

ATCO SALT CAVERN STORAGE EXPANSION PROJECT

Summary of a Detailed Project
Description

March 31, 2021

ATCO

always there. anywhere.

SUMMARY OF A DETAILED PROJECT DESCRIPTION

ATCO SALT CAVERN STORAGE EXPANSION PROJECT

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INTRODUCTION

ATCO Energy Solutions Ltd. (AES; ATCO Energy Solutions), a division of the ATCO Group of Companies (ATCO), is pleased to submit this Detailed Project Description (DPD) for the ATCO Salt Cavern Storage Expansion Project (the proposed Project; the Project). The Project is an expansion of the existing Strathcona Salt Cavern Storage Facility, which consists of four underground natural gas liquids (NGL) storage caverns. The Project will add four additional storage caverns. The Project is proposed to be located on an existing industrial site on lands that are owned by AES. The local area is zoned for heavy industrial use, and the Project lands and surrounding lands are privately owned and generally cultivated or developed. The Project requires limited surface disturbance and infrastructure, and expected effects associated with operation of the Project are minimal.

In accordance with the *Impact Assessment Act*, AES submitted an Initial Project Description (IPD) to the Impact Assessment Agency of Canada (IAAC) for the Project on January 13, 2021. IAAC conducted public engagement on the IPD and solicited comments until February 16, 2021. Issues raised in the public engagement period were summarized by IAAC in a Summary of Issues document provided to AES on March 1, 2021.

Pursuant to subsection 15(1) of the *Impact Assessment Act*, the Detailed Project Description (DPD) responds to the issues identified in the Summary of Issues (Appendix A) and includes the information described in the *Information and Management of Time Limits Regulations, Schedule 2* (Information Regulations) under the *Impact Assessment Act*.

This Summary of the Detailed Project Description was prepared in accordance with the Impact Assessment Act Guide to Preparing an Initial Project Description and a Detailed Project Description, and item 25 of the Information Regulations under the Impact Assessment Act.

AES prepared a Screening Assessment (SA) in support of the DPD to qualify and evaluate certain potential environmental, health, social and economic effects, and impacts on Indigenous peoples and rights of Indigenous peoples that may result from the construction and operation of the proposed Project. A summary of the results of the SA is provided in Appendix A. The SA, in conjunction with the DPD, provides evidence that the proposed Project is not likely to cause adverse effects in areas of federal jurisdiction as defined in the *Impact Assessment Act*.

Using conservative assumptions, the DPD and the SA demonstrate that with the application of technically and economically practicable mitigation measures, the Project is unlikely to result in consequential adverse residual effects to the environment, or health, social or economic conditions in the local or regional area. The low levels of greenhouse gas (GHG) emissions from the Project are not expected to cause changes to the environment outside the province or Canada or contribute materially to climate change.

Any residual effects of the Project will be monitored and managed in accordance with applicable provincial legislation and the terms and conditions of both existing and new regulatory approvals to be amended or obtained, respectively, for the Project. In the event that effects associated with the Project are greater than anticipated or result in exceedances of any applicable environmental thresholds, there are existing regulatory management systems and mechanisms in place that would apply, including the potential for compliance and enforcement measures to be taken by provincial and municipal regulators.

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AES undertook an early consultation program for the Project with local residents, landowners, and occupants, Indigenous groups, regulatory authorities and other interested parties, and is committed to continuing engagement throughout the life cycle of the Project and will actively respond to and attempt to address any issues or concerns raised.

In preparing the DPD and the SA, AES considered guidance and requirements in the *Strategic Assessment of Climate Change*, the *Impact Assessment Act Guide to Preparing an Initial Project Description and a Detailed Project Description*, the *Practitioner's Guide to Federal Impact Assessments under the Impact Assessment Act* and the *Tailored Impact Statement Guidelines Template for Designated Projects Subject to the Impact Assessment Act*.

A table identifying the sections of the DPD and SA that respond to the individual issues in the Summary of Issues is provided in Appendix A.

ATCO SALT CAVERN STORAGE EXPANSION PROJECT

PART A: UPDATED GENERAL INFORMATION

1. THE PROJECT'S NAME, TYPE OR SECTOR AND PROPOSED LOCATION

ATCO Energy Solutions owns and operates the Strathcona Salt Cavern Storage Facility at SW 34-55-21-W4M in the Alberta Industrial Heartland (AIH). This existing facility consists of four NGL storage caverns, each with a capacity of approximately 100,000 m³. These caverns serve industrial customers in the AIH. A fifth cavern is currently under construction. Associated facilities at the site include a product handling facility, a brine pond, an office building, buried pipelines, access roads, and parking facilities.

The ATCO Salt Cavern Storage Expansion Project (the proposed Project; the Project), would expand this existing storage facility capacity with the development of four additional salt caverns to store NGLs. Each cavern would have a working capacity of approximately 100,000 m³ for a total expansion size of approximately 400,000 m³. The proposed Project would also include associated surface facilities including a product handling facility, and a brine pond and would be located at the existing SW 34-55-21-W4M site and potentially extend onto NW 27-55-21-W4M or Lot 'D' of NW 34-55-21-W4M. The Project site would be wholly contained on private land owned by AES. The associated pipeline right-of-way (ROW) will be constructed on land privately owned by other industrial operators in the AIH. No portion of the Project is sited on Crown Land. The Project Location, in relation to the regional area, is shown in Figure 1.

The AIH is a joint land use planning and development initiative between five municipalities in the Edmonton Capital Region designed to attract investment to the region. It is the largest hydrocarbon processing region and one of the most established value-add manufacturing centres in Canada, making the region a critical partner in Canada's energy future (AIHA 2020). The AIH is guided by the Alberta Industrial Heartland Association (AIHA), a non-profit association of municipalities dedicated to sustainable eco-industrial development (AIHA 2020). The AIH has a strong industrial base of oil and gas processing, chemical manufacturing, hydrocarbon storage and loading facilities including underground salt caverns, and power generation facilities. Future industrial growth in the region is expected to be held to some of the highest environmental standards in the world, including technologies for carbon capture and storage, emissions reduction, progressive energy technology that modernizes plastics production and emerging energy solutions (AIHA 2020).

ATCO SALT CAVERN STORAGE EXPANSION PROJECT

2. PROPONENTS NAME AND CONTACT INFORMATION

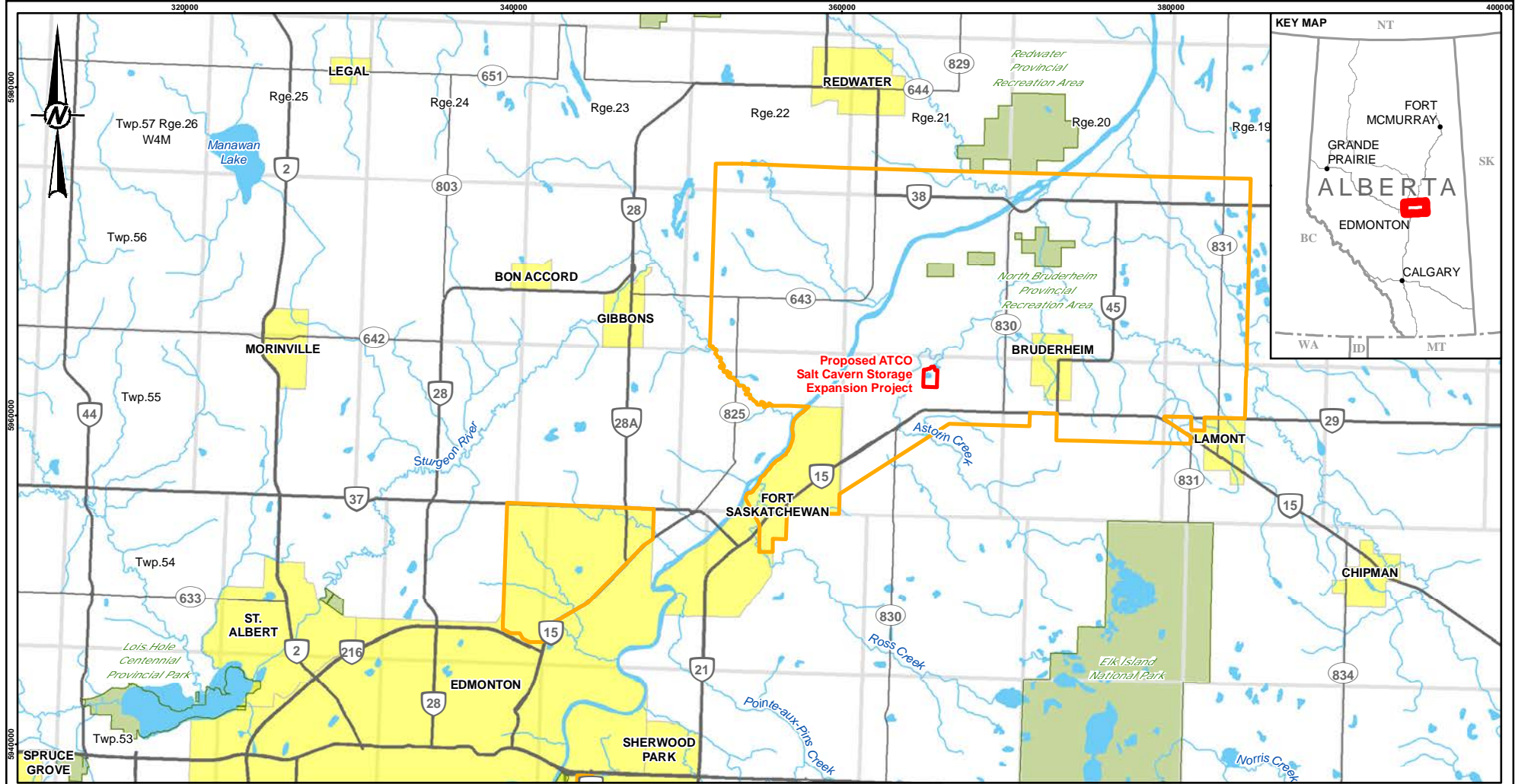
Name of the Project: ATCO Salt Cavern Storage Expansion Project

Name of Proponent: ATCO Energy Solutions Ltd.

Address of Proponent: 5302 Forand St. SW
Calgary AB T3E 8B4

Senior Vice President & General Manager: Mike Shaw

Principal Contact Person: Jennifer Rumas
Manager, Commercial Regulatory & Government Relations
Phone: 403-993-4259
Email: Jennifer.rumas@atco.com
Website: <https://www.atco.com/>



- PROJECT SITE
- ALBERTA INDUSTRIAL HEARTLAND BOUNDARY
- PRIMARY HIGHWAY
- SECONDARY HIGHWAY
- WATERCOURSE
- PARK / PROTECTED AREA
- POPULATION CENTRE
- TOWNSHIP
- WATERBODY



REFERENCE(S)
 PARKS AND PROTECTED AREAS OBTAINED FROM ALBERTA PARKS, GOVERNMENT OF ALBERTA. HIGHWAYS, WATERCOURSES AND WATERBODIES OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED. POPULATED PLACES © GOVERNMENT OF ALBERTA 2020. ALL RIGHTS RESERVED.
 PROJECTION: UTM ZONE 12 DATUM: NAD 83

CLIENT
ATCO ENERGY SOLUTIONS

CONSULTANT



YYYY-MM-DD	2021-03-30
DESIGNED	SL
PREPARED	NF
REVIEWED	CES
APPROVED	DV

PROJECT
PROPOSED ATCO SALT CAVERN STORAGE EXPANSION PROJECT

TITLE
PROJECT LOCATION

PROJECT NO.	CONTROL	REV.	FIGURE
123513692-0032		0	1

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ATCO SALT CAVERN STORAGE EXPANSION PROJECT

PART B: PLANNING PHASE RESULTS

3. ENGAGEMENT WITH JURISDICTIONS OR AGENCIES

In the Spring of 2020, AES commenced engagement with IAAC. In May of 2020, IAAC confirmed the need for an IPD. AES met with IAAC several times between May 2020 and January 2021 to discuss the Project and the approach to the IPD. AES submitted the IPD to IAAC on January 13, 2021. After submission of the IPD, IAAC engaged Indigenous Communities, Federal Agencies, and the general public to solicit comments on the Project. These comments were consolidated into a Summary of Issues, issued by IAAC on March 1, 2021. The Summary of Issues was considered and responded to as part of the preparation of the DPD. Engagement with IAAC will continue as required.

The Alberta Energy Regulator (AER) is the primary regulator of the subsurface and surface components of the Project, including in relation to environmental effects. Engagement with the AER was initiated in February 2021, and to date has consisted of discussions to determine the regulatory requirements for certain potential project alternatives for brine storage. Engagement with the AER will continue throughout the approval phase and up to completion of construction, and then continue throughout the operations phase as approval conditions are maintained and reporting requirements are met.

AES has also engaged other provincial and municipal authorities responsible for issuing authorizations for the Project, including Alberta Environment and Parks (AEP), and Strathcona County. Engagement with these authorities will continue as required.

In December 2020, formal engagement of area stakeholders began with the provision of project information packages to various federal, provincial and municipal agencies and governments, local landowners, occupants, and residents, mineral rights holders and regional associations. No issues were directly raised with AES during this initial engagement. Additional information regarding the Project was requested by one nearby industrial stakeholder after receipt of the Project Information Package.

Nine individual stakeholders attended the IAAC-led Virtual Engagement Session held on February 8, 2021, seven of which were members or representatives of First Nations or Métis organizations and one of which was known to be a member of an industrial association associated with the AIH. Four members of the public submitted formal comments or concerns on the Project via the IAAC-led engagement on the IPD.

The Summary of Issues and AES' responses to those issues is provided in Appendix A of the DPD.

Engagement and consultation activities will continue throughout permitting, construction, operation and decommissioning of the Project in accordance with applicable regulatory requirements and at the request of interested stakeholders to respond to any arising concerns or requests for information, and to assist in the preparation of regulatory applications. AES is committed to working with all stakeholders throughout all phases of the proposed Project to ensure any issues are addressed and concerns are appropriately mitigated. This will also support the identification of different needs and ensure transparency and inclusivity, including the removal of barriers to participation for under-represented groups over the life of the Project.

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4. ENGAGEMENT WITH INDIGENOUS GROUPS

Building respectful and mutually beneficial relationships with Indigenous Communities, their Peoples and their businesses has long defined how AES does business. The foundation of those relationships is respect, transparency, and trust. Together with its Indigenous partners, AES is continually exploring new ways to collaborate.

AES believes in the importance of reconciliation and conducts and develops relationships with the principle for free, prior and informed consent in mind, and in the spirit of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) and Canada's Truth and Reconciliation Commission's Calls to Action. AES' Indigenous strategy is captured by four Es: Engagement, Economic participation, Education and Employment.

AES, in conjunction with IAAC, identified 33 First Nation, Métis Settlements, and Métis Regions (Indigenous Communities) that were engaged prior to the IAAC-led engagement period. One additional Indigenous Community, (Kelly Lake First Nation), submitted a formal response on the IPD. Additionally, Sucker Creek First Nation submitted a Letter of Support for the Project directly to AES. AES has since engaged both of these communities.

The AIH is located to the northeast of Fort Saskatchewan, Alberta and adjacent to the North Saskatchewan River. The North Saskatchewan River or *kisiskâciwanisîpiy* (Cree) has been an important waterway for Indigenous Groups since before contact with European explorers. While the Project lands are privately owned, Indigenous Communities were identified as those communities who had historically used the area in and around the proposed Project for traditional uses including hunting, fishing, plant gathering, and spiritual use. Some Indigenous Communities engaged as part of Project planning and engagement noted that acknowledgement of the Indigenous language names such as *kisiskâciwanisîpiy* were a means of cultural education and facilitation. Use of these names, or acknowledgement of the origin of Indigenous language place names in current use (e.g., Astotin Creek is named after *Astotin*, the Cree word for "hat") helps to facilitate cultural knowledge transfer and a historical connection with the land.

The following timeline generally summarizes AES-led engagement to-date with Indigenous Communities.

- AES initiated engagement with each of the initial 33 Indigenous Communities at the beginning of December 2020 with the distribution of a Project Information Package on the proposed Project. The package included information regarding the scope of the proposed Project, its location, schedule, contact information, and information specific to AES' existing presence and operations in the area. No formal concerns or issues were raised by any Indigenous Communities prior to submission of the IPD.
- Following the initiation of the IAAC-led stakeholder engagement process on January 25, 2021, AES sent follow up emails to the 24 Indigenous Communities formally engaged by IAAC to advise them that the IPD had been posted to the IAAC website and that comments could be submitted through the IAAC-led engagement process or directly to AES.
- Based on responses and interest of Indigenous Communities engaged, AES had two-way discussions with a total of seven Indigenous Communities to discuss general comments, questions, concerns or requests for more information. These discussions occurred prior to and during the IAAC-led engagement period, which ended February 16, 2021.

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- Following receipt of the IAAC Summary of Issues, AES formally reached out to the seven Indigenous Communities who submitted formal comments to discuss their concerns, address any questions and support determining how AES could mitigate or address their comments. This included one First Nation (Kelly Lake First Nation) who had not yet been engaged through the IAAC- or AES-led engagement processes but who submitted formal comments through the IAAC led stakeholder engagement process. This also included initial dialogue with Kikino Métis Settlement and Métis Nation of Alberta Region 2, increasing the number of Indigenous Communities engaged to ten.
- In late March, one First Nation (Sucker Creek First Nation) contacted AES directly to provide a Letter of Support for the Project and to discuss potential procurement opportunities in partnership with the First Nation's joint-venture partner. This First Nation was not engaged by AES or IAAC prior to or during the IAAC engagement process and did not submit comments through the IAAC-led engagement process. This increased the total number of Indigenous Communities engaged to eleven.

Indigenous Communities included to-date in AES' engagement activities are listed in Table 1. Engagement to-date has been community-specific and includes distribution of initial Project Information Packages, formal notification by IAAC about the Project during their IAAC-led engagement process, follow up emails after the IPD was posted to the IAAC registry and the comment period officially began, submissions of formal comments to IAAC through the IAAC-led engagement, and two-way discussions between AES and the Indigenous Community both before or after the closure of the public comment period on February 16, 2021. No in-person engagement has taken place to-date due to concerns and restrictions arising from the COVID-19 pandemic.

Table 1 also includes the proximity of these Indigenous Communities' bands offices, reserve lands, or mailboxes to the proposed Project. AES acknowledges that these Indigenous Communities may have historic reserves, camp sites, and other connections to lands in closer proximity to the Project including historical use of the lands for traditional purposes.

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Table 1: Indigenous Groups Engaged during the Initial Planning Phase and their Proximity to the Proposed Project

Indigenous Community	Distance from Project	Engagement To-Date					
		Received PIP ¹	IAAC-led engagement ²	IPD follow up ³	Submitted comments ⁴	Engagement before Feb 16 ⁵	Engagement after Feb 16 ⁶
Treaty 6							
Alexander First Nation	NW 51 km	X	X		X	X	X
Alexis First Nation	W 90 km	X					
Beaver Lake Cree Nation	NE 120 km	X	X				
Enoch Cree Nation #440	SW 60 km	X	X	X		X	
Ermineskin Cree Nation	S 120 km	X	X	X			
Kehewin Cree Nation	E 150 km	X	X			X	
Louis Bull Tribe	S 110 km	X	X				
Montana First Nation	S 125 km	X	X	X		X	
O'Chiese First Nation	SW 185 km	X					
Paul First Nation	W 90 km	X	X	X			
Sunchild First Nation	SW 200 km	X					
Saddle Lake Cree Nation	NE 91 km	X	X	X			
Samson Cree Nation	S 115 km	X	X	X		X	
Whitefish Lake First Nation #128	NW 270 km	X	X				
Treaty 7							
Bearspaw First Nation (Stoney Nakoda Nations)	SW 315 km	X	X				
Blood Tribe	S 480 km	X					
Chiniki First Nation (Stoney Nakoda Nations)	SW 315 km	X	X				
Piikani Nation	SW 485 km	X	X				
Siksika Nation	S 335 km	X	X				
Stoney Nakoda Nations	SW 325 km	X		X		X	X
Tsuut'ina Nation	SW 335 km	X					
Wesley First Nation (Stoney Nakoda Nations)	SW 315 km	X	X				
Treaty 8							
Chipewyan Prairie Dene Nation	NE 120 km	X				X	
Sucker Creek First Nation	NW 260 km						X
Alberta Métis							
Métis Nation of Alberta – Region 4	SW 39 km	X	X				
Lac St. Anne Métis (Gunn Métis Local 55)	SW 70 km	X	X	X	X		
Buffalo Lake Métis Settlement	N 90 km	X	X				
Kikino Métis Settlement	NE 90 km	X	X		X		X
Elizabeth Métis Settlement	NE 195 km	X	X				

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Table 1: Indigenous Groups Engaged during the Initial Planning Phase and their Proximity to the Proposed Project

Indigenous Community	Distance from Project	Engagement To-Date					
		Received PIP ¹	IAAC-led engagement ²	IPD follow up ³	Submitted comments ⁴	Engagement before Feb 16 ⁵	Engagement after Feb 16 ⁶
Fishing Lake Métis Settlement	E 180 km	X					
Métis Nation of Alberta – Region 2	NE 160 km	X			X		X
Non-Treaty Nations							
Descendants of Michel First Nation	NE 200 km	X	X		X		
Friends of Michel First Nation Society (Michael First Nation)	NE 200 km	X	X	X	X		
Foothills Ojibway First Nation	W 300 km	X	X				
Kelly Lake First Nation	NW 475 km				X		X

¹ AES sent the Project Information Package to these Indigenous Communities via email or letter mail.

² These communities were contacted by IAAC as part of the IAAC-led engagement. This does not include Indigenous Communities who were not engaged and chose to submit their own comments to IAAC on the Project.

³ AES reached out to these communities via email to advise them that the IPD was available on the IAAC website for review or to follow up on submission of their comments on the IPD.

⁴ These Indigenous Communities submitted formal comments to IAAC during the IAAC-led engagement period.

⁴ These Indigenous Communities engaged in email exchanges, phone calls or meetings with AES prior to the end of the IAAC-led engagement period.

⁵ These Indigenous Communities engaged in phone calls or meetings with AES after the end of the IAAC-led engagement period.

Members of six Indigenous Communities participated in the IAAC-led Virtual Engagement Session held on February 8, 2021 conducted by IAAC, including Kelly Lake First Nation who was not originally engaged by AES or IAAC. The seven Indigenous Communities that formally submitted letters of comment to IAAC were Alexander First Nation, Descendants of Michel First Nation Association, Gunn Métis Local #55 (Lac Ste. Anne Métis), Kelly Lake First Nation, Kikino Métis Settlement, Métis Nation of Alberta Region 2, and Michel First Nation. Of these seven Indigenous Communities who provided formal feedback to IAAC, discussions have been held to date with four communities to discuss their comments and potential mitigation measures to address their concerns. Continued engagement with the remaining three Indigenous Communities who submitted comments via the IAAC process and any other Indigenous Communities who did not submit comments will continue as may be requested.

To date, a total of eleven Indigenous Communities have engaged directly with AES through teleconference calls, email exchanges, and requests for additional Project information. Additional information has been provided through conversation as well as through email and delivery of Project-specific graphics and shapefiles. The Indigenous Communities AES has directly engaged to date are: Alexander First Nation, Chipewyan Prairie Dene First Nation, Ermineskin First Nation, Kehewin Cree First Nation, Kikino Métis Settlement, Kelly Lake First Nation, Métis Nation of Alberta Region 2, Montana First Nation, Samson Cree Nation, Stoney Nakoda Nations, and Sucker Creek First Nation.

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Areas of interest and concerns discussed with the eleven Indigenous Communities engaged to-date are provided below. These items are addressed specifically in the DPD, and generally throughout this DPD summary.

- Understanding how caverns work
- Depth of the caverns in relation to groundwater
- Applicability of newly issued provincial water management plans on the Project (upon review, these plans were not applicable and were specific to upstream oil and gas production)
- Use of fresh water during Project construction and operation
- Potential impacts to tributaries of the North Saskatchewan River
- Importance of water to the Métis experience
- Environmental fate of water and brine used for the Project
- Cumulative development in the AIH
- Project location relative to Traditional Use Lands
- Potential for the Project to have downstream effects to Traditional Land Users by creating a larger avoidance zone and putting more pressure on existing Traditional Use areas
- Ground truthing of traditional and cultural use sites
- Potential effects to cultural or heritage resources
- Involvement in discovery of cultural or heritage resources
- Capacity for cultural education
- Potential procurement or employment opportunities
- Site visits (Site visits will be coordinated with Indigenous communities as part of ongoing Project engagement and following the lessening of COVID-19 restrictions)
- Land use after reclamation
- Loss of cultural traditions and language through employment or activity in the traditional western economy

Comments and concerns provided directly to IAAC through the IAAC-led engagement process and provided to AES in the IAAC Summary of Issues are identified in Appendix A of the DPD. Appendix A includes reference to where in the DPD or its Appendices AES has provided responses to these issues and how AES plans to address or mitigate them.

