NexGen Energy Ltd.

Rook I Project

Saskatchewan, Canada

Environmental Impact Statement

Master Executive Summary

Submitted to:

Canadian Nuclear Safety Commission
Saskatchewan Ministry of Environment

Submitted by:

NexGen Energy Ltd.

April 2022

NexGen recognizes that Indigenous Peoples are not one, but many. With the participation of Indigenous communities and organizations in the Environmental Assessment, we have been able to learn and reflect on the past, present, and future of the proposed Rook I Project.

NexGen would like to acknowledge Treaty 8 territory (the ancestral and traditional territory of the Dene and Cree), Treaty 10 territory (the ancestral and traditional territory of the Dene and Nehithaw/Cree), and the Homeland of the Métis.

NexGen acknowledges the many First Nations and Métis peoples who have been the stewards of these lands for generations. We are grateful for the Indigenous Knowledge Keepers and Elders who are still with us today and those who have gone before us.

NexGen recognizes true collaboration with Indigenous Peoples as an act of reconciliation and we express our gratitude to those whose territory we are visiting. We are committed to ongoing collaboration with Indigenous Peoples as we walk together for the duration of the proposed Rook I Project.

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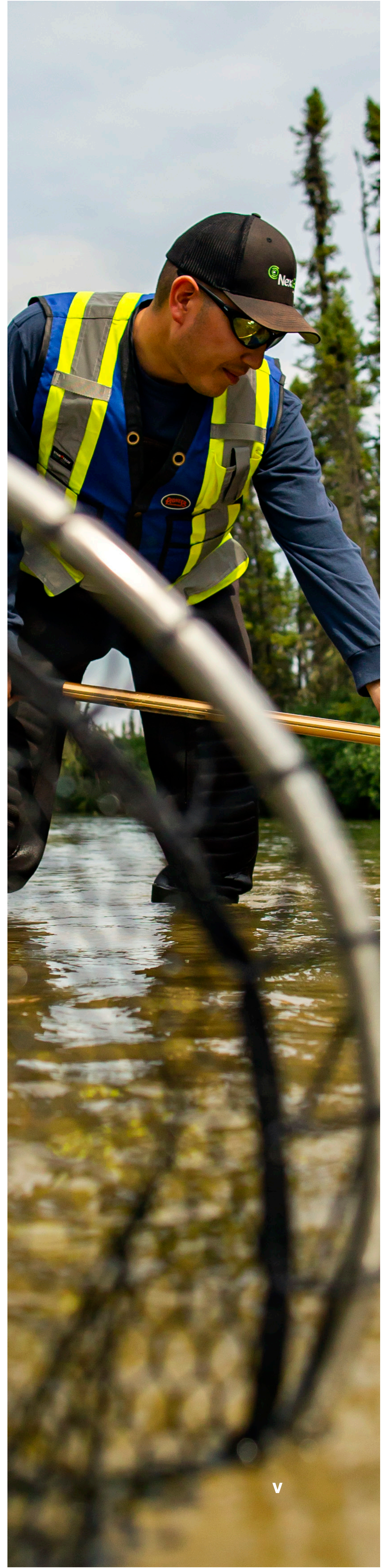

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Introduction 1

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Introduction

NexGen Energy Ltd. (NexGen) is seeking regulatory approval to develop the Rook I Project (Project), a proposed uranium mining and milling operation in northwest Saskatchewan's southern Athabasca Basin. The Project, which is 100% owned by NexGen, would include facilities to support the extraction and processing of uranium ore from the Arrow deposit, a land-based, basement-hosted, high-grade uranium deposit.

If approved for development, the Project would contribute a substantial and reliable source of uranium to meet the growing Canadian and global demand for electricity. Providing a source of uranium would help achieve domestic and international emission reduction targets through the establishment of nuclear-generated electrical capacity, which represents a low-greenhouse gas (GHG) emitting, green energy option. In addition, the Project would help advance provincial and federal goals for environmental protection, economic growth, and social development.

The proposed Project site is approximately 40 km east of the Saskatchewan-Alberta border, 130 km north of the town of La Loche, and 640 km northwest of the city of Saskatoon. The Project would be located on provincial Crown Land and within Treaty 8 territory and the Métis Homeland, adjacent to Treaty 10 territory.

NexGen is committed to fostering trusting relationships that facilitate collaboration and to optimizing benefits to Indigenous Groups and Project stakeholders. As a foundational principle, NexGen acknowledges and values the community interests and aspirations of those potentially affected by the Project. Reflective of this principle, NexGen started to work closely with the communities local to the Project in 2013, prior to early exploration activities, and has continued to do so since that time.

The proposed Project is subject to both provincial and federal Environmental Assessment (EA) processes. NexGen conducted its EA pursuant to the *Canadian Environmental Assessment Act, 2012* (CEAA 2012) and the Province of Saskatchewan's *Environmental Assessment Act*. As the responsible authority for projects that are regulated under the *Nuclear Safety and Control Act*, the Canadian Nuclear Safety Commission (CNSC) is the lead agency overseeing the federal EA process. Environmental assessments in Saskatchewan are overseen by the Saskatchewan Ministry of Environment (ENV), led by the Saskatchewan Environmental Assessment and Stewardship Branch. The CNSC and ENV are conducting their respective EA reviews under a cooperative federal-provincial process, though an approval decision is required from each.

1.1

About NexGen

Founded in 2011, NexGen is a Canadian corporation focused on the acquisition, exploration, and development of Canadian uranium projects.

NexGen's vision is to become a global leader in delivering uranium for the world's current and future clean energy needs. The company embeds the concept of sustainability in its business and operational decisions and practices. NexGen is committed to maximizing benefits for all of the communities where it works and developing its projects to create lasting, positive impacts. NexGen's approach to responsible development is underpinned by its commitment to environmental protection, cultural respect, health and wellness, education, careers, and training and economic capacity building.

With the growing global concern about climate change and greater understanding of the critical role that nuclear power has played and will continue to play in the production of a green electricity source, NexGen can be a meaningful contributor to one of the most important global initiatives of this century—the delivery of low-carbon baseload energy.

NexGen is led by a team of experienced uranium and mining industry professionals with expertise across the entire mining life cycle, including exploration, mine development, operations, and closure. NexGen is leveraging its proven experience to deliver a technically and environmentally elite Project and prospective portfolio in northern Saskatchewan's Athabasca Basin with long-term economic, environmental, and social benefits for Saskatchewan, Canada, and the world.

The company's vision, values, and policies demonstrate a transparent approach to environmental and social governance and ethical conduct, and a commitment to diversity, equity, and inclusion. NexGen's ethical standards are demonstrated through the conduct and interactions of all members of the NexGen team, including directors and officers, employees, consultants, and contractors. The company is committed to providing a diverse work environment in which all individuals are treated with dignity and respect and have equal opportunities to succeed. NexGen's complete list of governance policies are available on its website: https://www.nexgenenergy.ca/company.

NexGen Energy Ltd.

NexGen is a well-funded, public, Canadian company trading under the Toronto Stock Exchange, New York Stock Exchange, and Australian Securities Exchange. The company is headquartered in Vancouver, British Columbia, with an operations office in Saskatoon, Saskatchewan.

Vision

NexGen's vision is to become a global leader in delivering uranium for the world's current and future clean energy needs.

Since inception, NexGen's values of honesty, respect, resilience, and accountability have served as the company's roadmap to optimizing outcomes and creating as much positivity for as many people as possible.

Working with People

NexGen's philosophy for working with people is rooted in its principles and approach to governance, which is reflected in its commitment to community initiatives. NexGen's involvement in the community has been ongoing since exploration began, prior to the 2014 discovery of uranium mineralization (i.e., the Arrow deposit) that ultimately formed the basis for the proposed Project.

NexGen has worked closely with the communities local to the proposed Project to help develop meaningful community programs that focus on youth, with an emphasis on education, health and wellness, and building economic capacity. The company's engagement and outreach initiatives were recognized by the Prospectors & Developers Association of Canada with the 2019 Environment and Social Responsibility Award. Community initiatives continue to be developed in collaboration with local communities and are reviewed and amended as required to meet their changing needs.

Disciplined Planning Approach

NexGen's vision, values, and policies guide all aspects and stages of decision making on the proposed Project. This disciplined approach to planning includes exploration, development, and engineering design; driving excellence as the Project moves through the EA process, and ultimately, if approved, through the Project Construction, Operations, and Closure (i.e., Decommissioning and Reclamation) phases.

