



# ATCO SALT CAVERN STORAGE EXPANSION PROJECT

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Summary of an Initial Project  
Description

January 13, 2021

# ATCO

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always there. anywhere.

# SUMMARY OF AN INITIAL PROJECT DESCRIPTION

## ATCO SALT CAVERN STORAGE EXPANSION PROJECT

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# SUMMARY OF AN INITIAL PROJECT DESCRIPTION

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# ATCO SALT CAVERN STORAGE EXPANSION PROJECT

## PART A: GENERAL INFORMATION

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

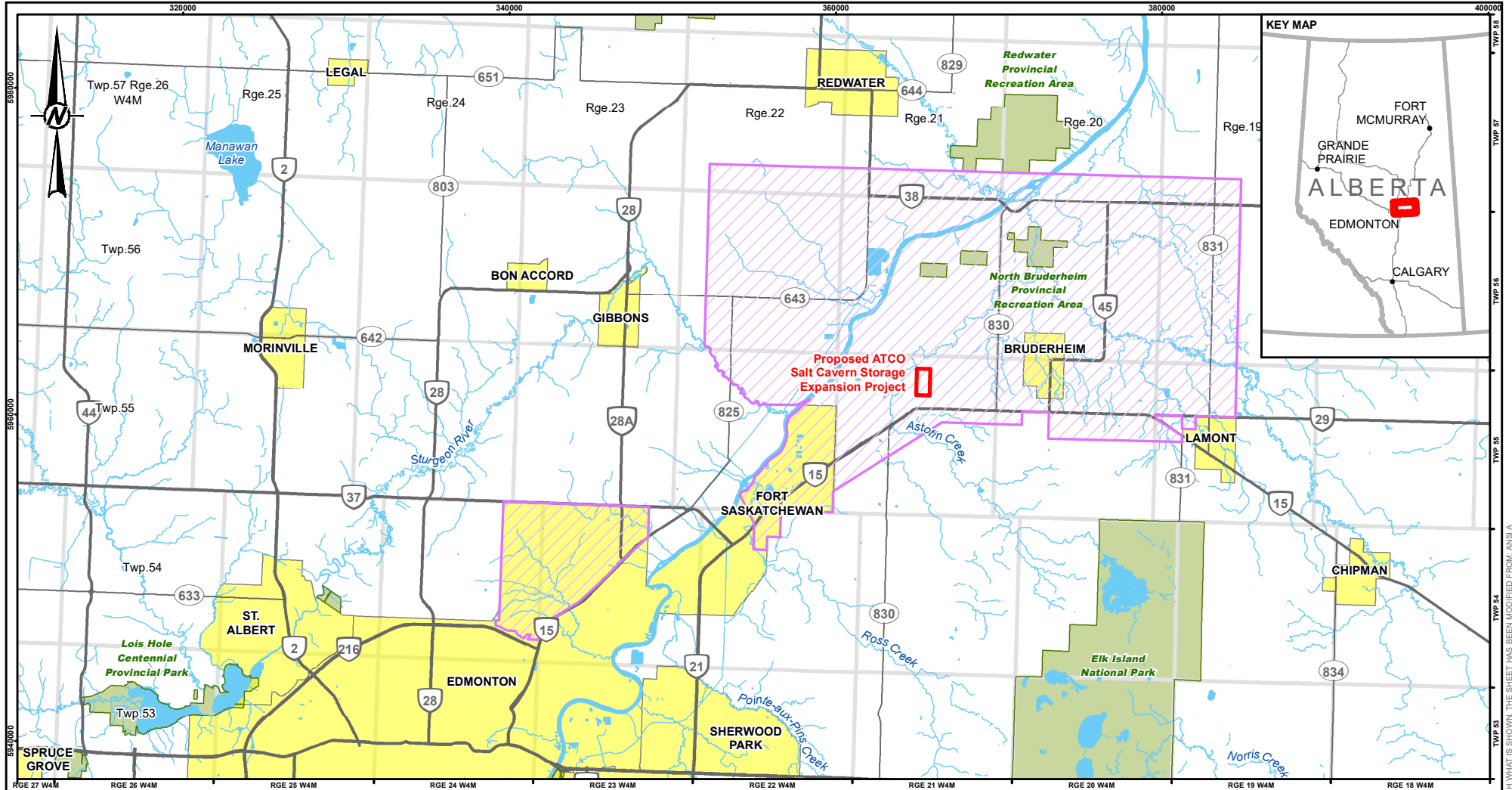
This summary has been prepared in accordance with the *Impact Assessment Act Guide to Preparing an Initial Project Description and a Detailed Project Description, Annex I* of the guide (GoC 2019), and the *Information and Management of Time Limits Regulations, Schedule 1*, which aligns with the content in Annex I of the guide. This summary corresponds to requirement 25 as outlined in the Schedule to the Regulations and the Annex to the guide.

ATCO Energy Solutions Ltd. (AES) 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 natural gas liquids (NGL) storage caverns containing one of propane, butane or ethylene, each with a capacity of approximately 100,000 m<sup>3</sup> and containing one of propane, butane or ethylene. 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 four additional salt caverns to store Natural Gas Liquids (NGLs) for the growing petrochemical industry. Each cavern would have a working capacity of approximately 100,000 m<sup>3</sup> for a total expansion size of approximately 400,000 m<sup>3</sup>. 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 extend onto NW 27-55-21-W4M/ The proposed Project would be wholly contained on private land owned by AES. The Project Location is shown in Figure 1.