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A Pre-Consultation Assessment Request will be submitted to the Alberta Aboriginal Consultation Office (ACO) for their consultation intensity recommendation for the Project. Once a response is provided, AES will follow the recommendation of the Government of Alberta. AES does not anticipate that consultation with First Nations or Métis Settlements will be required by the ACO due to the land ownership, location, and nature of the proposed Project.

AES (through ATCO) has an established Consultation Fee Schedule that is used to allocate consistent and fair Project or Activity Fees to Indigenous Communities engaged by AES. As part of AES' direct engagement with Indigenous Communities, AES has offered compensation in accordance with the Consultation Fee Schedule to facilitate engagement activities through the payment of Submission Fees or Administration Fees. Indigenous Communities were also eligible to apply for funding provided from IAAC to assist the communities with their participation in the IAAC process for the Project.

AES will continue to engage with these, and any additional Indigenous Communities interested in the proposed Project and is currently looking at alternatives to site visits (such as virtual tours) to protect the health and safety of AES workers and Indigenous Communities while COVID-19 remains a risk.

AES is committed to long-term and mutually beneficial relationships with Indigenous Communities. As part of Project planning, construction, and operation, AES will continue to engage with Indigenous Communities and provide updates on Project activities and potential opportunities for economic or educational participation. This approach will be refined on a Community-specific basis to ensure that updates and opportunities are provided in accordance with each Indigenous Community's consultation and engagement protocol. This will also support the identification of different needs and ensure transparency and inclusivity, including the removal of barriers to participation for under-represented groups over the life of the Project.

AES is also committed to ensuring that interested Indigenous Communities are informed of incidental discoveries of any archaeological or cultural heritage resources as a result of Project activities. AES is committed to open and honest engagement with Indigenous Communities on the potential effects of the Project, including providing opportunities to review environmental mitigation measures (e.g., Environmental Protection Plans, Discovery of Heritage and Archaeological Resources Contingency Plans), opportunities for economic involvement, and engagement on decommissioning, remediation and reclamation of the Project. In the event that AES plans to trench a pipeline crossing of a wetland or water body, AES is open to engaging with interested Indigenous Communities to discuss mitigation measures prior to submitting the *Code of Practice for Pipelines and Telecommunications Lines Crossing a Water Body* (GoA 2013) Notification to AER.

Future engagement activities will vary depending on the nature and extent of impacts on communities, and how each Indigenous Community wants to be engaged. Following recovery from the COVID-19 pandemic, or earlier if provincial restrictions are lifted, AES will begin to engage with Indigenous Communities through in-person engagement, including providing site visits to those Indigenous Communities who are interested. AES is currently looking at alternatives to site visits (such as virtual tours) to protect the health and safety of AES workers and Indigenous Communities while COVID-19 remains a risk. Engagement in 2021 will continue to be conducted through teleconference, telephone, video meetings, and email or mailed information requests as much as practicable.

ATCO SALT CAVERN STORAGE EXPANSION PROJECT

5. REGIONAL ASSESSMENTS AND RELEVANT ENVIRONMENTAL STUDIES

The proposed Project is located within the AIH. The AIH is a joint land use planning and development initiative between five municipalities in the Edmonton Capital Region to attract investment to the region. It is the largest hydrocarbon processing region and one of the most established value-add manufacturing centres in Canada, making the region a critical partner in Canada's energy future (AIHA 2020). The AIH is guided by the Alberta Industrial Heartland Association (AIHA), a non-profit association of municipalities dedicated to sustainable eco-industrial development (AIHA 2020).

No regional assessments as defined in Sections 92 and 93 of the *Impact Assessment Act* have taken place in the AIH.

The proposed Project will be subject to the Strathcona County Alberta Industrial Heartland Area Structure Plan, and the Strathcona County Municipal Development Plan. Additional regional plans which the proposed Project will be subject to include the Fort Air Partnership, Cumulative Effects Management Framework, Water Management Framework for the Industrial Heartland and Capital Region, the Capital Regional Air Quality Management Framework, the Northeast Capital Industrial Association Regional Noise Management Model, Regional Noise Management Plan, and the North Saskatchewan Regional Planning process.

Several regional initiatives are also in development, which could be applicable to the Project. These include the *North Saskatchewan Regional Plan*, the *Air Management Framework for the Industrial Air Management Area* and the *NCIA Regional Groundwater Management Framework* that will be developed by the Government of Alberta as part of the North Saskatchewan Regional Plan planning process and directive.

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6. STRATEGIC ASSESSMENTS

The AIH has not been the subject of a strategic assessment under section 95 of the *Impact Assessment Act*.

The Strategic Assessment of Climate Change (SACC; ECCC 2020) developed by Environment and Climate Change Canada (ECCC) applies to all projects designated under the *Impact Assessment Act*.

An estimate of GHG emissions associated with the proposed Project was calculated in accordance with the requirements of Section 3 of the SACC. The proposed Project will not have upstream GHG emissions greater than or equal to the thresholds outlined in Table 1 of Section 3.2.2 of the SACC. Estimated emissions are discussed in Section 23 of this DPD Summary and are provided in Section 23 and Appendix C of the DPD. Overall, the GHG emissions associated with Project construction and operation are low in magnitude when compared to provincial and national emission totals.

The proposed Project has a lifespan of 25 years and is expected to be in operation from 2024 to 2049. As the proposed Project is expected to cease operations prior to 2050, a formal plan to achieve net-zero emissions by 2050 is not required in accordance with Sections 1.1, 4.2 and 5.3 of the SACC. However, AES will evaluate opportunities to reduce Project-related emissions throughout the operations phase and will ensure decommissioning activities meet net-zero requirements.

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PART C: PROJECT INFORMATION

7. PROJECT PURPOSE AND NEED

The purpose of the Project is to expand the NGL storage capacity at AES' existing Strathcona Salt Cavern Storage Facility to serve additional customers. The proposed Project will add 400,000 m³ of NGL storage capacity to serve customers in the AIH. The NGL products stored in the caverns will be entirely owned and used by third parties.

Benefits associated with the Project include an increase in direct and indirect employment in the region, spend in local communities on contractors, products and services, including where possible, Indigenous-owned businesses, and increased provincial and municipal tax revenues, among others.

Concerns have been raised with respect to the potential for NGL storage projects to result in increased upstream oil and gas activities. The correlation between NGL storage projects and upstream natural gas production is considered the reverse. Global and regional market demand factors, including the transition away from higher carbon intensive fuels like coal, will likely result in increased natural gas production, which would necessitate NGL storage facilities to accommodate the predicted growth.

ATCO SALT CAVERN STORAGE EXPANSION PROJECT

8. PHYSICAL ACTIVITIES REGULATION

The proposed Project is subject to Section 38(f) of the Schedule of the *Physical Activities Regulation*:

“38 The expansion of one of the following: (f) an existing natural gas liquids storage facility, if the expansion would result in an increase in storage capacity of 50% or more and a total storage capacity of 100 000 m³ or more.”

AES was required to submit an IPD for the proposed Project because the total NGL storage capacity at AES' existing Strathcona Salt Cavern Storage Facility is approximately 430,000 m³ with an additional 100,000 m³ under construction. The increase in storage capacity that would result from the proposed Project is approximately 400,000 m³, which represents an increase in the total volume of storage that is more than 50% and greater than 100,000 m³.

No other criteria presented in the Schedule to the *Physical Activities Regulation* are applicable to the proposed Project.

ATCO SALT CAVERN STORAGE EXPANSION PROJECT

9. PROJECT ACTIVITIES AND PHYSICAL WORKS

The proposed Project will be an expansion of AES' existing Strathcona Salt Cavern Storage Facility. Existing infrastructure includes four NGL caverns, a product handling facility, a brine pond and auxiliary buildings. These facilities have been in operation since 2016. A fifth cavern is currently under development and will be operational in 2022.

The proposed expansion Project consists of the construction and operation of four new underground salt caverns and associated surface facilities and infrastructure for the storage of NGL products. The existing Strathcona Salt Cavern Storage Facility and the proposed Project, including development areas currently under consideration and pending final design, are shown in Figure 2.

All Project facilities related to this expansion are proposed to be developed on land, and within mineral rights, owned or controlled by AES. Three of the four caverns are targeted for commercial operation in mid-2024. The fourth cavern is targeted for commercial operation at the end of 2024.

Project Components

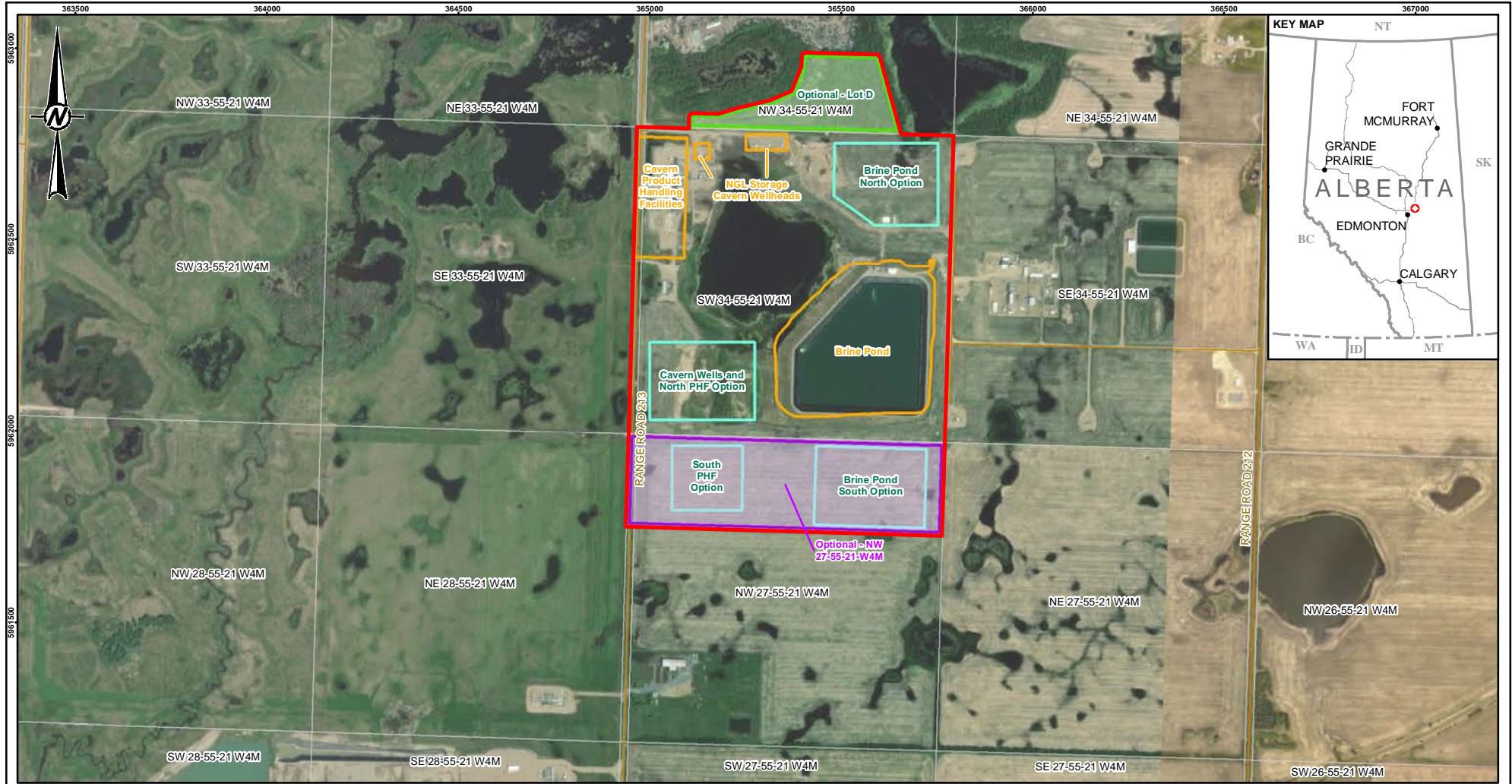
New Infrastructure Associated with the Project

The proposed Project includes the development and operation of four underground salt caverns. The NGL products proposed to be stored in the caverns are propane, butane and condensate. The caverns will be developed in the Lotsberg formation, the top of which is located approximately 1,800 m below surface. Once developed, each cavern will have an approximate total volume of 120,000 m³ and will have a working NGL product storage capacity of approximately 100,000 m³. Figure 3 shows a scale diagram of salt caverns, once developed.

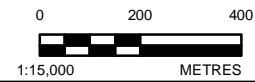
Four wells will be drilled and completed for cavern development. The caverns will be developed within AES mineral rights and entirely within SW 34-55-W4M. Following well completion activities, an application for approval of the storage scheme will be submitted to the AER. Following AER approval of the storage scheme, the wells will be used for cavern development and ultimately for cavern operations after development is finished.

A brine pond, (or alternatively a set of brine storage tanks), and a brine pump house will be used in the operation of the storage caverns. During injection of NGL product into a cavern, brine is displaced from the cavern and is stored for future use. During withdrawal of NGL product from the cavern, brine is pumped from the brine storage back into the cavern. AES is currently considering two options for brine storage: i) a storage pond as originally identified in the IPD; or ii) storage tanks. For the purposes of the DPD, AES is assuming a brine pond will be selected but has included applicable information on the tank storage option where relevant or supportive.

The brine pond will hold a maximum of approximately 400,000 m³ of brine with a nominal depth of 8 m and will occupy an area up to approximately 120,000 m² (12 hectares). The brine pond may consist of a single cell or two cells, each with a volume of approximately 200,000 m³. The brine pond will be surrounded by a fence at the top of the slope to limit access by terrestrial wildlife and the public. As brine is displaced into the pond from the caverns, it will flow through a brine separator/de-gasifier vessel to ensure no NGL products enter the brine pond.



- PROJECT SITE
- OPTIONAL - LOT D
- OPTIONAL - NW 27-55-21 W4M
- SITE PLAN - EXISTING FACILITY
- SITE PLAN - NEW FACILITY
- LOCAL ROAD



CLIENT
ATCO ENERGY SOLUTIONS

CONSULTANT



YYYY-MM-DD	2021-03-31
DESIGNED	SL
PREPARED	NF
REVIEWED	CES
APPROVED	DV

REFERENCE(S)

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PROJECTION: UTM ZONE 12 DATUM: NAD 83

PROJECT

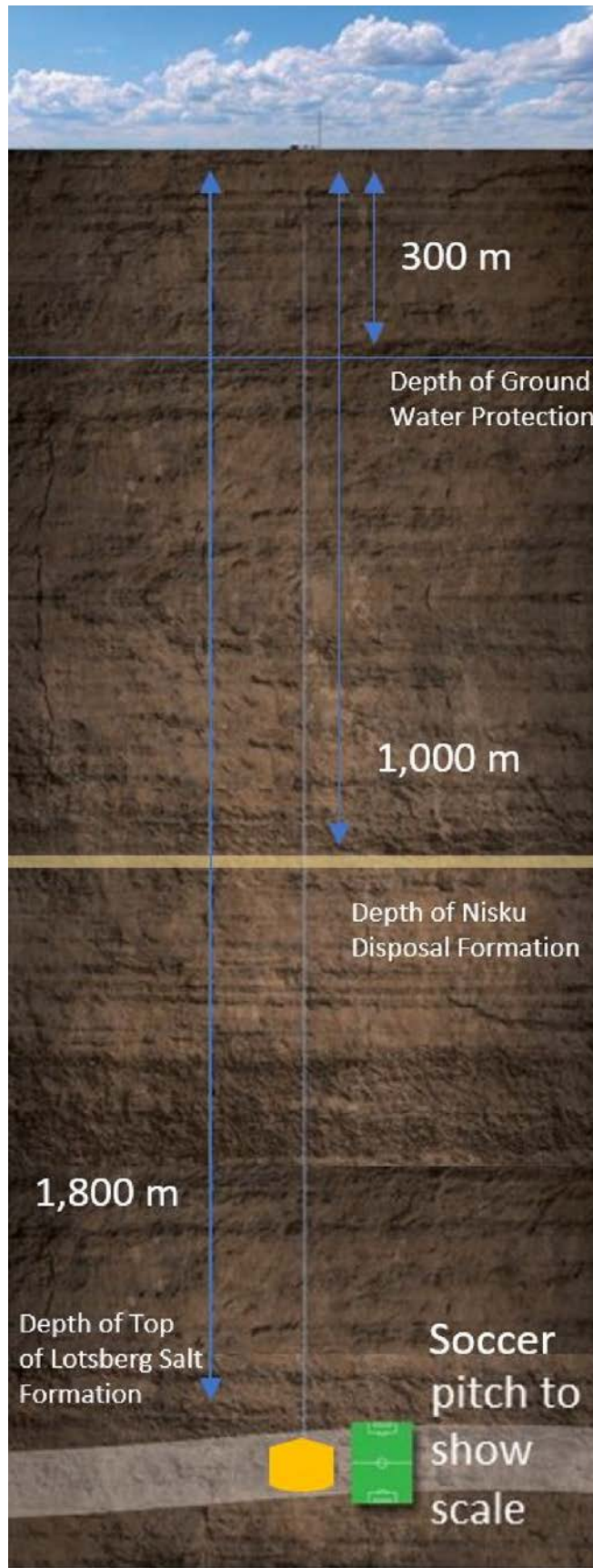
PROPOSED ATCO SALT CAVERN STORAGE EXPANSION PROJECT

TITLE

SITE PLAN

PROJECT NO.	CONTROL	REV.	FIGURE
123513692-0034		0	2

25mm IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET HAS BEEN MODIFIED FROM ANS/A



CLIENT
ATCO ENERGY SOLUTIONS

PROJECT
PROPOSED ATCO SALT CAVERN STORAGE EXPANSION PROJECT

CONSULTANT

YYYY-MM-DD 2021-03-31

TITLE

SALT CAVERN DEVELOPMENT (TO SCALE)

DESIGNED SL

PREPARED CES

REVIEWED NF

APPROVED DV

PROJECT NO. CONTROL
123513692-0028

REV.
0

FIGURE
3



ATCO SALT CAVERN STORAGE EXPANSION PROJECT

If brine storage tanks are selected, six tanks will hold a combined volume of approximately 300,000 m³. These tanks would be approximately 12 metres tall and 80 metres in diameter and would occupy approximately 60,000 m² of land (6 hectares). The brine tanks will operate essentially the same as a brine pond.

The brine pump house will be used to withdraw NGL products from the caverns. The brine pump house will contain approximately 900 kW of electrically driven pumps capable of moving up to approximately 1,300 m³ per hour of brine into the caverns.

The NGL product are required for the delivery of NGL products into and out of the storage caverns handling facilities and consist of pumps, product processing equipment, and related auxiliary facilities. Pumps and product processing equipment include: electrically driven pumps (approximately 9000 kW) for injecting the NGL products into the caverns; filtration and separation equipment to condition the products withdrawn from the caverns; associated utility systems including electrical, controls, instrument air and flare; and dehydrators to remove any water from the products prior to delivery to the pipeline systems. The design capacity of product injection and withdrawal from the NGL product handling facilities will be up to 330 m³ per hour per product, based on the customer needs for each of the NGL products.

An internal site road network will be developed to provide operator access to the various process areas. Strathcona County will develop an access approach from Range Road 213 to AES' proposed site. This access will be for AES' sole use. The specific location of the required access road will be determined during the detailed design phase of the Project in coordination with Strathcona County.

Other Infrastructure

Two new cavern washing pipelines, approximately 900 m long for each of fresh water and brine, will be constructed to connect the existing cavern washing infrastructure and brine disposal wells to the new salt cavern wells. These lines will be used in the development and future operation of the salt caverns.

One new brine disposal well will be developed for the proposed Project. This disposal well will be completed in the Nisku Formation approximately 1,000 m below surface. AES holds an existing disposal scheme (Approval #7900C, as amended), issued by the AER, to dispose of brine into the Nisku formation and will amend the existing disposal scheme to add the new well, which will be utilized for the disposal of brine during cavern mining. This existing disposal scheme has been in place since 1982. The Project would utilize the existing and new disposal wells primarily during Project construction to support cavern washing and disposal of brine. Disposal activities will taper out as the caverns near completion and saturated brine is directed to the brine pond.

Two pipelines, each less than 5 kilometres in length, will be constructed to convey NGL product to and from AES' customer. These pipelines will be installed within a single pipeline ROW.

Existing Facilities to Support Project Development

AES owns and is the operator of an existing cavern washing facility and of associated water and brine pipelines. This cavern development infrastructure, which was used in the development of AES' existing Strathcona Salt Cavern Storage Facility will also be used to develop the caverns for the proposed Project.

ATCO SALT CAVERN STORAGE EXPANSION PROJECT

AES also owns and operates a multi-user, industrial water system consisting of an intake and pump station on the North Saskatchewan River and which includes an existing pipeline from the river pump station to the cavern washing facility. Water for cavern washing will be provided through this existing intake. The water works and diversion licences are under Water Act Approval 346745-00-00 and Water Act Licence numbers 31016-00-00 and 327841-00-04, respectively. No amendments to AES' existing Water Act Licences or Intake Approval are required to support the development of the caverns for the Project. The proposed Project will not require an increase in water withdrawal rates or volumes. No work at the site of the existing intake is required.

As discussed above, AES currently holds an existing brine disposal Scheme (AER Scheme Approval 7900C). An existing well associated with this Scheme, owned and operated by AES, will be utilized to support disposal of brine generated by cavern washing. This disposal well is completed in the Nisku Formation approximately 1,000 m below surface. This disposal scheme has been in use since 1982.

Natural gas and electricity utility service will be extended to the proposed Project site by the local utility operators.

Permanent and Temporary Structures

Permanent structures will consist of electrical and control buildings, surface piping, treating facilities, pumps, pipelines for water, brine, and onsite product, NGL pipelines, brine storage, wellsite facilities, and four underground storage caverns.

During construction, temporary structures will be required for construction offices, equipment storage, workforce muster points, and various other functions. The temporary structures will be similar to those typically used on construction sites of this size (e.g. integrated workforce trailer systems). Temporary equipment, consisting of pumps and tanks, will be also used during the cavern development operations.

The Strathcona County Development Permit process applies to use of temporary structures and equipment, including the placement of these structures during construction and removal of these structures from the site once construction is complete.

Project Activities

Project activities, including construction, operation and decommissioning, are solely for the benefit of AES, which is building the Project infrastructure to provide services required by our customer. The activities to be performed in relation to the proposed Project are described under the following categories:

- Construction of the components of the Project
- Operation for the life of the Project (25 years)
- Decommissioning of the Project facilities following completion of operations

ATCO SALT CAVERN STORAGE EXPANSION PROJECT

Construction

The construction activities required for the proposed Project will be within the care and control of AES. Various mechanical, civil, structural, electrical and other service contractors will be retained to perform activities required for drilling, brine pond and pumphouse construction, pipeline construction and product handling facility and related surface construction. These contractors will be procured as service providers to AES and any ability of these contractors to direct or influence the carrying out of the activity will be limited to related safety and environmental management activities (e.g. prime contractor responsibilities).

Third party infrastructure required to support the Project but outside of the care and control of AES consists of the power line extensions and gas utility connections required into the Project site to support the new infrastructure. Power line extension and natural gas utility connections into the Project site will be under the care and control of the local utilities.

The cavern wells will be drilled to a depth of approximately 1,900 metres, terminating in the Lotsberg formation. The wells will be completed for water injection to develop the caverns. Cavern wells will be cased and cemented to protect surface and groundwater. The surface casing, which is the initial containment of injected substances, will be set below the base of groundwater protection (i.e., the surface casing will extend through all shallow groundwater and will terminate at least 300 metres below the ground surface). The production casing will be set into the top of the Lotsberg formation, providing additional containment of injected substances and preventing products injected and withdrawn from interacting with the groundwater table or other formations or geology. Refer to Figure 3 for a scale diagram of these features and resulting caverns.

The caverns will be developed by injecting fresh water into the newly drilled wells to dissolve the salt and create a brine solution which is pushed out of the cavern by the injected fresh water. The brine will be disposed of through disposal wells into a deep secure formation (the Nisku Formation), approximately 1,000 metres below surface. This process occurs until the desired cavern size is achieved. As mining nears completion, and once brine becomes more saturated, brine will be retained and stored onsite for use during operations. As customers send product to the facility for storage, the brine that is stored in the cavern is displaced and stored in the brine pond. As customers withdraw product, brine is pumped from the brine pond back into the cavern.