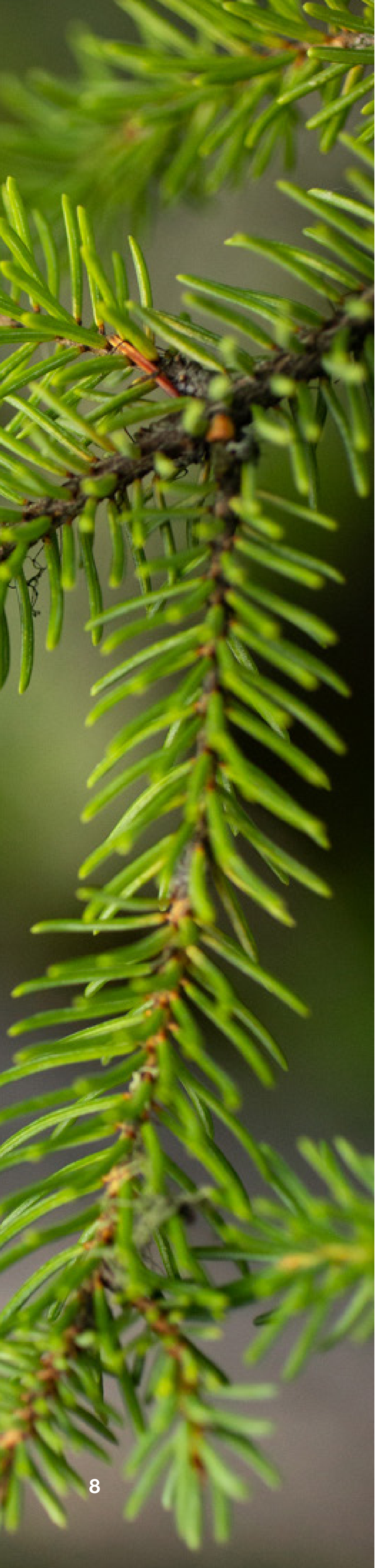
The proposed Project has been designed to promote high levels of environmental performance and incorporate best practices, including due consideration of input from local Indigenous Groups and communities. With a focus on designing a Project that is conducive to progressive reclamation and advanced closure management, key aspects of the Project design include plans to:

- store all tailings underground;
- minimize the total site disturbance footprint;
- optimize water management strategies and infrastructure; and
- fund and support independent Indigenous monitoring throughout the Project lifespan.

Since 2013, NexGen has worked closely with local communities to develop and support many initiatives including programs for youth focused on culture and education, health and wellness, and local economic development. Examples include:

- **Summer student program:** Since 2016, this program has aimed to build skills and confidence in young adults through skilled employment at the existing exploration site. To date, over 60 students have been employed in the summer student program.
- **Scholarships for local students:** Since 2017, NexGen has provided up to four scholarships each year to students from local communities to pursue post-secondary education. To date, seven students have received scholarships, and a number of these students have received scholarships for multiple academic years.
- **School breakfast program:** Since 2017, through a partnership with the Breakfast Club of Canada, healthy breakfasts have been provided to over 1,100 students each school day by eight local cooks who are employed to prepare the breakfasts at the Ducharme Elementary School, Dene High School, and Clearwater River Dene School. When schools in Saskatchewan were closed due to the Covid-19 pandemic in May 2020, food boxes were delivered to the homes of each student.
- **Youth sports program:** Since 2017, NexGen has provided support to minor volleyball and hockey teams in local communities. This support helps keep local youth engaged in sports and provides them with opportunities to participate in sporting events across Canada.
- **Recreational program:** Since 2018, NexGen has provided funding for recreational programming through the La Loche Sports, Recreation & Culture Board. This program provides structured after-school and summer-holiday recreational events and opportunities for youth and other community members. Programming includes beadwork, holiday decorating, traditional music lessons, and free public skating.
- **Dog adoption program:** Since 2015, through collaboration with the Meadow Lake Humane Society, NexGen has fostered over 35 dogs at the existing exploration site, with almost all the fostered dogs having found a permanent home.

Other community initiatives include providing a diamond driller helper training course (2018), funding a Métis Youth Cultural Music Program (2019), and funding Community Pandemic Coordinators (2020).



1.2

About the Master Executive Summary

The Master Executive Summary has been developed as a companion document to the Environmental Impact Statement (EIS) that was submitted to both the CNSC and ENV to meet their respective regulatory requirements.

The Master Executive Summary provides a concise overview of the entire EIS in a format intended for all audiences. It provides regulators, Indigenous Groups, and the public with a summary of the EA purpose, methods, findings, and implications. It is meant to be read from beginning to end to provide a high-level understanding of the proposed Project, its potential environmental and socio-economic effects, and the planned mitigations. *For full details on the EA completed for the proposed Project, please refer to the EIS.*

The structure of the Master Executive Summary provides:

- **a description of the proposed Project** including environs, Indigenous Group and community setting, geology and mineralization, Project development considerations, and key components and related activities **(Section 2)**;
- **a description of how the Project aligns with the regulatory framework (Section 3)**;
- **a summary of the results of engagement** conducted with Indigenous Groups, regulatory agencies, and the public, including issues raised **(Section 4)**;
- **a summary of the EA** conducted for the Project, including an overview of the approach and methods used in completing the EA and a summary of key environmental and socio-economic effects, proposed mitigation measures, determinations of significance, and proposed monitoring and management **(Section 5)**; and
- **key conclusions of the EA** as informed by NexGen's understanding of the significance of residual effects and potential Project benefits **(Section 6)**.

Summary of the Environmental Impact Statement

The Environmental Impact Statement (EIS), which is summarized within this Master Executive Summary, provides the full details of the EA conducted for the proposed Project that was developed in alignment with all federal and provincial requirements and guidelines. The EIS is organized as follows:

Section 1.0 Introduction: Introduces NexGen and its organizational and social philosophies and objectives; presents the purpose of the Project and Project overview, including information on the Project setting; and outlines the regulatory framework the Project will follow.

Section 2.0 Indigenous, Regulatory, and Public Engagement: Summarizes NexGen's engagement approach; activities completed to date, including documentation of meetings, discussion topics, and outcomes; and future planned engagement activities.

Section 3.0 Indigenous and Local Knowledge: Provides the approach to the collection and incorporation of Indigenous and Local Knowledge into the EIS.

Section 4.0 Project Alternatives: Discusses the purpose of the Project, considers the alternatives to the Project, and describes alternative means of carrying out the Project.

Section 5.0 Project Description: Provides a description of the Project setting, design considerations, components, activities, and human resource requirements in sufficient detail to adequately assess effects on the biophysical and socio-economic environments.

Section 6.0 Environmental Assessment Approach and Methods: Outlines the EA approach used for identifying and analyzing residual Project and cumulative effects on the biophysical and socio-economic valued components (VCs) and intermediate components, and the determination of significance on VCs.

Sections 7.0 to 19.0: Presents the EA methods and results for the biophysical and socio-economic environments, including how Indigenous and Local Knowledge was incorporated, identification of VCs and intermediate components, definition of the spatial and temporal boundaries of the assessments, characterization of existing conditions, the pathways analyses and the residual effects analyses, the residual effects classifications, the determinations of significance on VCs, prediction confidence and uncertainty, and proposed monitoring and adaptive management. These sections are organized by technical discipline:

- Section 7.0: Air Quality, Noise, and Climate Change;
- Section 8.0: Hydrogeology;
- Section 9.0: Hydrology;
- Section 10.0: Surface Water Quality and Sediment Quality;
- Section 11.0: Fish and Fish Habitat;
- Section 12.0: Terrain and Soils;
- Section 13.0: Vegetation;

Summary of the Environmental Impact Statement, continued . . .

- Section 14.0: Wildlife and Wildlife Habitat;
- Section 15.0: Human Health;
- Section 16.0: Cultural and Heritage Resources and Indigenous Land and Resource Use;
- Section 17.0: Other Land and Resource Use;
- Section 18.0: Economy; and
- Section 19.0: Community Well-Being.

Section 20.0 Summary of Significance of Residual Project and Cumulative Effects: Summarizes the significance of the residual Project and cumulative effects determined for the biophysical and socio-economic VCs.

Section 21.0 Accidents and Malfunctions: Presents a description of plausible accidents and malfunctions that could be associated with the Project, the conditions under which they could occur, and proposed mitigations and contingency plans.

Section 22.0 Assessment of Effects of the Environment on the Project: Identifies changes or effects on the Project that may be caused by natural hazards and mitigation planned to avoid or limit such changes or effects, and evaluates the likelihood and severity of the changes.

Section 23.0 Mitigation, Monitoring, and Follow-Up Programs: Provides mitigation actions and policies, monitoring and follow-up programs, and an associated list of Project commitments by NexGen.

Section 24.0 Conclusions: Summarizes the findings of the EA and provides an overall conclusion for the Project.