### 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 <b>Phone:</b> 403-993-4259 <b>Email:</b> <a href="mailto:Jennifer.rumas@atco.com">Jennifer.rumas@atco.com</a> <b>Website:</b> <a href="https://www.atco.com/">https://www.atco.com/</a>



- LEGEND**
- PROJECT AREA
  - PRIMARY HIGHWAY
  - SECONDARY HIGHWAY
  - WATERCOURSE
  - ALBERTA INDUSTRIAL HEARTLAND BOUNDARY
  - PARK / PROTECTED AREA
  - POPULATED PLACE
  - 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

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CONSULTANT



YYYY-MM-DD	2021-01-08
DESIGNED	SL
PREPARED	AB
REVIEWED	SL
APPROVED	TC

PROJECT  
**PROPOSED ATCO SALT CAVERN STORAGE EXPANSION PROJECT**

TITLE  
**PROJECT LOCATION**

PROJECT NO.	CONTROL	REV.	FIGURE
20147838		0	1

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# ATCO SALT CAVERN STORAGE EXPANSION PROJECT

## 3. ENGAGEMENT WITH JURISDICTIONS OR AGENCIES

In the Spring of 2020, AES commenced engagement with the Impact Assessment Agency of Canada (IAAC) and Strathcona County. These engagement activities included phone discussions and teleconference meetings to review Project information and discuss Project planning and permitting. AES has also consulted the Environmental Assessments Branch of Alberta Environment and Parks (AEP). A letter from AEP confirming an EIA was not required was received on December 21, 2020. In December 2020, more formal initial engagement with 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.

Engagement and consultation activities will continue throughout the permitting phase of the Project at the request of interested stakeholders and in accordance with the requirements of provincial approvals and to effectively respond to any arising concerns or requests for information. AES will engage the Alberta Energy Regulator (AER) and Strathcona County as required throughout all phases of the Project to support permitting requirements of the various components of the Project. AES will also further engage local landowners, occupants and residents within a 1.5 km radius of the Project as the various components of the Project progress and will meet Participant Involvement Program requirements prior to submission of regulatory applications. AES will continue to engage with regulators and stakeholders throughout the operation of the facility

## 4. ENGAGEMENT WITH INDIGENOUS GROUPS

Project Information Letters were distributed to 33 Indigenous communities, 24 of whom will be engaged by IAAC during the Agency-led engagement period following submission of the Initial Project Description. Since distribution of the Project Information Packages, AES has further engaged with those Indigenous communities who have followed up. These follow up engagements have consisted of telephone calls and emails to provide additional project information. A full list of all Indigenous communities engaged and their proximity to the proposed Project is provided in Appendix A.

Topics raised by Indigenous communities related to the Project include: Project location relative to Traditional Use Lands; depth of the caverns in relation to groundwater; potential impacts to tributaries of the North Saskatchewan River; potential procurement or employment opportunities; and site visits.

AES is evaluating virtual options for site visits in consideration of the COVID-19 pandemic and the health and safety of Indigenous Communities and AES' employees. AES will continue to engage with any Indigenous Communities interested in the proposed 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 Alberta Industrial Heartland is guided by the Alberta Industrial

# ATCO SALT CAVERN STORAGE EXPANSION PROJECT

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 Alberta Industrial Heartland.

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.

## 6. STRATEGIC ASSESSMENTS

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

ATCO Energy Solutions reviewed the Strategic Assessment of Climate Change (SACC; ECCC 2020). The SACC was developed by Environment and Climate Change Canada (ECCC) to enable consistent, predictable, efficient and transparent consideration of climate change throughout federal impact assessments (ECCC 2020). The SACC 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 is planned to cease operations prior to 2050. As such a plan to achieve net-zero emissions by 2050 is not required in accordance with Section 5.3 of the SACC. Overall, the GHG emissions associated with Project construction and operation are low in magnitude when compared to provincial and national emission totals.

## PART B: PROJECT INFORMATION

### 7. PROJECT PURPOSE AND NEED

The purpose of the Project is to expand the NGL storage capacity at ATCO's Heartland Energy Centre to serve additional customers. The proposed Project will add 400,000 m<sup>3</sup> of NGL storage capacity to serve customers in the AIH. NGLs are a critical feedstock for the petrochemical industry. Additional storage capacity is required by 2024 to support continued operations and growth of the petrochemical industry in the Alberta Industrial Heartland.

The proposed Project is ideally located to serve the requirements of the natural gas processing and petrochemical industries. Natural gas liquids are recovered from most gas sources and must be removed to meet pipeline specifications.

# ATCO SALT CAVERN STORAGE EXPANSION PROJECT

Petrochemical processing is expected to increase in Western Canada with the addition of propane and ethane processing facilities between the present time and the late 2020s (Rodwell 2020).

## 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 m<sup>3</sup> or more.”*

The proposed Project is subject to the review of a Project Description because the total NGL storage capacity at AES' existing Strathcona Salt Cavern Storage Facility is approximately 430,000 m<sup>3</sup> with an additional 100,000 m<sup>3</sup> under construction. The increase in storage capacity that would result from the proposed Project is approximately 400,000 m<sup>3</sup>, which represents an increase in the total volume of storage that is more than 50% and greater than 100,000 m<sup>3</sup>.

No other criteria presented in the Schedule to the *Physical Activities Regulation* are applicable to the proposed 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. Existing facilities and infrastructure are shown in Figure 2.

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 NGL products proposed to be stored in the caverns are propane, butane and condensate. The caverns will be developed in the Lotsberg formation, which is located approximately 1,800 m below surface. Once developed, each cavern will have an approximate total volume of 120,000 m<sup>3</sup> and will have a working NGL product storage capacity of approximately 100,000 m<sup>3</sup>.

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 Q2 2024. The fourth cavern is targeted for commercial operation in Q4 2024.

### Project Components

Four wells will be drilled by AES into the Lotsberg formation and completed for cavern development. Following completion activities, the application for approval of the storage scheme by the AER will be submitted. Following AER approval of the storage scheme, the wells will be used for cavern development and ultimately for cavern operations after development is finished.



# ATCO SALT CAVERN STORAGE EXPANSION PROJECT

A brine pond and brine pump house will be used in the operation of the storage caverns. The brine pond will hold a maximum of approximately 400,000 m<sup>3</sup> of brine with a nominal depth of 8 m and will occupy an area of approximately 50,000 m<sup>2</sup> (5 ha). The brine pond may consist of a single cell or two cells, each with a volume of approximately 200,000 m<sup>3</sup>. The brine pond will be surrounded by a fence at the top of the slope to limit access by land animals and people. As brine is displaced into the pond from the caverns, it will flow through a de-gasifier to ensure no NGL products enter the brine pond. The brine pump house will be used to withdraw NGL products from the caverns.