Following the completion of mining, wellbores will be converted for NGL storage. To demonstrate cavern integrity and obtain approval for product storage, various tests will be performed, and the results will be evaluated as part of the approval process by the AER. These tests include mechanical integrity testing to validate and prove integrity of the caverns and containment, cement bond logs, and casing integrity logs. These tests also establish baseline conditions, which are monitored over life of the wells and caverns.

AES holds two existing *Water Act* diversion licences for the purposes of cavern mining. These licences will be utilized for the proposed cavern mining and no additional water diversion licences will be required. As the Project will be utilizing existing water allocations through AES' existing and approved *Water Act* diversion licences, the Project will not result in any changes to existing allowable water withdrawals from the North Saskatchewan River. In the event of low-flow conditions, water use would be managed by the terms and conditions of AES's existing *Water Act* diversion licences and based on the priority numbers of these existing licences.

The AER is responsible for regulating cavern development in Alberta.

ATCO SALT CAVERN STORAGE EXPANSION PROJECT

To develop the brine pond, the brine pond area will be excavated, and berms will be constructed to create the desired brine pond volume. Dewatering will be required during the excavation of the brine pond and will be conducted in accordance with the conditions of *Water Act* Approval to dewater the area for construction and in accordance with the *Water Act* (Dam Safety) Approval and EPEA Approval, as amended. Based on AES's experience with existing operations in the area and the proximity to the existing brine pond, it is expected that groundwater levels will return to pre-excavation conditions after construction of the brine pond is complete. Two layers of high-density polyethylene (HDPE) liner will be installed in the pond excavation, between which a leak detection system will be installed. The leak detection system will be comprised of a network of weeping tile piping connected to sumps. A secondary system will also be used to control groundwater beneath the bottom liner.

In the event that brine is stored in tanks instead of a brine pond, topsoil will be stripped from the tank area and stockpiled. The foundations for the tanks will be constructed by excavating to the required depth and installing structural fill material. The tanks will be built by welding the sheet panels into place, after which the impermeable liners and interstitial leak detection systems will be installed. The tanks would be equipped with redundant high brine level alarms and automatic shutdowns to prevent overfilling. AES will comply with all applicable storage construction and operation requirements.

The brine pump house will be constructed in conjunction with the brine pond or brine tanks. Once the location has been excavated to the required depth, the structure of the pump house will be constructed, followed by installation of mechanical and electrical components and the pump house building. Dewatering will be required for the excavation for the brine pumphouse and will be managed using the same processes and requirements as dewatering for the brine pond.

The AER will be responsible for regulating brine pond or brine tank storage development and operation, including issuing an EPEA Approval Amendment, a *Water Act* (Dam Safety) Approval, and a *Water Act* Approval for dewatering activities. If brine storage tanks are utilized, AES will obtain an EPEA Approval Amendment and an Alternative Storage Approval under *Directive 055: Storage Requirements for the Upstream Petroleum Industry* (AER 2001). Strathcona County will also be responsible for regulating development of the brine storage through a Development Permit.

Construction of the product handling facility will begin with site preparation and grading. Once the site has been prepared, buried utilities will be installed, followed by building foundations, above ground piping, pumping and dehydration equipment, instrument air, flare system and other utilities, and electrical and control buildings.

The AER will be responsible for regulating development and operation of the product handling facility. Strathcona County will also be responsible for regulating development of the product handling and auxiliary facilities through a Development Permit.

Construction of the brine disposal well will commence with stripping the topsoil from the well pad area, followed by grading and gravelling of the well pad. A disposal well will be drilled to a depth of approximately 1,000 m, terminating in the Nisku Formation. After drilling has finished, the well will be completed in accordance with *AER Directive 051: Injection and Disposal Wells – Well Classifications, Completions, Logging, and Testing Requirements* (AER 1994). The well will be drilled to the top of the Nisku Formation and cased with both surface and production casings to protect surface and groundwater. The surface casing will be set below the base of groundwater protection (i.e. the surface casing will extend through all shallow groundwater and will terminate below the base of groundwater protection). The production casing will be set into the top of the Nisku formation, providing additional containment and preventing fluids disposed of through the well from interacting with the groundwater table.

ATCO SALT CAVERN STORAGE EXPANSION PROJECT

Construction of the NGL pipelines will commence with stripping the topsoil from the route, followed by excavating the required trench, installing the piping, and backfilling. Horizontal Directional Drilling, a trenchless installation method, will be used to install the pipelines under Astotin Creek. Once construction is complete, this disturbed area will be restored. The AER will be responsible for regulating development (and operation) of these pipelines.

Extension of electric and natural gas services will be conducted in accordance with the requirements of AES' utility providers.

Operation

The operation of the proposed Project will be within the care and control of AES. The main facilities associated with operating the Project are the caverns, which will contain either brine or product at all times, the product handling facility which includes pumps, separators and dehydrators that will transfer the NGL products into or out of the storage caverns to meet customer requirements, and the brine pond which will facilitate product injection and withdrawal. Maintenance activities on these facilities will be ongoing throughout the operating life of the facilities.

Specific operations, maintenance, and integrity manuals are in place for AES' existing facility and will be updated for the new infrastructure to ensure well, pipeline, and other equipment integrity over the life of the facility. These manuals are based on requirements of the *Oil and Gas Conservation Act* and *Pipeline Act* and associated Regulations, Directives, Codes and Standards. AES has also implemented asset-specific integrity programs and specific Operating Procedures and Preventative Maintenance programs for the facility and reviews and updates these procedures, manuals and programs at least every three years.

The caverns are operated following approval of a cavern storage scheme issued by the AER. The approval to utilize the caverns for storage is dependent on a detailed evaluation of cavern and wellbore integrity and safety systems. Following initial approval, the AER maintains regulatory authority and oversight of the caverns throughout its operational phase. The caverns are operated as per the requirements of CSA Z341.2-18 *Storage of Hydrocarbons in Underground Formations* (CSA 2018) to ensure their ongoing integrity throughout the operating phase. This includes engineered safety systems to ensure pressure and flow rates are operated at or below specific operating pressures at all times, and as required by CSA Z341.2. It also includes routine monitoring and testing of safety systems and periodic testing of cavern and wellbore integrity through mechanical integrity tests and full well workovers.

The impermeability of salt to hydrocarbon products makes salt caverns ideal to use for NGL storage. In addition, the depth and pressure of the caverns makes the salt slightly deformable, which allows it to self-seal any micro cracks that could occur. The caverns are full of NGL product and/or brine at all times and operate at a pressure similar to the surrounding rocks, which enables and maintains cavern stability and the stability of the surrounding salt formation.

The brine pond and pumphouse will be operated as per amendments to AES' existing EPEA Approval and as per a *Water Act* (Dam Safety) Approval, and *Water Act* (dewatering) Approval issued by the AER. A specific Dam Safety Management Plan and Operations, Maintenance, and Surveillance (OMS) Manual is in place for AES' existing brine pond and will be updated for the new infrastructure.

ATCO SALT CAVERN STORAGE EXPANSION PROJECT

As brine is displaced from the caverns into the brine pond, it will flow through a pipeline to a degasification system, which prevents any NGL products from entering the brine pond. The brine de-gasifier serves to remove liquid and flashed hydrocarbons from the brine stream prior to the brine entering the brine pond. The flashed hydrocarbon vapours in the de-gasifier are routed to a connected flare stack for combustion. The piping trap adjacent to the brine de-gasifier allows brine to flow to the pond but prevents any condensate that may be floating on the surface of the brine from being sent to the pond. The condensate would be removed with the use of a skimming weir and nozzle on the de-gasifier and will be collected for re-use.

Under normal operating conditions, little or no vapour is expected to be flared. In the case of an upset, safety integrity level rated pressure and flow sensors will act in coordination with emergency shut-down valves to trap the hydrocarbon and brine mixture in the piping between the wellhead and the brine de-gasifier. The trapped hydrocarbons will then be flared at a controlled rate through the brine de-gasifier flare system.

The brine de-gasifier will only be in operation during injection of NGL product into the caverns when brine is displaced. NGL injection frequencies and rates will be periodic in nature and will depend on commercial agreements.

The brine pond will be lined and equipped with a leak detection system. Two layers of HDPE liner will be in place over the excavated pond, between which there will be a leak detection system. The lining system consists of an HDPE primary liner, underlain by a drainage network and leak detection system, underlain by an HDPE secondary liner, with a groundwater collection system beneath the entire pond system. The leak detection system will be comprised of a network of weeping tile piping connected to sumps.

The brine pumphouse will be used to pump brine into the caverns to displace and withdraw NGL product. It will be constructed next to the berm of the brine pond. The brine pumphouse will contain electrically driven pumps capable of delivering approximately 1,300 m³ of brine per hour from the brine pond into the salt caverns.

AES' existing Groundwater and Wetland Monitoring Program (approved by the AER under the existing EPEA Approval) will be amended for the new brine pond. Annual groundwater monitoring reporting will be submitted to the AER as a term and condition of the EPEA Approval. Ongoing effectiveness of these monitoring programs will be evaluated and maintained.

The brine system also includes a supply/return pipeline to connect the brine pond and pump house to the cavern wells. This pipeline will transfer brine from the brine pond into the caverns during NGL product withdrawal and return brine to the brine storage pond during NGL product injection.

The product handling facility will be used to inject and withdraw NGL products to and from the caverns. Product will be received from the pipelines and injected into the caverns using pumps. On withdrawal, product will flow from the caverns through dehydrators and out to the pipelines. The surface facilities associated with the existing Strathcona Salt Cavern Storage Facility and the proposed Project are regulated by the Alberta Boiler Safety Association (ABSA) and all surface design must be registered with ABSA, who will review and approve the design to ensure it meets requirements such as ASME B31.3 *Process Piping Code*. AES will also ensure it hires fully qualified power engineers to operate the facility and will ensure the facility is supervised by a Chief Power engineer and that each shift has oversight by a qualified shift engineer.

ATCO SALT CAVERN STORAGE EXPANSION PROJECT

Prior to operation, and in order to receive approval for initial cavern storage, a comprehensive and facility specific emergency response plan (ERP) must be prepared in accordance with *AER Directive 071: Emergency Preparedness and Response Requirements for the Petroleum Industry* and approved by the AER. This includes the calculation of an emergency planning zone for facility emergencies. The emergency planning zone for the existing facility is 820 metres from the centre of the ethylene wellhead at the existing Strathcona Salt Cavern Storage Facility. As part of the maintenance of the required ERP, stakeholders in the surrounding area are provided updates on an annual basis.

AES' brine disposal wells are developed primarily for cavern washing activities. Once salt cavern development is complete, the brine disposal system will be used infrequently.

AES holds an approved Stormwater and Groundwater Management Plan submitted as part of EPEA Approval application 00357248 for the operation of the existing salt cavern facilities and brine pond that were constructed in 2016. AES plans to amend this Plan to include the construction and operation of the proposed Project facilities. The plan will allow for surface water and groundwater on the Project site to be collected and managed in compliance with EPEA and EPEA Approval requirements (as amended) and those requirements typical of an industrial facility of this nature.

Stormwater will be directed to an onsite wetland (Wetland W3; W3), which will act as a storage basin for the Project. Wetland W3 has adequate capacity to function as a stormwater management facility for the Project site and is large enough to contain the 100-year 24-hour rainfall event, even when the water level is at the wetland boundary. During wet conditions, if the high-water level in W3 is greater than expected, a pump will be used to draw down the water level, and the water will be managed as per the EPEA Approval requirements, as amended. Overland discharge from the wetland to the adjacent environment is not expected.

The stormwater management facility will be monitored, and performance evaluated as per conditions of the existing EPEA Approval, as amended, and *Water Act* Approval conditions required for the Project. Reporting on the stormwater and groundwater management facility will be completed as per the conditions of EPEA Approval 357248-00-01, as amended.

Decommissioning

Decommissioning requirements for surface facilities (including the brine pond), pipelines, wells, and caverns are prescribed by the EPEA and *Conservation and Reclamation Regulation*, EPEA Approval 357248-00-01, as amended, *AEP Conservation and Reclamation Guidelines for Alberta* (AEP 1997), *AEP Environmental Guidelines for Pipelines* (AEP 1994), *AER Directive 013: Suspension Requirements for Wells* (AER 2020), *AER Directive 020 Well Abandonment* (AER 2021), *CSA Z662 Oil and Gas Pipeline Systems* (CSA 2019) and *CSA Z341 Series 18 Storage of Hydrocarbons in Underground Formations* (CSA 2018).

AES anticipates that decommissioning techniques and regulations will continue to evolve through the lifespan of the Project. Although the Standards and Directives listed above are considered best practice today, AES understands that different Standards or Directives will likely be in force at the time.

ATCO SALT CAVERN STORAGE EXPANSION PROJECT

At Project end of life, the salt caverns and wells will be decommissioned in accordance with CSA Z341.2 Storage of Hydrocarbons in Underground Formations. The standard prescribes requirements for each of: pre-abandonment activities; cavern abandonment; wellbore abandonment; and post-abandonment. Where the cavern system is to be abandoned, the cavern will be suspended from service for a period of time to collect data used to determine when the cavern will be in a state of static equilibrium such that abandonment can occur.

There are five major mechanisms that act within caverns that are inactive or abandoned: cavern dissolution, brine warming, salt creep, brine permeation, and leaks. These mechanisms have different impacts in the short, medium, and long-terms, therefore the cavern must be stabilized and monitored prior to abandonment operations.

The salt caverns will be emptied of hydrocarbon product prior to abandonment. The cavern well casing and wellhead integrity will be demonstrated prior to the stabilization monitoring period. After NGLs are removed, the caverns will be stabilized and pressure data, temperature, subsidence, and surface casing vent flow monitoring will occur. Brine will be periodically injected or withdrawn to maintain the brine pressure within an appropriate range.

A risk assessment will be conducted and quantified to predict when the cavern can be successfully abandoned to ensure integrity and stability. Once determined appropriate, the caverns will be abandoned. Caverns are expected to return to static equilibrium at the time of abandonment. A sonar survey will be conducted prior to cavern abandonment.

The cavern wellbores will be inspected, remediated (if required) and abandoned as required by CSA Z341.2. Abandonment of storage wells will ensure that all storage zones, non-saline aquifers, and hydrocarbon-bearing zones are isolated from the wellbore and not in communication. All downhole equipment and tubing strings will be removed prior to commencing abandonment operations. A bridge plug will be installed at the depth of the caprock above the Lotsberg formation and will be pressure tested and cement plugs will be placed in the well. All casing strings will be cut a minimum of one metre below ground level and will be covered with a cap to preclude pressure build up from within the well. After abandonment, risk assessments and subsidence monitoring will be conducted and maintained until the risks have become negligible.

All buildings, foundations, piles, and surface equipment will be removed from the site. Gravel will be removed, and disturbed areas will be recontoured. Subsoil and topsoil that was stockpiled during construction activities will be replaced at uniform depths and generally consistent with pre-development thicknesses. Areas where soil was replaced will be reseeded to limit erosion and potential for weeds.

Remediation (if needed) and reclamation will occur during and following the decommissioning of the brine pond to achieve natural drainage patterns towards drainage features on site.

Surplus brine remaining in the brine pond after decommissioning of the salt caverns will be injected in the brine disposal wells for permanent disposal. The liners and associated infrastructure will be decommissioned and removed from site for disposal or recycling. The brine pond is expected to be reclaimed as a human-made water feature by stabilizing the dam slopes and recontouring as necessary to reduce erosion potential. The remaining excavation would be allowed to naturally fill with water.

ATCO SALT CAVERN STORAGE EXPANSION PROJECT

If the brine storage tank option is selected, the brine tanks would be emptied of any surplus brine and dismantled. The materials would be removed from site and disposed of or recycled. The tank areas would be backfilled with subsoil prior to placement of the topsoil. The area would be recontoured and revegetated to match the surrounding area.

The site will be revegetated in a manner that is consistent with its proposed end land use. Areas will be seeded with species that are consistent with the surrounding lands and unlikely to be incompatible with other nearby land uses. A detailed revegetation plan with a seed mix reflecting the final land use will be established closer to the final reclamation phase.

Background: Underground Cavern Development

The cavern development infrastructure used in the development of AES' existing Strathcona Salt Cavern Storage Facility salt caverns will be used to develop the caverns for the proposed Project. Fresh water for the cavern washing activities will be provided through an existing AES owned and operated industrial water system consisting of an intake and pump station on the North Saskatchewan River and a pipeline from the river pump station to the cavern washing facility.

Natural gas and electricity utility service will be extended to the Project expansion site by the local franchised utility operators.

Salt caverns are developed in an underground salt layer formation deep below the ground surface. The salt layer is accessed by drilling from the surface down to the required depth in the formation. The well is then completed for water injection, and cavern development can commence, as shown in Figure 4. Surface facilities required for cavern development are fresh water pumps and a pipeline from a water source to the cavern wells, a brine disposal pipeline from the cavern wells to the disposal wells, and control fluid handling facilities including a pump, pipeline, and storage tank. The caverns will be developed approximately 1,800 m below surface (top of cavern) and approximately 1,500 m below shallow groundwater.

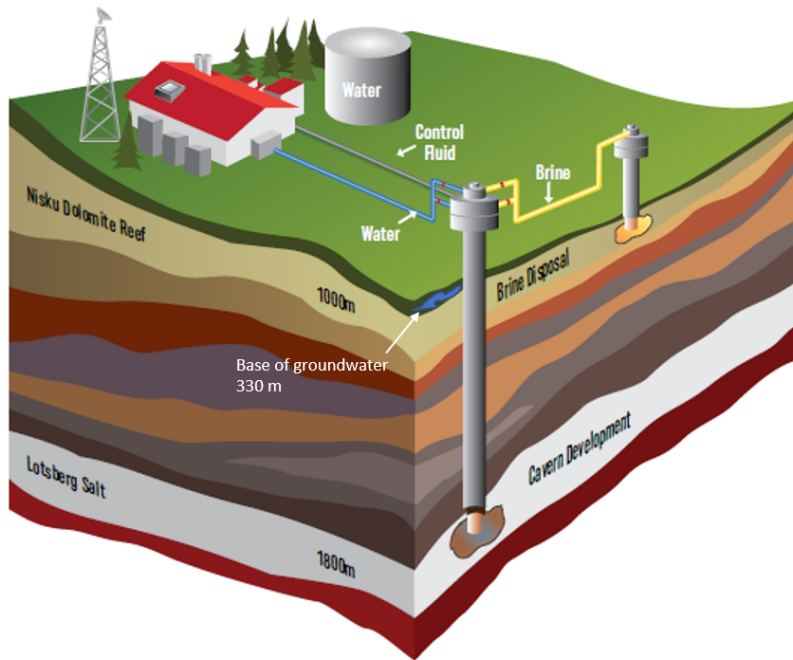
A salt cavern is formed by dissolving the natural salt below surface in a process known as solution mining, or cavern washing. This process involves injecting water down a completed well and into the salt layer, where the water dissolves the salt, creating a void (cavern) in the salt layer. As new water is injected, the brine (a solution of salt dissolved in water) that is formed is then displaced back up to surface and down a disposal well (refer to Figure 4 and Figure 1 of Figure 5). The disposal well is completed into a disposal formation at a depth of about 1,000 m, which is significantly below surface so there would be no interaction with surficial features or groundwater.

At the onset of the development of a cavern, a solution mining program is developed to control the flow of the water to the well to obtain the desired cavern shape. Periodic testing is completed throughout the washing phase to monitor the size and shape of the cavern and evaluate the results of the program.

The control fluid is comprised of a hydrocarbon liquid that is less dense than water which floats on the brine. It is pumped into the cavern during the washing process to help protect and shape the roof section of the cavern. The amount of control fluid used is governed by the wash program, with all of the fluid being removed prior to commencing full storage operations.

ATCO SALT CAVERN STORAGE EXPANSION PROJECT

Figure 4: Solution Mining Process (Not to Scale)

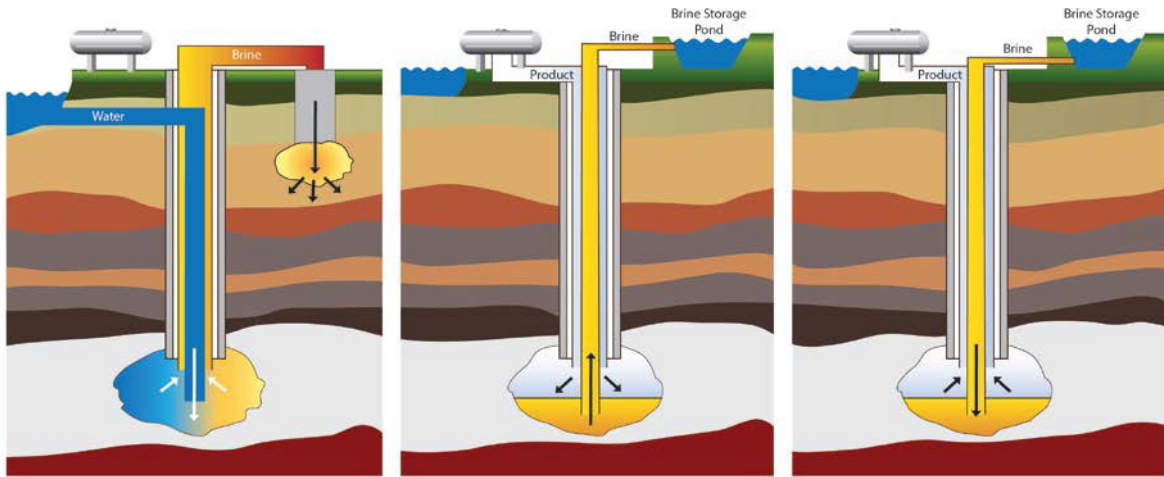


The washing process continues until the desired cavern size and shape are obtained. Cavern integrity is then verified, and product storage operations can commence once the product handling surface facilities are completed.

During operation of the storage caverns, saturated brine is used to facilitate the movement of the storage product and ensure that cavern integrity is maintained. The cavern is initially filled completely with brine prior to beginning storage operations. As product is pumped into the cavern, brine is displaced and is stored in a surface level brine pond (refer to Figure 2 of Figure 5). When product is withdrawn from the cavern, brine is pumped into the cavern and product is displaced up the storage well to the surface for transport (refer to Figure 3 of Figure 5). The cavern is kept full of liquid at all times to maintain pressure in the underground structure and to avoid movement of the salt that could compromise the integrity of the cavern.

ATCO SALT CAVERN STORAGE EXPANSION PROJECT

Figure 5: Cavern Development and Operation (Not to Scale)



Cavern Development and Brine Disposal (Fig.1)

Liquid Injection and Brine Removal (Fig. 2)

Liquid Withdrawal and Brine Injection (Fig. 3)

ATCO SALT CAVERN STORAGE EXPANSION PROJECT

10. ESTIMATED MAXIMUM PROJECT CAPACITY

The target size of each of the four proposed underground storage caverns is 120,000 m³. Each cavern will have a working storage capacity of approximately 100,000 m³. Working storage capacity is limited by the sump at the bottom of each cavern, which is taken up by brine fluid, preventing the full cavern volume from being utilized for storage of NGL product.

With the exception of brine to be used in the ongoing operation of the Project, no production of any materials or substances will occur as part of the project. All NGL products stored in the proposed salt caverns will be produced and consumed by third parties. Product will be conveyed from a third-party location via pipeline to the caverns and injected. When NGLs are injected, brine will be displaced to the surface where it will undergo a de-gasification process and will be stored in the brine pond. Brine will be re-injected into the caverns when the customer requests withdrawal of their NGLs. A sufficient quantity of brine will be retained on site in the brine pond to enable the injection and withdrawal of NGLs from the caverns.

ATCO SALT CAVERN STORAGE EXPANSION PROJECT

11. PROJECT SCHEDULE

The proposed Project Schedule is presented in Table 1. Timelines are approximate.

Table 2: Estimated Project Schedule

Key Project Phase	Start	Finish
Prepare site (grading and leveling)	Q3 2021	Q4 2021
Construct cavern washing pipelines	Q4 2021	Q2 2022
Drill Wells	Q4 2021	Q3 2022
Cavern mining	Q2 2022	Q3 2024
Construct Product Handling Facility	Q3 2022	Q4 2023
Construct brine pond and pump house	Q3 2022	Q4 2023
Construct connecting pipelines	Q2 2023	Q4 2023
Commissioning	Q4 2023	Q1 2024
Begin commercial operation	Q2 2024	2049
Decommission and abandon ¹	2049	-

¹ Decommissioning and abandonment is based on a 25-year lifespan of the salt caverns.