The Rook I Project

2

2

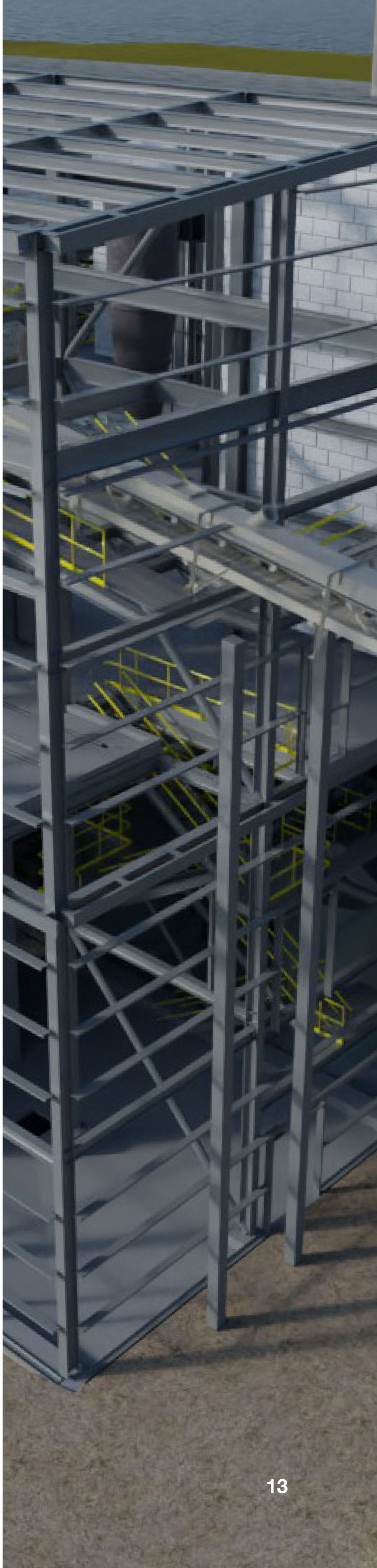
The Rook I Project

Section 2 introduces the proposed Rook I Project, including the Project's purpose and setting.

The section also provides information on Project development considerations, including the assessment of alternative means, and describes the Project components, activities, and schedule that served as the basis for the EA. Assessments conducted as part of the EA for potential accidents and malfunctions and effects of the environment on the Project are summarized in the context of NexGen's Project design and systems review and validation approach.

If approved, NexGen would establish a new uranium mining and milling operation, including an underground mine and surface facilities, to support the extraction of uranium ore from the Arrow deposit. As part of the Project, NexGen would also produce uranium concentrate on site.

For illustrative purposes, key infrastructure associated with the proposed Project is shown in Figure 2.0-1. Further details on Project components and activities are provided in Section 2.3.2.



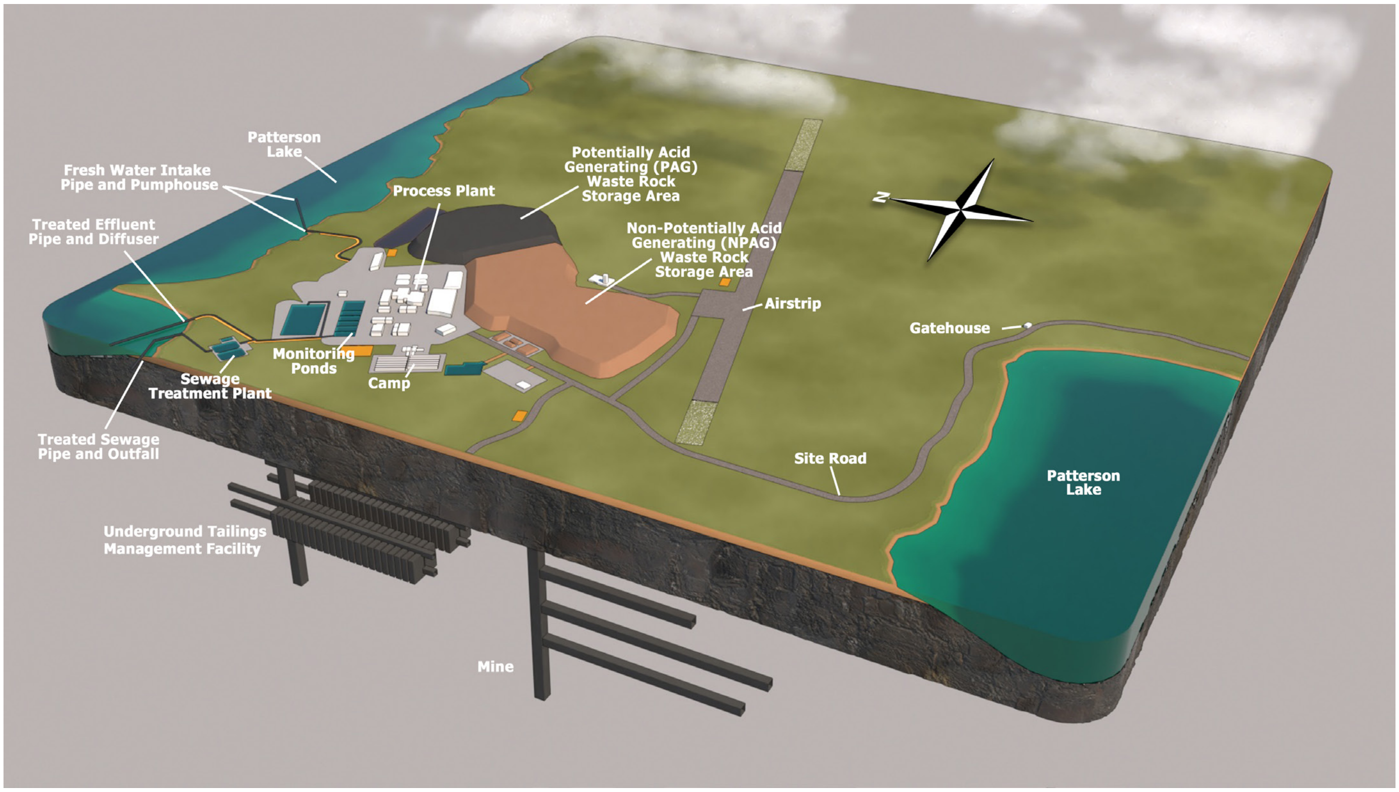


Figure 2.0-1: General Schematic of Primary Project Infrastructure

2.1

Purpose of the Proposed Project

In the long term, a significant increase in the uranium resource will be required both nationally and internationally to support the use and growth of nuclear capacity as the transition to low-carbon electricity generation continues.

(Nuclear Energy Agency and the International Atomic Energy Agency 2020)

This increased demand will result in the need for an increased uranium supply, of which the Project could become a material contributor.

2.1.1 The Need for Uranium

The International Energy Agency forecasts indicate that the global demand for electricity could increase by up to 90% between 2018 and 2040, resulting in increased GHG emissions due to the ongoing reliance on fossil fuels (IEA 2019). As a signatory to the 2015 Paris Agreement (UNFCCC 2015), Canada committed to reducing its GHG emissions by 40% to 45% below 2005 levels by 2030 (Prime Minister of Canada 2021). Similarly, reducing carbon emissions in Saskatchewan's electricity production by 2030 is a stated objective of Saskatchewan's Growth Plan, with a target of a 40% reduction in carbon emissions from 2005 levels by 2030 (Government of Saskatchewan 2019a). While nuclear power is not the only option to support these provincial and federal targets and global electricity requirements, the demand for uranium is increasing, and this energy source can be an important part of the transition towards more sustainable measures to protect the environment and mitigate climate change.

A significant increase in uranium is needed to support the transition to nuclear electrical generating capacity, which has lower carbon emissions (Nuclear Energy Agency and the International Atomic Energy Agency 2020).

Benefits of the Project

Development of the Project could:

- support the establishment of clean energy options; and
- help meet the growing global electricity demands and support both national and international efforts to reduce GHG emissions.

To meet the Paris Agreement targets, there would need to be an 80% increase in global nuclear power production by 2040 compared to current production levels (IEA 2019). In Canada, 80% of national electricity generation is currently from non-GHG emitting sources, and Canada aims to increase that amount to 90% by 2030. To meet growing electricity requirements and the GHG emission reduction targets, significant new nuclear-generated electrical capacity would have to be established in addition to decarbonization efforts (Canadian Nuclear Association 2017).

The proposed Project could play a key role in meeting the global demands for uranium. Between 2016 and 2020, Canada's contribution to world uranium mining production steadily decreased from 22% to 8% (World Nuclear Association 2021), highlighting the need for additional uranium-producing mines if Canada is to re-establish itself as a global supply leader. All of Canada's uranium supply is mined in Saskatchewan (Canada Energy Regulator 2021), with Canadian mined and milled uranium already helping to eliminate approximately 300 megatonnes to 500 megatonnes of carbon dioxide emissions worldwide annually (International Atomic Energy Agency Ministerial Conference 2017).

Canada's non-proliferation policy stipulates that Canadian-supplied nuclear material, equipment, and technology may only be transferred to countries with which Canada has concluded a bilateral Nuclear Cooperation Agreement.

