.cfm&leg_type=Acts&isbncln=9780779850785.

Weed Control Act. RSA 2008, c W-5.1. Last amended December 7, 2023; current to December 7, 2023. Edmonton AB: Alberta King's Printer. https://kings-printer.alberta.ca/1266.cfm?page=W05P1.cfm&leg_type=Acts&isbncln=9780779845521.

Weed Control Act Regulation. Alta Reg 19/2010 under the Weed Control Act. Current to August 9, 2016. Edmonton AB: Alberta King's Printer. https://kings-printer.alberta.ca/1266.cfm?page=2010_019.cfm&leg_type=Regs&isbncln=9780779792474.

Wildlife Act. RSA 2000, c W-10. Last amended December 15, 2022; current to December 15, 2022. Edmonton AB: Alberta King's Printer. https://kings-printer.alberta.ca/1266.cfm?page=W10.cfm&leg_type=Acts&isbncln=9780779844401.

8.2 Literature Cited

AEP (Alberta Environment and Parks). 2020. Alberta grizzly bear recovery plan. Alberta Species at Risk Recovery Plan No. 37. Edmonton AB. [accessed February 16, 2025]. https://open.alberta.ca/dataset/5bc2f11a-7360-48fe-a768-73127d24f039/resource/0f4abf49-9bdd-42a8-892f-a74f1a143770/download/aep-alberta-grizzly-bear-recovery-2020.pdf. 83 p.

AEPA (Alberta Environment and Protected Areas). 2023. Wild species status search. [accessed August 30 2024]. https://www.alberta.ca/lookup/wild-species-status-search.aspx.

AEPA. 2024a. Fish and wildlife internet mapping tool. [accessed August 23, 2024]. https://geospatial.alberta.ca/FWIMT_Pub/Viewer/?TermsOfUseRequired=true&Viewer=FWIMT_Pub.

AEPA. 2024b [draft]. Little brown myotis and northern myotis bat recovery plan for Alberta. Alberta Species at Risk Recovery Plan No. 49. Edmonton, AB. 33 p.

AESO (Alberta Electric System Operator). 2022. AESO Net-Zero Emissions Pathways Report. [accessed March 2025]. https://www.aeso.ca/assets/AESO-Net-Zero-Emissions-Pathways-Report-July7.pdf

AESO. 2024. 2024 Long-Term Out. [accessed March 2025]. https://www.aeso.ca/assets/Uploads/grid/lto/2024/2024-LTO-Report-Final.pdf

AESO. 2025. Reliability Requirements Roadmap: Important Dates and Materials. [accessed March 2025]. https://www.aesoengage.aeso.ca/reliability-requirements-roadmap

AFNIGC (Alberta First Nations Information Governance Centre). 2023. Alberta First Nations Health Status Report. [accessed March 7, 2025]. https://abfnhealth.afnigc.ca/the-report/chronic-disease/.

AFNIGC. 2024. Alberta Opioid Response Surveillance Report: First Nations Peoples in Alberta. [accessed March 7, 2025]. https://open.alberta.ca/dataset/dda35281-eeb4-42d6-a146-6f34d408ac92/resource/8ee1addc-8496-4709-b40f-7cb1063b0d36/download/mha-alberta-opioid-response-surveillance-report-first-nations-peoples-2024.pdf?utm_source=st.%20albert%20gazette&utm_campaign=st.%.

Alberta Energy Regulator. 2022. Announcement – seismic events southeast of Peace River – November 30, 2022. [accessed August 30 2024]. https://www.aer.ca/providing-information/news-and-resources/news-and-announcements/announcements/announcement-november-30-2022.

Alberta Geological Survey. 2020. Naturally occurring seismic events. [accessed March 5, 2025]. https://ags.aer.ca/research-initiatives/natural-earthquakes.

AHS. 2023. AHS & Horse Lake First Nation working together. [accessed August 16, 2024]. https://www.albertahealthservices.ca/news/Page17914.aspx.

AHS. 2025a. AHS map and zone overview. [accessed March 5, 2025]. albertahealthservices.ca/assets/about/publications/ahs-ar-2021/zones.html.

AHS. 2025b. Indigenous wellness core. [accessed March 5, 2025]. https://www.albertahealthservices.ca/findhealth/service.aspx?Id=1069951.

AHS. 2025c. Programs & services. [accessed March 5, 2025]. https://www.albertahealthservices.ca/findhealth/search.aspx?type=service&source=ahs.

Alberta. 2003. *Natural Resources Transfer Agreement*. Available at: https://open.alberta.ca/publications/natural-resources-transfer-agreement. Accessed March 2025.

Alberta Parks. 2014. Natural regions and subregions of Alberta. A framework for Alberta's parks. Alberta Tourism, Parks and Recreation. Edmonton AB. [accessed March 6, 2025]. https://open.alberta.ca/dataset/d3af996b-c784-4183-8fc5-fd4d608e6e0a/resource/0675ed1b-5003-41e1-9f4b-3a6f32733129/download/2014-natural-regions-subregions-of-alberta-a-framework-for-albertas-parks-booklet.pdf. 72p.

APTN (Aboriginal Peoples Television Network). 2023. First Nations life expectancy plummets in Alberta due to opioids death. [accessed March 7, 2025]. https://www.aptnnews.ca/national-news/first-nations-life-expectancy-plummets-in-alberta-due-to-opioid-deaths/

ASRD (Alberta Sustainable Resource Development). 2006. Code of practice for watercourse crossings – Peace River management area map. [accessed March 6, 2025]. https://open.alberta.ca/dataset/1bdbc003-75a0-41dc-b33d-099c5bc536ad/resource/955b0cb4-f044-4e5e-a1ee-ffaa1a89ed97/download/2478000-2006-Peace-River-Code-Practice.pdf.

Atkinson LA, Pawley SM, Andriashek LD, Hartman GMD, Utting DJ, Atkinson N. 2020. Sediment thickness of Alberta. Version 2. Alberta Energy Regulator/Alberta Geological Survey, AER/AGS Map 611, scales 1:1,000,000. [accessed March 6, 2025]. https://ags.aer.ca/publications/all-publications/map-611.

Birch Hills County. 2025. Utilities. [accessed March 5, 2025]. https://birchhillscounty.com/utilities/.

Bishop Law. 2012. *Written Submission of the Métis Nation of Alberta Region 1. Reference Number 59540. RE: Shell Canada Energy: Jackpine Mine Expansion Project (Jackpine Mine Project)*. October 1, 2012. Available at: https://iaac-aeic.gc.ca/050/documents_staticpost/59540/81947/Metis_Nation_of_Alberta_Region_1_-_Written_Submission.pdf. Accessed March 2025.

Bostock HS. 2014. Geology, physiographic regions of Canada. Geological Survey of Canada, Map 1254A (2nd edition), scale 1:5,000,000. doi:10.4095/293408.

Canada Energy Regulator. (n.d.). *Filing manual - Guide A: Facilities applications*. Retrieved March 13, 2025, from https://www.cer-rec.gc.ca/en/applications-hearings/submit-applications-documents/filing-manuals/filing-manual/filing-manual-guide-a-facilities-applications-a2.html#sa_2_2

CAP (Congress of Aboriginal Peoples) Department of Research. 2025. Indigenous Determinants. [accessed March 7, 2025]. https://abo-peoples.org/wp-content/uploads/2024/03/Enviromental-Fact-Sheet-Final.pdf

CBC (The Conference Board of Canada). 2024. An economic impact assessment of the CANDU MONARK nuclear reactor. Presented to AtkinsRealis; June 2024. [accessed March 6, 2025]. https://www.conferenceboard.ca/wp-content/uploads/2022/10/AtkinsRealis_CBoC_EIA_Final.pdf. 23 p.

CIRNAC. 2013b. *Treaty Texts: Treaty 8*. Available at: https://www.aadnc-aandc.gc.ca/eng/1100100028813/1100100028853. Accessed March 2025.

Clear Hills County. 2025. Emergency services. [accessed March 5, 2025]. https://www.clearhillscounty.ab.ca/emergency-services.