ATCO SALT CAVERN STORAGE EXPANSION PROJECT

12. PROJECT ALTERNATIVES

Various approaches were considered to minimize the Project footprint. The proposed brine pond will be located on privately owned land zoned for, and surrounded by, industrial development in the AIH. The AIH has been designated for industrial uses, and there are plans for several additional large projects in the area. Neighbouring public, government and industry generally view the AIH as more favourable for development and less disruptive to undeveloped lands than other regions of the province. The Project footprint is minimized by siting the Project and equipment where the Strathcona Salt Cavern Storage Facility is already located and on cultivated land out of areas with high wildlife habitat value or in areas with other environmental sensitivities.

The proposed Project site is proximal to existing industrial transportation corridors to minimize the establishment of new transportation corridors or increase transportation time, and to existing utilities. The Project Site is also proximal to labour and would not require prolonged commuting during operations.

Proximity to existing infrastructure required for the Project also minimizes the Project footprint. AES currently owns and has approval to operate a brine disposal scheme and cavern washing facilities at the Project site. These were used to develop the existing facility. AES also currently holds two Water Act Diversion Licences for withdrawal of water from the North Saskatchewan River. Use of AES' existing infrastructure and *Water Act* Diversion Licences minimizes new developments and the use of resources that would otherwise be required on alternate sites.

Typically, when geology favours development of salt caverns, it is the preferred method for NGL storage (US Department of Energy 2017). Alternatives to the storage of NGL products in salt caverns include above ground storage in pressurized vessels or refrigerated tanks. AES is not considering these alternatives to the proposed Project for the reasons outlined below:

- Above ground pressurized storage tanks are not being considered because:
 - The proposed Project will require approximately 400,000 m³ of NGL product storage capacity. To store NGLs in pressurized vessels, the land needed for this volume of storage would significantly increase the project's footprint. Approximately 200 storage bullet tanks would be required to store the same volume as one cavern, resulting in the need for at least 800 storage bullet tanks
 - Above ground pressurized storage tanks would require pressure relief systems, resulting in increased fugitive GHG emissions from the project that would not occur with storage in underground caverns
 - Use of above ground pressurized storage presents the risk of vessel failure and accidental release of NGL product to the environment
 - Use of above ground pressurized storage tanks are susceptible to impacts from weather and have the risk of corrosion or erosion
- Above ground refrigerated storage tanks are not being considered because:
 - To store NGLs in refrigerated tanks, a substantial amount of energy would be required to cool, continually refrigerate, and reheat the NGL product for storage purposes

ATCO SALT CAVERN STORAGE EXPANSION PROJECT

- Above ground refrigerated storage tanks would require pressure relief systems, resulting in minor fugitive GHG emissions from the project that would not occur with storage in underground caverns
- Use of above ground refrigerated storage presents the risk of vessel failure and accidental release of NGL product to the environment
- Use of above ground refrigerated storage tanks are susceptible to impacts from weather and have the risk of corrosion or erosion

Ultimately, salt caverns were chosen over the alternative means described for safety, environmental and operational reasons. Salt caverns are considered the safest way to store large volumes of NGLs. The following factors are the main reasons salt caverns are the preferred storage method for large volumes of NGLs:

- The products are contained deep below ground (approximately 1,800 m in this case) in impermeable salt formations, with only limited surface footprint and facilities. The deep subsurface nature of caverns reduces the number of environmental and health receptors that could be impacted by the project than if surface infrastructure was selected. Refer to Figure 3 for a scale drawing of AES' existing caverns.
- Storage in salt caverns requires minimal surface land footprint (for wellheads) as storage occurs 1,800 metres below surface. Underground storage is extremely economic in terms of land area.
- There is negligible risk of structural failure of the cavern itself due to the properties and impermeability of the salt. Salt formations are almost perfectly impermeable.
- The impermeability of salt to hydrocarbon products makes salt caverns ideal to use for hydrocarbon storage. In addition, the depth and pressure of the caverns makes the salt slightly deformable, which allows it to self-seal any micro cracks that could form.
- The caverns are full of hydrocarbon product and/or brine at all times and operate at a pressure similar to the surrounding rocks, which enables and maintains cavern stability.
- High storage pressures present no problem as high pressure is the natural state of the fluids underground and caverns are maintained at the similar pressures as the rock and salt around them.
- There is no risk of underground combustion. Underground, hydrocarbons are separated from the oxygen in the air (necessary for combustion) by nearly 2,000 meters of rock.
- Caverns are not susceptible to accidents or malfunctions from adverse impacts from weather, corrosion, or erosion.
- There is negligible risk of accidental cavern damage. Their natural barrier protects them from fire, willful damage and external impacts.

ATCO SALT CAVERN STORAGE EXPANSION PROJECT

- Fugitive emissions from the use of caverns is negligible.
- Storage in caverns is not energy intensive. Once product is injected, no energy is required for long-term storage and low energy is required to withdraw product from the caverns.

Other alternative means of carrying out the Project that relate to incidental facilities and activities required to operate the salt caverns that have been or are currently under consideration are described below.

- As noted in the IPD, the use of electric pumps for the injection and withdrawal of product from the caverns has been considered over natural gas engine driven pumps. Electric drive pumps have now been selected for the Project for their reduced GHG emissions, simpler maintenance, and operational flexibility.
- As noted in the IPD, the use of low emissions calcium chloride dehydration of NGL product versus molecular sieve dehydration which requires greater energy input has been considered. Calcium chloride dehydration has been selected for the Project for its reduced GHG emissions and lower capital cost.
- As noted in the IPD, the need for a gas chromatograph to measure the composition of the product received at and delivered from the storage facility is being considered. Product quality measurement requirements are still under evaluation and will be determined later in the project.
- As noted in the IPD, alternative locations for the brine pond and product handling facility within the Project site are being considered. The specific locations of these facilities on the site are still under evaluation. The main factors being considered are constructability, efficient land use, and construction costs. It is possible that the project will be wholly contained within SW 34-55-21 W4M and that the use of NW 27-55-21-W4M and NW 34-55-21 W4M (Lot D) will not be required, reducing the overall project footprint.
- Aboveground brine storage tanks are being considered as an alternative to a brine pond as they potentially offer better constructability and options for construction sequencing (i.e. the tanks can be built over time, not all at once if not needed), operational flexibility, and easier maintenance than a brine pond. Conversely, brine storage tanks have not been utilized by industry to date, are more costly, and are much more visible surface facilities than a brine pond. Both options would be regulated as per AER EPEA Approval amendments to AES' existing EPEA Approval. In addition, brine storage tanks would be further regulated by an Alternative Storage Approval under *Directive 055: Storage Requirements for the Upstream Petroleum Industry* (AER 2001).
- AES is considering the use of approximately 5 hectares on Lot D, a 16-hectare lot privately owned by AES on the southern portion of NW 34-55-21 W4M, directly north of the existing facility, for storage of existing stockpiles currently located on SW 34-55-21 W4M that were established as part of the existing Strathcona Salt Cavern Storage Facility. The approximately 5 hectares of Lot D that would be utilized for stockpile storage are currently approximately 20% grasses and 80% trees and shrubs. Utilization of this area would include both existing stockpiles at SW 34-55-21 W4M (relocated) and topsoil and subsoil associated with the excavation of the new brine pond. Stockpile locations would be maintained at least 30 metres from the boundary of a wetland located in the northeast corner of Lot D. Disturbance of existing vegetation on Lot D has been considered as part of the GHG Emissions Report provided in Appendix C of the Detailed Project Description and as part of GHG emissions calculations required by the SACC and described in Sections 6 and 23.

ATCO SALT CAVERN STORAGE EXPANSION PROJECT

Based on the above information regarding NGL storage alternatives, it has been demonstrated that cavern storage is a safer, more energy efficient, and less disruptive method to store large volumes of NGLs. Further, AES has demonstrated that many design decisions have been made to reduce GHG emissions associated with the Project and direct GHG emissions are now limited to pilots for the two flare stacks, which are in place for upset conditions or infrequent maintenance of operating equipment and minimal fugitive emissions from piping and process equipment. AES will continue to evaluate GHG emissions as they relate to any potential future alternatives as detailed engineering is finalized.

ATCO SALT CAVERN STORAGE EXPANSION PROJECT

PART D: LOCATION INFORMATION

13. GEOGRAPHIC INFORMATION

The geographic centre of the proposed Project area is Latitude 53° 47' 27.23 and Longitude 113° 02' 45.13".

The proposed Project will be located at the existing Strathcona Salt Cavern Storage Facility site, approximately 14 kilometres northeast of the City of Fort Saskatchewan and approximately 30 kilometres north of the City of Edmonton, in Strathcona County, Alberta. The surface facilities for the proposed Project will be located on privately owned land zoned for, and surrounded by, industrial development within the AIH.

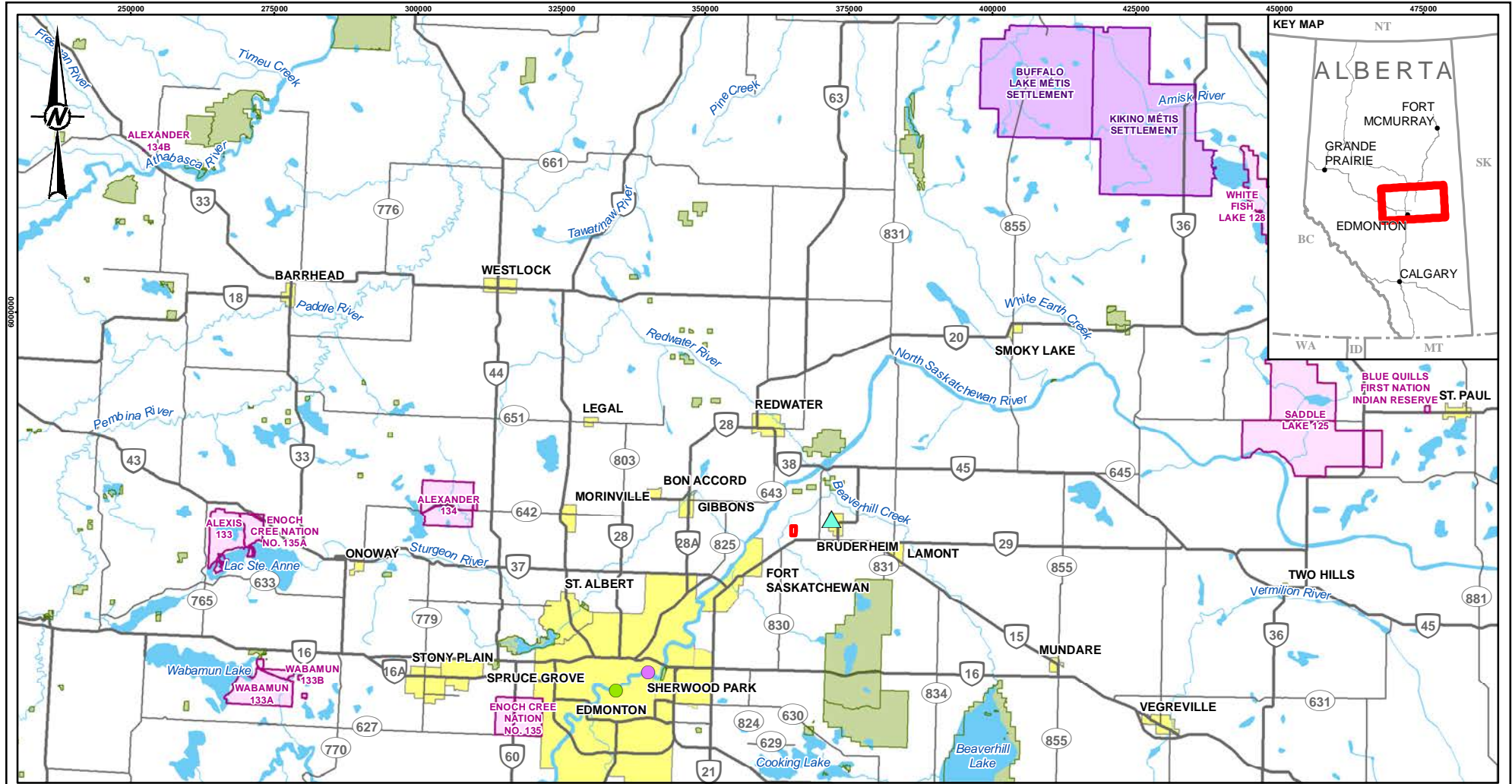
The proposed Project will be developed on a total land area of approximately 24 to 34 hectares pending final design. The Project will be developed on SW 34-55-21 W4M with the potential use of a 5-hectare area in Lot D NW 34-55-21W4M for soil stockpiles, and the potential use of approximately 20 hectares in the northern portion of the adjacent NW 27-55-21 W4M parcel. These areas of potential development are currently considered alternatives. The caverns will be developed in the Lotsberg Salt Formation at SW 34-55-21 W4M where AES holds Special Mineral Lease No. 3712020336.













The closest federal lands to the Project are Elk Island National Park, located approximately 13 km to the southeast of the Project area.

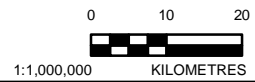
The proposed Project is located within Treaty 6 and Métis Harvesting Area D, which extends from the east to the west of the province and from near Ponoka as the southernmost extent to north of Conklin. No lakes or rivers where Métis Harvesting is permitted are located within 10 kilometres of the Project site (GoA 2019). First Nations reserves, Métis Settlements, and local communities are shown in Figure 6.

The closest First Nation reserve is the Alexander First Nation, approximately 50 kilometres northwest of the Project site. AES is not aware of Traditional Land Use within, or in the immediate vicinity of, the Project area. The bed and banks and associated setbacks along the North Saskatchewan River are the closest Crown lands to the Project Site, approximately 4.5 kilometres away. It is unlikely that Traditional Use activities are occurring in this area due to barriers to accessing this land (i.e., access via land would involve crossing private land) and the proximity to industrial activities occurring in the AIH.

AES acknowledges that many of the Indigenous Communities engaged as part of the Project have harvested, fished, or hunted in the AIH area in pre- or post-contact eras and have ancestral connections to the land and recognizes that members of Indigenous Communities may still feel connections to the area and that Indigenous knowledge and culture may still be obtained from these areas. AES is committed to working with Indigenous Communities to ensure anything of historical, cultural or archaeological significance that may be found during project activities, throughout the Project lifecycle, is preserved and returned to the appropriate communities in accordance with applicable laws.



-  BRUDERHEIM STABILIZATION LAGOON SYSTEM
-  EPCOR WASTEWATER TREATMENT PLANT
-  ROSSDALE WATER TREATMENT PLANT
-  FIRST NATION RESERVE
-  MÉTIS SETTLEMENT
-  PROJECT SITE
-  PRIMARY HIGHWAY
-  SECONDARY HIGHWAY
-  WATERCOURSE
-  PARK / PROTECTED AREA
-  POPULATION CENTRE
-  WATERBODY



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YYYY-MM-DD	2021-03-31
DESIGNED	SL
PREPARED	NF
REVIEWED	CES
APPROVED	DV

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 PROJECTION: UTM ZONE 12 DATUM: NAD 83

PROJECT
PROPOSED ATCO SALT CAVERN STORAGE EXPANSION PROJECT

TITLE
FIRST NATIONS, MÉTIS SETTLEMENT, AND LOCAL COMMUNITIES

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ATCO SALT CAVERN STORAGE EXPANSION PROJECT

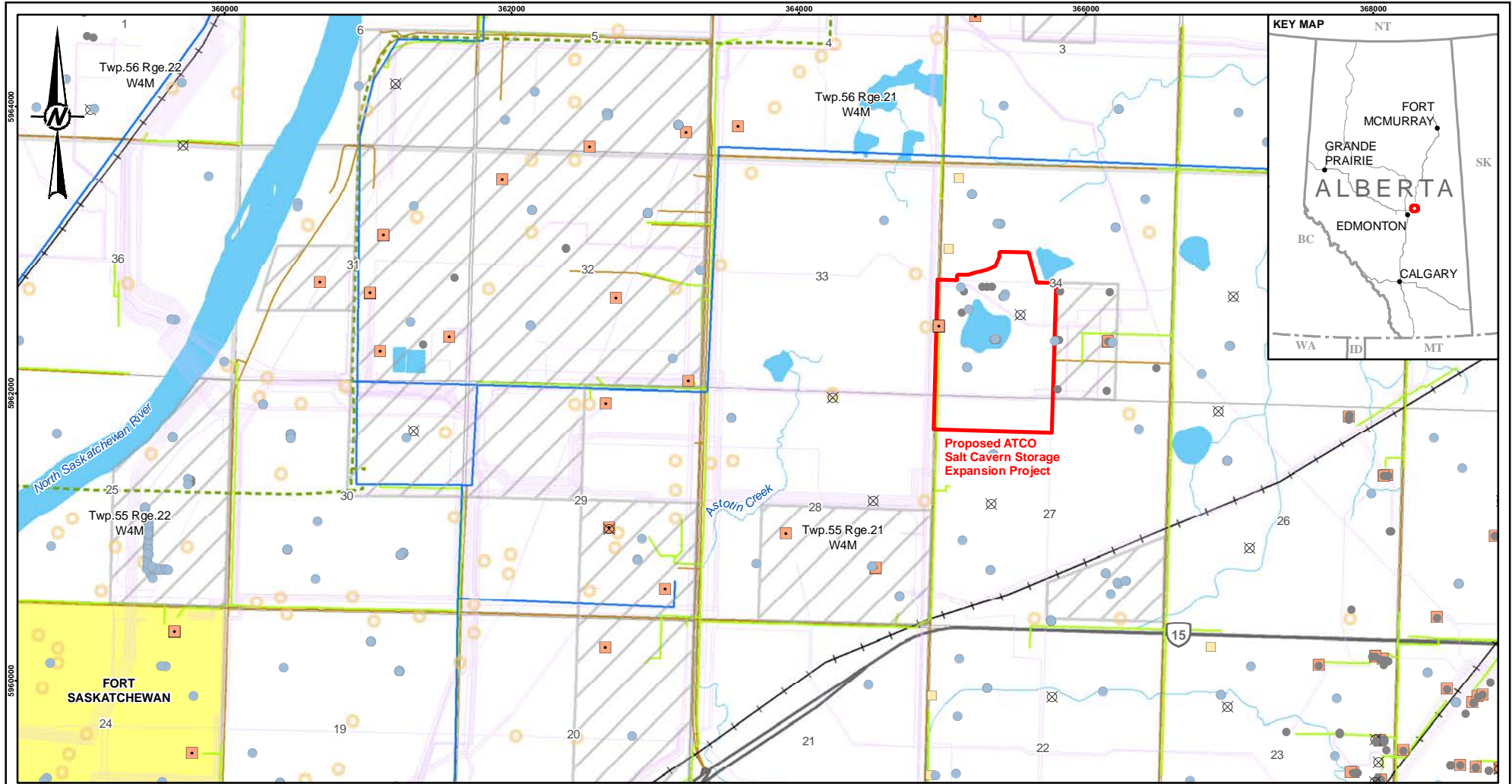
The closest community to the Project is the Town of Bruderheim, which is approximately 5 kilometres east of the Project site. There are two occupied residences within 1.6 kilometres of the Project. The closest schools, retirement homes, or recreational facilities are approximately 5 kilometres from the Project in the Town of Bruderheim. The Project will not be visible from any recreational areas or navigable waters. Energy infrastructure, occupied residences, private water wells, and archaeological sites are shown on Figure 7. Proximity to schools, seniors' lodging and recreational sites is shown on Figure 8. Environmentally Significant Areas, federal lands, and airports are shown on Figure 9.

The closest wastewater treatment facility to the Project is the Alberta Capital Region Wastewater Commission facility, located approximately 25 kilometres southwest of the Project site. The Town of Bruderheim has a Smart Wastewater Treatment system where wastewater is treated through a stabilization lagoon system. There are no domestic water wells within the Project site. There are 11 existing groundwater monitoring wells within SW 34-55-21-W4M. Due to the locations and limited proximity of regional drinking water sources and water treatment facilities relative to the Project site, and the limited extent of any potential effects of the proposed Project on surface water quality, as evaluated in Appendix B of the DPD, there is very limited potential for drinking water (i.e. surface and groundwater sources), water used for recreational purposes, and water treatment facilities to experience effects as a result of Project activities.

All existing caverns within a 5 kilometre radius of the Project are in SW and SE 34-55-21W4M and are owned and operated by AES or ATCO Gas and Pipelines. The nearest caverns not owned or operated by ATCO are approximately 8 kilometres away from AES' proposed Project and existing Strathcona Salt Cavern Storage Facility.

The proposed caverns will be developed in the Lotsberg Salt Formation at SW 34-55-21 W4M where AES holds Special Mineral Lease No. 3712020336. The salt caverns are each approximately 100 metres in diameter and will be developed fully within the boundary of SW 34-55-21 W4M. Minimum spacing between the cavern centres will be at least 200 metres, as prescribed by the AER requirements for salt cavern development, and 100 metres away from edge of mineral rights.

No potential effects to existing caverns associated with other nearby facilities are expected due to adherence to regulatory guidelines and AES' experience operating caverns in the area.