The NGL product handling facilities consist of pumps and product processing equipment, and related auxiliary facilities required for the delivery of NGL products into and out of the storage caverns. 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; 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 m<sup>3</sup> per hour per product, based on the customer needs for each of the NGL products.

New cavern washing pipelines, approximately 800 m long for fresh water and brine, will be constructed below ground to connect the existing cavern washing infrastructure and brine disposal wells to the new salt cavern wells.

One new brine disposal well will be developed for the proposed Project. This disposal well will be completed in the Nisku disposal formation approximately 1,000 m below surface.

Two pipelines, each approximately 4 km, will be constructed to convey NGL product to and from AES' customer.

The proposed Project will be developed adjacent to the existing Strathcona Salt Cavern Storage Facility operated by AES. ATCO Energy Solutions owns and is the operator of an existing cavern washing facility and of associated water and brine pipelines which are located on lands of, and adjacent to the Project.

## **Project Activities**

These 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.

## **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 procured to perform the various activities required for drilling, brine pond 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.

# ATCO SALT CAVERN STORAGE EXPANSION PROJECT

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.

Cavern wells will be drilled to a depth of approximately 1,900 m, terminating in the Lotsberg formation. The wells will be completed for water injection. 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 through disposal wells into a deep secure formation. This process occurs continuously for 40 to 50 weeks until the desired cavern size is achieved.

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. Two layers of high-density polyethylene (HDPE) liner will be installed over the excavated pond, 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.

The brine pump house will be constructed in conjunction with the brine pond. Once the location has been excavated to the required depth, the foundation of the pump house will be constructed, followed by installation of mechanical and electrical components and the pump house building.

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 above ground piping and facilities, building foundations, pumping and treating equipment, and office, maintenance, electrical and control buildings.

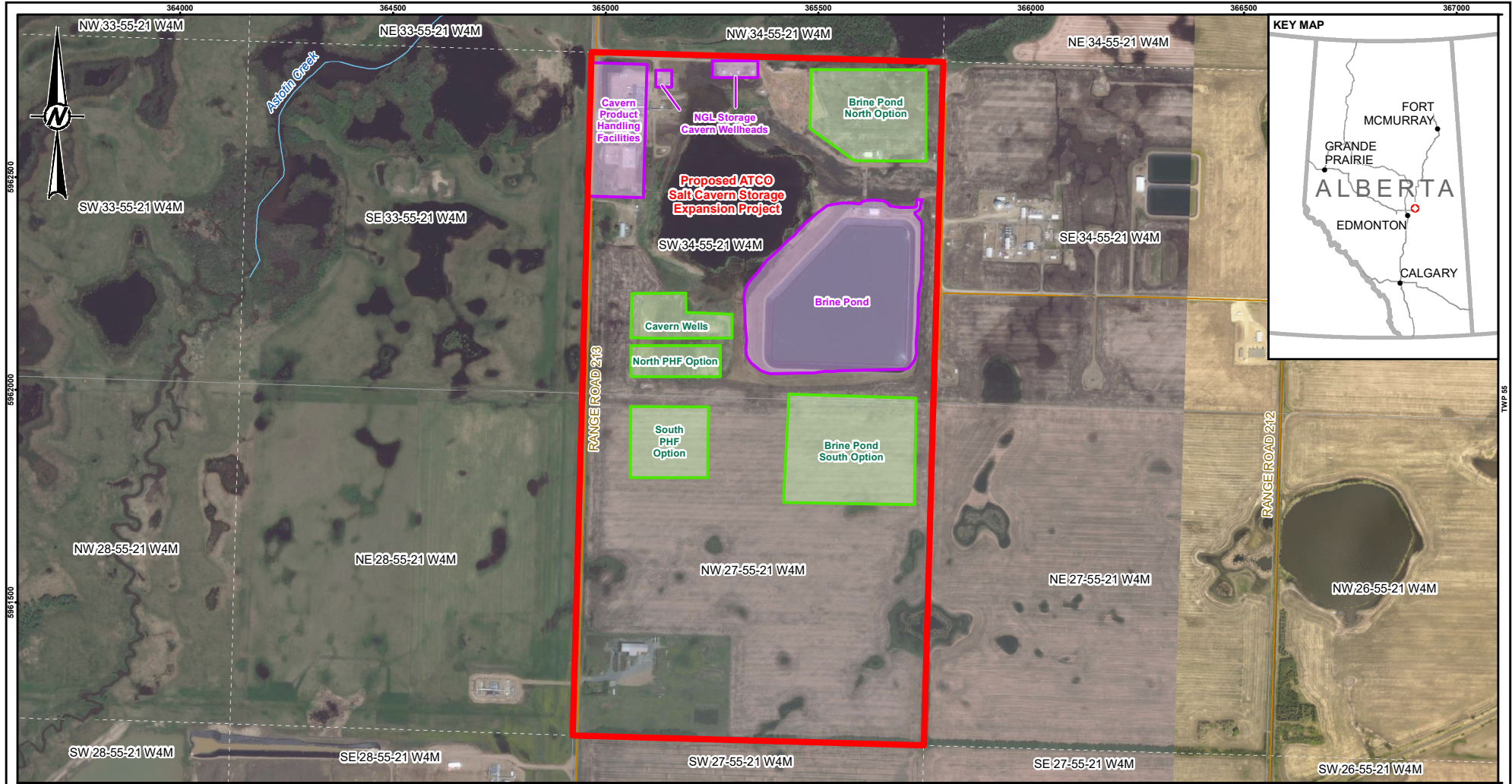
Construction of the brine disposal well will commence with stripping the topsoil from the well pad area, followed by grading and gravelling of the well pad. A disposal well will be drilled to a depth of approximately 1,000 m, terminating in the Nisku formation. Construction of the NGL pipelines will commence with stripping the topsoil from the route, followed by excavating the required trench, installing the piping, and backfilling. Once construction is complete, this disturbed area will be restored.