CNA (Canadian Nuclear Association). 2023. Public attitudes to nuclear power. Environics Research; January 16, 2023. [accessed March 6, 2025]. https://cna.ca/wp-content/uploads/2023/01/Environics-CNA-Final-Report-Jan-2023.pdf. 38 p.

CNA. 2025. Outlook for Nuclear Energy in Canada. [accessed November 27, 2025]. https://cna.ca/resources/

CN (Canadian National Railway). 2025. North American rail carriers. [accessed March 5, 2025]. https://cnebusiness.geomapguide.ca/.

CNSC (Canadian Nuclear Safety Commission). 2016. DIS-16-04 Small Modular Reactors: Regulatory Strategy, Approaches and Challenges (Discussion paper from formal consultation). [accessed March 19, 2025]. https://publications.gc.ca/collections/collection_2016/ccsn-cnsc/CC174-4-2016-4-eng.pdf

County of Northern Lights. 2021. Municipal development plan. Bylaw #10-61-270. [accessed September 30, 2024]. https://www.countyofnorthernlights.com/sites/default/files/2023-11/Municipal%20Development%20Plan.pdf. 52 p.

County of Northern Lights. 2024. Economic development. [accessed August 30 2024]. https://www.countyofnorthernlights.com/business-and-development/business/economic-development.

County of Northern Lights. 2025. Airport. [accessed March 5, 2025]. https://www.countyofnorthernlights.com/airport.

CSPG (Canadian Society of Petroleum Geologists). 1981. Lexicon of Canadian stratigraphy, Volume 4, western Canada, including eastern British Columbia, Alberta, Saskatchewan and southern Manitoba. Glass DJ, editor. Calgary AB: Canadian Society of Petroleum Geologists. 772 p.

DFO (Fisheries and Oceans Canada). 2020. Recovery strategy for the rainbow trout (*Oncorhynchus mykiss*) in Canada (Athabasca River populations) [Proposed]. Species at Risk Act Recovery Strategy Series. Ottawa ON: Fisheries and Oceans Canada. [accessed March 6, 2025]. https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/recovery-strategies/rainbow-trout.html. 92 p.

DFO. 2023a. Measures to protect fish and fish habitat. [accessed March 11, 2025]. https://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures-eng.html

DFO 2023b. Interim code of practice: End-of-pipe fish protection screens for small water intakes in freshwater. [accessed March 11, 2025]. https://www.dfo-mpo.gc.ca/pnw-ppe/codes/screen-ecran-eng.html

DFO. 2024. Aquatic species at risk map. [accessed March 6, 2025]. https://www.dfo-mpo.gc.ca/species-especes/sara-lep/map-carte/index-eng.html.

Downing DJ, Pettepiece, WW. 2006. Natural regions and subregions of Alberta. Natural Regions Committee. Edmonton AB: Government of Alberta. Pub. No. T/852. https://open.alberta.ca/dataset/dd01aa27-2c64-46ca-bc93-ca7ab5a145a4/resource/98f6a93e-c629-46fc-a025-114d79a0250d/download/2006-nrsrcomplete-may.pdf. 264 p.

DCN (Driftpile Cree Nation). 2024. Maggie Willier wellness centre: public health. [accessed August 30, 2024]. https://dcn450.com/maggie-willier-wellness-centre-public-health/.

ECCC. 2020a. Strategic assessment of climate change revised. [updated October 6, 2020; accessed February 25, 2025]. https://www.canada.ca/en/services/environment/conservation/assessments/strategic-assessments/climate-change.html.

ECCC. 2020b. Compendium Of Canada's engagement in international environmental agreements and instruments. February 2022. https://www.canada.ca/content/dam/eccc/documents/pdf/international-affairs/compendium/2020/batch-10/united-nation-framework-convention-climate-change-paris-agreement.pdf. 4 p.

ECCC. 2022. 2030 Emissions reduction plan: Canada's next steps for clean air and a strong economy. Ottawa ON: Environment and Climate Change Canada. [accessed March 5, 2025]. https://publications.gc.ca/collections/collection_2022/eccc/En4-460-2022-eng.pdf. 240 p.

ECCC. 2023. Guidelines to avoid harm to migratory birds. [accessed March 11, 2025]. https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/reduce-risk-migratory-birds.html

Exner-Pirot H, McCormick, J. 2024. How Indigenous participation can help drive the new nuclear age. The Hub. April 3, 2024. [accessed February 16, 2025]. https://thehub.ca/2024/04/03/heather-exner-pirot-and-jesse-mccormick-how-indigenous-participation-can-help-drive-the-new-nuclear-age/.

Fumoleau, R. (1975). *As long as this land shall last: A history of Treaty 8 and Treaty 11, 1870-1939*. Arctic Institute of North America. (p. 55).GOA (Government of Alberta). 2002. Alberta's Trumpeter Swan – Fact Sheet. [accessed 11 March 2025]. https://open.alberta.ca/dataset/ba1df794-c6e6-4179-8fbf-fc02d14fe3ad/resource/2b9ea4d1-45fc-45fd-b856-afed6022784b/download/sar-trumpeterswan-factsheet-mar2002.pdf

GOA. 2013. Alberta wetland policy. [accessed February 26, 2025]. https://open.alberta.ca/dataset/5250f98b-2e1e-43e7-947f-62c14747e3b3/resource/43677a60-3503-4509-acfd-6918e8b8ec0a/download/6249018-2013-alberta-wetland-policy-2013-09.pdf. 26 p.

GOA. 2015. Recommended land use guidelines: key wildlife and biodiversity zones. [accessed August 28, 2024]. https://open.alberta.ca/dataset/5c6e2826-50ab-4d2a-a673-9d703d6b5c52/resource/d8d1b2e9-3a72-471d-9479-56db5ee68210/download/keywildlifebiodiversityzones-apr08-2015.pdf. 2 p.

GOA. 2017a. Alberta river water quality index, April 1996–March 2016. [accessed February 26, 2025]. https://open.alberta.ca/dataset/0013f39f-f399-40b3-9c34-7cf8c0212272/resource/43f28f4b-54d2-4147-8a0f-3e8177c7e5f3/download/waterqualityindexgraphs-1996-2016-jun2017.pdf. 1 p.

GOA. 2017b. Alberta caribou ranges. [Accessed February 25, 2025]. https://open.alberta.ca/publications/alberta-caribou-ranges-map

GOA. 2018. Environmental quality guidelines for Alberta surface water. Edmonton AB: Water Policy Branch, Alberta Environment and Parks.[accessed March 6, 2026]. https://open.alberta.ca/dataset/5298aadb-f5cc-4160-8620-ad139bb985d8/resource/38ed9bb1-233f-4e28-b344-808670b20dae/download/environmentalqualitysurfacewaters-mar28-2018.pdf. 58 p.

GOA. 2022. Community profile: Peace River health data and summary. [accessed March 6, 2025]. https://open.alberta.ca/dataset/e1de1b92-100a-4be5-b2c1-121bf8d9925e/resource/3ad81f51-ad03-4ea3-8fb2-2d731995bf41/download/hlth-phc-peace-river-2022.pdf. 64 p.

GOA. 2024a. Emissions reduction and energy development plan. [accessed August 30, 2024]. https://open.alberta.ca/dataset/7483e660-cd1a-4ded-a09d-82112c2fc6e7/resource/75eec73f-8ba9-40cc-b7f4-cdf335a1bd30/download/epa-emissions-reduction-and-energy-development-plan.pdf. 66 p.

GOA. 2024b. Water quality data portal. [accessed March 6, 2024]. https://www.alberta.ca/surface-water-quality-data.

GOA. 2024c. Wild species status search. [Accessed August 27, 2024]. https://www.alberta.ca/lookup/wild-species-status-search.aspx.

GOA. 2024d. About the Canada Wildlife Act. [accessed August 27, 2024]. https://www.canada.ca/en/environment-climate-change/services/environmental-enforcement/acts-regulations/about-wildlife-act.html.

GOA. 2024e. Census subdivision (municipal) population estimates 2016 to 2024. [Accessed February 18, 2025]. https://open.alberta.ca/dataset/alberta-population-estimates-data-tables.