(Government of Canada 2021)

2.2

Project Setting

The proposed Project would be located in northwest Saskatchewan's southern Athabasca Basin.

2.2.1 Project Environs

The proposed Project would be located approximately 40 km east of the Saskatchewan-Alberta border and 640 km northwest of the City of Saskatoon (Figure 2.2-1). At a regional scale, the proposed Project would be located adjacent to Patterson Lake, along the upper Clearwater River system.

Climatic conditions at the Project site are considered sub-arctic, with mean ambient temperatures ranging from -18°C in February to 17°C in July. Winters are characterized as long and cold, with mean monthly temperatures below freezing from October to April. Drumlins, lakes, wetlands, rivers, streams, and muskegs are common in the Project vicinity. Elevations in the region range from 583 metres above sea level at the crest of major drumlins to 480 metres above sea level for some of the lowland lakes. The Project site is covered by a 30 m to 100 m thick layer of till over mudstone, which is composed of fine-grained clay particles that have been compressed by the overlying material over a long period of time. The till is composed primarily of sand, with gravels, cobbles, and boulders also present. The Project site is dominated by sandstone with some bedrock outcroppings.

The broader regional area of the proposed Project intersects the Boreal Shield and Boreal Plain ecozones. At a more local scale, the Project site is located within the Boreal Plain Ecozone of the Mid-Boreal Uplands Ecoregion. The area surrounding the Project site consists of recent burns as well as residual tree stands of jack pine and some black spruce, with shrub and lichen as ground cover. Over the last 40 years, much of the region has been burned in fires.

The wildlife species present within the regional area of the proposed Project are typical of the Boreal Shield and Boreal Plains ecozones. The proposed Project is located within the SK2 West Administration Unit for woodland caribou and adjacent

The Project Setting

A robust understanding of the Project setting was foundational to the Project design process.

Key considerations included:

- the Project environs;
- existing mineral tenure and surface rights in the area of the Project;
- regulatory context for the Project;
- an understanding of local Indigenous Groups and communities and traditional land use;
- potential presence of heritage resources in the area of the Project; and
- the local geology and mineral resources.

to the boundary of the SK1 caribou conservation unit. Moose, black bear, and beaver are commonly harvested species.

Fish species captured or previously documented in waterbodies and watercourses surveyed in the proposed Project vicinity are typical of northern temperate waterbodies and watercourses in Saskatchewan and include Arctic grayling, burbot, cisco, lake trout, lake whitefish, longnose sucker, northern pike, walleye, white sucker, and yellow perch. These fish species are commonly targeted by recreational and subsistence fishers.

Two Saskatchewan provincial parks are located within 150 km of the proposed Project: Clearwater River Provincial Park (approximately 40 km south), and Athabasca Sand Dunes Provincial Park (approximately 140 km north). Preston Lake Wildlife Refuge (approximately 30 km south) is located on a small island in Preston Lake to protect a pelican colony during its nesting and rearing period. The portion of the Clearwater River in Saskatchewan is recognized for its cultural heritage and has been designated as part of the Canadian Heritage Rivers System.

The proposed Project would be located entirely on provincial Crown Land within Treaty 8 territory and the Métis Homeland, adjacent to Treaty 10 territory. The closest federal lands to the proposed Project site consist of Indigenous reserves, including Clearwater River Dene Band 222 (approximately 120 km south), English River First Nation Cable Bay Cree Lake 192M and 192N (approximately 130 km southwest), Cree Lake 192G (approximately 130 km southwest), Turnor Lake 193B (approximately 135 km southeast), and Clearwater River Dene Band 221 (approximately 140 km south).

The broader regional area surrounding the Project is largely undisturbed by human activities and infrastructure; approximately 0.5% of the regional area (i.e., 1,000 km^2) encompassing the Patterson Lake watershed has been influenced by human development. Most human-related disturbances in this area include linear features such as Highway 955, cutlines, seismic lines, and trails, with some additional cleared areas. There are currently no land use plans that encompass the proposed Project location.

The Project is north of the commercial forest zone, and commercial forestry activity is not conducted in the vicinity of the Project. There are no active mines near the Project. The Cluff Lake Mine, located approximately 80 km north of the Project site, was closed in 2002 and is currently in a long-term monitoring and maintenance phase.

Approximately 92 active mineral dispositions exist within the general area of the Project. The proposed Patterson Lake South Property, which is planned by Fission Uranium Corp. (Fission 2019), is also located on Patterson Lake, approximately 5 km from the proposed Project. Fission recently commenced the provincial EA process per the requirements of *The Environmental Assessment Act* (Fission 2021).

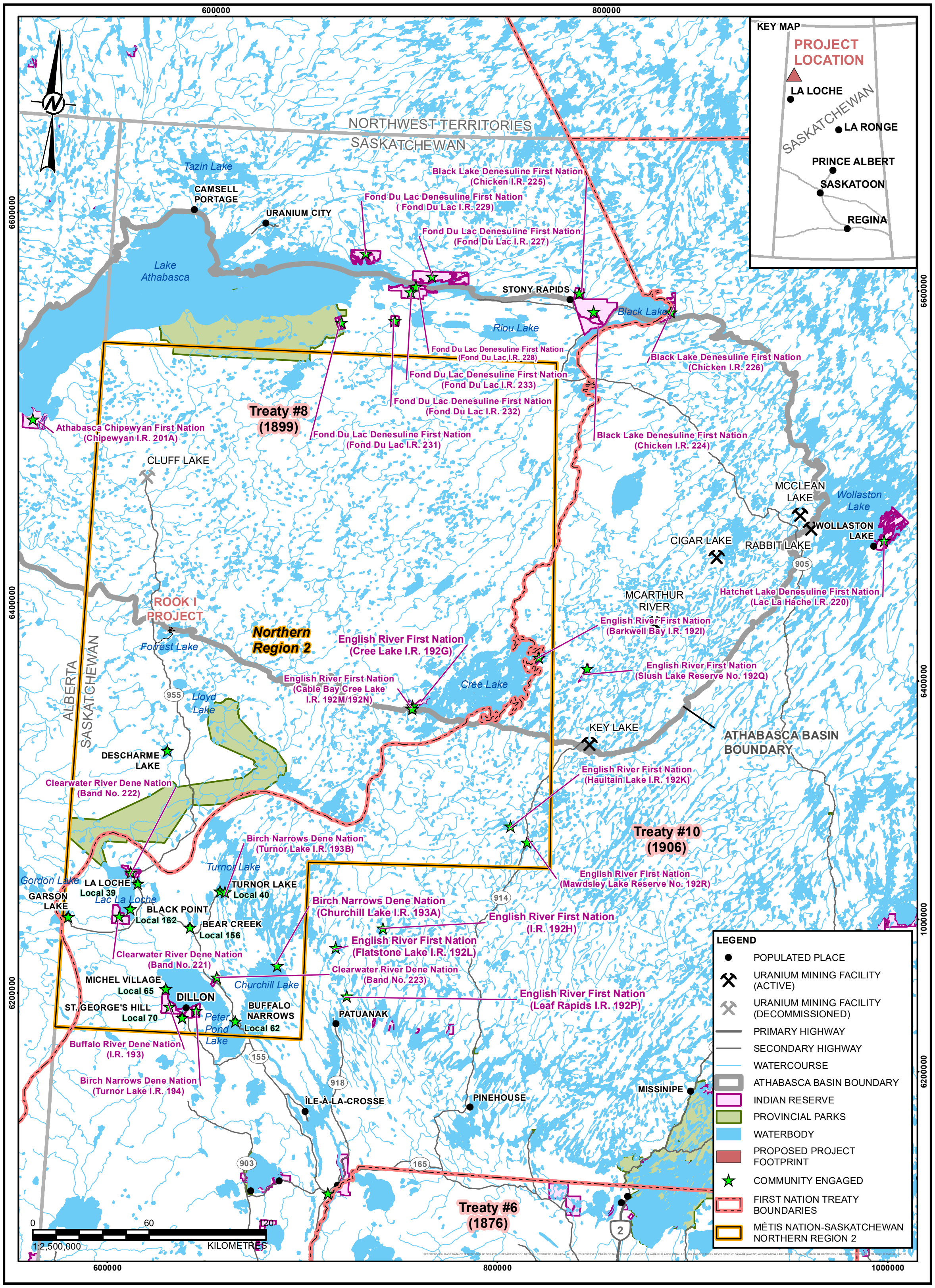


Figure 2.2-1: Location of the Rook I Project

2.2.2 Indigenous Groups and Community Setting

Since 2013, NexGen has worked closely with local Indigenous Groups and communities. Local Indigenous Groups and communities in the vicinity of the proposed Project are situated within the Project's local priority area, which consists of residents closest to the Project that would experience most of the Project effects and for which NexGen would prioritize training, employment, and business opportunities. These communities are located along or accessed via Highways 155 and 955 north of the intersection of Highways 155 and 925. The communities in the local priority area include the following:

- Clearwater River Dene Nation (CRDN)
- Clearwater Clear Lake (Métis Nation – Saskatchewan [MN-S] name for Northern Region 2 [NR2])
- La Loche (Local 39)
- Birch Narrows Dene Nation (BNDN)
- Turnor Lake (Local 40)
- Buffalo River Dene Nation (BRDN) / Dillon
- Buffalo Narrows (Local 62)
- Bear Creek (Local 156)
- Descharme Lake
- Garson Lake
- Black Point (Local 162)
- Michel Village (Local 65)
- St. George's Hill (Local 70)

Communities within the local priority area are generally composed of Dene Nation members, Métis citizens, those who have identified as other Indigenous persons, and those who have identified as non-Indigenous (Statistics Canada 2016). Overall, approximately 96% of the local priority area residents in 2016 identified as being Indigenous. Almost 6,000 people live in the local priority area, with community populations ranging in size from almost 2,400 people in La Loche to 10 or fewer people in each of Descharme Lake and Garson Lake.