## **Operation**

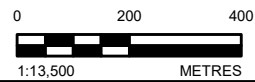
The operation of the proposed Project will be within the care and control of AES. The main facilities associated with operating the Project are pumps, separators and dehydrators that will transfer the NGL products into or out of the storage caverns to meet customer requirements, and the brine pond which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

## **Decommissioning**

The decommissioning of the salt caverns and associated facilities and infrastructure will include removing all buildings and surface equipment and returning the project site to an equivalent pre-development land capability. The storage caverns will be filled with brine and the wells will be abandoned as per AER requirements.



- LEGEND**
- PROJECT AREA
  - SITE PLAN - EXISTING FACILITY
  - SITE PLAN - NEW FACILITY
  - LOCAL ROAD
  - WATERCOURSE



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DESIGNED	SL
PREPARED	AB
REVIEWED	SL
APPROVED	TC

**REFERENCE(S)**

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PROJECT  
**PROPOSED ATCO SALT CAVERN STORAGE EXPANSION PROJECT**

TITLE  
**SITE PLAN**

PROJECT NO.	CONTROL	REV.	FIGURE
20147838		0	2

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# ATCO SALT CAVERN STORAGE EXPANSION PROJECT

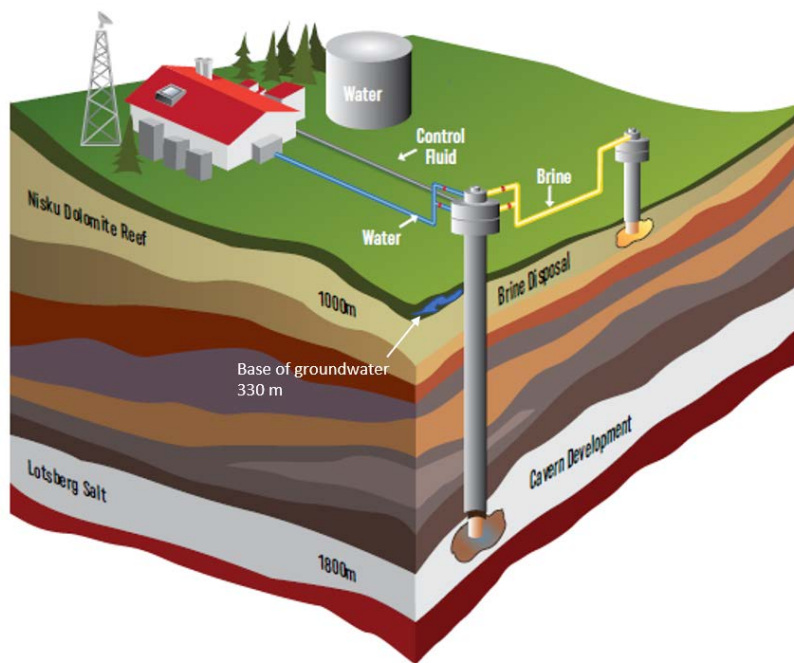
## Background: Underground Cavern Development

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 3. 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.

Figure 3: Solution Mining Process (not to scale)



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

# ATCO SALT CAVERN STORAGE EXPANSION PROJECT

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 3 and Figure 1 of Figure 4). 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 fresh groundwater.

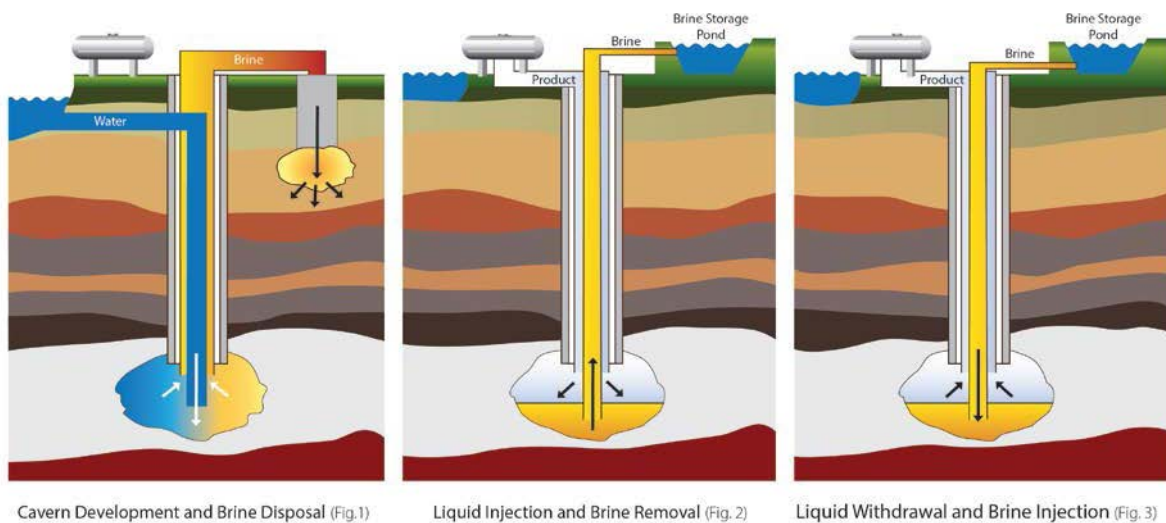
At the onset of the development of a cavern, a solution mining program is developed to control the flow of the water to the well to obtain the desired cavern shape. Periodic testing is completed throughout the washing phase to monitor the size and shape of the cavern and evaluate the results of the program.

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.

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 4). 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 4). 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.

Figure 4: Cavern Development and Operation



# ATCO SALT CAVERN STORAGE EXPANSION PROJECT

## 10. ESTIMATED MAXIMUM PROJECT CAPACITY

The target size of each of the four underground storage caverns is 120,000 m<sup>3</sup>. Each cavern will have a working storage capacity of approximately 100,000 m<sup>3</sup>. 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 is displaced and pumped to the surface where it undergoes a de-gasification process and is stored in the brine pond. Brine is re-injected when customers request withdrawal of their NGL products. Sufficient quantity of brine will be retained on site in a brine pond to enable the injection and withdrawal of NGLs from the caverns.