GOA. 2024f. Occupational health and safety code. Alta Reg 191/2021 under the Occupational Health and Safety Act. Current to January 14, 2025. Edmonton AB: Alberta King's Printer. https://kings-printer.alberta.ca/1266.cfm?page=2021_191.cfm&leg_type=Regs&isbncln=9780779851003.

GOA. 2024g. Clear Hills. [accessed August 30, 2024]. https://regionaldashboard.alberta.ca/region/clear-hills/#/.

GOA. 2025a. Map of health corridors. [Accessed February 18, 2025]. https://www.alberta.ca/lookup/map-of-health-corridors.aspx?searchSelect0=NW&view=list.

GOA. 2025b. Athabasca University. [accessed February 16, 2025]. https://study.alberta.ca/plan-your-studies/universities-colleges-technical-institutes/universities/athabasca-university/

GOC. 2011. Aboriginal Consultation and Accommodation – Updated Guidelines for Federal Officials to Fulfill the Duty to Consult Ottawa ON: Department of Aboriginal Affairs and Northern Development Canada. [accessed September 2024]. https://www.rcaanc-cirnac.gc.ca/eng/1100100014664/1609421824729#chpiGOC. 2016. Species at Risk Act implementation guidance for recovery practitioners. Version 2.3. [accessed March 6, 2025]. https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/critical-habitat-descriptions/identification-toolbox-guidance.html.

GOC. 2000a. Canadian Nuclear Safety Commission by-laws. SOR/2000-212 under the Nuclear Safety and Control Act. Current to January 22, 2025. [accessed March 5, 2025]. Ottawa ON: Minister of Justice. https://laws-lois.justice.gc.ca/eng/regulations/SOR-2000-212/index.html.

GOC. 2000b. Canadian Nuclear Safety Commission rules of procedures. SOR/2000-211 under the Nuclear Safety and Control Act. Last amended September 18, 2007; current to January 22, 2025. Ottawa ON: Minister of Justice. https://laws-lois.justice.gc.ca/eng/regulations/SOR-2000-211/page-1.html.

GOC. 2021a. Draft technical guide related to the strategic assessment of climate change. [accessed March 6, 2025]. https://www.canada.ca/content/dam/eccc/documents/pdf/consultations/strategic-assessment-climate-change/strategic-assessment-climate-change-draft-technical-guide.pdf. 95 p.

GOC. 2021b. Achievements at COP26. [updated November 24, 2021; accessed March 6, 2025]. https://www.canada.ca/en/services/environment/weather/climatechange/canada-international-action/un-climate-change-conference/cop26-summit/achievements-at-cop26.html.

GOC. 2022a. Registry for abandoned nests. [accessed February 28, 2024]. https://www.permis-permits.ec.gc.ca/en/AbandonedNests.

GOC. 2022b. Fact sheet: nest protection under the Migratory Birds Regulations, 2022. [updated May 30, 2023; accessed September 2023]. https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/fact-sheet-nest-protection-under-mbr-2022.html.

GOC. 2024a. Guide to preparing an initial project description and a detailed project description. [updated June 21, 2024; accessed March 5, 2025]. https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/guide-preparing-project-description-detailed-project-description.html.

GOC. 2024b. Consulting Indigenous Peoples. [updated October 16, 2024; accessed March 6, 2025]. https://housing-infrastructure.canada.ca/rd/indigenous-consult-autochtones-eng.html.

GOC. 2024c. Powering Canada: a blueprint for success. Final report. Ottawa ON: Canada Electricity Advisory Council. [accessed March 6, 2025]. https://natural-resources.canada.ca/sites/nrcan/files/energy/electricity/Canada-Electricity-Advisory-Council-Final-Report-2024.pdf. 170 p.

GOC. 2024d. G7 leaders' statement. [accessed March 6, 2025]. https://www.pm.gc.ca/en/news/statements/2024/06/14/g7-leaders-statem.

GOC. 2024e. Station Results – Historical Data. Environment and Climate Change Canada. [accessed August 30, 2024]. https://climate.weather.gc.ca/historical_data/search_historic_data_stations_e.html?timeframe=2&Prov=AB&StationID=2770&Year=1969&Month=5&Day=1&StartYear=1840&EndYear=2019&searchType=stnProx&txtRadius=25&optProxType=navLink&txtLatDecDeg=56.226944444444&txtLongDecDeg=117.44722222222&optLimit=specDate&selRowPerPage=25&station=PEACE+RIVER+A.

GOC. 2025. Social Determinants of Health and Health Inequalities. [accessed March 3, 2025]. https://www.canada.ca/en/public-health/services/health-promotion/population-health/what-determines-health.html

Gould J. 2006. Alberta Natural Heritage Information Centre tracking and watch lists – vascular plants, mosses, liverworts and hornworts. Edmonton AB: Alberta Community Development, Parks and Protected Areas Division. [accessed February 16, 2025]. https://open.alberta.ca/publications/0778547183. 30 p.

Government of Saskatchewan. 2024. Saskatchewan and Alberta partner to advance nuclear power generation. [accessed March 6, 2025]. https://www.saskatchewan.ca/government/news-and-media/2024/may/02/smr-mou-signing-with-alberta.

Grande Prairie Airport. 2024. Arrivals and departures. [accessed March 6, 2025]. https://grandeprairieairport.com/.

Halchuk S, Allen TI, Rogers GC, Adams J. 2015. Seismic Hazard Earthquake Epicentre File (SHEEF2010) used in the Fifth Generation Seismic Hazard Maps of Canada; Geological Survey of Canada, Open File 7724. https://doi.org/10.4095/296908. 21 p.

Hartman GMD, Pawley SM, Liggett JE. Atkinson N, Utting DJ. 2023. Distribution of aquifer-hosting sediments above bedrock in Alberta; Alberta Energy Regulator / Alberta Geological Survey, AER/AGS Map 632, scale 1:3,000,000. [accessed March 6.2025]. https://ags.aer.ca/publications/all-publications/map-632.

IAAC. 2021. Guidance: gender-based analysis plus in impact assessment. [accessed March 6, 2025]. https://www.canada.ca/content/dam/iaac-acei/documents/policy-guidance/gender-based-analysis-plus/guidance-gender-based-analysis-plus-impact-assessment.pdf. 26 p.

International Association for Public Participation (IAP2). (n.d.). Spectrum evolution. Retrieved December 13, 2024, from https://www.iap2.org/page/SpectrumEvolution

Impact Assessment Agency of Canada. (2024). *Guidance: Assessment of potential impacts on the rights of Indigenous peoples*. Government of Canada. Retrieved March 13, 2025, from https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/guidance-assessment-potential-impacts-rights-indigenous-peoples.html

Inform Alberta. 2024. First Nations community health centres. [accessed August 30, 2024]. https://informalberta.ca/public/service/serviceProfileStyled.do?serviceQueryId=1005212.

IAEA (International Atomic Energy Agency). 2021. IAEA increases projections for nuclear power use in 2050. [updated October 15, 2021; accessed August 30, 2024]. https://www.iaea.org/newscenter/pressreleases/iaea-increases-projections-for-nuclear-power-use-in-2050.

IEA (International Energy Agency). 2024. Nuclear power. [accessed August 30, 2024]. https://www.iea.org/energy-system/electricity/nuclear-power.

IPCC (Intergovernmental Panel on Climate Change). 2019. 2019 refinement to the 2006 IPCC guidelines for national greenhouse gas inventories. [accessed March 6, 2025]. https://www.ipcc.ch/report/2019-refinement-to-the-2006-ipcc-guidelines-for-national-greenhouse-gas-inventories/.

Jacques Whitford Limited. 2006. Final report – Environmental impact assessment Dunvegan hydroelectric project. Prepared for Glacier Power Ltd. Project No. ABC50541. October 2006. [accessed March 6, 2025]. https://open.alberta.ca/publications/3840864.

Kapaweno First Nation. (n.d.). *Comments on the Onshore Pipeline Regulations Review Discussion Paper*. Retrieved from http://one.gc.ca/en/about/acts-regulations/cer-act-regulations-guidance-notes-related-documents/onshore-pipeline/onshore-pipeline-regulations-review/discussion-paper/submissions/indigenous-groups/kapaweno-first-nation.pdfKFN (Kapawe'no First Nation). 2024. Health centre. [accessed August 30, 2024]. https://www.kapaweno.com/health-services.