- ⊗ ABANDONED OIL/GAS WELL
- ACTIVE OIL/GAS WELL
- HISTORIC RESOURCE SITE
- OIL/GAS FACILITY
- OCCUPIED RESIDENCE (RECEPTOR)
- WATER WELL (ANY)
- PIPELINE
- TRANSMISSION AND DISTRIBUTION LINE TYPES
- 240 kV
- 138 kV
- 13.8 kV or 25 kV
- ▭ INDUSTRIAL SITE
- ▭ PROJECT SITE
- PRIMARY HIGHWAY
- SECONDARY HIGHWAY
- LOCAL ROAD
- RAILROAD
- WATERCOURSE
- POPULATION CENTRE
- WATERBODY



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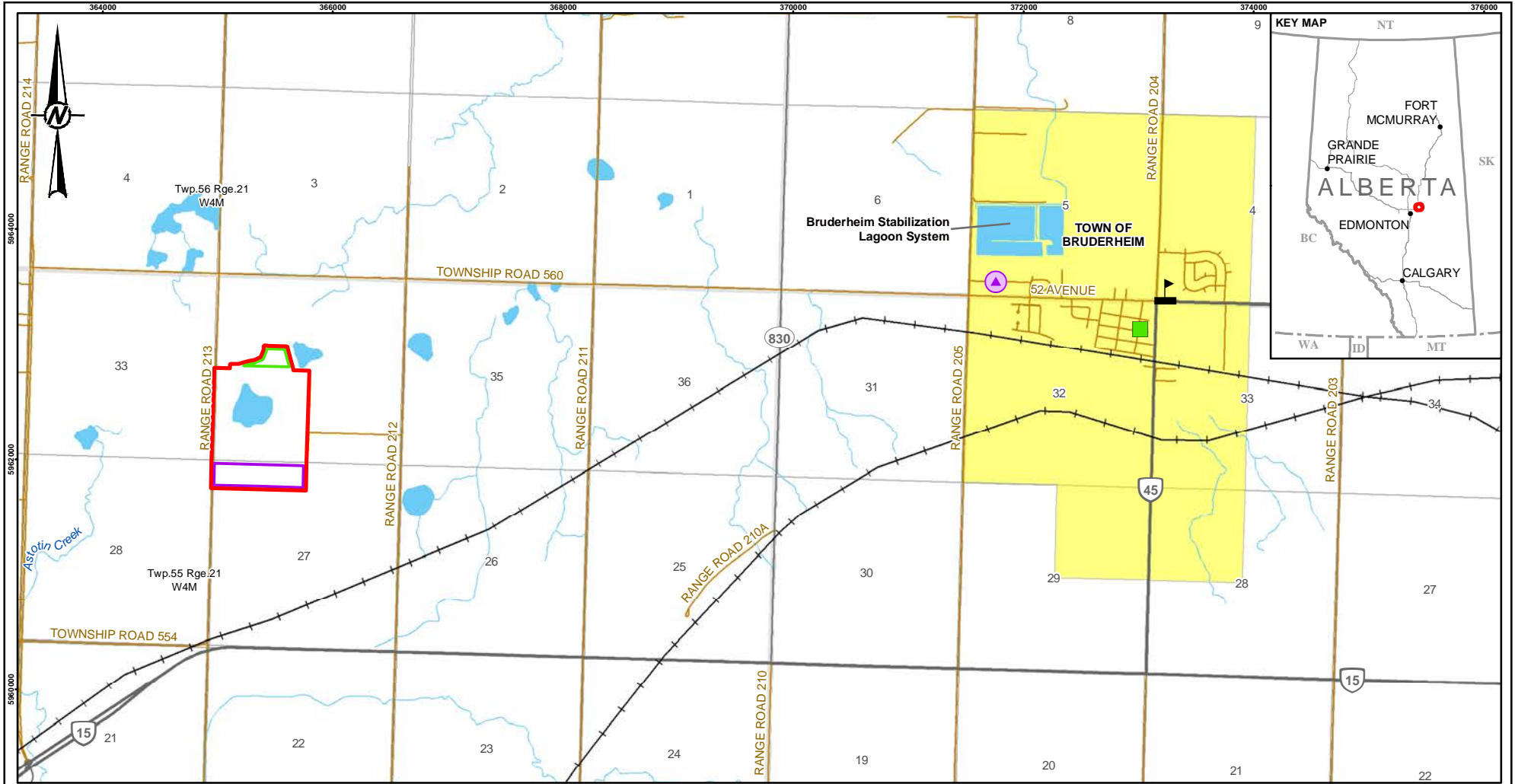
PROJECT
PROPOSED ATCO SALT CAVERN STORAGE EXPANSION PROJECT

TITLE
ENERGY INFRASTRUCTURE, OCCUPIED RESIDENCES, PRIVATE WATER WELLS AND ARCHAEOLOGICAL SITES

PROJECT NO.	CONTROL	REV.	FIGURE
123513692-0040		0	7



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- ▲ AGRICULTURE GROUND
- ▲ BRUDERHEIM SCHOOL
- SENIOR CITIZENS RESIDENCE
- PROJECT SITE
- OPTIONAL - LOT D
- OPTIONAL - NW 27-55-21 W4M
- PRIMARY HIGHWAY
- SECONDARY HIGHWAY
- LOCAL ROAD
- + RAILROAD
- WATERCOURSE
- POPULATION CENTRE
- WATERBODY



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YYYY-MM-DD	2021-03-31
DESIGNED	SL
PREPARED	NF
REVIEWED	CES
APPROVED	DV

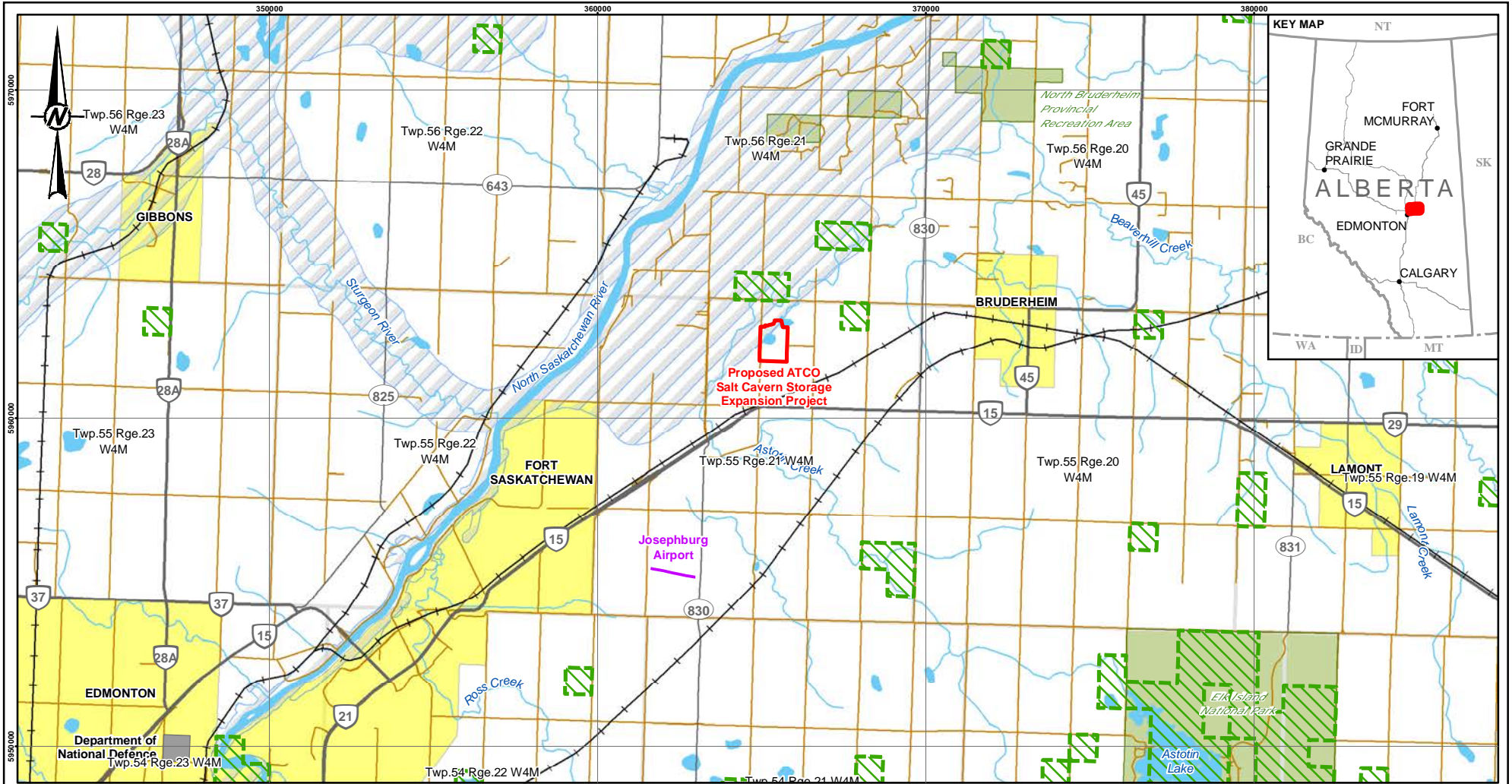
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PROJECTION: UTM ZONE 12 DATUM: NAD 83

PROJECT
PROPOSED ATCO SALT CAVERN STORAGE EXPANSION PROJECT

TITLE
PROXIMITY TO SCHOOLS, SENIORS' LODGING AND RECREATIONAL SITES

PROJECT NO.	CONTROL	REV.	FIGURE
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- RUNWAY
- ▨ ENVIRONMENTALLY SIGNIFICANT AREA
- FEDERAL MILITARY LAND
- KEY WILDLIFE AND BIODIVERSITY ZONE
- PROJECT AREA
- PRIMARY HIGHWAY
- SECONDARY HIGHWAY
- LOCAL ROAD
- + RAILROAD
- PARK / PROTECTED AREA
- POPULATION CENTRE



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YYYY-MM-DD	2021-03-30
DESIGNED	SL
PREPARED	NF
REVIEWED	CES
APPROVED	DV

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PROJECTION: UTM ZONE 12 DATUM: NAD 83

PROJECT

PROPOSED ATCO SALT CAVERN STORAGE EXPANSION PROJECT

TITLE

ENVIRONMENTALLY SIGNIFICANT AREAS, MILITARY AND FEDERAL LANDS, AND AIRPORTS

PROJECT NO.	CONTROL	REV.	FIGURE
123513692-0044		0	9

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ATCO SALT CAVERN STORAGE EXPANSION PROJECT

14. PHYSICAL ENVIRONMENT

The proposed Project is located in the Dry Mixedwood Natural Subregion of the Boreal Forest Natural Region and the Central Parkland Natural Subregion of the Parkland Natural Region of Alberta (Natural Regions Subcommittee 2006).

The Central Parkland Natural Subregion is the most densely-populated region in the province, and most of its native vegetation has been altered by human development. Groves of aspen and balsam poplar (*Populus balsamifera*) are intermixed with grasslands and depressional wetlands (Natural Regions Subcommittee 2006). Temperature, precipitation and growing seasons are characterized as intermediate between the dry, warm grasslands to the south and the cooler, moist boreal forests to the west and north.

The Project is surrounded by a number of petroleum, petrochemical, and chemical facilities that contribute to the overall emissions inventory in the region. The climate and meteorology in the AIH exhibit a general tendency for regional winds from the northwest, due to the proximity to the North Saskatchewan River. Wind speeds in the exposed rural areas of the AIH average wind speeds from 3.2 to 3.6 m/s (11 to 13 km/h). Annual precipitation across the AIH is uniform (Jacques-Whitford & RWDI 2007).

The Project site is located within the boundaries of the North Saskatchewan Air Zone, which includes both the Capital Region Airshed Zone and the Fort Air Partnership (FAP) Airshed Zone. The North Saskatchewan Air Zone is characterized by a strong industrial base of oil refineries, chemical manufacturing, and power generation. Future industrial activity in the region is also expected to include NGL terminalling and processing as well as additional bitumen upgrading. Current industrial activity, in combination with vehicle use, home heating and urban activity, results in local and regional emissions of nitrogen dioxide (NO₂), sulphur dioxide (SO₂), fine particulate (PM_{2.5}) and ozone (O₃).

The FAP monitors air quality in the region through ten continuous ambient air quality monitoring stations. In 2019, FAP also operated a regional passive monitoring network, monitoring for SO₂ and H₂S. During 2019, one hundred fifty-one (151) 1-hour exceedances of PM_{2.5}, H₂S, and O₃ parameters were reported (FAP 2019). Of these 151 exceedances, four were attributed to local industry. The largest contributor to 1-hour exceedances in 2019 was wildfire smoke, with ninety-nine (99) recorded exceedances. In 2019, thirty-eight (38) 24-hour exceedances of parameters were reported. Of these 38 exceedances, one was attributed to local industry (FAP 2019). The largest contributor to 24-hour exceedances was wildfire smoke, with 17 recorded exceedances (FAP 2019).

In general, air quality in the FAP is good, with monitoring stations reporting Air Quality Health Index Low Risk levels between 85 to 100% of the time (FAP 2019). No station exceeded more than 0.051% of time in the High-Risk category and no station exceeded more than 0.07% of time in the Very High-Risk category (FAP 2019). In 2019, FAP monitoring stations captured 56,085 hours of air quality data (FAP 2019).

The Project will be a very small contributor to air emissions within the local air shed. The Project will not have emissions that could deposit atmospheric contaminants to the surrounding environment and there are no potentially acidifying substances that will be emitted by the Project. Presently, AES is not required to conduct ambient air quality monitoring under EPEA Approval 357248-00-01, as amended. Ambient air quality monitoring in the region is conducted and managed by the FAP. At present, AES is not an industry member of FAP and does not anticipate any Project-specific obligations for monitoring given its small contribution to emissions. In addition, AES will comply with the Capital Region Air Quality Management Framework. However, there are currently no Project-specific commitments associated with this framework,

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as it applies to NO₂, SO₂, PM_{2.5}, and dust. NO₂, PM_{2.5}, and dust are expected to be minimally emitted during Project construction and negligible volumes of NO₂ will be emitted as part of Operations. No SO₂ emissions will be generated by any phase of the Project. Strathcona County has developed management plans that could be applicable to the Project, including a heavy industrial policy area within its municipal development plan, area structure plan and county land use bylaws. AES has met with Strathcona County to discuss the Project and will adhere to the relevant requirements of these plans through Project planning into construction and operation of the Project.

Wetlands are common, occupying approximately 10% of the subregion. Marshes, willow shrub lands and seasonal ponds are the most common types of wetlands encountered (Natural Regions Committee 2006). The majority of the wetlands present on the Project site are Graminoid Marsh (Golder 2020). Wetland W3 is a Crown-claimed 5.22-hectare wetland in the centre of SW 34-55-21. AES has retained this wetland for drainage/stormwater management. There are three to four graminoid marshes intersected by the area under consideration in NW 27-55-21-W4M. These likely comprise three ephemeral-to-temporary wetlands and one seasonal wetland (Howell 2021). The lands being considered in Lot D are adjacent to one wetland, which is Class IV Graminoid Marsh (Wetland W1) and one water body classified as Class IV Shallow Open Water (Golder 2020). Both wetlands are Class IV (Golder 2020). If AES selects Lot D as an option for the Project, the development will be set back from these wetlands and will not disturb the bed or banks of either wetland.

AES plans to continue to use Wetland W3 as a stormwater management facility. If AES selects NW 27-55-21-W4M as an option for the Project, development of the Project may overlap some of these temporary-to-ephemeral wetlands or the seasonal wetland. AES will obtain the services of a Qualified Aquatic Environmental Specialist to complete the required field surveys in support of a Wetland Impact Assessment Report for a *Water Act* Approval if any Project activities are anticipated to affect any additional wetlands associated with the Project Site

Wetland W1 is located in the northeast corner of SW 34-55-21-W4M and is not intended to be used for surface runoff. Fluctuations in groundwater levels beneath Wetland W1 are lower, likely as a result of its connection to the more highly transmissive surficial saturated sand further to the northwest (Stantec 2006; Shell 2007). As a result of this transmissive and saturated sand to the north, Wetland W1 north of the site is considered to be in connection with Astotin Creek.

Surficial sand deposits are variably saturated across the Project site. The majority of the saturated surficial sands are restricted to the north of the Project site with surficial sands in the other areas in the central and southern portions of the Project site generally not present or unsaturated (i.e., around Wetland W3). Therefore, when these sands are unsaturated, there is no direct hydraulic connection of Wetland W3 to Astotin Creek.

The water table surface within the Project site generally mimics the topography of the site with elevations ranging from approximately 625 metres above seas level (masl) in the southeast corner of the Project site to 618 masl in the centre of the Project site in the area near Wetland W3. The water table is strongly influenced by Wetland W3. Wetland W3 accepts surface water runoff from the surrounding land and appears to fluctuate between approximately 618 and 622 masl based on historical air photos of the site (Stantec 2021). Given this range of water levels, groundwater is thought to be recharged by Wetland W3 during wet periods and discharged to Wetland W3 during dry periods. During periods of high runoff, Wetland W3 would recharge the surficial aquifer and the primary direction of horizontal groundwater flow would likely be northwest toward Astotin Creek. There is no direct connection between Wetland W3 and Astotin Creek. However, there may be some latent connection between the two, which would only occur during periods of high runoff and high-water levels in Wetland W3, such as high precipitation (>1:100 year event) or snow melt events (Stantec 2021). AES has

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an existing Stormwater and Groundwater Management Plan approved under EPEA Approval 357248-00-01, as amended, and would implement methods to reduce levels in Wetland W3 if the water level in Wetland W3 was expected to exceed 621.2 masl.

AES will complete a survey of the pipeline ROW prior to start of construction. The wetlands along the pipeline ROW are likely to be seasonally flooded graminoid marshes and one temporary graminoid marsh (Howell 2021). Should any wetlands or waterbodies along the ROW be trenched, AES will obtain the services of a Qualified Aquatic Environmental Specialist to complete the required surveys in support of a Wetland Impact Assessment Form for a notification under the Code of Practice for Pipelines and Telecommunication Lines Crossing a Water Body (AEP 2013).

The Project site is located within the North Saskatchewan River watershed in an area of relatively flat topography with localized depressional features. Local topographic relief is relatively low, and generally slopes northwest towards the North Saskatchewan River located approximately 4,500 metres west-northwest of the site. At the edge of the river valley, the topography slopes steeply toward the river (approximately 30% slope).

The North Saskatchewan River derives its name from the Cree *kisiskâciwanisîpiy*, meaning “swift-flowing river” (Caron 2018). The North Saskatchewan River is a glacier-fed river that flows east from the Canadian Rockies to central Saskatchewan. The Project area is located approximately 4.5 kilometres east of the North Saskatchewan River and approximately 200 m east of the lower portion of Astotin Creek in an area consisting of agricultural field and mixed industrial land use.

Astotin Creek is the closest permanent water body which supports fish and fish habitat, as defined by the *Fisheries Act*, and aquatic life, as defined by the *Species at Risk Act* (SARA). Astotin Creek is classified as a Class C waterway, which means that the waterway is considered moderately sensitive and would be considered as having broadly distributed habitats supporting local populations of fish species; habitat areas are sensitive enough to be potentially damaged by unconfined or unrestricted activities in the water body (GoA 2004). Forage fish have been observed upstream of the Project pipeline ROW crossing, however due to beaver damming on Astotin Creek, it is unlikely that sport fish or large-bodied fish could access the reach of Astotin Creek traversed by the pipeline ROW (TEPCA 2007). Discussions with operational staff suggest that Astotin Creek has been observed running dry in previous summers, however it is still assumed to have the potential to provide habitat for forage fish.

Fish inventories of Astotin Creek have shown presence of small-bodied fish, including brook stickleback (*Culaea inconstans*), fathead minnow (*Pimephales promelas*), and one large-bodied fish, white sucker (*Catostomus commersonii*) (FWMIS 2021). No sport fish have been reported and Astotin Creek is not stocked (FWMIS 2021). No benthic invertebrate surveys for Astotin Creek are available for public review. Although no sensitive species have been identified in Astotin Creek, it drains into the North Saskatchewan River Watershed. The North Saskatchewan River supports habitat for lake sturgeon (*Acipenser fulvescens*), a species that is designated as Threatened under Alberta’s Wildlife Act and recommended by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) to be designated Endangered under the SARA. The designation of Endangered status under SARA is pending (GoA 2021). The lake sturgeon is considered At-Risk by DFO (DFO 2021).

There are no fish-bearing surface waterbodies or watercourses present within the Project site.

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The Government of Alberta has implemented the Water Management Framework (WMF) for the Industrial Heartland and Capital Region (AEP 2016). The goal of the WMF is to improve water quality in the North Saskatchewan River by minimizing load discharge, setting contaminant concentration thresholds in the Devon to Pakan reach of the North Saskatchewan River, and assigning values to contaminant concentration thresholds to inform management responses (AEP 2016). The WMF seeks to minimize impacts to water quantity by optimizing the use of existing and new withdrawal infrastructure and increasing the use of retained water (AEP 2016).

At the time of the wetland assessment site visit in August 2020, the Project site was composed of the existing Strathcona Salt Cavern Storage Facility surface infrastructure and agricultural land. Given the extensive existing disturbance across and in the vicinity of the Project site, and the agricultural ground cover, these lands are considered to have low potential habitat value for wildlife, and limited potential to support rare plant species.

The Project site offers limited high-quality wildlife habitat given its level of agricultural and industrial development. Cultivated land typically provides low suitability habitat for wildlife, however, the following species can potentially be found:

- Canada goose (*Branta Canadensis*) may use cultivated fields during migration
- Diurnal and nocturnal raptors such as Swainson's hawk (*Buteo swainsoni*) or great gray owl (*Strix nebulosa*), both listed as sensitive in Alberta (AEP 2015), may use the Project site to forage for small rodents
- Ungulates may use the Project site for feeding and traveling
- Small mammals may use the Project site for traveling and foraging

No terrestrial wildlife species have been reported in the Project area during previous wildlife inventories. Four bird species, black-throated green warbler (*Dendroica virens*), Clark's nutcracker (*Nucifraga columbiana*), sora (*Porzana Carolina*), and white-winged scoter (*Melanitta fusca*), have been reported in the Project area during previous wildlife inventories (FWMIS 2021). All four species are considered sensitive in Alberta (GoA 2015). None of the species observed on the site have been assessed by the Committee on the Status of Endangered Wildlife in Canada, nor are they listed as Extirpated, Endangered, Threatened, or Special Concern under SARA.

Approximately 10 hectares in the northwest corner of SW-34-55-21-W4M sits within a Key Wildlife Biodiversity Zone (KWBZ). During development of the existing Strathcona Salt Cavern Storage Facility, the Project site was also located within an Environmentally Significant Area, however the methodology to identify Environmentally Significant Areas changed in 2014, and as such, the Project is no longer considered to be in an area that meets the criteria of an Environmentally Significant Area (Fiera 2014). There is no high suitability habitat present for ungulates or extensive native vegetation. The Project site is identified as having low wildlife habitat suitability on the basis that that the surrounding area is heavily industrialized, with a major industrial complex located nearby. The proposed Project is located in an area that has been under cultivation for more than 40 years, with virtually all native habitats having been displaced (Stantec 2014b).

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15. HEALTH, SOCIAL AND ECONOMIC CONTEXT

Health Context, Effects and Mitigation Measures

The most recent census data available for review was the Strathcona County Census 2018. The 2020 Census was cancelled in response to the state of public health emergency declared by the Government of Alberta in response to the COVID-19 pandemic (Strathcona County 2020a). In 2018, the total population of Strathcona County was 98,381, with 71,332 people living in Sherwood Park (the Urban Service Area) and 27,049 living outside of Sherwood Park in smaller cities and towns, farms, country residential communities, and other hamlets (the Rural Service Area; Strathcona County 2018a).

Strathcona County is located in the Alberta Health Services Edmonton Zone. The Community Profile of Strathcona County excluding Sherwood Park indicates that the long-term health of the population is consistent with the rest of Alberta, with minor deviations between prevalence of chronic health conditions between residents of Strathcona County and the rest of Alberta (Alberta Health Services 2019). The leading causes of mortality in Fort Saskatchewan are neoplasms (e.g., cancer), circulatory disease, and external causes (i.e., injuries). This is consistent with the mortality rate of the province of Alberta, with slightly higher incidences of neoplasms and circulatory system mortality in the Rural Service Area versus Alberta and a slightly higher incidence of external causes for the province of Alberta compared to the Rural Service Area.

The closest hospital to the project is the Fort Saskatchewan Community Hospital, offering a range of acute and outpatient care.

Potential health effects from the project are assessed in Section 4 of Appendix B to the DPD and discussed in Sections 14, 15, 19, 22 and 24 of the DPD. No measurable residual effects on health are expected as a result of the Project.

There are minimal air emissions associated with construction and operation of the Project, and no effects to air quality or water quality are expected. During construction, AES will undertake dust mitigation measures and erosion and sedimentation control measures to reduce potential effects of dust and particulate matter. These mitigation measures are discussed in Section 24 of the DPD and Table 6 of Appendix B to the DPD. Any noticeable effects from use of diesel or emission of dust and particulate matter during construction are expected to be short-term and not noticeable outside of the Project site. Due to the limited and infrequent nature of these emissions, there is no measurable residual effect as a direct result of dust and particulate matter and no predicted effects to surface water quality or vegetation and wetlands as a result of these emissions. The Project will not have emissions that could deposit atmospheric contaminants to the surrounding environment and there are no potentially acidifying substances that will be emitted by the Project.

An increase in noise emissions is predicted to occur during the Construction Phase due to increased activity on the site and the addition of on- and off-road construction equipment. This noise will be short-term, intermittent and limited to the local area. Given the Project location, a noticeable increase in noise emissions is not predicted. The Project will also comply with the requirements of *Directive 038: Noise Control* (AER 2007) and with noise bylaws within Strathcona County. Noise dampening technology is well understood and if an exceedance is noted during operation of the Project, noise dampening equipment will be installed. No noise levels or types of noise that could cause effects to human health (e.g., infrasound) are predicted to occur as part of Project operations.

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The landscape surrounding the proposed Project is presently a mix of industrial development and cultivated lands. The majority of the Project components will be constructed adjacent to AES's existing Strathcona Salt Cavern Storage Facility and will not result in a significant change to the landscape. It is not anticipated that construction and operation of the Project will significantly change visual aesthetics of the local area or affect nearby residents.

Four new operators are expected to be hired as a result of this Project. AES' priority is always safety, and all employees support and adhere to AES' core value of "Safety First, Always." Safety is the first consideration in everything AES does and factors into every business, construction and operational decision made and every action taken to ensure that AES conducts its operations in a safe, responsible manner. AES believes that a job can only be done if it can be done safely and with a mind to operational sustainability. AES has a comprehensive health and safety management system and its health and safety policies and procedures are continually improved to ensure the protection of its employees and contractors, and the public.

As a critical infrastructure provider, AES is committed to responsible development and environmental and social sustainability. AES cares for the natural, cultural and historical resources of the communities in which it works and serves and understands that its success depends on its ability to operate in a sustainable and responsible manner, today and in the future. AES considers the environment in its designs and works to minimize any adverse environmental affects from its operations. As part of ATCO's annual Stewardship Report, it shares key metrics demonstrating its commitment to its collaborative and long-term approach to environmental stewardship.

Social Context, Effects and Mitigation Measures

The population of the Rural Service Area has increased by approximately 2,000 or 7.9% since 2005. The population of the Rural Service Area in 2005 was 25,169 and increased to 27,049 in 2018. The median age of Strathcona County inclusive of the Urban Service Area and Rural Service Area increased from 37 in 2005 to 40 in 2018. As of 2014, the average life expectancy of men in Strathcona County was 79.53 years and 84.18 years for women (GoA 2014a). The average life expectancy of men in Canada was 79.7 years and 83.9 years for women (Statistics Canada 2018).