## 11. PROJECT SCHEDULE

The proposed Project is planned to be in service by Q2 2024. Construction of the Project is planned to commence in Q2 2020 by drilling wells and beginning the solution mining process. Construction of surface facilities (i.e., the product handling facility and brine pond) would commence in 2022.

Site preparation is expected to begin in Q2 2021 with the first three caverns planned to come on stream in Q2 2024. The caverns are planned to be drilled in phases. The first cavern is planned to be drilled in Q3 2021, with the following two planned for Q1 2022. The fourth cavern is expected to follow in Q2 2022. Washing would occur from Q2 2022 to Q3 2023.

Construction of the product handling facility is expected to commence in Q2 2022. Construction of the brine pond is expected to commence in Q3 2022. The majority of the construction is expected to be completed by the end of 2023 with tie ins and commissioning planned to occur in Q4 2023 and Q1 2024.

The proposed Project Schedule is presented in Table 1.

Table 1: Project Schedule

Key Project Phase	Start	Finish
Prepare site (grading and leveling)	Q3 2021	Q3 2021
Construct cavern washing pipelines	Q3 2021	Q1 2022
Drill Disposal Well	Q4 2021	Q4 2021
Drill Cavern Well #1	Q3 2021	Q1 2022
Drill Cavern Well #2	Q1 2022	Q1 2022
Drill Cavern Well #3	Q1 2022	Q2 2022
Drill Cavern Well #4	Q2 2022	Q3 2022
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

# ATCO SALT CAVERN STORAGE EXPANSION PROJECT

Table 1: Project Schedule

Key Project Phase	Start	Finish
Commissioning	Q4 2023	Q2 2024
Begin commercial operation	Q2 2024	-
Decommission and abandon <sup>1</sup>	2049	-

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

## 12. PROJECT ALTERNATIVES

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 because salt caverns are considered the safest way to store large volumes of NGLs. Further, the land needed to store NGLs in pressurized vessels would increase the proposed Project's footprint, refrigerated tanks require substantial additional energy to cool, continually refrigerate and reheat, and above ground storage increases fugitive emissions from pressure relief systems. Above-ground storage also increases the risk of vessel failure and accidental release of NGL product to the environment.

The project, as proposed was chosen over the alternative means presented for safety, environmental and financial reasons. Salt caverns are considered the safest way to store large volumes of NGLs. The products are contained approximately 1,800 m below ground 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. These factors, in combination with the additional cost, energy and land footprint that would be required for surface storage are the main reasons salt caverns are the preferred storage method for large volumes of NGLs.

AES is considering several design alternatives to decrease the proposed Project's footprint. These alternatives include the use of electric pumps over natural gas engine driven pumps, the specific locations of the brine pond and product handling facility within the Project site, the use of lower emissions calcium chloride dehydration of NGL product versus molecular sieve dehydration, and the need for a gas chromatograph.

## PART C: LOCATION INFORMATION AND CONTEXT

### 13. GEOGRAPHIC INFORMATION

The Project location is shown in Figure 1.

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 developed on private lands owned by AES. AES holds the land title (fee simple) for SW 34-55-21 W4M and NW 27-55-21-W4M. The caverns will be developed in the Lotsberg Salt Formation at SW 34-55-21 W4M

# ATCO SALT CAVERN STORAGE EXPANSION PROJECT

where AES holds Special Mineral Lease No. 3712020336. The development area of the Project is approximately 320 hectares in size (2 quarter sections) and the Project footprint is approximately 15 hectares.

The Project is located approximately 14 km northeast of the City of Fort Saskatchewan and approximately 30 km north of the City of Edmonton, in Strathcona County, Alberta and within the Alberta Industrial Heartland. The Project is located approximately 500 m north of secondary Highway 15 and will be located within NW-27-55-21-W4M and SW-34-55-21-W4M. The closest community is the Town of Bruderheim, located approximately 5 km west of the Project area.

ATCO Energy Solutions is not aware of Traditional Land Use within the Project area. The proposed Project is located 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. The closest First Nation reserve is the Alexander Cree Nation, approximately 50 km northwest of the Project area. The closest federal lands to the Project are Elk Island National Park, located approximately 13 km to the southeast of the Project area.

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, members of Indigenous Communities may still feel connections to the area.

## 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 located in the AIH and 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 exhibits a general tendency for regional winds from the northwest, due to the proximity to the North Saskatchewan River. Average 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).

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 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



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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 NO<sub>2</sub>, SO<sub>2</sub>, PM<sub>2.5</sub> and O<sub>3</sub>.

The AIH climate is generally characterized by mild summers and cold, relatively dry winters. The Köppen-Geiger climate classification system identifies the region as a Dfc, which is a sub-arctic climate characterized by snow in the winter, generally humid, with cool summers (Kottek et al. 2006). Wind data are not reported from the Fort Saskatchewan station, but are available from a station approximately 20 km to the east located in Elk Island National Park. Winds recorded at Elk Island station show an average annual wind-speed of 6.4 kilometres per hour (km/hr) and little variability by month, ranging from a high of 7.7 km/hr in May, to a low of 5.4 km/hr in August.

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 sulphur dioxide (SO<sub>2</sub>) and hydrogen sulphide (H<sub>2</sub>S). During 2019, one hundred fifty-one (151) 1-hour exceedances of Fine Particulate (PM<sub>2.5</sub>), H<sub>2</sub>S, and Ozone (O<sub>3</sub>) 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).

The Project area is located approximately 5 km east of the North Saskatchewan River and 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 located approximately 200 m from the Project area boundary.

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.

There are no surface waterbodies or watercourses present on the Project site. There are 15.58 hectares of wetlands within the Project area and a 0.10-hectare ephemeral (Class I) water body. The majority of the wetlands are Graminoid Marsh. The Project area offers limited high-quality wildlife habitat given its level of agricultural and industrial development.