Leslie LE. Fenton MM. 2001. Quaternary stratigraphy and surficial geology Peace River – Final report. AGS Special Report SPE10. Calgary AB: Alberta Geological Survey, Alberta Energy and Utilities Board. [accessed March 6, 2025]. https://ags.aer.ca/publications/all-publications/spe-010. 156 p.

Loveseth B. 1984. Historical resources impact assessment Alberta Natural Gas Company Ltd. gas supply line to Shell Peace River expansion project. Consultant's report (Permit 85-033). Copy on file, Alberta Art Culture and Status of Women, Edmonton AB.

Madill, D. 1986. *Treaty Research Report- Treaty Eight (1899)*. *Treaties and Historical Research Centre, Indian and Northern Affairs Canada*. Available at: https://www.rcaanc-cirnac.gc.ca/eng/1100100028809/1564415096517. Accessed September 2024.

Mazzotti S, Leonard LJ, Hyndman RD, Cassidy JF. 2008. Tectonics, dynamics, and seismic hazard in the Canada-Alaska cordillera. In: Freymueller JT, Haeussler PJ, Wesson RL, Ekström G, editors. Active tectonics and seismic potential of Alaska. p. 229–241. https://doi.org/10.1029/179GM17.

MD of Fairview (Municipal District of Fairview). 2025. Water. [accessed March 5, 2025]. https://www.mdfairview.com/departments-and-services/utilities/water.

MD of Peace River (Municipal District of Peace River No. 135). 2025a. Water co-operatives. [accessed March 5, 2025]. https://www.mdpeace.com/resident-services/water-co-operatives.

MD of Peace River. 2025b. Area overview. [accessed March 5, 2025]. https://www.mdpeace.com/community-recreation/area-overview.

MD of Smoky River (Municipal District of Smoky River No. 130). 2025. Utilities. [accessed March 5, 2025]. https://www.mdsmokyriver.com/departments/public-works/utilities/.

Meijer M. 2008. Alberta Sustainable Resource Development. ANHIC [Alberta Natural Heritage Information Centre] search request. Email to Young L, Golder Associates Ltd. October 22, 2008.

Mighty Peace Tourism. 2025. Five best attractions in the County of Northern Lights. [Accessed August 30, 2024]. https://mightypeace.com/blogs/5-best-attractions-in-the-county-of-northern-lights/.

MMIWG (National Inquiry into Missing and Murdered Indigenous Women and Girls). 2019. Reclaiming power and place: the final report of the national inquiry into missing and murdered Indigenous women and girls. Volumes 1a and 1b. [accessed February 16, 2025]. https://www.mmiwg-ffada.ca/final-report/. 1,080 p.

MNA (Métis Nation of Alberta–Now Otipemisiwak Métis Government [OMG]). 2023a. *Métis Nation of Alberta: Mission & Values*. Available at: https://albertametis.com/who-we-are/mission-statement/. Accessed March 2025.

MNA. 2023b. *Historic Swearing-In of the First Otipemisiwak Métis Government*. Available at: https://albertametis.com/news/historicswearing-in-of-the-first-otipemisiwak-metis-government/. Accessed March 2025.

MNA. 2023c. *Métis Nation of Alberta: Programs & Services*. Available at: https://albertametis.com/programs-services/. Accessed March 2025.

MNA. 2023d. *Métis Nation of Alberta: Harvesting Rights*. Available at: https://albertametis.com/metis-rights/harvesting-rights/. Accessed March 2025.

MNC (Métis National Council). 2023. *About Us*. Available at: https://www.metisnation.ca/about/about-us. Accessed March 2025.

Moss EH. 1983. Flora of Alberta. 2nd edition (revised by K.G. Packer). Toronto ON: University of Toronto Press. 687 p.

Natural Regions Committee 2006. Natural regions and subregions of Alberta. Compiled by Downing DJ and Pettapiece WW. Government of Alberta. Pub. No. T/852. [accessed February 16, 2025]. https://open.alberta.ca/dataset/dd01aa27-2c64-46ca-bc93-ca7ab5a145a4/resource/98f6a93e-c629-46fc-a025-114d79a0250d/download/2006-nrsrcomplete-may.pdf. 264 p.

Navius Research. 2023. A pivotal moment: Technical report. {accessed August 30, 2024]. https://cleanenergycanada.org/report/a-pivotal-moment/a-pivotal-moment-technical-report/. 47 p.

NGTL (Nova Gas Transmission Ltd.). 2014. *Liege Lateral Loop 2 - Thornbury Section Pipeline and the Leismer Compressor Station Project, Appendix 10: Traditional Knowledge Report*. September 2014. Available at: https://docs2.cer-rec.gc.ca/ll-eng/llisapi.dll/fetch/2000/90464/90550/554112/2445209/2523776/2524035/16_ESA_FINAL_Appe ndix10_-_A4C2V4.pdf?nodeid=2524037&vernum=-2. Accessed March 2025.

NGTL. 2015a. *2017 NGTL System Expansion. Environmental and Socio-Economic Assessment. Appendix 10: Aboriginal Field Study Participation and Traditional Land Use Report for the Proposed Nova Gas Transmission Ltd. 2017 NGTL System Expansion*. Available at: https://docs2.cer-rec.gc.ca/ll-eng/llisapi.dll/fetch/%E2%80%8C2000/90464/90550/554112/2671288/2758964/2786592/274882 8/B3-48_ESA_Appendix_10%E2%80%8C_TEK_TLU_TDR_Part1of1_-_A4K2W1.pdf?nodeid=2758523&vernum=-2. Accessed March 2025.

NGTL. 2023. *NOVA Gas Transmission Ltd. (NGTL) Mildred Lake West Sales Meter Station. Response to CER Information Request No. 1*. Available at: https://docs2.cer-rec.gc.ca/ll-eng/llisapi.dll/fetch/2000/90464/90550/554112/4302086/4336886/4364769/C24103-1_Mildred_Lake_West_Sales_Meter_Station_Response_to_CER_Information_Request_No._1_-_A8L7E4.pdf?nodeid=4364973&vernum=-2. Accessed March 2025.

Northern Lakes College. 2025. Programs & courses. [accessed March 5, 2025]. https://www.northernlakescollege.ca/programs-courses.

Northern Sunrise County. 2025a. Resident services. [accessed March 25, 2025]. https://northernsunrise.net/index.asp?SEC=E1034285-EDC1-4A73-A5A6-A73FBBA7FA5F.

Northern Sunrise County. 2025b. Industries in Northern Sunrise County. [Accessed August 30, 2024]. https://northernsunrise.net/industries.

Northwestern Polytechnic. 2025. About our institution. [accessed March 5. 2025]. https://www.nwpolytech.ca/about/.

NRCan (Natural Resources Canada). 2021. 2020 national building code of Canada seismic hazard tool. [updated April 6, 2021; accessed March 5, 2025]. https://earthquakescanada.nrcan.gc.ca/hazard-alea/interpolat/nbc2020-cnb2020-en.php.

NRCan. 2023. Powering Canada forward: building a clean, affordable and reliable electricity system for every region of Canada. Ottawa ON: Natural Resources Canada. [accessed March 5, 2025]. https://natural-resources.canada.ca/sites/nrcan/files/electricityVisionPaper/Electricity%20Paper_ENGLISH.pdf. 31 p.

NRCC (National Research Council of Canada). 2022. National building code of Canada 2020. Ottawa ON: Canadian Commission on Building and Fire Codes. [accessed March 5, 2025]. https://nrc-publications.canada.ca/eng/view/ft/?id=515340b5-f4e0-4798-be69-692e4ec423e8. 1,530 p.

Nuclear Energy Institute. 2012. *Nuclear Energy's Economic Benefits – Current and Future*. [accessed August 30, 2024]. http://large.stanford.edu/courses/2018/ph241/may2/docs/nei-apr12.pdf.

NWMO. Nuclear Waste Management Organization. https://www.nwmo.ca/

O'Connell SC, Dix GR, Barclay JE. 1990. Origin, history, and regional structural development of the Peace River Arch, Western Canada. Bulletin of Canadian Petroleum Geology 38A: 4-24.