The following presents brief community context for the Indigenous Groups in the local priority area:

- **Clearwater River Dene Nation (EIS TSD V.2):** The CRDN share a common identity that is supported through activities and values including being out on the land and engaging in harvesting activities (e.g., hunting, trapping, fishing, gathering), having freedom of movement, respecting the land, having ecological knowledge of the land, and participating in the sharing of communal use cabins and harvests among community members. These activities tie community members to each other and to their heritage.

- **Métis Nation – Saskatchewan (MN-S-JWG 2020):** The MN-S citizens living in NR 2 shared how they value their sense of community. They described the sense of community in terms of friendly people who know each other and the small-town atmosphere of the local communities. Northern Region 2 members identified the themes of freedom and control over their traditional territory as important aspects of their shared values. Freedom was described within the context of being able to go out and use the land and living in the north.
- **Birch Narrows Dene Nation (BNDN-JWG 2020):** Birch Narrows Dene Nation members conveyed that they value the people in Birch Narrows – everyone is family, and they share a common northerner perspective. Community members identified the environment as a direct benefit with positive effects on the community and its identity. Ties to the land contribute to community members' sense of spirituality. Birch Narrows Dene Nation members described the environment as beautiful, clean, and deserving of respect.
- **Buffalo River Dene Nation (BRDN-JWG 2020):** Buffalo River Dene Nation members remarked that they value the sense of community among members living on reserve. Community members identified the theme of freedom as an important aspect of their shared values. Freedom was described in connection with being able to go out on the land and use it. The ability to go out was seen as fundamental to maintaining the BRDN way of life, which is considered healthy.

Indigenous Groups and other community members use the land in the local priority area for activities such as traditional harvesting, recreational and commercial fishing, hunting, trapping, gathering, outfitting and guiding, canoeing, and mineral exploration.

Local community members have noted that the traditional economy makes important contributions to the economic well-being of people and communities; however, in general, there are limited economic opportunities in the local priority area. Employment is concentrated primarily in government-funded service sectors and Crown corporations. In 2016, the employment rate in the local priority area was lower at 32.5% compared to the province at 63.5%, and the unemployment rate in the local priority area was higher at 28.0% compared to the province at 7.1%.

Overall, education levels in local communities were less than those for the province in 2016. For the local area population, 56.3% had less than a high school certificate and 5.4% possessed a university degree at Bachelor level or above when compared to the province at 20.7% and 18.0%, respectively. On the other hand, the proportion of the community that had an apprenticeship, trades certificate, or diploma was similar to the province, with this accreditation being achieved by 10.5% of the local area population compared to 10.4% for the province.

2.2.3 Geology, Mineralization, and Mineral Tenure

The Project site is located along the southwestern rim of the Athabasca Basin. The basin is oval-shaped at surface, and its dimensions are approximately 450 km by 200 km (Figure 2.2-2). The basin reaches a maximum thickness of approximately 1,500 m near its centre and consists principally of unmetamorphosed sandstone with local conglomerate beds that are collectively known as the Athabasca Group.

The base of the Athabasca Group is marked by an unconformity with the underlying crystalline basement rocks. The Athabasca Group basal unconformity is spatially related to all significant uranium occurrences in the region. The basement immediately below the unconformity typically has a paleoweathered profile and ranges in thickness from a few centimetres to up to 220 m, where fluid migration was aided by fault zones (MacDonald 1980).

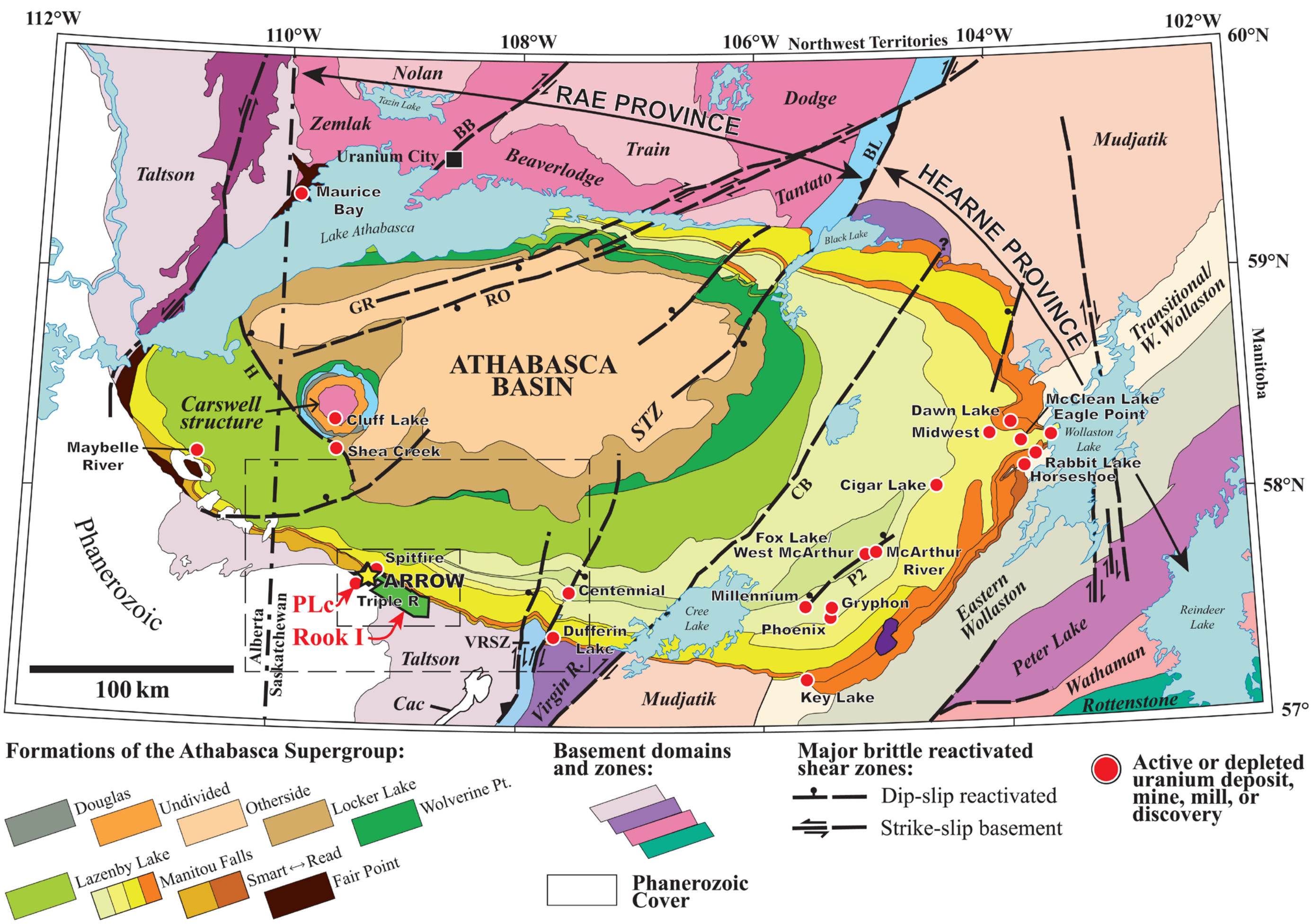


Figure 2.2-2: Geological Context for the Rook I Project

PLc = Patterson Lake corridor.
Source: Hillacre et al. 2020

The Rook I property straddles the Athabasca Group basal unconformity. Directly below the unconformity is variably weathered basement rock, where the weathering depth varies and penetrates deeper into the basement rock along conduits of water (i.e., shears, faults, and other persistent geologic structures).