The Government of Alberta has implemented the Water Management Framework for the Industrial Heartland and Capital Region (the WMF; 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

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(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).

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) and the Project area sits within Environmentally Significant Area (ESA) 454 (ESRD 2009). Although a portion of the Project site is within a KWBZ and ESA 454, the lands have been disturbed by development of the existing Strathcona Salt Cavern Storage facility and long-term agricultural activity. There is no high suitability habitat present for ungulates or extensive native vegetation. The Project area is identified as having low wildlife habitat suitability on the basis 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.

## 15. HEALTH, SOCIAL AND ECONOMIC CONTEXT

### Health Context

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.

Four new operators are expected to be hired as a result of this Project. ATCO's priority is always safety, and all employees support and adhere to our core value of "Safety First, Always." AES has a comprehensive health and safety management

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system and our health and safety policies and procedures are continually improved to ensure the protection of our employees and contractors, and the public.

As a critical infrastructure provider, ATCO is committed to responsible development and environmental and social sustainability. We care for the natural, cultural and historical resources of the communities in which we work and serve and understand that our success depends on our ability to operate in a sustainable and responsible manner, today and in the future.

## Social Context

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).

## Economic Context

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).

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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 were 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 proposed Project will 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 local. During operation of the project, AES will require additional contractor support and will source contractors, maintenance personnel, and other contractors from the local area where practicable. Expansion of NGL product storage will also indirectly contribute to economic growth in the region as other operators expand their facilities or new facilities are built.

## PART D: 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 owned by AES. There will be no federal lands used for the purpose of carrying out the Project.

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

In addition to the proposed Project being under the jurisdiction of the Impact Assessment Agency, the proposed Project will be subject to approvals required and issued by the Alberta Energy Regulator (AER) under the *Oil and Gas Conservation Act* (OGCA), the *Environmental Protection and Enhancement Act* (EPEA) and the *Water Act*. The Project will also require permitting under the *Municipal Development Act*.

Approvals and licenses required for the salt caverns, brine pond and associated surface facilities include an Environmental Protection and Enhancement Act (EPEA) Approval to construct and operate the brine pond, Water Act Approval for the purpose of constructing a brine pond, and Oil and Gas Conservation Act and AER licenses and approvals to construct and operate the salt caverns, pipelines and surface facilities.

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Approvals and licenses already in place that will be used as part of the proposed Project include AES' existing Water Act Approval 356745-00-00 for its water intake on the North Saskatchewan River and Water Act Licences diversion of water for the development of salt caverns. 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 will not require any additional *Water Act* Licences to divert water for the purposes of the Project.

The Project is also regulated by zoning and development permit requirements administered by Strathcona County and the Municipal Development Plan, under the Municipal Government Act. Preliminary discussions with Strathcona County have occurred regarding the development permit requirements and schedule for the proposed Project. Considerations include access, road use, utilities and traffic impact.

A Historical Resources Act (HRA) clearance application will also be submitted to Alberta Culture for review under the *Historical Resources Act*. The HRA clearance application would encompass all parts of the Project, including the salt caverns, brine pond and surface facilities.

A First Nation Consultation Adequacy Assessment (FNCAA) will be submitted to the Alberta Aboriginal Consultation Office for their consultation intensity recommendation for the Project. Once a response is provided, AES will follow the recommendation of the Government of Alberta.

## PART E: POTENTIAL EFFECTS OF THE PROJECT

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

#### **Fish and Fish Habitat**

There are no fish bearing waterbodies or watercourses present on the Project site. The nearest water body that supports fish and fish habitat is Astotin Creek, located approximately 200 m from the Project area boundary. 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.

The proposed Project is located in the Beaverhill subwatershed of the North Saskatchewan River (NSWA 2021). The wetlands in and around the Project area are considered recharge wetlands; these recharge wetlands 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

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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.

Stormwater in SW 34-55-21-W4M will be diverted to the onsite wetland (W3), and stormwater in NW 27-55-21-W4M will be diverted to a stormwater management system, likely a stormwater management pond. There are no fish bearing waterbodies or watercourses present on the Project site.

Introduction of contaminants to wetland W3 is not anticipated. 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.

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. AES has well established groundwater, wetland and soil monitoring programs that were approved by the AER as per the existing brine pond EPEA approval. Baselines were developed before the operation of the facility (2014) and monitoring continues spring and fall for groundwater and wetland quality monitoring. The soil monitoring program is conducted once every 5 years. 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.

Two pipelines will extend approximately 4 km outside of the Project area to convey product to and from customers. The pipelines will parallel existing pipeline routes extending to the west and south of the Project area. The pipelines will cross 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 potential damage to the bed and banks of the watercourse and wetlands. Trenching will be conducted in accordance with the requirements of the Code of Practice for Pipelines and Telecommunication Lines Crossing a Water Body (AEP 2013). 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.

Based on the lack of permanent or fish bearing water bodies in the Project area, combined with the low surface hydrological connectivity of wetland W3 to other wetlands in the area and the planned facility design, containment and monitoring measures described, the Project is not expected to interact with fish and fish habitats and no impacts to water quality in wetland W3 are anticipated. Because the Project is not expected to interact with fish and fish habitat, the Project is not expected to adversely affect fish or fish habitat, as defined in the *Fisheries Act*. No impacts from the introduction of contaminants into the watershed are anticipated. As a result, no impacts to fish or aquatic species are expected. As no impacts to water quality in wetland W3 are anticipated, the proposed Project is not anticipated to adversely affect migratory birds or terrestrial animals who utilize wetland W3.

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## Aquatic Species

There were no aquatic species, as defined under SARA, observed on the Project site during the wetland assessments conducted in 2013 and 2020. Although no sensitive species have been identified in the Project area 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 the *Species at Risk Act* (SARA). The designation of Endangered status under SARA is pending (GoA 2021). The lake sturgeon is considered At-Risk by DFO (DFO 2021).

AES will follow the mitigation measures described above relating to Fish and Fish Habitat. Because the Project is not expected to interact with aquatic life, the Project is not expected to adversely affect aquatic species at risk, as defined under SARA.