Ontario. 2024. Emergency Preparedness: Provincial Nuclear Emergency Response Plan (PNERP) Master Plan, Chapter 2 The planning basis. [accessed March 19, 2025]. https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-2-planning-basis

Pettapiece WW. 1986. Physiographic subdivisions of Alberta. Ottawa ON: Land Resource Research Centre, Agriculture Canada. https://open.alberta.ca/publications/physiographic-subdivisions-of-alberta

PIWC (Pauktuutit Inuit Women of Canada). 2021. Addressing Inuit women's economic security and prosperity in the resource extraction industry. [accessed February 16, 2025]. https://pauktuutit.ca/project/addressing-inuit-womens-economic-security-and-prosperity-in-the-resource-extraction-industry/. 70 p.

PRAMP (Peace River Area Monitoring Program). 2024. 2023 annual data report. Peace River AB. [accessed March 5, 2025]. https://prampairshed.ca/wp-content/uploads/2024/09/PRAMP_2023_Annual-Data-Review_Final_-Sept_5_2024.pdf. 44 p.

PricewaterhouseCoopers (PwC). 2024. The Economic Impact of a Westinghouse AP1000 Reactor Project in Canada. https://westinghouse.relayto.com/e/the-economic-impact-of-a-westinghouse-ap1000-reactor-project-in-canada-nibfngv9hun7a.

Prior GJ, Hathway B, Glombick PM, Pană DI, Banks CJ, Hay DC, Schneider CL, Grobe M, Elgr R, Weiss JA. 2013. Bedrock geology of Alberta; Alberta Energy Regulator, AER/AGS Map 600, scale 1:1,000,000. https://ags.aer.ca/publications/all-publications/map-600.

Prowse TD, Conly M. 1996. Northern River Basins Study Synthesis Report No. 1: Impact of flow regulation on the aquatic ecosystem of the Peace and Slave Rivers. Edmonton AB: Northern River Basins Study. [accessed March 5, 2025]. https://publications.gc.ca/site/eng/9.945426/publication.html. 191 p.

Rintoul J. 2008. Alberta Sustainable Resource Development. ANHIC [Alberta Natural Heritage Information Centre] search request. Email to Gregory M, Golder Associates Ltd. January 9, 2008.

Rodríguez-Pradilla G, Eaton DW, Verdon JP. 2022. Basin-scale multi-decadal analysis of hydraulic fracturing and seismicity in western Canada shows non-recurrence of induced runaway fault rupture. Scientific Reports 12, 14463. https://doi.org/10.1038/s41598-022-18505-0.

Rodtka M. 2009. Status of the Bull Trout (Salvelinus confluentus) in Alberta: Update 2009. Prepared for the Alberta Sustainable Resource Development and the Alberta Conservation Association. Alberta Wildlife Status Report No. 39. https://open.alberta.ca/dataset/16a3731d-4e66-4cd7-87c2-d6197ed3d4cf/resource/c3d1396c-035a-45e1-87a8-9c852a435ec8/download/2009-sar-statusbulltroutalberta-sep2009.pdf. 61 p.

SCC (Supreme Court of Canada). 1990a. *Judgements of the Supreme Court of Canada. R. v. Sioui*. Available at: https://scc-csc.lexum.com/scc-csc/scc-csc/en/item/608/index.do. Accessed September 2024.

SCC. 1990b. *Judgements of the Supreme Court of Canada. R. v. Sparrow*. Available at: https://scc-csc.lexum.com/scc-csc/scc-csc/en/item/609/index.do. Accessed March 2025.

SCC. 1996. *Judgements of the Supreme Court of Canada. R. v. Van der Peet*. Available at: https://scc- csc.lexum.com/scc-csc/scc-csc/en/item/15858/index.do. Accessed March 2025.

SCC. 1999a. *Judgements of the Supreme Court of Canada. R. v. Sundown*. Available at: https://scc-csc.lexum.com/scc-csc/scc-csc/en/item/1687/index.do. Accessed March 2025.

SCC. 1999b. *Judgements of the Supreme Court of Canada. R. v. Marshall*. Available at: https://scc-csc.lexum.com/scc-csc/scc-csc/en/item/1740/index.do. Accessed March 2025.

SCC. 2005. *Judgements of the Supreme Court of Canada. Mikisew Cree v. Canada*. Available at: https://scc-csc.lexum.com/scc-csc/scc-csc/en/item/2251/index.do. Accessed March 2025.

Schultz R, Woo J-U, Pepin K. Ellsworth WL, Zebkar H, Segall P, Gu YJ, Samsonov S. 2023. Disposal from in situ bitumen recovery induced the ML 5.6 Peace River earthquake. Geophysical Research Letters 50(6), e2023GL102940. https://doi.org/10.1029/2023GL102940

Slomka JM, Hartman GMD, Klassen J. 2018. Architecture and geometry of basal sand and gravel deposits, including the 'Grimshaw gravels', northwestern Alberta (NTS 84C and 84D); Alberta Energy Regulator, AER/AGS Open File Report 2018-04.

Smoky River Regional Economic Development. 2024. Top industries. [Accessed August 30, 2024]. https://smokyriverregion.ca/top-industries/.

Spirit River. 2025. Spirit River Airport. [accessed March 5, 2025]. https://www.townofspiritriver.ca/location/spirit-river-airport/.

Statistics Canada. 2007. 2006 census of agriculture, farm data and farm operator data. [accessed September 30, 2024]. https://www150.statcan.gc.ca/n1/pub/95-629-x/2007000/4123856-eng.htm.

Statistics Canada. 2017. Archived – land use, census of agriculture, 2011 and 2016, inactive. [accessed March 6, 2025]. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210040601.

Statistics Canada. 2022a. Census profile, 2021 census of population. [updated November 15, 2023 ; accessed March 6, 2025]. https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/index.cfm?Lang=E.

Statistics Canada. 2022b. Operating revenues, census of agriculture, 2021. Accessed from: https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210024001 [accessed September 2024].

Statistics Canada. 2024a. COVID-19 mortality among First Nations people and Métis in private dewllings in Canada: An analysis of social determinants of health and health inequalities. [accessed March 7, 2025]. ttps://www150.statcan.gc.ca/n1/pub/45-28-0001/2024001/article/00001-eng.htm?utm_source=st.%20albert%20gazette&utm_campaign=st.%20albert%20gazette%3A%20outbound&utm_medium=referral.

Statistics Canada. 2024b. Labour force characteristics by province, monthly, seasonally adjusted. [accessed August 30, 2024]. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1410028703

SLCN (Sturgeon Lake Cree Nation). 2024. Health centre. [accessed August 30, 2024]. https://www.sturgeonlake.ca/service/health-centre/.

SRFN (Swan River First Nation). 2024. Health centre. [accessed August 30, 2024]. https://srfn.ca/health-centre/.

Town of Manning. 2025a.). Water treatment plant. [accessed March 5, 2025]. https://manning.ca/residents/water-treatment-plant/.

Town of Manning. 2025b. Emergency services. [accessed March 5, 2025]. https://manning.ca/emergency-services/disaster-services-joint-agency/.

UNFCCC (United Nations Framework Convention on Climate Change). 2016. Paris Agreement. Adopted December 12, 2015; entered into force November 4, 2016. United Nations Treaty Collection, c. XXVII 7 d. [accessed March 5, 2025]. https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en.

U.S. EPA (United States Environmental Protection Agency). 2024. AP-42: Compilation of Air Emissions Factors from Stationary Sources. [Accessed March 17, 2025]. https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emissions-factors-stationary-sources

Van Dyke S. 1984. Historical resources impact assessment Peace River in-situ pilot project water supply line, Shell Canada Resources Ltd. Consultant's report (Permit 84-071). Copy on file, Alberta Art Culture and Status of Women, Edmonton AB.

Wadell WH. 1957. Cadotte and Paddy members of Peace River formation (Master of Science thesis). Saskatoon SK: University of Saskatchewan, Geological Sciences. [accessed August 30, 2024]. https://harvest.usask.ca/items/d3ce75f8-27c9-43a4-ad69-b4fefc6d5a4b/full. 92 p.