Overlying the basement rocks in the area of the Rook I property are the flat-lying sandstones of the Athabasca Group of variable thickness, rarely exceeding 50 m. Phanerozoic rocks of the Cretaceous Mannville Group and Devonian La Loche Formation overlie the Athabasca Group and basement rocks in portions of the western side of the property, including above the Arrow deposit. The Mannville Group is characterized by both non-marine and marine shales and sandstones.

The Rook I property and surrounding area are covered by Pleistocene glacial deposits composed of sand, Athabasca Group sandstone boulders, and rare basement and Mannville Group boulders. The glacial deposits are typically at least 30 m thick and may be up to 100 m thick. The glacial overburden over the Arrow deposit is approximately 60 m thick, with the cumulative thickness of the units overlying the basement rock at the Arrow deposit being between 90 m and 120 m.

The Arrow deposit is a basement-hosted, vein-type uranium deposit. The ingress-type deposit occurs in basement rocks below an unconformity located between the crystalline basement lithologies and overlying sedimentary units (Figure 2.2-3). The deposit consists of several high-grade, near-vertical uranium veins. The mineralized area is 315 m wide with an overall strike length (i.e., longest horizontal dimension) of 980 m, and mineralization occurs 100 m below surface and extends to a depth of 950 m.

The Arrow deposit has undergone considerable advancement since discovery in February 2014, with mineral resource estimates completed in 2016, 2017, 2018, and 2021, each supported by successive, systematic drill programs. Currently, the Arrow deposit has Measured Mineral Resources of 209.6 million pounds of triuranium octoxide (U_3O_8) contained in 2,183 kilotonnes grading 4.35% U_3O_8, Indicated Mineral Resources of 47.1 million pounds of U_3O_8 contained in 1,572 kilotonnes grading 1.36% U_3O_8, and Inferred Mineral Resources of 80.7 million pounds of U_3O_8 contained in 4,399 kilotonnes grading 0.83% U_3O_8.

Mineral Resources are sub-divided, in order of increasing geological confidence, into Inferred, Indicated and Measured categories. An Inferred Mineral Resource has a lower level of confidence than that applied to an Indicated Mineral Resource. An Indicated Mineral Resource has a higher level of confidence than an Inferred Mineral Resource but has a lower level of confidence than a Measured Mineral Resource.

(CIM 2014; p.4)

Mineral resource estimates for the Arrow deposit were completed in 2016, 2017, 2018, and 2021.

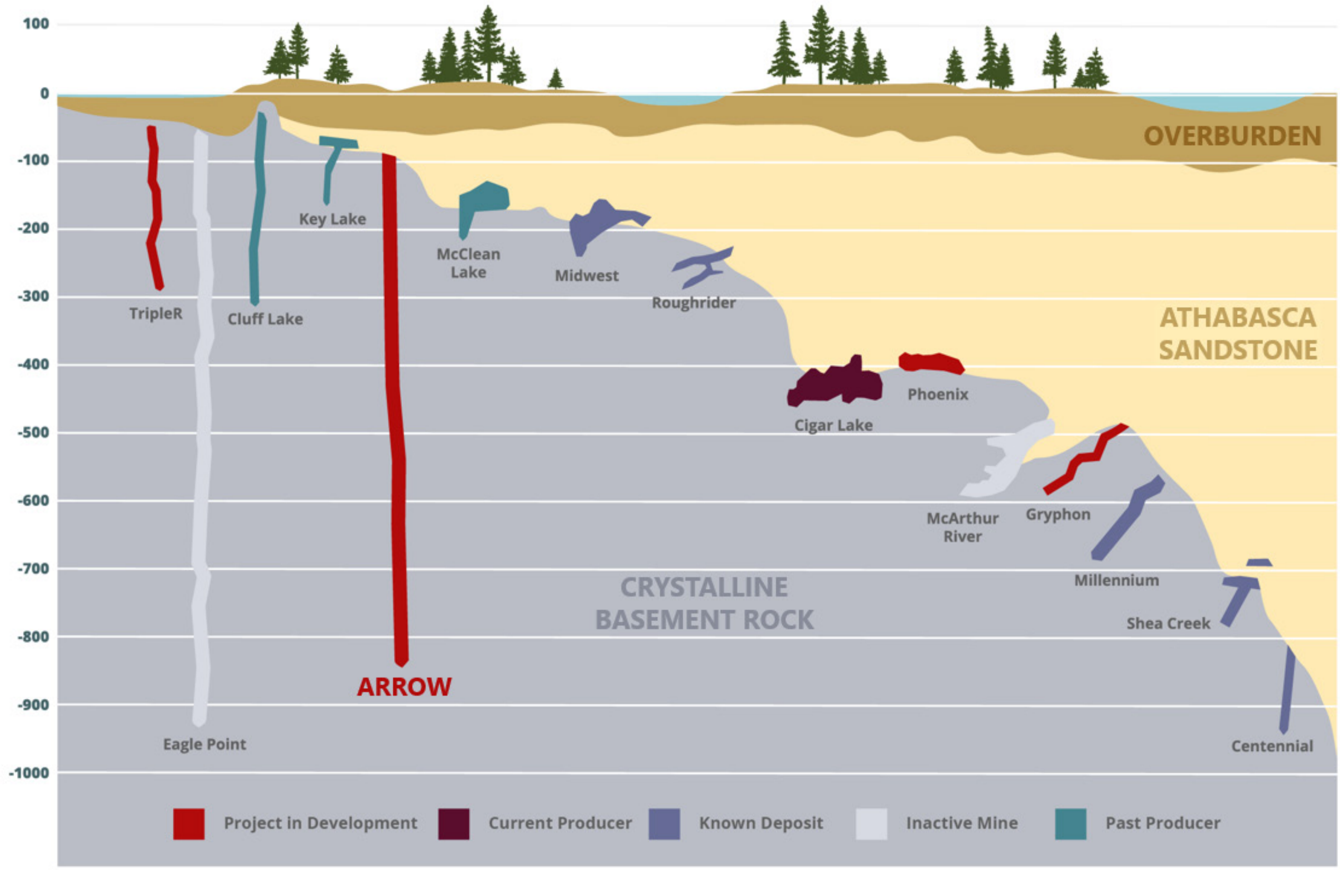


Figure 2.2-3: Arrow Deposit Setting within the Athabasca Basin

2.2.4 Current Activities

Current activities on the Rook I property support regional exploration programs, environmental baseline and monitoring programs for the proposed Project, and field investigation programs to support Project design. An existing all-season exploration camp and ancillary infrastructure are located at the Rook I property to support these current activities. Access to the existing exploration camp is via a 13 km long all-season access road from Highway 955.

Authorizations from applicable regulatory bodies are maintained to support site activities. NexGen does not currently hold surface rights for the proposed Project site.

2.3

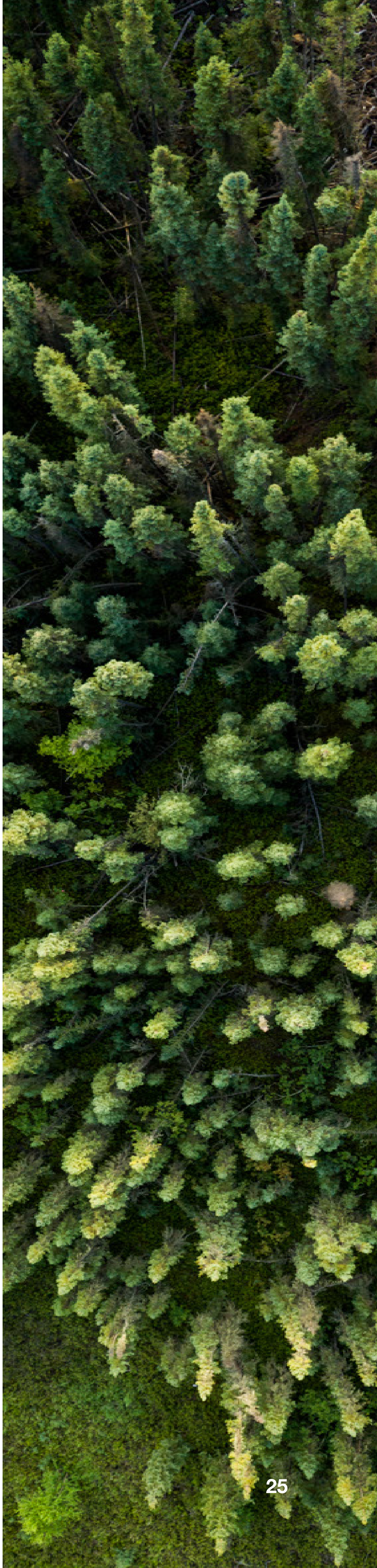
Project Overview

The proposed Project would include an underground mine and surface facilities to support the extraction of uranium ore from the Arrow deposit and the production of uranium concentrate.