## Migratory Birds

The Project is not expected to adversely affect migratory birds, as defined in the Migratory Birds Convention Act. No high suitability bird habitat has been identified within the Project area. 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). Given 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. The Project will remove approximately 13 ha of low suitability wildlife habitat (i.e., cultivated land and disturbed wetland).

AES will develop an Environmental Protection Plan (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.

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 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, the dehydration process heater if installed, and vehicular traffic. Noise during construction will arise from drilling, the use of heavy equipment, and increased human activity on

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the site. This increase in noise during the construction period may discourage migratory birds from nesting in the vegetated fringe surrounding wetland W3 and they may instead prefer nesting along Astotin Creek or the North Saskatchewan River.

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.

It is anticipated that birds will be preferentially attracted to the more suitable habitat provided by either the 5.22 hectare natural wetland (W3) in SW-34-55-22-W4M, or to the extensive wetlands associated with Astotin Creek, located approximately 200 metres to the northwest of the Project area. AES regularly monitors its existing brine pond to confirm that migratory birds are not impacted 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.

### 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. The proposed Project footprint will be contained wholly within the AIH.

The proposed Project is not expected to result in any changes to air quality inside or outside of Alberta. There is no continuous flaring associated with the proposed Project and emissions directly associated with the proposed Project are minimal.

Water will be sourced from the North Saskatchewan River through AES's 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's *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.

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

The proposed Project is located approximately 5 km from the banks of the North Saskatchewan River. 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). Post-contact, the North Saskatchewan River has been an important route for commercial transportation and for



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transportation of explorers and settlers prior to the construction of the Canadian Pacific Railway (NSRBC 2017). The lands in and around the Project area have been in use for thousands of years and have more recently been cultivated and developed in the last hundred years (NSRBC 2017).

The proposed Project is located on AES's privately-owned lands within the Alberta Industrial Heartland, on land that is zoned for heavy industrial development. As the land is privately held and located within an industrial area, the potential for traditional land use is low. ATCO Energy Solutions has initiated engagement with the Indigenous groups as discussed in Section 4 and listed in Appendix A. The closest First Nation or Métis Settlement to the proposed Project is the Alexander Cree First Nation, located approximately 50 km from the Project site.

No traditional uses of the Project site by Indigenous groups or peoples have been identified in previous regional studies for the area (Stantec 2010; Stantec 2013). The additional lands required for the proposed expansion are cultivated and hold low potential for traditional uses including hunting, fishing, plant gathering, or spiritual use. Limited to no impacts to Treaty Rights and Traditional Land Use, and Métis Harvesting Rights are expected. The Project is not expected to impact water quality or quantity, wildlife habitat, traditional and medicinal plants, or spiritual use sites.

ATCO Energy Solutions received Historic Resources Clearance for SW 34-55-21-W4M in 2014 in support of the existing Strathcona Salt Cavern Storage Facility and will obtain Historic Resources Clearance for NW-27-55-34-W4M prior to any clearing activities in the quarter section. The lands in NW-27-55-23-W4M were previously held by ATCO Power Canada Ltd. and historic resources clearance was submitted and obtained in 2014 in support of the Heartland Generating Station Project, which ultimately was not constructed. AES will obtain appropriate clearance for the proposed Project footprint and will follow all guidance from Alberta Culture prior to commencing construction.

During construction of the proposed Project, if any structures, sites, or items of historical, archaeological, palaeontological, or spiritual significance to Indigenous groups are identified, ATCO Energy Solutions and its contractors will stop work and flag the area to prevent any further disturbance. Workers will notify AES who will contact a Resource Specialist. No potential archaeological or palaeontological sites will be further disturbed or impacted until the Resource Specialist has indicated that appropriate mitigation measures have been met. This contingency plan will be included in the Environmental Protection Plan for the Project.

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

ATCO has long demonstrated that building respectful and mutually beneficial relationships defines how we do business. Along with our Indigenous and community partners, we are continually exploring new ways to collaborate. We recognize the need to continue to work to understand unique perspectives of neighboring communities and Indigenous Peoples and take a long-term approach to building relationships based on trust. As of the end of 2019, we maintain 50 formal joint-venture partnerships, Memorandums of Understanding, and other relationships with Indigenous communities, including some that have lasted decades. In 2019, they generated over \$220 million of economic benefits for our Indigenous partners.

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## Potential Health Impacts

No impacts to Indigenous health are expected due to the low air emissions and limited opportunity and low likelihood for potential contaminants to enter the watershed or food chain. The proposed Project is located on privately owned land that is used for agricultural purposes and is zoned for Heavy Industrial (Heartland) use.

The proposed Project will make use of the existing river water intake system owned and operated by AES and will utilize 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. The caverns will be developed approximately 1,800 m below surface (top of cavern) and approximately 1,500 m below shallow groundwater. Excess brine generated during the solution mining process will be disposed of downhole into the Nisku formation, approximately 1,000 m below surface and approximately 700 m below the base of groundwater protection. Due to the depths of the salt cavern and disposal formations and isolation of wellbores from the groundwater zone, no impacts to groundwater quantity or quality are expected.

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. Acute care access could potentially be impacted in the event of an incident or off-site traffic accident involving personnel employed in construction of the proposed Project.

## Potential Social Impacts

Limited social impacts to Indigenous Communities are expected as a result of the proposed Project. The proposed Project is located approximately 50 km away from the closest First Nation Reserve. The proposed Project is in a developed area zoned for heavy Industrial use.

AES does not anticipate any impacts to Indigenous use of lands for traditional purposes, as the lands are not suitable for subsistence hunting or gathering of traditional or medicinal plants. Access constructed for the proposed Project will connect AES's 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 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.

No impacts to traffic, or access to community resources as a result of the Project are anticipated in Indigenous Communities. During construction, labour is expected to be largely sourced from the Edmonton Capital Region. Construction and operation of the proposed Project is 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.

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## Potential Economic Impacts

Limited economic impact to Indigenous communities is expected. Most of the jobs generated by the proposed Project will be temporary jobs during construction of surface facilities with approximately four permanent operator jobs anticipated. No community benefits agreements are anticipated due to the location and previous land use of the proposed Project.