WSC (Water Survey of Canada). 2024. Historical hydrometric data. [accessed September 30, 2024]. https://wateroffice.ec.gc.ca/search/historical_e.html.

WLFN (Whitefish Lake First Nation #128). 2024. Health services. [accessed August 30, 2024]. https://wfl128.ca/health-programs/.

WCFN (Woodland Cree First Nation). 2015. Home. [accessed August 30, 2024]. https://www.woodlandcree.net/.

WCFN. 2024. Health. [accessed August 30, 2024]. https://www.woodlandcree.net/health.

World Nuclear Association. 2024. Carbon dioxide emissions from electricity. [accessed March 11, 2025, 2024] https://world-nuclear.org/information-library/energy-and-the-environment/carbon-dioxide-emissions-from-electricity

Appendix A: Indigenous Engagement and Communications Plan

ENERGY
Alberta

Peace River Nuclear Power Project

Indigenous Engagement Plan

February, 2026

Table of Contents

ABBREVIATIONS AND UNITS OF MEASURE

Abbreviation	Definition
ACO	Aboriginal Consultation Office
AER	Alberta Energy Regulator
AFN	Assembly of First Nations
BCER	BC Energy Regulator
CNSN	Canadian Nuclear Safety Commission
DIA	Detailed Impact Assessment
DFO	Fisheries and Oceans Canada
EA	Environmental Assessment
ECCC	Environment and Climate Change Canada
EPEA	Environmental Protection and Enhancement Act
IAAC	Impact Assessment Agency of Canada
IA	Impact Assessment
IBA	Impact Benefit Agreement
IPD	Initial Project Description
ISC	Indigenous Services Canada
MOU	Memoranda of Understanding

1 CORPORATE COMMITMENT

Energy Alberta is committed to open, extensive and thorough engagement as a vital component to the success of the Project. We aim to build and sustain meaningful relationships based on mutual respect and trust with Indigenous Nations and Communities, non-Indigenous Stakeholders, local communities and other potentially affected parties. Energy Alberta recognizes the importance of engaging early and often to understand each group's unique interests.

In alignment with its corporate policies, Energy Alberta is committed to undertaking engagement and communications that will meet or exceed requirements from federal and provincial agencies, and it will also draw upon current best practices.

2 INDIGENOUS ENGAGEMENT POLICY AND PRINCIPLES

Engagement with Indigenous Nations and Communities is a corporate value of Energy Alberta, and a vital component of the Project process. Energy Alberta is committed to building meaningful, mutually-beneficial relationships with Indigenous Nations and Communities, guided by respect, integrity and a shared commitment to advancing reconciliation, and as outlined in its Indigenous Relations Policy and the principles below:

- **Respect for Indigenous Rights and Traditions:** Energy Alberta acknowledges the inherent and constitutionally protected rights of Indigenous Peoples and the significance of Indigenous Knowledge, values, and practices. Engagement will be conducted transparently, recognizing these rights as central to Energy Alberta's operations.
- **Commitment to the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) and Reconciliation:** Energy Alberta aligns its practices with the spirit and intent of UNDRIP and the principles of reconciliation, including addressing the Business and Reconciliation action of the Truth and Reconciliation Commission's Calls to Action.
- **Open, Respectful Communication:** Energy Alberta prioritizes open, respectful, and proactive communication with Indigenous Nations and Communities, ensuring their perspectives are considered in its decision-making processes. Energy Alberta is dedicated to ongoing dialogue and information sharing, with sensitivity to each community's unique values and cultural heritage.
- **Environmental Stewardship with Indigenous Knowledge:** Energy Alberta values Indigenous perspectives on environmental stewardship. Energy Alberta will actively integrate Indigenous Knowledge into its sustainability and environmental protection strategies, aiming to align its operations with Indigenous values of respecting the land and resources.
- **Equitable Economic Opportunities:** Energy Alberta is committed to creating economic opportunities for Indigenous Nations and Communities, including fair access to employment, training, and business partnerships. Energy Alberta seeks to support Indigenous economic growth by collaborating with Indigenous-owned businesses and investing in community-led initiatives.

Energy Alberta is also exploring the potential of economic participation of Indigenous Nations and Communities in the Project. In doing so, Energy Alberta aims to build meaningful partnerships so that Indigenous Nations and Communities are active participants in the economic benefits and environmental stewardship of the Project.

3 APPROACH TO INDIGENOUS ENGAGEMENT

Energy Alberta's engagement and communications efforts are intended to be inclusive of Indigenous Nations, Bands, Communities, Métis Settlements and Groups potentially impacted by the Project. The term "Indigenous Nations and Communities" is used throughout Project documentation to represent this inclusion.

3.1 Understanding Indigenous Rights and Interests

A deep understanding of Indigenous Rights, interests, and values is fundamental to respectful and meaningful engagement. Indigenous Nations and Communities in the Peace River region hold unique Rights, which must be acknowledged and carefully considered throughout the planning and implementation of the Project. This includes recognizing inherent rights to hunt, fish, trap, and gather on traditional lands, as well as spiritual and cultural connections to the land that may not always align with Western land-use concepts.

Energy Alberta will take a comprehensive approach to Indigenous engagement which is essential to understanding Indigenous interests related to the proposed Project. This may include studies related to land use and occupancy mapping, gathering Indigenous Knowledge, and understanding how the proposed Project may affect sacred sites, burial grounds, or areas of spiritual significance. A key to the gathering of this research will be collaborating with Indigenous Nations and Communities to develop research methodologies that respect Indigenous knowledge and integrating it into project planning without exploitation or misrepresentation. Energy Alberta's proposed Project may also raise particular concerns such as safety, long-term environmental stewardship, and potential impacts on water resources, and these should also considered within the context of Indigenous worldviews and intergenerational equity.

3.2 Identification of Potentially Impacted Indigenous Nations and Communities

Energy Alberta sought guidance from the Government of Canada First Nation Profiles Interactive Map and the Alberta Aboriginal Consultation Office Electronic Disposition System Landscape Analysis Tool, to determine a preliminary list of Indigenous Nations and Communities that may be potentially impacted by, or have an interest in, the proposed Project. Since the release of the Initial Project Description, additional Indigenous Nations and Communities have expressed an interest in engaging with Energy Alberta.

Engagement has been initiated and undertaken to varying degrees with the following Indigenous Nations and Communities (listed in alphabetical order):

- Asini Wachi Nehiyawak
- Athabasca Chipewyan First Nation
- Beaver First Nation
- Cadotte Lake Métis Nation
- Dene Nation
- Dene Tha' First Nation
- Driftpile Cree Nation
- Duncan's First Nation
- East Prairie Métis Settlement
- Ermineskin Cree Nation
- Fort Chipewyan Métis Nation
- Fort McKay First Nation
- Gift Lake Métis Settlement
- Grande Prairie Métis Local
- Horse Lake First Nation
- Kapawe'no First Nation
- Kee Tas Kee Now Tribal Council (comprised of Loon River First Nation, Lubicon Lake Band, Peerless Trout First Nation, Whitefish Lake First Nation #459, and Woodland Cree First Nation)
- Kikino Métis Settlement
- Lac Ste. Anne Métis Community Association
- Lakeland Métis Nation
- Little Red River Cree Nation
- Loon River First Nation
- Lubicon Lake Band
- Mikisew Cree First Nation
- Nations of the North Peace (comprised of Beaver First Nation, Dene Tha' First Nation, Little Red River Cree Nation, and Tallcree First Nation)
- O'Chiese First Nation
- Otipemisiwak Métis Government
- Paddle Prairie Métis Settlement
- Peavine Métis Settlement
- Peerless Trout First Nation
- Sawridge First Nation
- Sturgeon Lake Cree Nation
- Sucker Creek First Nation
- Sucker Creek Off Reserve Elders Council
- Swan River First Nation
- Tallcree Tribal Government
- Treaty 8
- Valleyview Métis Local
- Whitefish (Goodfish) Lake First Nation #128
- Whitefish Lake First Nation #459
- Woodland Cree First Nation

As Energy Alberta progress its engagement, the above list of potentially affected Indigenous Nations and Communities may be updated, based on interest and feedback Energy Alberta receives, and ongoing planning and guidance from applicable regulators.