The Project would span a 43-year period from the beginning of Construction, through Operations, to the end of Closure (i.e., Decommissioning and Reclamation). Construction is expected to take place over approximately four years and include activities such as site preparation and infrastructure development. Operations is expected to last for 24 years and include mining, processing, and the associated tailings, waste, and water management. Closure would follow, with an expected duration of 15 years.

The anticipated physical footprint of the mine site and access road is approximately 228 ha, and would include the following key facilities (Figure 2.3-1):

- underground mine development;
- process plant buildings, including uranium concentrate packaging facilities;
- paste tailings distribution system;
- underground tailings management facility (UGTMF);
- potentially acid generating waste rock storage area (WRSA);
- non-potentially acid generating WRSA;
- special waste rock and ore storage stockpiles;
- surface and underground water management infrastructure, including water management ponds, effluent treatment plant, and sewage treatment plant;
- conventional waste management facilities and fuel storage facilities;
- ancillary infrastructure, including maintenance shop, warehouse, administration building, and camp;
- airstrip and associated infrastructure; and
- access road to the Project and site roads.



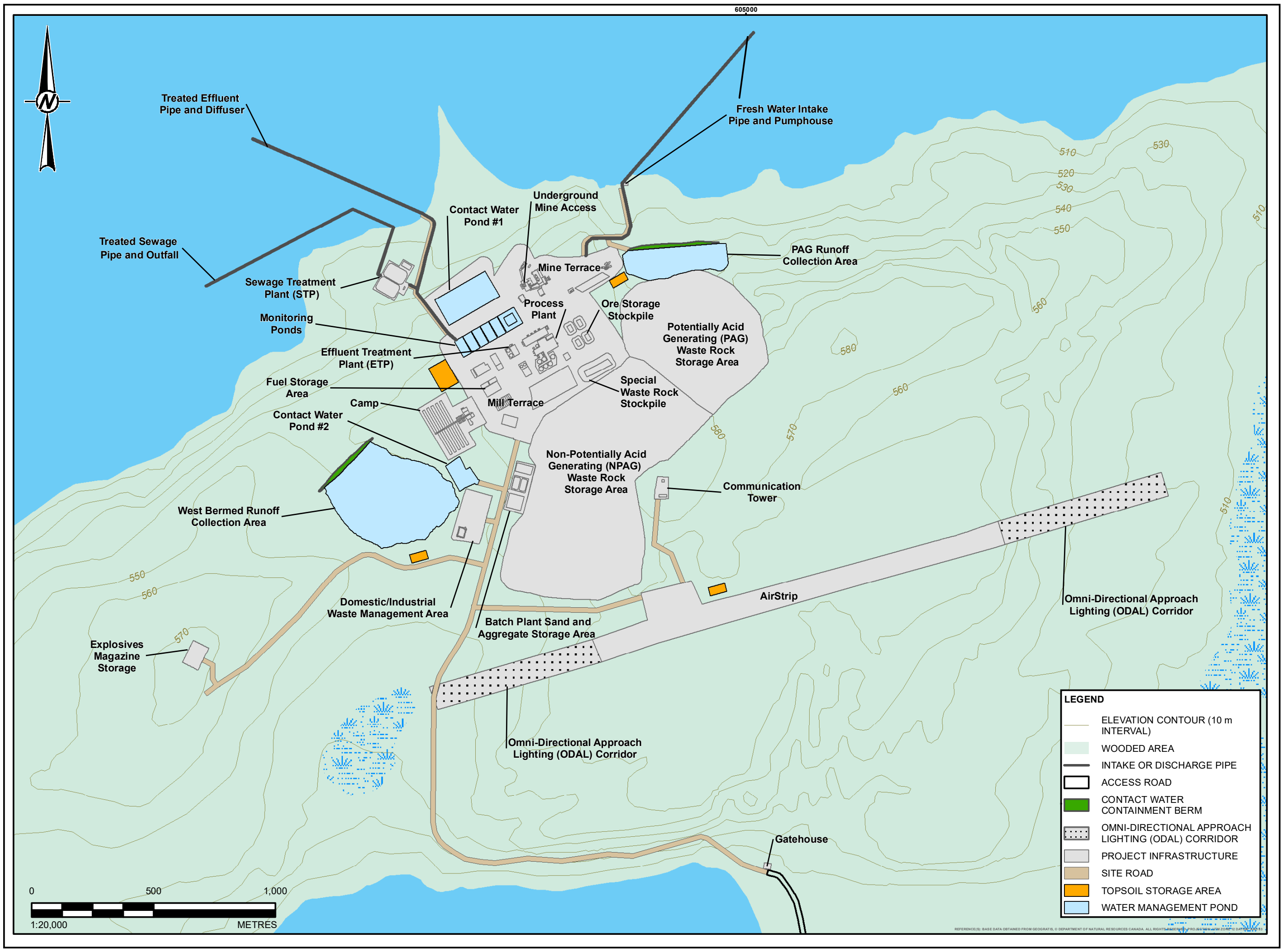


Figure 2.3-1: Layout of Infrastructure and Facilities for the Rook I Project

2.3.1 Project Development Considerations

NexGen's overall philosophy is to design, construct, commission, operate, decommission, reclaim, and close the Project with fit-for-purpose approaches to mine design, management, and operations to deliver enhanced environmental, social, and economic performance.

Project development activities completed to date are based on feasibility engineering studies, and have:

- **incorporated applicable regulatory guidance and design standards;**
- **considered the local setting and environment;**
- **been influenced by Indigenous and Local Knowledge; and**
- **been informed by completion of alternatives assessments.**

NexGen has designed, and would continue to refine and operate, all Project infrastructure, facilities, and systems in accordance with standards relevant to the Project, which are based on regulatory guidance (e.g., CNSC regulatory documents, ENV guidelines), applicable building code requirements (e.g., National Building Code of Canada, National Fire Code of Canada), and best management practices as developed by applicable industry and trade associations (e.g., Mining Association of Canada) and standards organizations (e.g., International Organization for Standardization, Canadian Standards Association Group). These design standards promote the protection of the public, workers, and the environment.

NexGen is focused on the responsible and optimal development of the Project, incorporating environmental stewardship, social advancement, and sustainable long-term economic benefits for local Indigenous Groups and communities and other stakeholders. This includes Project design considerations with respect to the remote location; climate; water regime; existing landscape; plant, fish, and wildlife species present; and the feedback and knowledge from the people that value and use the land and resources in the area.

Project design activities completed to date include consideration of Project footprint minimization, protection of water, safe storage of tailings, and other items. Future feedback would also be integrated in Project design refinements as well as in Construction, Operations, and Closure activities during the Project lifespan.

NexGen has always focused on, and will continue to focus on, community confidence through rigorous environmental standards and engagement, and employee assurance through effective health and safety measures.

NexGen's goal is to leave lasting benefits to local communities, and the company has approached advancement of the proposed Project with consideration of current and future generations.

NexGen's Project planning has utilized national and international best practices and lessons learned from other mining operations.

2.3.2 Project Components and Activities

An overview of mining, processing, tailings management, mine rock management, site water management, and conventional waste management proposed for the Project are outlined below, along with a summary of Project supporting infrastructure, and off-site infrastructure and transportation.

Mining

Mining refers to all activities associated with the drilling, blasting, and removal of material from the underground that is brought to surface for processing or long-term storage.

Underground Infrastructure and Activities

The underground mine would include all the components required to access and support mining activities and the deposition of tailings in the UGTMF (Figure 2.3-2).

The primary mining method selected for the Arrow deposit is long hole stoping, which is a variation of bulk mining. Long hole stoping is the process of extracting ore by drilling, blasting, and excavating material from underground, leaving behind an open space (known as a stope), which is subsequently backfilled to support further development in the surrounding areas. The long hole mining method was chosen to optimize safety performance, reduce worker exposure to physical hazards and radiation, maximize mineral resource extraction, and increase operational flexibility and productivity.

Access underground would be via a production shaft, which would serve as the main access point to the Arrow deposit and other mine and tailings management working areas. The production shaft would also be used to remove ore and waste rock from underground and act as the fresh air intake for the underground operations. Ventilation exhaust air would be returned to surface by the exhaust shaft, which would also provide a means of secondary egress should the production shaft become inaccessible.

Lateral developments, including ramps, access drifts, and purpose-built excavations, would be used to provide access and connection for underground mine activities and locations for storage, maintenance, and services.

Vertical developments would include ventilation raises, ore and waste passes, and ore and waste bins. The raises would be used to provide ventilation throughout the underground mine. The ore and waste passes would move mined materials to a rock breaker located below. Ore and waste bins would be located below the rock breaker and would provide storage capacity for mined rock until the material was directed onto a conveyor belt for transfer to the surface via the production shaft hoist system. Once on surface, mined rock would be stored in the ore storage stockpile, special waste stockpile, or WRSAs.