As of 2016, approximately 4% of the population of Strathcona County identified as Indigenous (Strathcona County 2016). This is higher than the Alberta average of 2.8% of the population, however most Indigenous peoples in Strathcona County reside in the Urban Service Area. As of 2016, 0.8% of the Rural Service Area of Strathcona County identified as Indigenous (Alberta Health Services 2017). There are no First Nations Reserves or Métis Settlements located within the boundaries of Strathcona County.

Of the 97,020 residents of Strathcona County surveyed in the 2016 Canada census, 7,150 identified as visible minorities (GoC 2016). There is no data available on the number of people in Strathcona County who identify as LGBTQ+2S (Sherwood Park News 2020). Food bank usage statistics for the Rural Service Area are not available, however Strathcona County (Urban Service Area and Rural Service Area) noted an 87% increase in usage of the Strathcona Food Bank from 4,897 visits in 2014 to 9,151 visits in 2017 (Strathcona County 2018b). One women's shelter for abused women and children operates in Strathcona County (A Safe Place 2020). The shelter is located outside of the Rural Service Area. There are no women's emergency centres within the Rural Service Area (GoA 2020a). No seniors' emergency, homeless shelters, second stage (i.e., non-crisis), or long-term supportive housing is available in Strathcona County (GoA 2020a). All types of emergency and homeless shelters are available in Edmonton (GoA 2020a).

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Overall, women in Canada make up 22% of the Canadian oil and gas workforce (PetroLMI 2018). This percentage of employment is consistent with women's participation in the oil and gas industry in 2006 (PetroLMI 2018). The proportion of visible minorities in the oil and gas workforce nearly doubled between 2006 and 2016, from 7% to 13%. The proportion of visible minorities in the workforce in Canada is 21% (PetroLMI 2018).

Potential social effects from the project are assessed in Section 4 of Appendix B to the DPD and further discussed in Sections 21 and 22 of the DPD. No measurable residual effects are expected as a result of the Project. Potential negative interactions between Project personnel and vulnerable people were considered and mitigation measures specific to the Project are provided in Table 17 of Appendix B to the DPD.

The Project site is located within the AIH in a largely industrial and agricultural area. The number of temporary workers required for the Project is relatively low and will be phased throughout construction. The total construction workforce is anticipated to be approximately 350 to 450 workers, with onsite workers at any given time peaking at approximately 175 to 200 over the course of the 2.5 years of construction. It is expected that Project personnel would remain onsite throughout daily work duties and would not be interacting with any members of the community while at the Project site. Individuals unaffiliated with Project construction activities (i.e., individuals who are not employed by AES or by its contractor or affiliated with any inspection and monitoring activities) will not be permitted on site.

Because the temporary workforce will be relatively small and primarily sourced from the regional area, the potential for an increase in temporary workers during construction to adversely affect nearby vulnerable populations is limited. Potential Project effects (positive or negative) to vulnerable members of society, including Indigenous Communities (i.e., Indigenous women, girls, youth, and LGBTQ2S+) will continue to be considered as part of AES' normal course of business and throughout Project planning, construction, and operations.

AES has a Diversity and Inclusion Committee which has a vision to enhance and sustain a workplace culture. All AES employees are required to complete Indigenous Cultural Awareness training to understand the history of Indigenous Peoples and current issues and concerns facing Indigenous Peoples. AES will also consider offering this training to contractors if it is not provided through the selected vendors.

AES has a Violence and Harassment Policy and Prevention Plan and enforcement action will be taken for discrimination or harassment. AES is committed to providing a work environment in which all workers are treated with respect and dignity. AES will take whatever steps are reasonable to protect workers from the potential hazards associated with workplace harassment and violence and provides procedures and means for summoning assistance and reporting incidents or concerns. AES will investigate any reported incidents of harassment or violence related to Project personnel in accordance with the Occupational Health and Safety Act and the Alberta Human Rights Act. If an employee or contractor is found to be acting in a harassing, threatening, or illegal manner, AES will implement disciplinary actions up to and including termination of the employee or contractor, or reporting the worker's actions to the appropriate authorities.

AES is committed to enhancing and sustaining a workplace culture that is inclusive and diverse and this vision is embedded in ATCO's Core Values of Agility, Caring, Collaboration and Integrity. AES believes that organizations with diverse teams perform better and improve creativity and innovation and that the strength of its workforce comes from diversity. All employees have the responsibility to maintain an environment that is safe, respectful and productive and everyone has the right to be treated fairly within the workplace in an environment that recognizes and accepts diversity.

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While the proposed Project will only result in the addition of approximately four permanent employees, AES is committed to ensuring that its vision for inclusion and diversity remains a key consideration in its hiring process and part of its contractor selection process for construction activities. AES' policies ensure it hires people based on their experience and expertise and provide opportunities for advancement to promote diversity and inclusion.

AES will look at specific employment measures for uplifting and educating vulnerable members of Indigenous Communities and other vulnerable groups and will work towards removing barriers to participation in economic opportunities created by the Project.

AES will continue to facilitate cross-cultural education through means such as employee Indigenous awareness training, as described above. AES is also open to site visits with community elders or other opportunities for Indigenous Communities to transmit their traditional knowledge of the area to AES.

Economic Context, Effects and Mitigation Measures

The most recent economic information available for Strathcona County is in the 2018 Strathcona County Community Social Profile. It is assumed that the continued depression in global oil and gas prices and economic impacts from the COVID-19 pandemic have also impacted the financial environment in Strathcona County. The primary industry in Strathcona County is petrochemical and hydrocarbon processing. Associated sectors, such as engineering, construction, manufacturing, business accommodation, and the general service sector are all highly dependent on petrochemical and hydrocarbon processing (Strathcona County 2017).

The median income in Strathcona County is higher than the Alberta and Canada average. The median income of all households in 2016 was \$140,039, while the Albertan median was \$109,997 and the federal median was \$88,306 (Strathcona County 2018b). In 2018, approximately 50% of the population of Strathcona County was employed full or part time. The other 50% included children who were not yet in school, students including K-12 and post-secondary students, retirees, and those who were not in the workforce. (Strathcona County 2018a).

The economic outlook of the region and for Alberta in general has been heavily impacted by COVID-19. By the end of 2020, Alberta had recovered approximately three-quarters of the jobs lost between February 2020 and April 2020, however economic activity is still currently weak, and recovery will take time (GoA 2021).

Potential economic effects from the project are assessed in Section 4 of Appendix B to the DPD as well as Sections 7 and 22 of the DPD. Economic effects of the Project are expected to be positive.

Development of the Project is not expected to substantially change the current standard of living or property values in the immediate area. The Project will be developed on privately-owned lands that have been held by AES and other ATCO entities for nearly 40 years. Property values are not expected to increase or decrease due to the Project, as the net influx of temporary workers will be minimal and there is sufficient temporary accommodation in the Fort Saskatchewan area. Property values are anticipated to align more with general economic and hiring activity in the AIH and are not expected to be influenced by individual projects of this scale.

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The proposed Project is expected to result in four additional full-time operators and an increase in temporary work during the construction period. Where possible, AES will source construction personnel from the local area. Some temporary specialist positions may be filled from outside the region if they cannot be filled locally. During operation of the project, AES will require additional contractor support and will source required contractors from the local area where practicable.

During construction, AES expects to employ a total of 400 to 450 contractors over a period of two and a half years. At peak construction, AES expects approximately 175 to 200 contractors to be onsite and this would last for up to one year. Throughout the remainder of the construction phase, direct construction jobs are expected to reach daily totals of 60 to 150. These direct jobs will be made up of a variety of skilled labour including welders/fitters, electricians, millwrights, scaffolders, civil works operators, specialty equipment providers, drillers, pipeline contractors, fabrication shops, and supervisory or inspection related jobs. Almost all of these jobs are expected to be 10- to 12-hour day shifts. Labour for construction of the project facilities is expected to be primarily sourced locally.

Approximately 50 jobs that are indirectly related to project construction are expected to be created. These jobs would include but not be limited to jobs at material and equipment vendors, fire marshals, gas co-ops, municipal governments line locators, gravel pit operators and similar services. Approximately 100 engineering and design contractors are expected to be utilized for the project. These jobs will be sourced regionally or elsewhere within the province of Alberta.

Induced employment is expected to arise in areas such as hospitality (restaurants and hotels for engineering and design contractors or AES employees visiting the project site). Additional AES employees, either temporary or permanent, may also be hired to support the execution of the Project. Due to the relatively small workforce required for this project as compared to other Projects developed in the area, the possibility of a boom-bust cycle in the local economy as the Project moves from the construction to the operations phase is unlikely.

The majority of goods and services, and the majority of labour are expected to be sourced regionally. To the greatest extent possible, labour will be sourced from surrounding communities. AES will support hiring of qualified personnel from the regional area and support regional procurement where practicable. AES will support and prioritize employment and procurement opportunities for qualified Indigenous candidates and will review opportunities to support training of interested candidates. AES' hiring policies are also inclusive of vulnerable populations.

For construction activities, AES will follow its existing supply chain management procedures which include ensuring contractors and suppliers have been approved, are preferred on the basis of safety, environmental and social history and experience, and have positive records of accomplishment. Selection criteria also includes the ability, facilities and personnel to produce the required equipment, material or services to an acceptable quality standard, the correct expertise, and an ability to meet the required schedule and cost constraints. Local and / or Indigenous Affiliated Vendors are encouraged to participate in the competitive bid processes for material and services.

As part of the contractor selection process, a review is undertaken of contractor bidders' financial status, openness to various contracting terms, availability, experience and history of executing projects of this size and nature, health and safety, and any other general information about their organization. Upon issuance of the Request for Proposals (RFP) for the required work, project commitments for inclusion will be identified and will include factors such as potential involvement of Indigenous groups, GBA, and local content when feasible.

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Permanent jobs will be posted to the ATCO website and kept up for a period of several days. Depending on the skill requirements for the job, the posting may be kept open until a suitable candidate is found. The jobs will also be posted to job boards to promote the employment and uplift of diversity. These boards include job boards specific to women in oil and gas, and boards like Working Warriors, which is a job board for Indigenous workers in Canada. Hiring needs will be identified and AES is open to reviewing opportunities for working with interested members of Indigenous Communities who wish to work with AES but may require additional training. Procurement opportunities will be discussed with interested Indigenous Communities who will be able to forward job postings or RFPs to appropriate personnel within the community.

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PART E: FEDERAL, PROVINCIAL, TERRITORIAL, INDIGENOUS AND MUNICIPAL INVOLVEMENT AND EFFECTS

16. FINANCIAL SUPPORT FROM FEDERAL AUTHORITIES

The Project will be fully funded by the proponent and does not include any proposed or anticipated federal financial support.

17. USE OF FEDERAL LANDS FOR PROJECT

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

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18. JURISDICTIONS THAT HAVE POWERS, DUTIES OR FUNCTIONS IN RELATION TO AN ASSESSMENT OF THE PROJECT'S ENVIRONMENTAL EFFECTS.

In addition to the current IAAC process under the Impact Assessment Act, the proposed Project will be subject to authorizations and approvals required and issued by the AER under the *Oil and Gas Conservation Act* (OGCA), the *Pipeline Act*, the *Environmental Protection and Enhancement Act* (EPEA) and the *Water Act*. Approvals under the *Water Act* will also be required from AEP. The Project will also require permitting from Strathcona County under the *Municipal Government Act*. The AER is the primary regulator of the Project.

Permits, Licences and Other Authorizations

The following permits, licences or authorizations are required, by the identified jurisdictions, in relation to the assessment and regulation of the Project's environmental effects:

- OGCA and Pipeline Act requirements under *AER Directive 056: Energy Development Applications and Schedules for the development of energy related infrastructure including wells, facilities and pipelines* (AER 2019). Licences will be required for the cavern and disposal wells, product handling facility and pipelines.
- Cavern mining scheme approval, as per OGCA requirements, for approval of the salt cavern mining program.
- Cavern storage scheme approval, as per OCGA requirements, for approval of salt cavern operations.
- EPEA Approval to construct, operate and reclaim the brine pond, (and associated facilities) to be issued by the AER under the Industrial Approval Application (Activities Designation Regulation). EPEA is the primary Act in Alberta through which regulatory requirements for air, water, land, and biodiversity are managed and governs the lifecycle of the project. AES holds EPEA Approval 357248-00-01 for the existing Strathcona Salt Cavern Storage Facility and will amend the Approval for the proposed Project. EPEA Approval 357248-00-01 was issued based on an evaluation of proposed design and management of the brine pond and associated infrastructure or facilities, and prescribes requirements, including monitoring, sampling, and reporting, for:
 - Flare/air stack heights and identification of permitted air effluent streams.
 - Erosion and Sediment Control Plan
 - Groundwater dewatering activities
 - Land conservation, soil monitoring and revegetation
 - Groundwater management and monitoring
 - Stormwater management and monitoring
 - Industrial runoff management and monitoring
 - Wetland monitoring of the existing Wetland W3

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- Soil monitoring and management
- Decommissioning Plans and Land Reclamation Plans
- Water Act Approval for the purpose of constructing a brine pond pursuant to the *Water (Ministerial) Regulation* and the *Dam and Canal Safety Directive* which provide enforceable requirements for the full lifecycle of dams in Alberta.
- Water Act Approval for the purpose of dewatering beneath the brine pond pursuant to the *Water (Ministerial) Regulation*.
- To construct the product pipelines, the *Code of Practice for Pipelines and Telecommunication Lines Crossing a Water Body*, made under the *Water Act* and *Water (Ministerial) Regulation*, must be followed which establishes the requirements and conditions to be met when undertaking the activity of constructing or removing a pipeline watercourse crossing to eliminate or minimize any potential for harmful effects of pipeline watercourse crossings activity.
- Development Permit requirements administered by Strathcona County and the Municipal Development Plan, under the Municipal Government Act for the surface facilities associated with the Project, including the product handling facilities, brine pond and brine pumphouse.
- The development of the brine disposal well will require Approval under *AER Directive 051: Injection and Disposal Wells – Well Classifications, Completions, Logging and Testing Requirements* (AER 1994). The licences for AES's brine disposal wells are held under AER Class II Disposal Approval 7900C, as amended. The Disposal Approval will be amended to add an additional well to the Disposal Approval.
- A *Historical Resources Act* (HRA) Application will be submitted to Alberta Culture, Multiculturalism, and Status of Women (Alberta Culture) for approval under the *Historical Resources Act*.
- A Pre-Consultation Assessment Request will be submitted to the Alberta Aboriginal Consultation Office (ACO) for their consultation intensity recommendation for the Project as the Project requires an amendment to the existing EPEA Approval. Once a response is provided, AES will follow the recommendation of the Government of Alberta.

Existing approvals and licences that will be used to support the development of the Project include:

- AES' existing Water Act Approval 356745-00-00 for its water intake on the North Saskatchewan River.
- AES' Water Act Diversion Licences. AES currently holds Water Act Licence 00346745-00-00 for the purpose of cavern solution mining and Water Act Licence 31016-00-04 for the purposes of industrial processing.
- AES' existing Disposal Well Scheme Approval (AER Class II Disposal Approval 7900C, as amended).

No other federal or provincial approval requirements are anticipated for the Project.

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Monitoring and Inspection Requirements

The Project will be subject to monitoring and inspection requirements as prescribed in applicable legislation and guidelines, and regulatory approvals for the Project issued by the AER, AEP and Strathcona County. Expected and planned monitoring and inspection activities are described below. Construction and operations monitoring commitments made in the SA (Appendix B to the DPD) to monitor effectiveness of mitigation measures are also summarized.

The monitoring and inspection programs that AES will undertake as part of the proposed Project include construction, post-construction, and operational activities throughout the lifecycle of the Project. Monitoring will also be required post-decommissioning. Regulatory monitoring, inspection and reporting requirements that apply to the existing Strathcona Salt Cavern Storage Facility are expected to be amended for the proposed Project.

Construction and Post Construction

AES will develop and implement an Environmental Protection Plan (EPP) to guide the construction phase of the proposed Project to ensure that mitigation measures are documented, consistent, and easily referenced by all Project personnel. The EPP will be certified by the applicable contractors and will prescribe planned measures for mitigating the effects and potential effects of construction activities. The EPP will be developed in accordance with EPEA and other applicable requirements. The EPP will consolidate policies and procedures, safe work practices, environmental control plans, environmental contingency plans, environmental management plans, and a construction site fire safety plan. Roles and responsibilities of AES, contractors, and sub-contractors responsible for achieving compliance with the EPP will also be defined.

Additional management plans include but are not limited to: erosion and sediment control plan; stormwater management plan; stormwater management plan; groundwater management plan; water management plan; site preparation control plan; air emissions control plan; vegetation management control plan; waste management plan; traffic management plan; cleanup and reclamation plans; environmental inspection plans; and post-construction monitoring. AES will also develop contingency plans, including an emergency response plan, spill prevention and containment plans, and chance find plans for historical resources. Additional information regarding emergency response and spill prevention and containment measures for the Project is provided in the context of potential accidents and malfunctions associated with the Project in section 6 of the AS (Appendix B to the DPD).

Additional monitoring and inspection will occur as required. AES will respond immediately to any stakeholder complaints received during construction of the Project (e.g., noise complaint). AES and its contractors will work with the affected stakeholder to develop a plan to address and manage the complaint (e.g. noise monitoring).

AES will review approval conditions, environmental management plans, and any other planned protective or mitigative measures with the applicable contractor(s) prior to start of construction, will monitor compliance to these plans over the construction period and will evaluate construction mitigation measures implemented by the contractor to ensure they are effective.

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Operations:

The majority of inspection and monitoring performed during operations will be prescribed by applicable legislation and regulatory approvals for the Project.

AES currently holds EPEA Approval 357248-00-01, as amended. This Approval was issued on June 24, 2015 and permits AES to construct, operate, and reclaim the Strathcona Salt Cavern Storage Project (now known as the Strathcona Salt Cavern Storage Facility) and associated Brine Storage Pond. The terms and conditions of the EPEA Approval apply to the Project from start of construction to completion of remediation and reclamation. As part of the EPEA Approval, AES is required to develop and implement the following:

- Industrial Wastewater Control System
- Groundwater Dewatering System
- Groundwater and Wetland Monitoring
- Soil Monitoring Program

The groundwater, wetland, and soil monitoring programs are site-specific and were developed to meet terms and conditions defined in EPEA Approval 357248-00-01, as amended. Each monitoring plan or program was approved by the AER prior to commencing the monitoring programs. To date, the AER has had no concerns with the established monitoring programs. AES expects that these existing programs would be reviewed and modified to accommodate the facility expansion and operation. If monitoring suggests that further investigation is required, AES will develop additional mitigation and monitoring plans and will work with the AER to define the requirements of these plans and any adjustments to future inspection, monitoring and reporting.

The following management plans were also approved as part of AES' existing EPEA Approval 357248-00-01. AES expects these plans will be amended and updated to account for the Project:

- Stormwater and Groundwater Management Plan
- Erosion and Sediment Control Plan

A Dam Safety Management Plan, and an Operation, Maintenance and Surveillance (OMS) Manual is in place for the existing brine pond and will be updated for the new brine pond, for duration of its operation. This Plan and Manual are developed in accordance with the *Dam and Canal Safety Directive* (AER 2018) and include various inspection and monitoring requirements and activities conducted by AES employees, the Engineer of Record, or other qualified third parties. Inspection and monitoring will include but not be limited to inspections and surveillance of berms and berm integrity, related operating equipment and meters, and groundwater and liner protection systems. Formal engineering inspections are also completed annually and submitted to the AER and a Comprehensive Dam Safety Review is completed every ten years.

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AES currently maintains and continually improves Asset Integrity Programs for wells, pipelines, and pressure equipment as required under applicable AER legislation, including a Well and Subsurface Integrity Program, a Pipeline Integrity Program and a Pressure Equipment Integrity Program. These programs are required by the AER under the OCGA and Regulations, and Pipeline Act and Regulations and ABSA. These programs comply with prescribed inspection and monitoring requirements (e.g. well casing integrity inspections, annual pipeline inspections) and are reviewed and updated at least every three years for continual improvement.

AES has preventative maintenance and equipment inspection programs and undertakes additional monitoring and inspection as required (e.g. stakeholder complaint).

AES also has an integrated organizational management system which prescribes requirements for the ongoing continual improvement of integrity, maintenance, inspection and monitoring programs and activities, and a formal review of effectiveness at least every three years. In particular, the AES management system provides requirements for training and record retention associated with the listed activities.

Any results of inspection and monitoring activities will be addressed in accordance with regulatory or approval requirements, or otherwise as per internal AES procedures to ensure the adequate corrective or preventive action is taken.

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PART F: POTENTIAL EFFECTS OF THE PROJECT

19. POTENTIAL EFFECTS ON FISH AND FISH HABITAT, AQUATIC SPECIES AND MIGRATORY BIRDS

Fish and Fish Habitat

No measurable or adverse effect on fish and fish habitat is predicted as a result of the Project. Potential effects to fish and fish habitat from the construction and operation of the proposed Project are discussed in Section 4 of the SA (Appendix B to the DPD).

There are no fish bearing waterbodies or watercourses present on the Project site, however the proposed pipeline ROW will cross Astotin Creek, which may support forage fish. Fish inventories of Astotin Creek have shown presence of small-bodied fish, including brook stickleback (*Culaea inconstans*), fathead minnow (*Pimephales promelas*), and one large-bodied fish, white sucker (*Catostomus commersonii*) (FWMIS 2021). No sport fish have been reported and Astotin Creek is not stocked (FWMIS 2021). No benthic invertebrate surveys for Astotin Creek are available for public review.

Two pipelines will extend up to 5 kilometres outside of the Project site to convey product to and from customers. The pipelines will parallel existing pipeline routes extending to the west and south of the Project site. The pipeline ROW is expected to traverse Astotin Creek and a number of wetlands, including ephemeral waterbodies, marshes, shallow open water, and swamp wetlands. AES plans to Horizontally Directionally Drill (HDD) below Astotin Creek and any Crown claimed wetlands to prevent disturbance of wetlands which could affect groundwater recharge or surface water availability, or potential damage to the bed and banks of the watercourse and wetlands. Crossing design will consider technical and environmental considerations. Some wetland crossings are expected to be trenched. Trenching will be conducted in accordance with the requirements of the *Code of Practice for Pipelines and Telecommunication Lines Crossing a Water Body* (GoA 2013). This Code of Practice requires signed and stamped crossing designs and an evaluation of the crossing by a Qualified Aquatic Environmental Specialist. Appropriate erosion and sediment control measures will be used during construction of the pipeline ROW. AES will engage a qualified wetland specialist to complete a Wetland Assessment Impact Form (WAIF) prior to submission of a Code of Practice Notification when trenching pipelines through a wetland.

AES will take care to design wetland and water body crossings to preserve existing catchment and prevent impacts to the bed, banks, and riparian areas to the extent practicable. AES will develop a horizontal directional drill frac-out contingency plan and review it with the drilling contractor prior to drilling the crossing of Astotin Creek. Experienced contractors will be engaged to construct any directionally drilled or trenched water body crossings. Water body crossings will not be constructed until appropriate supporting documentation has been developed and submitted to the AER in accordance with Code of Practice Notification Requirements.

The proposed Project is located in the Beaverhill subwatershed of the North Saskatchewan River (NSWA 2021). Although average annual precipitation is generally high in the region, most precipitation occurs between May and September, when potential evapotranspiration is as large as 450 millimetres. As a result, there is generally little surface runoff. Spring snowmelt is one of the most important contributors to local runoff to wetlands (Ameli and Creed 2017). Subsurface connectivity modeling completed by Ameli and Creed (2017) suggests that subsurface connectivity exists between the

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North Saskatchewan River and wetlands up to 30 kilometres away. The wetlands within the Project site are recharge wetlands, located approximately 4.5 kilometres (south south-east) from the North Saskatchewan River. These recharge wetlands and other wetlands up to 30 kilometres away account for a monthly groundwater contribution of $0.775 \times 10^6 \text{ m}^3$ to the North Saskatchewan River (Ameli and Creed 2017). Ameli and Creed's model (2017) demonstrated subsurface connectivity between the North Saskatchewan River and recharge wetlands. As a result, shallow groundwater connectivity between wetlands in the area has been inferred. Surface water connectivity is not common and would only occur during inundation (e.g., significant snow melt or a more than 1 in 100-year rainfall event). Impacts to fish and fish habitat through hydrologic connectivity between wetlands, the North Saskatchewan River, and tributaries of the North Saskatchewan River are not expected, as surface connectivity is low in most conditions and recharge mainly occurs through shallow groundwater infiltration. As noted in Section 14, there is no direct connection between Astotin Creek and Wetland W3.