4 ENGAGEMENT AND COMMUNICATIONS ACTIVITIES

Ongoing and comprehensive engagement and communications with Indigenous Nations and Communities will continue beyond the Impact Assessment process, including throughout construction and operations. Engagement activities will be based on each Indigenous Nation or Community's interest and degree of potential impact. Energy Alberta has developed a broad framework to guide Indigenous engagement and communications activities through the regulatory and construction phases of the Project. The following framework allocates Indigenous engagement and communications activities into 5 stages:

Stage 1: Establish Relationship

The goals of this first stage focuses on Introducing Energy Alberta and the proposed Peace River Nuclear Power Project, while seeking to learn about the Indigenous Nations and Communities interested in engaging on the Project, and to identify preliminary interests and concerns. Activities that Energy Alberta will undertake in this stage include:

- **Introductory information packages -** In alignment with regulatory requirements, Energy Alberta will send Project introduction information to potentially impacted Indigenous Nations and Communities, as they are identified.
- **Introductory meetings –** In follow-up the sending of introductory information packages, Energy Alberta will seek introductory meetings with potentially impacted Indigenous Nations and Communities. This will be an opportunity for Energy Alberta to learn about the Nations and Communities and to provide an overview of the proposed Project. At these meetings, Energy Alberta will gather preliminary information on interests and concerns of Nations and Communities as well as seek input from Nations and Communities on how they would like to engage on the Project. Energy Alberta will take direction from Nations and Communities on who would participate in these introductory meetings. Attendees could include consultation and/or technical department staff, community members, Elders, Chief and Council or its consultants.

Stage 2: Framework for Dialogue

In the second stage of engagement, Energy Alberta will work in collaboration with Nations and Communities to formalize the engagement and communications process, requirements and protocols. Activities that will be undertaken in Stage 2 include:

- **Relationship Agreements –** Energy Alberta will work with Nations and Communities to document the planned approach to engagement in a way that is meaningful to Communities.
- **Detailed Workplans and Capacity Funding –** Energy Alberta will work with Nations and Communities to co-develop Community- specific work plans that facilitate Indigenous inclusion in the development of the Impact Statement. In co-developing these work plans Energy Alberta will be guided by the interests of each Nation or Community as well as regulatory requirements. Energy Alberta will provide reasonable capacity funding to support the involvement of Nations and Communities in the development of the Impact Statement.

Stage 3: Project Input

In this stage of engagement and communications, Energy Alberta will enable Indigenous inclusion in the completion of baseline studies and assessments that will form the basis of the Impact Statement and other applicable licencing and permit applications. The means and methods for the inclusion of each individual Nation and Community will be set out in the respective relationship agreements and work plans. Types of activities undertaken in this stage could include:

- **Indigenous Led Studies –** As agreed upon in the development of the specific work plans for each Nation or Community, Energy Alberta will provide support for the completion of Indigenous-led studies that meet or exceed the Tailored Impact Statement Guidelines.
- **Scoping of Baseline Studies -**Energy Alberta will make opportunities available for Nations and Communities to participate in the scoping of baseline studies.
- **Participation in Data Gathering** – Energy Alberta will make opportunities available for Nations and Communities to participate in data gathering in support of Impact Statement studies. Guided by applicable health and safety considerations, opportunities to participate in field work may be limited.
- **Review Studies and Findings** – Energy Alberta will make opportunities available for Nations and Communities to review draft study reports and findings.

Stage 4: Community Readiness

As the Project moves closer to the commencement of construction activities, Energy Alberta will work with Nations and Communities to ensure they are prepared for the construction and operations stages of the Project. This preparation would include readiness to take advantage of economic benefits and opportunities that may arise through the construction and operations, as well as involvement in monitoring and mitigation measures where appropriate. Activities in Stage 4 include:

- **Employment and Training Outreach –** Energy Alberta will work with Nations and Communities to ensure leadership and community members are aware of potential employment opportunities and training requirements so that they are well positioned to take advantage of opportunities throughout the various stages of the Project.
- **Business Readiness –** Energy Alberta will work with Nations and Communities to ensure Indigenous-owned businesses are aware of potential procurement opportunities and are positioned to take advantage of opportunities throughout the various stages of the Project.
- **Community Readiness –** Energy Alberta will work with Nations and Communities to ensure that community members know what to expect during the construction stage of the Project.

Stage 5: Long-term Relationships

Energy Alberta is committed to building and maintaining positive working relationships with Nations and Communities throughout the life of the Project. Activities to be undertaken during the construction and operations phases of the Project will be developed at a future date. Energy Alberta will continue to adhere to the principles set out in our Indigenous Relations Policy and this Engagement Plan for all future activities.

Appendix B: Water Wells

Appendix B-1: Water Wells Within the RSAs

Water Well Driller Record	Legal and Land Location	Client Name	Well Use	Driller Name	Date Completed	Drilling Method	Elevation (m ASL)	Total Borehole Depth (m BGS)	Screen Length (m)	Screen Bottom (m BGS)
Location 1										
399975	4-19-87-20-W5	SHELL OIL CO	Industrial	UNKNOWN DRILLER	1950-11-25	Unknown	525.0	226.2	-	-
400033	2-13-87-21-W5	SHELL OIL CO OF CAN#SP	Industrial	UNKNOWN DRILLER	-	Unknown	531	4.6	-	-
359118	NE-31-85-21-W5	LILLICO, K.	Domestic	UNKNOWN DRILLER	-	Not Applicable	593	-	-	-
359119	NE-31-85-21-W5	POCKNELL, AL	Domestic	UNKNOWN DRILLER	-	Not Applicable	610	-	-	-
359231	NW-6-86-21-W5	MORESIDE, STEVE	Domestic	MCALLISTER WATERWELLS LTD.	1982-06-09	Rotary	610	61.0	-	-
359240	SE-12-86-22-W5	MUELLER, HANS	Domestic	UNKNOWN DRILLER	1973-06-08	Not Applicable	640.0	-	-	-
359241	SE-13-86-22-W5	SHAW, ED	Domestic	LBR CONTRACTORS LTD.	1971-06-01	Rotary	-	8.5	-	-
359242	1-13-86-22-W5	SHAW, EDWIN	Domestic	UNKNOWN DRILLER	-	Hand Dug	597.0	4.0	-	-
359243	SW-13-86-22-W5	ADOLFSON, THOR	Domestic	UNKNOWN DRILLER	-	Hand Dug	614	6.1	-	-
359244	WH-13-86-22-W5	ADOLFSON, THOR #702H	Domestic	WATER RESOURCES	-	Unknown	639	23.2	-	-
359245	WH-13-86-22-W5	ADOLFSON, THOR #701H	Domestic	WATER RESOURCES	1969-07-12	Unknown	639	7.9	-	-
492655	1-13-86-22-W5	DAVIE, WAYNE	Domestic	ANDERSON AIR DRILLING LTD.	1998-07-24	Rotary	-	97.5	-	-
497610	SE-13-86-22-W5	DAVIES, WAYNE	Domestic	KLYMIUK WATER WELL DRILLING	1998-08-13	Rotary	-	30.5	1.5	18.3
9516044	NE-31-85-21-W5	BLAYONE, JANET	Domestic	ANDERSON WATER SERVICES LTD.	2013-06-10	Rotary - Air	-	30.5	-	-
492656	5-13-86-22-W5	ADOLFSON, THOR	Domestic	ANDERSON AIR DRILLING LTD.	1998-07-25	Rotary	-	30.5	12.2	24.4
495172	5-13-86-22-W5	ADOLFSON, THOR	Domestic	ANDERSON AIR DRILLING LTD.	1998-08-26	Rotary	-	24.4	1.2	24.1
359232	NW-7-86-21-W5	CRAIG, CINDY	Domestic & Stock	SANDERSON, LLOYD	1979-08-17	Cable Tool	593	19.2	1.8	19.2
359394	4-18-86-21-W5	HUDSON'S BAY/UNION#S.T.H. 14	Industrial	STRUCTURAL TEST HOLE	1952-09-11	Unknown	593	213.4	-	-
359395	13-19-86-21-W5	FRONTIER GEOPH#STH 174-249	Industrial	STRUCTURAL TEST HOLE	1954-10-04	Unknown	598	280.4	-	-
365009	15-31-85-21-W5	WEBERVILLE WATER CO-OP	Municipal	MCALLISTER WATERWELLS LTD.	1992-03-10	Rotary	-	12.2	-	-
365010	15-31-85-21-W5	WEBERVILLE WATER CO-OP	Municipal	MCALLISTER WATERWELLS LTD.	1992-03-19	Rotary	-	11.0	3.0	7.9
9516131	15-31-85-21-W5	WEBERVILLE WATER CO-OP	Other	ANDERSON WATER SERVICES LTD.	2015-09-20	Rotary - Air	-	8.8	3.0	7.9
9516131	15-31-85-21-W5	WEBERVILLE WATER CO-OP	Other	ANDERSON WATER SERVICES LTD.	2015-09-20	Rotary - Air	-	8.8	0.9	8.8
357203	SW-30-86-20-W5	HARTER, DORIS#WELL 2	Domestic	UNKNOWN DRILLER	-	Not Applicable	-	-	-	-
359233	NW-9-86-21-W5	ALTA ENV #0818E WIEBE, S.	Domestic	WATER RESOURCES	1972-06-16	Unknown	533	61.0	-	-
359234	NE-9-86-21-W5	WIEBE, BILL	Domestic	SANDERSON, LLOYD	1985-06-17	Cable Tool	-	18.3	-	-
359396	12-22-86-21-W5	FRONTIER GEOPH#STH 174-250	Industrial	STRUCTURAL TEST HOLE	1954-10-06	Unknown	539	249.9	-	-
399973	4-5-87-20-W5	SHELL OIL CO	Industrial	UNKNOWN DRILLER	1950-11-20	Unknown	515.0	214.0	-	-
359235	14-24-86-21-W5	ALTA ENV #1221E LARAMORE, C.	Observation	UNKNOWN DRILLER	1974-07-08	Unknown	-	19.8	-	-
398526	SW-30-86-20-W5	LARAMORE, S.#1818 819E	Unknown	UNKNOWN DRILLER	1972-06-16	Unknown	495.0	56.4	-	-
398524	4-19-86-20-W5	SHELL OIL CO #STH38	Industrial	UNKNOWN DRILLER	1950-11-16	Unknown	512.0	222.8	-	-