AES will endeavour to work with interested and qualified Indigenous Communities or members of Indigenous Communities who wish to partake in the procurement process for the proposed Project. AES will evaluate opportunities to meet short and long-term labour force needs through the employment of Indigenous peoples with relevant qualifications or required equipment and/or services. 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. Given the relatively short durations for any contractors on site during construction and the addition of only approximately four permanent operators during operation of the project, limited economic impact to Indigenous Communities is anticipated.

## 23. GREENHOUSE GAS EMISSIONS ASSOCIATED WITH THE PROJECT

The proposed Project will release GHG emissions to the atmosphere during the construction and operation phases of the Project. The GHGs that are released during Project construction and operation phases are carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O). 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 emissions associated with construction, operation and upstream emissions are summarized below:

- During the construction phase, there will be emissions from off-road equipment, on-road equipment and other construction and space heating equipment onsite. The direct GHG emissions from the entire construction period are estimated to be 6,074 tonnes of carbon dioxide equivalent (tCO<sub>2</sub>e), of which the emissions from off-road equipment accounts for about 92% (i.e. 5,574 tCO<sub>2</sub>e) of the total construction emissions. Using the 2018 GHG emission totals for Canada (729,000 ktCO<sub>2</sub>e) and Alberta (273,000 ktCO<sub>2</sub>e) as a baseline, the direct emissions 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 tCO<sub>2</sub>e of indirect emissions associated with imported electricity from the Alberta electrical grid. The Project is located within an existing industrial facility so there will be no emissions associated with land use change.
- During the operation phase of the Project, there will be emissions from stationary combustion sources, flaring, and fugitive emission sources. The direct GHG emissions from Project operation are estimated to be 12,232 tCO<sub>2</sub>e per year, of which the emissions from stationary combustion equipment accounts for about 87% (i.e. 10,638 tCO<sub>2</sub>e per year) of the annual operation emissions. Using the 2018 GHG emission totals for Canada and Alberta as a baseline, the direct emissions during the operational phase is equal to 0.002% and 0.004% of Canada's and Alberta's total annual GHG emissions. In addition to this, the indirect emissions

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associated with imported electricity during operation is estimated to be 59,568 tCO<sub>2</sub>e per year. The project does not capture and store CO<sub>2</sub> and there are no avoided emissions as a result of this Project.

A screening level estimate of upstream GHG emissions indicates that the upstream emissions associated with the Project are approximately 13 kt CO<sub>2</sub>e and are less than 500 kt CO<sub>2</sub>e per year.

The GHG emission estimates provided incorporate a number of conservative assumptions such as assuming the Project would use a hot oil heater operating at design capacity continuously, the Project would use a gas chromatograph and it would run continuously, annual electricity use is conservatively based upon equipment electrical ratings, and electrical grid GHG intensity is based upon 2018 intensity and is forecast to decline in future years.

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

## 24. WASTE AND EMISSIONS GENERATED BY THE PROJECT

### Solid Wastes

Solid wastes will be generated during construction and decommissioning. Low quantities of solid waste will 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. Suitable containment will be used to contain waste and incompatible wastes will not be stored together.

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), 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.

### Water

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.

Small amounts of process wastewater will be generated by the NGL process dehydrators. All process wastewater will be temporarily stored on site in a small above ground tank (approximately 65 m<sup>3</sup>) 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.

## Air

Emissions that are likely to be generated during the Project include carbon dioxide (CO<sub>2</sub>) and nitrous oxide (NO<sub>2</sub>). In addition, minimal volumes of methane (CH<sub>4</sub>) may also be released. Project emissions will be released during construction as a result of vehicle and equipment use, and during operation as a result of use of certain equipment, periodic flaring and fugitive emissions.

Air emissions as a result 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 the brine 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)
- Intermittent emissions from the plant flare stack during any upset conditions
- Intermittent emissions from the process heaters for the dehydration system, pending final design

## 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 equipment, including excavation equipment for the brine pond. The proposed Project is located in an area zoned for Heavy Industrial. Construction is anticipated to occur during daytime hours (i.e., 7:00 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.

A noise impact assessment for the Project in accordance with *AER Directive 038: Noise Control* (Directive 038; AER 2007) will be completed prior to submission of the AER applications for the surface facilities (i.e., the product handling facility and brine pond). AES will comply with *AER Directive 038: Noise Control*, Section 3.11 Construction Noise during construction of the Project.

All noise emissions from the Project will comply with *Directive 038*. Compliance with Directive 038 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:

Indigenous Communities Engaged During Initial Planning Phase

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Indigenous Communities Engaged during Initial Planning Process
<b>Treaty 6</b>
Alexander First Nation
Alexis Nakota Sioux Nation
Beaver Lake Cree Nation
Enoch Cree Nation #440
Ermineskin Cree Nation
Kehewin Cree Nation
Louis Bull Tribe
Montana First Nation
O'Chiese First Nation
Sunchild First Nation
Paul First Nation
Saddle Lake Cree Nation
Samson Cree Nation
Whitefish Lake First Nation #128
<b>Treaty 7</b>
Stoney Nakoda Nations
Bearspaw First Nation (Stoney Nakoda Nations)
Chiniki First Nation (Stoney Nakoda Nations)
Wesley First Nation (Stoney Nakoda Nations)
Blood Tribe
Piikani Nation
Siksika Nation
Tsuut'ina Nation
<b>Treaty 8</b>
Chipewyan Prairie Dene Nation
<b>Métis Regions and Métis Settlements</b>
Métis Nation of Alberta – Region 4
Lac Ste. Anne Métis (Gunn Métis Local #55)
Buffalo Lake Métis Settlement
Kikino Métis Settlement
Elizabeth Métis Settlement
Fishing Lake Metis Settlement
Metis Nation of Alberta – Region 3
<b>Non-Treaty Nations</b>
Descendants of Michel First Nation Association
Friends of Michel Society
Foothills Ojibway First Nation