Discharge from Wetland W3 in SW 34-55-21-W4M to the neighbouring wetlands is not expected to occur as it is large enough to contain the 100-year 24-hour rainfall event, even when the water level is at the wetland boundary. The typical mechanism of drawdown of the wetland is infiltration and evaporation. In the unlikely event that enough runoff accumulates during a major precipitation event (i.e. greater than 1 in 100-year volumes) which could connect the on-site wetland with Wetland W1, flows could eventually make their way north to Astotin Creek through a series of wetlands (Stantec 2014a). However, AES will manage the water level in Wetland W3 to the elevation approved in the existing Stormwater and Groundwater Management Plan, approved under EPEA Approval 357248-00-01, as amended. The Stormwater and Groundwater Management Plan allows AES to implement mitigation measures to eliminate the potential of Wetland W3 discharging to neighbouring wetlands. During wet conditions, if the high-water level in Wetland W3 is greater than expected, a pump will be used to draw down the water level, and the water will be managed as per AES' existing EPEA Approval requirements, as amended for the proposed Project. Overland discharge from Wetland W3 to the adjacent environment is not expected. The existing general drainage path will be maintained for the offsite areas. These naturally drain towards the onsite Wetland W3, and it is important not to deplete the wetland.

The stormwater management facility will be monitored, and performance evaluated as per the EPEA Approval conditions and Water Act approval conditions required for the Project. Reporting on the stormwater and groundwater management activities will be completed as per EPEA Approval 357248-00-01, as amended.

Introduction of contaminants to Wetland W3 is not anticipated and no fish or aquatic species as defined under SARA inhabit Wetland W3. All process wastes will be stored in appropriate containers and potential contaminants from accidental releases will be prevented by installing appropriate primary and secondary containment. This includes grading the product handling facility site to an onsite catchment basin and primary and secondary containment for hydraulic sumps on pumps. The proposed liquid hydrocarbon cavern well will be located on a well pad designed with primary and secondary containment for both accidental liquid spills and stormwater runoff. Runoff from the pad will not be released unless it meets AEP parameters/concentration limits.

There is no connectivity between the cavern and disposal wells and surface water (i.e. Wetland W3 or other wetlands) in the immediate Project or local areas. All potential hydrocarbon bearing zones or injection and disposal zones outside of the target formations will be isolated by cement casings, as required by the AER. In accordance with the requirements of *Directive 051: Injection and Disposal Wells* (AER 1994) and *CSA Z341 Storage of Hydrocarbons in Underground Formations* (CSA 2018) as applicable, the wells will be isolated from groundwater with an appropriate combination of surface and

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production casing cemented to surface from a minimum of 25 metres below the lowest usable groundwater zone (i.e. 25 metres below the base of groundwater protection). Due to existing design and engineering controls and AES' operational history, no effects to surface water quality in the immediate Project or local areas as a result of drilling or downhole operations are expected. As such, no effects to fish or fish habitat are predicted from these activities.

The potential for chloride contamination from the brine pond is limited by both design measures and monitoring processes. The brine pond will be installed with a double liner and leak detection system to detect leaks from the primary liner, which would be contained by the secondary liner. A series of groundwater monitoring wells and a groundwater recovery system will also be in place. No overflow of the brine pond which could affect surface or groundwater runoff would be generated by a rainfall event. The brine pond will be built to a capacity in excess of the maximum amount of brine it would be required to contain. In the event that brine levels began to rise, the brine would be pumped from the pond to the disposal wells to manage the brine level in the pond.

Alterations to the grade and drainage patterns at the Project site are not expected to alter fish habitat or affect fish and there is no reasonably foreseeable method for onsite sedimentation processes affecting off-site fish and fish habitat. There will be no increase of sedimentation in fish-bearing water bodies as a result of Project activities.

AES has well established groundwater, wetland and soil monitoring programs that were approved by the AER as per the existing EPEA Approval. Baselines were developed before the operation of the facility (2014) and monitoring continues spring and fall for groundwater and wetland quality monitoring. To date, the AER has had no concerns with the established monitoring programs. AES expects that these existing programs would be reviewed and modified to accommodate the facility expansion and operation.

Aquatic Species

No measurable or adverse effect on aquatic species is predicted as a result of the Project. Potential effects to aquatic species from the construction and operation of the proposed Project are discussed in Section 4 of the SA (Appendix B of the DPD).

None of the wetlands or water bodies on AES' Project site are presently known to contain aquatic species. The pipeline ROW traverses Astotin Creek, which is a Class C waterbody and is conservatively assumed to be fish-bearing; however, there are no aquatic species, as defined under SARA, that are known to live in Astotin Creek. The pipeline ROW crossing of Astotin Creek will be directionally drilled to eliminate potential effects to the bed and banks of Astotin Creek.

There were no aquatic species, as defined under SARA, observed on the Project site during the wetland assessments conducted in 2013 and 2020. Additionally, there is no high suitability habitat for aquatic species as defined under SARA in the Project site, given that the land is currently used for industrial purposes. There have been no sensitive aquatic plants observed in Wetland W3 or other waterbodies in the Project site.

Although no sensitive species have been identified in the Project Site or in Astotin Creek, Astotin Creek drains into the North Saskatchewan River. The North Saskatchewan River supports habitat for lake sturgeon (*Acipenser fulvescens*), a species that is designated as Threatened under Alberta's Wildlife Act and recommended by COSEWIC to be designated Endangered under SARA. The designation of Endangered status under SARA is pending (GoA 2021). The lake sturgeon is considered At-Risk by DFO (DFO 2021).

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Due to the distance from the North Saskatchewan River and lack of surface connectivity between surface water in the Project site and the North Saskatchewan River, no effects to lake sturgeon spawning or feeding grounds are anticipated.

AES will follow the mitigation measures described above relating to Fish and Fish Habitat. Water withdrawals from the North Saskatchewan River will be conducted using AES's existing water intake system and no disturbance to the bed, banks, or riparian vegetation of the North Saskatchewan River is required. Additionally, the construction of the pipeline ROW is not predicted to have a noticeable effect on groundwater recharge or noticeable impacts to the flow rates or levels in the North Saskatchewan River.

AES does not plan to affect or disturb any of the wetlands traversed by the pipeline ROW beyond the temporary disturbance associated with trenched crossings. No effects are anticipated to aquatic species as wetland abundance will not noticeably change and the disturbance associated with construction will be brief in duration and will return to a similar state after construction clean up and revegetation.

Migratory Birds

No measurable or adverse effect on Migratory Birds, as defined in the Migratory Birds Convention Act, is predicted as a result of the Project. Potential effects to migratory birds from the construction and operation of the proposed Project are discussed in Section 4 of the SA (Appendix B to the DPD).

No high suitability bird habitat has been identified within the Project Site. Four bird species, black-throated green warbler (*Dendroica virens*), Clark's nutcracker (*Nucifraga columbiana*), sora (*Porzana Carolina*), and white-winged scoter (*Melanitta fusca*), have been reported in the Project area during previous wildlife inventories (FWMIS 2021). All four species are considered sensitive in Alberta (GoA 2015). None of the species observed on the site have been assessed by COSEWIC, nor are they listed as Extirpated, Endangered, Threatened, or Special Concern under SARA.

A wetland survey was conducted in summer 2020, and no federally (i.e., SARA) or provincially protected species (i.e., Alberta *Wildlife Act*) species were observed in the Project area during the survey, or in a previous survey conducted in 2013. Given that most of the Project area is developed or cultivated with annual crops, there is limited potential for sensitive species to use the Project area (Golder 2020). Due to the proximity to the North Saskatchewan River, it is expected that migratory birds and terrestrial wildlife will preferentially use natural habitats outside of the proposed Project area.

It is predicted that migratory birds would preferentially use the vegetated fringe surrounding Wetland W3 or the wetland complexes to the northeast of the Project site along Astotin Creek. No effects to water quality in Wetland W3 are expected, and as such, the proposed Project is not anticipated to adversely affect migratory birds or terrestrial wildlife that use Wetland W3.

The pipeline ROW parallels existing pipelines in the area and traverses an area with surrounding industrial development. Given that the pipeline ROW traverses existing wetland complexes and Astotin Creek, it is anticipated that the pipeline ROW may provide more suitable habitat for migratory birds. Generally, the Project is not anticipated to affect migratory bird survival or reproduction. Construction of the ROW may disrupt nesting activities along the pipeline ROW during the construction period, however the effect will be short in duration and post-construction cleanup and reclamation will occur progressively as each segment of the pipeline ROW is completed.

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AES will develop an EPP prior to beginning construction of the Project. The EPP is intended to identify key environmental information and requirements, field instructions, and mitigation measures specific to the construction, post-construction cleanup and remediation of the proposed Project. The purpose of an EPP is to provide guidance to employees and contractors for responsible environmental working procedures and standards during construction. The EPP will also provide contingency plans or instructions to workers in the event that an unexpected event occurs.

The primary mitigation measure to limit potential adverse environmental effects on wildlife and to ensure compliance with the *Migratory Birds Convention Act* will be to conduct vegetation clearing outside the migratory bird restricted activity periods (May 1 to August 20 in upland areas and April 20 to August 25 in wetlands). In the event that site clearing is scheduled to occur within the breeding bird window, nest sweeps will be conducted by a qualified biologist to identify active nests protected under the *Migratory Birds Convention Act* and the *Migratory Birds Regulation*. If occupied nests or migratory birds are encountered during construction, AES or its contractors will stop work around the nest or feature, flag the area, and notify a Resource Specialist and/or regulatory agencies as needed. If it is possible to relocate a nest, the nest will be relocated and will be monitored until the end of the post-construction phase. If the nests are relocated from an area that is to be remediated, appropriate plant species to maintain habitat quality will be revegetated or encouraged to grow along the recontoured area.

If any development is required in the KWBZ, AES will endeavor to undertake clearing and grading activities outside the KWBZ restricted period (January 15 to April 30). If Project activities are required within this restricted period, a wildlife management plan will be developed and wildlife surveys (e.g. a winter mammal tracking survey) will be performed prior to their undertaking (ESRD 2015).

Limited sensory impacts to migratory birds are anticipated due to the limited emissions and noise sources associated with operation of the proposed Project. Flaring is expected to be infrequent and limited to upset conditions or planned maintenance. To date, flaring at the existing AES facility has been infrequent, and no bird mortality or injury has been reported. Noise sources from the proposed Project during operation are expected to be limited to pumps and vehicular traffic.

Noise during construction will arise from drilling, the use of heavy equipment, and increased human activity on the site. This increase in noise during the construction period may discourage migratory birds from nesting in the vegetated fringe surrounding Wetland W3. It is anticipated that during this period, migratory birds may prefer nesting in the extensive wetlands associated with Astotin Creek, or along the banks of the North Saskatchewan River, resulting in negligible impact to migratory birds from the Project. The noise disturbance is expected to fluctuate and last the duration of construction and avoidance may only impact the nesting seasons in 2022 and 2023, as Project activities are not expected to start until the 2021 nesting season has ended and will be into the construction clean up and reclamation phase by 2024. The increased noise is not expected to affect nesting birds or fledglings.

During construction, there is potential for increased mortality risk due to vehicle strikes. AES presently has speed limit signs posted on site and all employees, contractors, and visitors are required to abide by these limits and AES will implement a Traffic Management Plan. Where practicable, portions of the Project site will be graded or an appropriate temporary road reinforcement material (e.g. swamp mats or corduroy) will be in place to discourage potential take of ground nesting birds.

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The brine pond will be designed with measures that will minimize impacts to wildlife and deter birds from using the pond for roosting, nesting, foraging or resting. The pond will be fenced around the perimeter to limit access to terrestrial animals. The brine pond will be lined with double high-density polyethylene (HDPE) liners that will extend from the interior of the pond to the top of the pond berm. The pond berm top will have gravel surfacing suitable for pedestrian and light vehicle access. The lack of a vegetated margin on the edge of the pond and on top of the pond berm will deter nesting and feeding activity by waterfowl. As brine is displaced into the pond from the caverns, it will flow through a degasifier to remove all NGL (i.e. hydrocarbon) products.

Since starting operation of the Strathcona Salt Cavern Storage Facility, no migratory birds have been observed landing on or using the brine pond. It is anticipated that throughout operation, birds will be preferentially attracted to the more suitable habitat provided by either Wetland W3, or the wetlands associated with Astotin Creek.

AES regularly monitors its existing brine pond to confirm that migratory birds are not affected and to ensure mitigations remain effective. No impacts on migratory birds have been identified to date. Should any indication of an adverse effect on migratory birds arise, AES will consider the installation of further deterrents, such as effigies, at the perimeter of the pond.

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20. POTENTIAL EXTRA-PROVINCIAL AND FEDERAL IMPACTS

The proposed Project is not expected to result in any changes to lands outside of the province of Alberta, to reserve lands, or to federal lands. No portion of the proposed Project will be developed on reserve lands or federal lands. With the exception of the less than 5-kilometre pipeline ROW, the proposed Project infrastructure will be located on lands privately owned by AES, at the site of the existing Strathcona Salt Cavern Storage Facility. The pipeline ROW will be constructed on land privately owned by other industrial operators in the AIH.

The proposed Project is not expected to result in any changes to air quality inside or outside of Alberta. The emissions directly associated with the proposed Project are minimal.

Water will be sourced from the North Saskatchewan River through AES' existing Alberta Heartland River Water System and using existing Water Act licences. No increases to existing withdrawal limits are required. Water diversion for the proposed Project will be completed in accordance with AES' *Water Act* Approvals and Licences and no impacts to downstream flows in the North Saskatchewan River watershed are expected as a result of the proposed Project.

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21. IMPACTS TO INDIGENOUS GROUPS INCLUDING TRADITIONAL LAND USE, PHYSICAL AND CULTURAL HERITAGE, AND HISTORICAL, ARCHAEOLOGICAL AND PALAEOANTHROPOLOGICAL RESOURCES

No measurable residual effects on Traditional Land and Resource Use (TLRU) are anticipated as a result of the Proposed Project. AES assessed potential effects to TLRU in section 4 of the SA (Appendix B to the DPD).

AES has engaged 33 First Nations, Métis Settlements and Métis Regions as part of the initial engagement activities and has subsequently engaged with two additional Indigenous Communities for a total of 35 communities. AES is committed to ensuring the Indigenous Peoples of Canada have the opportunity to discuss any potential concerns with the Project. To date, specific Project discussions have taken place with eleven of these Indigenous Communities (identified in Section 4) to ensure any potential impacts of the Project are identified. Following receipt of the IAAC Summary of Issues in early March 2021, AES reached out to each of the Indigenous Communities that submitted formal comments to IAAC to discuss their concerns and learn more about how AES could address them. Concerns expressed by Indigenous Communities through Project engagement activities are summarized in Section 4 and addressed throughout the DPD.

The proposed Project is located in Treaty 6, and in Métis Harvesting Area D, which extends from the east to the west of the province and from near Ponoka as the southernmost extent to north of Conklin. However, no lakes or rivers where Métis Harvesting is permitted are located within 10 kilometres of the Project site (GoA 2019). The closest First Nation reserve or Métis Settlement to the proposed Project is the Alexander First Nation, located approximately 50 kilometres from the Project site. The lands in and around the Project site have been in use for thousands of years and have more recently been cultivated and developed in the last hundred years (NSRBC 2017).

As the Project will be located on privately owned land that is zoned for heavy industrial use by Strathcona County and is located within the AIH adjacent to other heavy industrial sites, there is limited potential for terrestrial Indigenous harvesting rights in the area to be impacted by the Project. No traditional uses of the proposed Project site by Indigenous groups or peoples have been identified in previous regional studies for the area (Stantec 2010; Stantec 2013).

The existing Strathcona Salt Cavern Storage Facility is located at SW-34-55-21-W4M where most or potentially all Project development will occur. The additional lands contemplated in the 16-hectare area in the northern portion of the adjacent NW-27-55-21-W4M parcel are currently cultivated and hold low potential for traditional uses including hunting, fishing, plant gathering, or spiritual use. There is no current traditional land use within the Project site.

The lands surrounding the Project are privately owned and are generally cultivated or developed with limited remaining native (i.e., Prairie) vegetation. AES is not aware of any use of lands in proximity to the Project site by Indigenous Communities for traditional purposes.

The bed and banks and associated setbacks along the North Saskatchewan River are the closest Crown land to the Project site, approximately 4.5 kilometres away. The Project is located in an area that AES understands is already avoided for traditional land use purposes due to existing heavy industrial development. The Project is not anticipated to result in increased avoidance of the area or any preferential use areas, nor block or remove access to preferred use areas. Access constructed for the proposed Project will connect AES' land to an existing Range Road within Strathcona County and will not impact any Crown land. No increased access to Crown land which may be used for traditional purposes will result

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from the Project. Further, the proposed Project will not create additional disturbances that could increase the likelihood of non-Indigenous use of land and resources on Crown lands.

There is limited surface infrastructure being developed for this Project and it is being added to an existing development. Sensory disturbances associated with the Project (e.g., noise, presence of workers on site) will be limited primarily to the construction phase.

As noted above, the proposed Project is located approximately 4.5 kilometres from the banks of the North Saskatchewan River or *kisiskâciwanisîpiy*. The *kisiskâciwanisîpiy* has been an important waterway for Indigenous Groups since before contact with European explorers. The North Saskatchewan River contributes to Canada's cultural and geological history and has been an important source of fish, shoreline resources, and for freshwater use stretching back to before contact with European explorers (NSRBC 2017). No part of the Project site, including the pipeline ROW, traverses the North Saskatchewan River and the pipeline ROW crossing of Astotin Creek will be directionally drilled and completed in accordance with the *Code of Practice for Pipelines and Telecommunications Lines Crossing a Water Body* (GoA 2013). No direct impacts to the North Saskatchewan River or tributaries of the North Saskatchewan River are anticipated as a result of Project activities.

The Project is not expected to result in consequential adverse residual impacts to resources of importance to Indigenous peoples, including water quality or quantity, wildlife or wildlife habitat, traditional and medicinal plants, or spiritual use sites due to the extensive history of cultivation and development in the area and the very limited potential for any of the minor effects from the Project to cross the boundary of the Project site. As noted above, the Project is not expected to impact fish or fish habitat or migratory birds.

AES understands that the Project lands are in an area where traditional land use was practiced by Indigenous Communities for thousands of years. Changes that have occurred in the AIH have occurred within recent history and elders and other Traditional Use practitioners in Indigenous communities may recall using the area prior to some of the large-scale developments in the AIH. AES understands that development of the Project may impact Indigenous cultural and experiential connections to the land, as it will add to existing development in the area. AES will continue to engage with interested Indigenous Communities throughout the life of the Project and will consider feedback on ways to enhance the experience on the landscape.

Physical and Cultural Heritage and Historical, Archaeological and Palaeontological Resources

No measurable residual effects on Indigenous physical and cultural heritage and historical, archaeological and palaeontological resources are expected as a result of the proposed Project. Potential effects to physical and cultural heritage and historical archaeological and palaeontological resources were assessed in section 4 of the SA (Appendix B to the DPD).

The Project site has been cultivated since the early 1900s and previous archaeological surveys conducted in the area have not identified any evidence of historical structures, camps, or spiritual sites (ATCO Power 2013). Refer to Figure 10 in the DPD for a map of archaeological sites identified in the proposed Project site and surrounding area.

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AES received HRA Approval for SW 34-55-21-W4M in 2014 in support of the existing Strathcona Salt Cavern Storage Facility and will seek an amendment to this Approval prior to any clearing or construction activities. Should AES determine that it will utilize NW 27-55-34 W4M for the proposed Project, AES will obtain HRA Approval for this area prior to any clearing or construction activities in the quarter section. AES will also obtain HRA Approval for the pipeline ROW prior to any clearing for or construction of the pipelines. AES will, at a minimum, follow all guidance from Alberta Culture prior to commencing construction.

In accordance with the requirements of Alberta Culture and the HRA, the discovery of any Indigenous traditional use sites must be reported to the Director, Aboriginal Heritage Section of Alberta Culture. Sites that must be reported include historic cabin remains, historic (unoccupied) cabins, cultural or historical community camp sites, ceremonial sites/spiritual sites, gravesites, historic settlements/homesteads, historic sites, oral history sites, ceremonial plant or mineral gathering sites, historical trail features, and sweat/thirst/fasting lodge sites (Alberta Culture 2019). AES will follow the guidance provided by the Director, Aboriginal Heritage Section.

AES acknowledges that many of the Indigenous Communities engaged as part of the project have harvested, fished, or hunted in the AIH area in pre- or post-contact eras and have ancestral connections to the land. Although the landscape has changed through cultivation and later development, AES recognizes that members of Indigenous Communities may still feel connections to the area and that Indigenous knowledge and culture may still be obtained from these areas. AES is committed to working with Indigenous Communities to ensure anything of historical, cultural, archaeological or palaeontological significance that may be found during project activities, and throughout the Project lifecycle, is preserved. AES has specifically been in contact with Alexander First Nation, Kikino Métis Settlement, and Métis Nation of Alberta Region 2 and has committed to developing a Discovery of Heritage and Archaeological Resources Contingency Plan and sharing an overview of this plan with these communities prior to commencing construction of the Project.

As part of this Plan, if any structures, sites, or items of historical, archaeological, palaeontological, or spiritual significance to Indigenous groups are identified during construction of the proposed Project, AES and its contractors will stop work and flag the area to prevent any further disturbance. AES will implement the Discovery of Heritage and Archaeological Resources Contingency Plan and contact a Resource Specialist. No potential sites will be further disturbed until the Resource Specialist has indicated that appropriate mitigation measures have been met. This Plan will also be included in the EPP for construction of the Project.

Alexander First Nation noted a historic canoe-making site in the general area. AES further discussed this site with Alexander First Nation and learned that the site is outside of lands within AES' care and control. Although AES is not able to directly mitigate impacts to this site, AES understands that there could be additional artefacts in the general area including the Project footprint. AES will follow the protocol regarding notification of Indigenous Communities if any potential historical resource is discovered and will share an overview of the Discovery of Heritage and Archaeological Resources Contingency Plan with interested Indigenous Groups prior to commencing construction.

AES further discussed with Kikino Métis Settlement potential mitigation measures to preserve Indigenous knowledge and culture, including Indigenous language. These mitigation measures are discussed further below.

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22. IMPACTS TO INDIGENOUS HEALTH, SOCIAL, AND ECONOMIC CONDITIONS

Potential Health Impacts

No impacts to Indigenous health are expected due to the low air emissions that will result from the Project and the limited opportunity and low likelihood for potential contaminants to enter the watershed or food chain. The Project is also not expected to adversely affect water quality or quantity, wildlife or wildlife habitat, traditional and medicinal plants, or spiritual use sites due to the extensive history of cultivation and development in the area and the very limited potential for any of the minor effects from the Project to cross the boundary of the Project Site.

During construction, AES will undertake dust mitigation and erosion and sedimentation control measures to reduce potential effects of dust and particulate matter. The Project will not have emissions that could deposit atmospheric contaminants to the surrounding environment and there are no potentially acidifying substances that will be emitted by the Project. Due to the nature of expected emissions and volumes, mitigation measures to reduce impacts to air quality from dust and particulate matter are expected to be sufficient to address potential effects to surface water, plant communities and wildlife. As a result, there will be no interaction between air emissions and surface water, vegetative cover or wildlife species that may be harvested by Indigenous Communities as part of traditional use. Air emissions during operation of the Project will be limited to infrequent flaring and fugitive emissions and will be negligible.

The proposed Project is located on privately owned land that is used for industrial and agricultural purposes and is zoned for Heavy Industrial (Heartland) use. These lands are no longer used for subsistence hunting or gathering of traditional or medicinal plants, and AES therefore does not anticipate any impacts to Indigenous health associated with changes to the Project site.

No noise levels or types of noise that could cause effects to human health (e.g., infrasound) are predicted to occur as part of Project operations, and AES will comply with the requirements of *Directive 038: Noise Control* (AER 2007) and with noise bylaws within Strathcona County.

The majority of the Project components will be constructed adjacent to AES's existing Strathcona Salt Cavern Storage Facility and will not result in a significant change to the landscape. It is not anticipated that construction and operation of the Project will significantly change visual aesthetics of the local area or affect Indigenous Peoples.

The proposed Project will make use of AES' existing river water intake system owned and operated by AES and will utilize allocations from existing diversion licences held for the purposes of cavern washing. No alterations to the existing intake or additional draws on the river will be required and as such, there will be no impacts to the bed or banks of the North Saskatchewan River, to fish, fish spawning or feeding grounds, or to aquatic species as a result of the proposed Project.

No process wastewater from the proposed Project is planned to be returned to the watershed. Any wastewater generated by the proposed Project will be minimal and will be stored on site until it is removed and disposed of in a licensed facility.

It is expected that most of the personnel engaged during the proposed Project will be local to the Edmonton Capital Region. Any increase in workers in the area are expected to be minimal and temporary in nature. Access to health care is not expected to be impacted as a result of the Project.