Appendix B-1: Water Wells Within the RSAs

Water Well Driller Record	Legal and Land Location	Client Name	Well Use	Driller Name	Date Completed	Drilling Method	Elevation (m ASL)	Total Borehole Depth (m BGS)	Screen Length (m)	Screen Bottom (m BGS)
Location 2										
340185	12-1-86-21-W5	WAGNER, TERRY	Domestic	ANDERSON AIR DRILLING LTD.	2000-09-10	Cable Tool	-	36.6	-	-
398392	SW-31-85-20-W5	NIXON, LARRY	Domestic	UNKNOWN DRILLER	-	Unknown	-	-	-	-
398394	NE-31-85-20-W5	GRIEP, B.	Domestic	UNKNOWN DRILLER	-	Not Applicable	-	-	-	-
398522	6-6-86-20-W5	17 RANCHING LTD	Domestic	UNKNOWN DRILLER	1972-01-01	Unknown	594.0	7.6	1.8	7.6
359124	SW-13-85-21-W5	PACIFIC LIAICON LTD VANCOUVER	Domestic	CARIBOO WATER WELLS LTD.	1988-05-10	Rotary	-	24.4	3.0	24.4
359125	SW-13-85-21-W5	PACIFIC LIAICON LTD	Domestic	CARIBOO WATER WELLS LTD.	1988-08-07	Rotary	-	20.7	1.2	19.5
359125	SW-13-85-21-W5	PACIFIC LIAICON LTD	Domestic	CARIBOO WATER WELLS LTD.	1988-08-07	Rotary	-	20.7	1.2	20.7
398366	9-8-85-20-W5	SYDORCHUK, WM	Domestic	UNKNOWN DRILLER	-	Drilled	521.0	48.8	-	-
398380	4-15-85-20-W5	OSLIE, MRS	Domestic	UNKNOWN DRILLER	-	Unknown	526	6.1	-	-
398369	1-9-85-20-W5	THOMPSON, CHRIS	Domestic & Stock	UNKNOWN DRILLER	-	Unknown	541	27.4	-	-
398340	12-31-85-19-W5	SHELL OIL CO #SP	Industrial	UNKNOWN DRILLER	-	Unknown	572	-	-	-
359120	SW-13-85-21-W5	PACIFIC LIAICON VANCOUVER#88-1	Observation	CARIBOO WATER WELLS LTD.	1988-05-09	Rotary	-	36.6	-	-
359121	SW-13-85-21-W5	PACIFIC LIAICON#WELL 2 TH88-2	Observation	CARIBOO WATER WELLS LTD.	1988-05-10	Rotary	-	25.6	3.0	24.4
359122	SW-13-85-21-W5	PACIFIC LIAICON VANCOUVER#4	Observation	CARIBOO WATER WELLS LTD.	1988-05-13	Rotary	-	24.4	1.2	24.1
359123	SW-13-85-21-W5	PACIFIC LIAICON LTD#WELL3 WEST	Observation	CARIBOO WATER WELLS LTD.	1988-05-12	Rotary	-	24.4	1.8	23.8
398378	SW-15-85-20-W5	OSLIE, BILL	Unknown	HILL'S DRILLING	1984-04-26	Cable Tool	-	67.1	-	-
351372	SE-28-85-20-W5	GLASIER, W.	Domestic	BIG IRON DRILLING LTD.	1989-12-18	Rotary	-	30.5	3.1	20.1
398388	1-26-85-20-W5	DZIENGIELEWSKI, HENRY	Domestic	UNKNOWN DRILLER	-	Unknown	565.0	3.7	-	-
492646	SE-21-85-20-W5	GLASIER, LLOYD	Domestic	KLYMIUK WATER WELL DRILLING	1998-07-31	Rotary	-	45.7	12.2	36.6
492647	SE-28-85-20-W5	GLACIER, WENDAL	Domestic	KLYMIUK WATER WELL DRILLING	1998-08-07	Rotary	-	54.9	12.2	30.5
398396	16-33-85-20-W5	SHELL OIL CO #STH4	Industrial	UNKNOWN DRILLER	1950-06-24	Unknown	511	189.0	-	-
398521	SE-1-86-20-W5	SHELL OIL CO #STH17	Industrial	UNKNOWN DRILLER	1950-08-07	Unknown	570	249.9	-	-
9516023	9-24-85-21-W5	SHELL CANADA	Industrial	ANDERSON WATER SERVICES LTD.	2012-02-18	Rotary - Air	-	18.3	3.1	18.3
9516024	9-24-85-21-W5	SHELL CANADA	Monitoring	ANDERSON WATER SERVICES LTD.	2012-02-17	Rotary - Air	-	17.7	3.8	17.7
9516027	9-24-85-21-W5	SHELL CANADA	Monitoring	ANDERSON WATER SERVICES LTD.	2012-02-16	Rotary - Air	-	18.0	3.1	15.8
9516028	9-24-85-21-W5	SHELL CANADA	Monitoring	ANDERSON WATER SERVICES LTD.	2012-02-21	Rotary - Air	-	17.9	3.1	17.9
9516025	9-24-85-21-W5	SHELL CANADA	Observation	ANDERSON WATER SERVICES LTD.	2012-02-16	Rotary - Air	-	17.7	3.0	17.7
9516026	9-24-85-21-W5	SHELL CANADA	Observation	ANDERSON WATER SERVICES LTD.	2012-02-16	Rotary - Air	-	17.1	2.7	17.1
398387	1-22-85-20-W5	OSINCHUK, WILLIAM	Stock	UNKNOWN DRILLER	-	Hand Dug	556.0	10.7	-	-
398391	1-26-85-20-W5	DZIENGIELEWSKI, HENRY	Stock	UNKNOWN DRILLER	-	Unknown	565.0	9.5	-	-
398384	1-21-85-20-W5	ALTA ENV #484-H	Unknown	ALBERTA ENVIRONMENT	1968-11-15	Bored	521.0	22.9	-	-