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Potential Social Impacts

Limited social impacts to Indigenous Communities are expected as a result of the proposed Project. The proposed Project is in a developed area zoned for Heavy Industrial use. The proposed Project is bound by existing Range and Township roads and is located approximately one kilometre north of secondary Highway 15, and located on privately owned land and is adjacent to other privately-owned parcels.

No impacts to traffic, or access to community resources as a result of the Project are anticipated in any Indigenous Communities. During construction, labour is largely expected to be sourced from the Edmonton Capital Region. Construction and operation of the proposed Project are not expected to significantly increase the temporary or long-term population of Strathcona County or the Edmonton Capital Region. Construction and operation of the proposed Project will not result in an increased transient workforce and no camps or other common housing is required for temporary workers. At peak, the construction workforce is expected to be approximately 175 to 200 workers who are largely expected to reside in their own homes or housing. A small portion could be expected to periodically stay in hotels in the Edmonton Capital Region, which is well suited to accommodate temporary workers.

As noted above, the potential for an increase in temporary workers during construction to adversely affect vulnerable populations is limited. Potential Project effects (positive or negative) to vulnerable members of Indigenous Communities (i.e., Indigenous women, girls, youth, and LGBTQ2S+) will continue to be considered throughout Project planning, construction, and operations through engagement with Indigenous Communities. Well-being of vulnerable populations and mitigation measures are discussed in Table 17 of Appendix B. As noted above, AES will continue to look at specific employment measures for uplifting and educating vulnerable members of Indigenous Communities and other vulnerable groups and will work towards removing barriers to participation in economic opportunities created by the Project. AES recognizes the need for Indigenous cultural awareness training for all employees. Where contractors used as part of the Project do not have similar training programs, ATCO will consider offering its programs to these contractors as part of its contractor orientation process.

Continued engagement with Indigenous Communities will also support AES in attempting to effectively address social considerations such as youth and elder needs and family support services. It will also support AES in identifying how best to engage and involve people of Indigenous Communities at all phases of the Project, which may include requesting information from Indigenous Communities relating to employment by gender types in their specific communities, and consulting with social services, health services and other support organizations in each community to determine if there are opportunities for AES to contribute to ongoing social support through those organizations.

It is anticipated that interaction between Indigenous Communities and the construction and operation activities associated with the proposed Project will largely be through procurement and vendor services as described below (refer to Potential Economic Impacts). AES understands that while development projects such as this are often positive economically for Indigenous Communities, these projects could also detract from the time available to practice traditional and cultural activities. AES has specifically discussed this potential with Kikino Métis Settlement as part of ongoing engagement and has also listened to potential mitigation measures that could support maintaining the traditional economy while participating in the local economy. These included leave during harvesting times and promoting the use of Indigenous language as part of Project naming conventions, which can also support preserving Indigenous language over time. As a result of the engagement and discussion arising from the proposed Project, AES will consider adding

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programs, activities, policies and opportunities which support social and cultural enhancement and economic participation, and which positively impact and accommodate Indigenous traditional economic or cultural activities.

AES (and ATCO) are committed to the ongoing training and education of its own employees on the Rights and cultures of Indigenous Peoples and of the Indigenous Communities with which ATCO shares the environment. ATCO's training programs include:

- Indigenous Awareness Orientation, which provides foundational information on the history and culture of Indigenous Peoples in Canada and ATCO's history of partnerships with Indigenous groups. To date, over 6,000 employees have completed this training.
- Lunch and learn sessions, which introduce what Indigenous Relations means to ATCO and covers a variety of topics. To date, over 500 employees have attended sessions.
- Corporate Indigenous Training, which provides employees with the opportunity to gain more in-depth knowledge of the history, culture and the legal and traditional rights of Indigenous Peoples in Canada. Sessions are offered over one or two days. Nearly 600 employees have participated in this training.
- The University of Calgary Indigenous Relations Training Program, sponsored in part by ATCO, is a four-day course designed to help participants gain a better understanding of the culture, history, and current plight of Canada's Indigenous Peoples. Topics include:
 - Indigenous Ways of Knowing
 - Historical overview of Indigenous Peoples in Canada
 - Current Indigenous issues in Canada
 - Current trends in education and employment
 - Socio-cultural issues in the Northern and Circumpolar Region
 - Economic development and environmental issues in the Northern and Circumpolar Region
 - Resource development in Indigenous communities
 - Building strong community relations

To date, over 130 employees have completed this training.

In addition to training its own employees on the unique cultural and historical status of Indigenous Peoples, ATCO also provides training and education to Indigenous Communities and continues to expand on its existing programs.

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Potential Economic Impacts

The economic impact to Indigenous Communities is expected to be neutral or positive. Potential effects of the Project associated with Indigenous employment and procurement are assessed in Appendix B of the DPD. Most of the jobs generated by the proposed Project will be temporary jobs during Project construction of surface facilities with approximately four permanent operator jobs anticipated, as discussed in Section 15.

AES has engaged with 35 Indigenous Communities across Alberta and has received one formal Letter of Support for the Project. Several of the communities contacted have expressed interest in participating in Project construction or procurement in some manner. AES will evaluate opportunities to meet temporary and permanent labour force needs through the employment of Indigenous peoples with relevant qualifications or required equipment and/or services. AES is currently evaluating education and training initiatives to increase Indigenous participation as part of the proposed Project. As noted, this may include ways of accommodating cultural and social needs of Indigenous employees. AES will continue to engage with interested Indigenous Communities during the procurement process and coordinate with any selected vendors who reside outside of the region.

As part of Project engagement activities, AES continues to evaluate opportunities to meet labour force needs through the employment of Indigenous peoples. AES will support and prioritize employment and procurement opportunities for qualified Indigenous candidates and will review opportunities to support training of interested candidates. AES' hiring policies are also inclusive of vulnerable populations. Indigenous vendors are also encouraged to participate in the competitive bid processes discussed in Section 15 for material and services.

Permanent jobs will be posted to the ATCO website and kept up for a period of several days. Depending on the skill requirements for the job, the posting may be kept open until a suitable candidate is found. The jobs will also be posted to job boards to promote the employment and uplift of diversity. These boards include job boards specific to women in oil and gas, and boards like Working Warriors, which is a job board for Indigenous workers in Canada. Hiring needs will be identified and AES is open to working with interested members of Indigenous Communities who wish to work with AES but may require additional training. Procurement opportunities will be discussed with interested Indigenous Communities who will be able to forward job postings or Requests for Proposals to appropriate personnel within the community.

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23. GREENHOUSE GAS EMISSIONS ASSOCIATED WITH THE PROJECT

GHG emissions that would be released to atmosphere during the construction and operation phases of the proposed Project carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O). GHG emission sources during construction and operations are quantified and discussed in Section 3.1 and 3.2 of the Greenhouse Gas Technical Data Report (the GHG assessment) provided in Appendix B of the DPD. The GHG assessment evaluated the contribution of GHGs released during Project construction and operation activities in the context of federal and provincial GHG emissions. The GHG emission estimates provided for the proposed Project are expected to be an overestimate of actual GHG emissions and incorporate several conservative assumptions.

During the construction phase, there will be direct emissions from off-road equipment, on-road equipment, and other construction and space heating equipment onsite and land-use change activities.

- The direct GHG emissions from the entire construction period (2.5 years) are estimated to be 10,699 tonnes of carbon dioxide equivalent (tCO₂e), of which the emission from off-road equipment accounts for about 52% (i.e. 5,574 tCO₂e) of the total construction emissions followed by land-use change (43%). Using the 2018 GHG emission totals for Canada (729,000 ktCO₂e) and Alberta (273,000 ktCO₂e) as a baseline, the direct emissions (excluding emissions associated with land-use change activities) during the construction phase represents 0.0008% and 0.002% of Canada's and Alberta's total annual GHG emissions.
- In addition to this, during construction, it is estimated that there will be 17,012 tCO₂e of indirect emissions associated with imported electricity from the Alberta electrical grid.
- The maximum annual net GHG emissions for the construction phase, including both direct and indirect emissions, is estimated to be 11,085 tCO₂e. The assumption, methodologies and emissions factors used to calculate emissions from each of the above sources can be found in Sections 3 and 4 the GHG assessment (Appendix B to the DPD).
- During the construction phase, approximately 4 ha of trees and shrubs and 1 ha of grassland may be removed and converted to industrial land. Based on the most conservative assumptions, the release of carbon associated with this 5 ha of land is expected to be 4,625 tCO₂e. The emissions represent approximately 0.0006% and 0.002% of 2018 Canada and Alberta total annual GHG emissions. Given the limited clearing associated with the Project, effects on carbon sinks are limited, and land clearing is estimated to have an immaterial impact on climate change.

During the operation phase of the Project, there will be emissions from flaring and fugitive emission sources. No stationary combustion sources will be used and no venting to atmosphere or industrial process emissions will occur as part of the operation of the proposed Project.

- The direct GHG emissions from Project operation are estimated to be 1,593 tCO₂e per year, of which the emissions from flaring accounts for about 94% (i.e., 1,497 tCO₂e per year) of the annual operation emissions followed by fugitive (6%). Using the 2018 GHG emission totals for Canada and Alberta as a baseline, the direct emissions during the operational phase are equal to 0.0002% and 0.0006% of Canada's and Alberta's total annual GHG emissions.

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- In addition to this, the indirect emissions associated with imported electricity during operation are estimated to be 59,568 tCO₂e per year. The project does not capture and store CO₂ and there are no avoided emissions as a result of this Project.
- The maximum annual net GHG emissions for the operation phase, including both direct and indirect emissions, are estimated to be 61,161 tCO₂e. The assumption, methodologies and emissions factors used to calculate emissions from each of the above sources can be found in Sections 3 and 4 of the GHG assessment (Appendix C to the DPD).

Based on the screening level estimate of upstream GHG emissions, the upstream emissions associated with the Project are significantly below the thresholds provided by the SACC. The proposed Project will not have upstream GHG emissions greater than or equal to the thresholds outlined in Table 1 of Section 3.2.2 of the SACC. These upstream GHG thresholds, which begin at 500 kt CO₂e per year for 2020 to 2029 and end at 100 kt CO₂e per year in 2050 and beyond, greatly exceed the estimated upstream emissions associated with the Project. The highest total annual upstream emissions expected in relation to the Project between 2024 and 2030 is 12.64 kt CO₂e. Upstream emissions are not expected to increase post-2030 as the various federal and provincial emissions reductions requirements are expected to be further implemented.

Since submission of the IPD, AES has determined that it will not utilize a hot oil heater during operation of the facility. As such, emissions from this source have been removed from the GHG estimates. Further, the option to use Lot 'D' for stockpile storage has also been proposed and related activities have been included in the estimates of emissions from construction activities.

The full GHG assessment is presented in Appendix B to the DPD. The assumptions used in the report are provided in the GHG assessment and in Section 23 of the DPD.

Overall, the GHG emissions associated with Project construction and operation are low in magnitude when compared to provincial and national emission totals.

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24. WASTE AND EMISSIONS GENERATED BY THE PROJECT

Solid Wastes

Solid wastes will be generated during construction and decommissioning. Very low quantities of solid waste are expected to be generated through the ongoing operation of the storage caverns. Waste oil will be stored in secure containers with secondary containment. Containers will be stored in well-ventilated, shaded areas wherever possible. Any waste that has a potential to be released to the environment will have secondary containment as per the AER's Directive 55 Storage Requirements for the Upstream Petroleum Industry. (AER 2006). Suitable containment will be used to contain waste and incompatible wastes will not be stored together.

Wastes generated during construction include domestic waste, recyclables (wood, paper, metal), mixed construction wastes, sewage and hydrovac waste. Wastes generated during operations is expected to be limited to domestic and shop waste, recyclables, wastes from plant maintenance (e.g. filters), and small volumes of waste oil.

All wastes will be disposed of according to the applicable provisions of AER Directive 058: Oilfield Waste Management Requirements for the Upstream Petroleum Industry (AER 2006), and as required during construction, the Waste Control Regulation and the requirements for each waste classification outlined in the Alberta Waste Users Guide for Waste Managers (AEP 1996). Solid wastes will be either recycled or disposed of through licensed waste disposal companies at licensed facilities. A waste management plan will be developed for the Project as part of its construction and operating procedures. The waste volumes generated during operation will be much smaller than those generated during the construction phase. A description of wastes that are likely to be generated as part of the Project and the methods planned to manage them are identified in Tables 8 and 9 of the DPD.

Water

Water for the proposed Project will be sourced from the North Saskatchewan River through existing infrastructure and under existing water diversion licences. Liquid discharges from the Project will consist of brine, small amounts of process wastewater, and domestic sewage.

Brine will be generated during the development of the caverns and will include high concentrations of dissolved sodium chloride from the salt formation as well as hydrocarbon residue from the control fluid (diesel) used during washing. Brine will be disposed through one existing licensed disposal well owned and operated by AES and through one disposal well to be developed as part of the Project.

No effluent is generated onsite, with the exception of leachate collected in the pond's leak detection system. Piping will collect and convey any leachate to a pump, which will return the leachate back to the brine pond. The rate of leachate pumping is monitored remotely.

Small amounts of process wastewater will be periodically generated by the NGL process dehydrators. All process wastewater will be temporarily stored on site in a small above ground tank (approximately 65 m³) which will be installed with secondary containment. The contents will be disposed of at a licensed disposal facility.

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Domestic sewage from an office located on site will be collected in a septic holding tank. The contents of the tank will be pumped out and disposed at a licensed disposal facility as required. A similar tank for process wastewater is in place at AES' existing Strathcona Salt Cavern Storage Facility and to-date, has not been required to be utilized because no process wastewater has been produced.

AES has a stormwater and groundwater management plan for the existing Strathcona Salt Cavern Storage Facility to allow for surface water and high-level ground water beneath the existing brine pond to be collected and managed in accordance with the EPEA Approval conditions. This stormwater and groundwater management plan will be updated to include the additional surface facilities and drainage associated with the proposed Project as part of the amendment application under EPEA Approval 357248-00-01.

Air

Emissions as part of the project will be limited to dust and particulate matter from diesel operated equipment during construction and from flaring and fugitive emissions as a result of operations. No additional emissions from equipment are expected. No emissions are expected as a result of stationary combustion sources, venting, or industrial processes. Refer to Sections 6, 23 and 24 of the DPD and Tables 6 and 7 of Appendix B of the DPD for additional details.

Construction Phase:

Air emissions as a result of construction of the Project will consist of the following two sources:

- Project emissions during construction will be released as a result of vehicle and equipment use. Emissions from construction activities are expected to result from on- and off-road equipment used for construction with minimal emissions from other equipment (e.g., diesel-fueled heaters). Emissions from diesel-fueled vehicles will not be continuous throughout the construction period.
- Dust may be created during construction, though it is expected to be minimal. AES will implement dust management processes during construction and operation of the proposed Project. The magnitude of emissions from dust and construction vehicles will be small and temporary. Effects on air quality will be low in magnitude and local in extent. No dust would be released in a volume sufficient to cause acute or chronic reactions in human or wildlife health receptors. Dust control mitigation measures will be implemented during earthworks and construction as described in Table 6 of Appendix B to the DPD.

It is predicted that greater than 99% of emissions during construction will be CO₂. Approximately 5,925 tonnes of CO₂ will be emitted by construction activities with less than 1% of CH₄ and N₂O emissions. Refer to Appendix B of the DPD for a breakdown of all GHGs to be emitted by the Project.

Construction will occur in phases and segments, including construction of the pipeline ROW. Construction activities associated with the Project will have the potential to temporarily affect air quality in the immediate vicinity of the Project, however the effect is expected to be short-term and intermittent in duration and localized to the immediate area before potentially dispersing to the airshed as a result of wind. Due to the combustion of diesel from construction equipment, there is potential that there could be a short-term, intermittent, and localized increase in dust and particulate matter. It

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is not expected to result in a change to surface water or ecosystem quality due to the minimal deposition and lack of continuous emissions.

Diesel is a typical fuel used in construction and by private citizens who own diesel-burning vehicles or generators. There is no anticipated effect to human health due to the short-term and intermittent combustion of diesel during construction, the lack of nearby sensitive receptors, and minimal to no deposition of particulates or metals. While diesel is considered a carcinogenic substance, the evidence linking diesel to cancer suggests that exposure to diesel must be chronic (i.e., occur continuously over an extended period of time; HPA 2006). Due to the short duration of construction and the intermittent presence of on- and off-road construction equipment during the construction period, the Project is not predicted to cause acute or chronic health effects to any receptors.

Operations Phase:

Air emissions as a result of operation of the Project will consist of products of combustion and will be minor and limited to the following sources:

- Small volumes of hydrocarbons, de-gassed from brine after withdrawal from the caverns and prior to storage in the brine pond. Recovery of hydrocarbons from the brine will be required infrequently. Hydrocarbon volumes will be small and will be flared on site. Flaring of de-gassed hydrocarbons will follow AER *Directive 60 Upstream Petroleum Industry Flaring, Incinerating and Venting* (AER 2020) and AES' EPEA Approval, as amended;
- Intermittent emissions from the plant flare stack during any upset conditions or maintenance, and potentially from operation of the gas chromatograph being considered in the design of the Project (which is directed to flare); and
- Fugitive emissions from unintentional releases of GHGs to the atmosphere from an equipment component that leaks as a result of wear or damage. Sources of fugitive emissions include but are not limited to connectors, valves, flanges, and pumps.

Since submission of the IPD, AES has determined that process heaters being considered for use as part of the dehydration system will not be utilized for the Project, and as such, there will be no associated intermittent emissions.

During operations, the Project will not emit volatile organic compounds, sulphur oxides, hydrogen sulphide, coarse and fine particulate matter, diesel particulate matter, polycyclic aromatic hydrocarbons, or metals. The Project will not release any acidifying substances or any atmospheric contaminants with the potential to affect terrestrial and aquatic ecosystems.

Emissions from the Project are not expected to have a noticeable impact on regional air quality, which is monitored by the FAP to compare regional air quality against the Alberta Ambient Air Quality Objectives (AAAQO). The Canadian Ambient Air Quality Objectives (CAAQS) and AAAQO were considered during development of the Project. Emissions from the Project during operations will be intermittent and limited to flaring events for upset conditions, planned maintenance or pilot gas, and minor fugitive emissions related to process piping and equipment. The Project, alone or in combination with existing development, is not expected to result in exceedances of the criteria in either the AAAQO or the CAAQS.

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The Project is not predicted to emit contaminants that would increase acid inputs into the surrounding terrestrial or aquatic environment and is not predicted to have any measurable effect on potential acidification or to result in an exceedance of the ecosystem's critical loads.

Noise

Project activities will contribute to noise levels in the area during the construction and operation phases. Noise sources during construction will be primarily from drilling and construction activities, including excavation equipment for the brine pond and pile driving. The proposed Project is located in an area zoned for Heavy Industrial use. Construction is anticipated to occur during daytime hours (i.e., 07:00 to 19:00), with the exception of drilling which will occur on a continuous (24 hours per day seven days a week) basis while the wells are being drilled, and certain earth moving operations. The total duration of drilling activities is expected to be approximately 40 weeks, with some downtime and reduction in noise levels between each of the wells. AES demonstrated its ability to work with area residents during drilling activity associated with the existing Strathcona Salt Cavern Storage Facility and mitigate noise concerns associated with drilling and construction. AES will comply with AER *Directive 038: Noise Control*, Section 3.11 Construction Noise (AER 2007) during construction of the Project. Any stakeholder complaints will be responded to immediately.

Noise sources during operation will be minimal and will come primarily from pumps for product injection and withdrawal. A Noise Impact Assessment for the Project will be completed in accordance with *Directive 038: Noise Control* (Directive 038; AER 2007) prior to submission of the AER applications for the surface facilities. If the Noise Impact Assessment indicates that noise levels at a receptor are higher than permissible levels, AES will install additional noise dampening measures. No residual effect is predicted as a result of noise levels at the Project Site. AES has operated the existing Strathcona Salt Cavern Storage Facility since 2016 and has received no noise complaints or feedback from the public regarding noise levels. The existing facility is operating within permissible sound levels and no additional noise control is required. Noise dampening technology is well understood and if an exceedance is noted during operation of the Project, noise dampening equipment will be installed.

A Noise Impact Assessment conducted in Alberta for an energy project must be conducted in accordance with the prescriptive guidance in Appendix 4 of *Directive 038: Noise Control* (AER 2007). When conducting this Noise Impact Assessment, AES will also consider the guidance provided in Health Canada's *Guidance for Evaluating Human Health Impacts in Environmental Assessment* (Health Canada 2016).

All noise emissions from the Project will comply with *Directive 038*. Compliance with *Directive 038: Noise Control* (AER 2008) will be demonstrated through conformance with the Regional Noise Model developed through the Northeast Capital Industrial Association (NCIA), in collaboration with the AER. The Project will comply with noise level requirements of the NCIA Regional Noise Management Plan, Strathcona County noise bylaws, and any potential conditions within the Development Permit issued by the County for the Project.

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Appendix A:

Summary of Results of the Screening Assessment

In the Screening Assessment, AES undertook a qualitative assessment of potential effects of the Project on Valued Components (VC) identified in the Information Regulations and as being of concern to stakeholders. Using conservative assumptions, the Screening Assessment demonstrates that with the application of technically and economically practicable mitigation measures, the Project is unlikely to result in consequential adverse residual effects (i.e., no measurable residual effect or minor residual effect) to the environment, or health, social or economic conditions. In particular, the Project is unlikely to result in effects to fish and fish habitat, aquatic species, migratory birds, or to Indigenous peoples, their current traditional land and resource use, physical and cultural heritage, or their rights. The low levels of GHG emissions from the Project are not expected to cause changes to the environment outside the province or Canada or contribute materially to climate change.

The minor residual effects predicted for the Project are summarized in the following Table, and in Section 5 of Appendix B to the DPD:

Valued Component	Indicator	Residual Effect	Extent of Residual Effect	Existing Regulatory Processes to Manage Residual Effect
Air Quality	Greenhouse Gas Emissions	Residual Effect - Minor	Regional	EPEA, MGA
Surface Water	Surface Water Quantity	Residual Effect - Minor	Project Site	EPEA, Water Act, MGA
Surface Water	Surface Water Quality	Residual Effect - Minor	Project Site	EPEA, Water Act, MGA
Vegetation & Wetlands	Ecosystem Availability and Distribution	Residual Effect - Minor	Project Site	EPEA, Water Act, MGA
Socioeconomics	Employment and Procurement	Residual Effect - Minor	Regional	N/A
Indigenous Peoples	Indigenous Employment and Procurement	Residual Effect - Minor	Regional	N/A

The remaining minor residual effects predicted for the Project will be monitored and managed in accordance with applicable provincial legislation and the terms and conditions of existing, amended and new regulatory approvals required for the Project. In particular, these include the EPEA, the Water Act, the Municipal Government Act (MGA), and their respective regulations and requirements. In the event that effects associated with the Project are greater than anticipated or result in exceedances of any applicable environmental thresholds, there are existing regulatory management systems and mechanisms in place that would apply, including the potential for compliance and enforcement measures to be taken by provincial and municipal regulators.

The Screening Assessment also addresses potential accidents and malfunctions associated with the Project, including leaks, spills and other potential emergency scenarios. Potential accidents and malfunctions are considered in the design of the Project, and AES is required to have in place Project-specific emergency response plans approved by the AER that will guide AES' response to accidents and malfunctions should they occur. Similarly, AES has existing spill prevention and response plans in place for the existing Strathcona Salt Cavern Storage Facility, which will be amended for the Project. AES is an active member of both the Western Canadian Spill Services Co-op and Northeast Region CAER, which is a mutual aid emergency response association in the AIH.

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There is a robust regulatory oversight system in place for the prevention of accidents and malfunctions associated with the Project through minimum standards and requirements for the safe design, construction and operation of the Project. In order to obtain provincial regulatory approvals for the Project, AES will be required to satisfy the AER and other regulators that the risks of potential accidents and malfunctions associated with the Project will be appropriately managed and mitigated to prevent effects to the environment and human health and safety. This includes undertaking any required risk assessments, including sufficient design and other mitigation measures, prior to obtaining approval to operate.

Risks of spills, leaks or other emergency events are minimized through design, construction and operations mitigation measures and management and preparedness measures, as well as existing legislative and regulatory controls. The Project has been designed to withstand expected environmental effects associated with climate change that could lead to accidents and malfunctions. Potential accidents and malfunctions associated with the Project, as well as applicable mitigation measures, emergency preparedness and response, and spill preparedness and response measures, are discussed in Section 6 of the SA, in Appendix B to the DPD.