To support mining, additional underground infrastructure would be required, including:

- personnel and material movement systems
- electrical and communications systems
- maintenance facilities
- paste backfill and paste tailings distribution system
- fuel facilities
- explosive and detonator storage facilities
- dewatering facilities
- ventilation system
- underground water supply

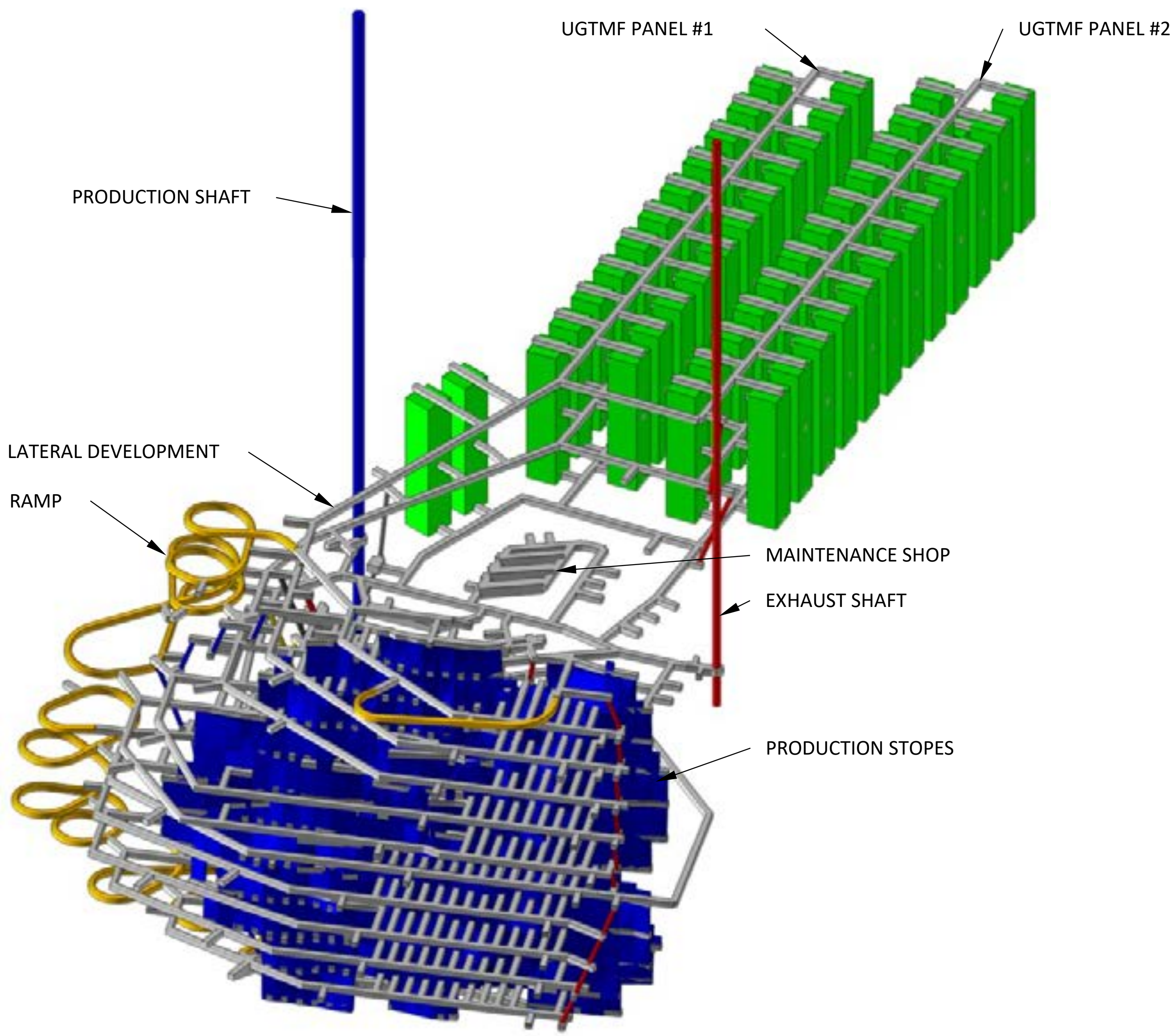


Figure 2.3-2: Rook I Project Underground Mine and Infrastructure Overview

UGTMF = underground tailings management facility.

Surface Infrastructure and Facilities

Much of the mine infrastructure required to support underground mining would be located on the mine terrace, a graded pad area on surface that surrounds the production shaft, exhaust shaft, and connecting areas in between (Figure 2.3-3). The following key infrastructure would be located on the mine terrace:

- compressor plant
- office/dry facility
- hoist buildings
- freeze plant
- batch plant
- diesel fuel storage
- headframes and collar buildings
- fresh air intake fans and heaters to underground mine
- ventilation exhaust fans from the underground mine
- fire protection water tank and pump house

In addition to infrastructure on the mine terrace, laydown areas would be developed for shaft sinking operations, and a surface explosives magazine would be required to support development of the underground workings.

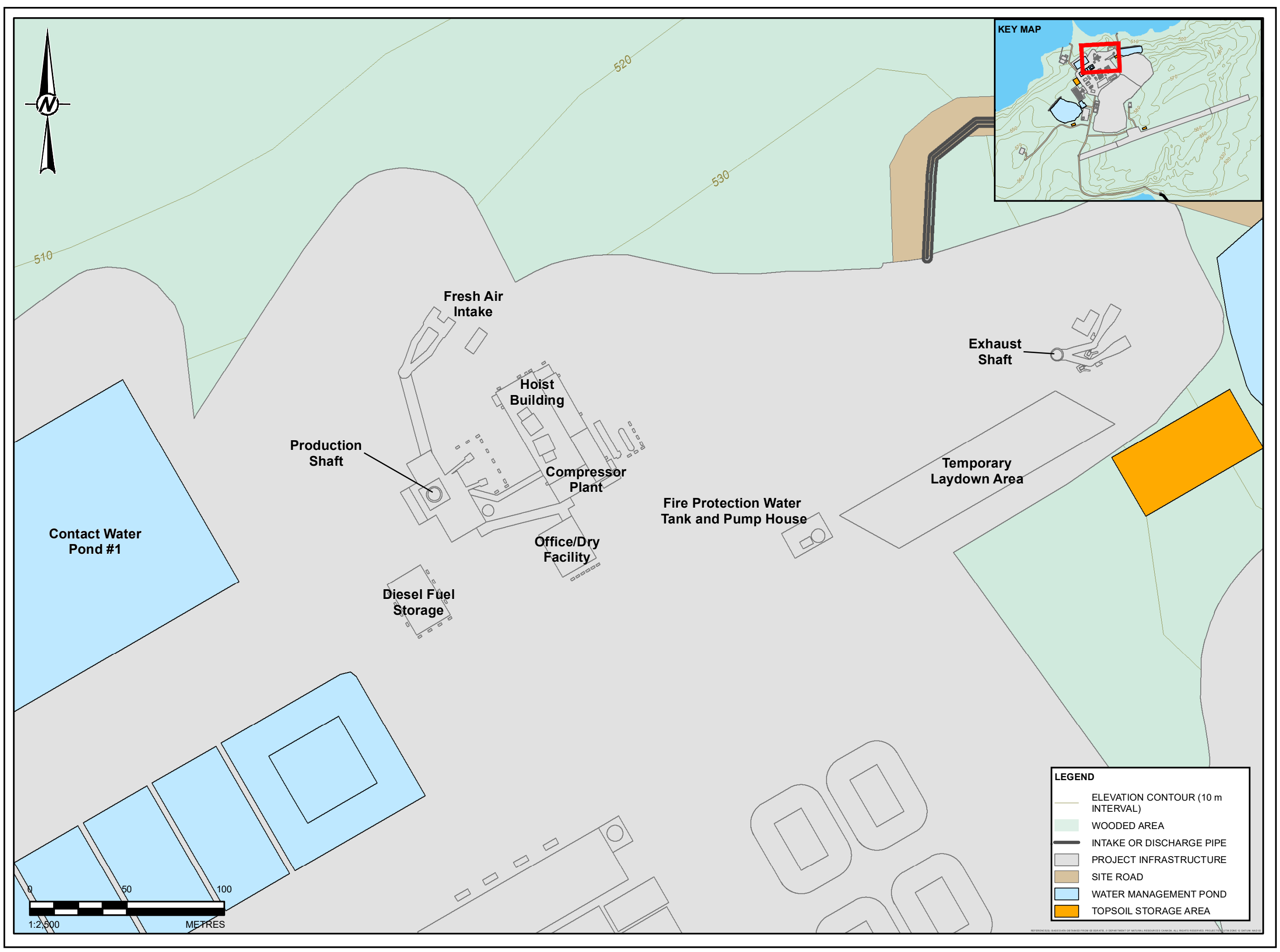


Figure 2.3-3: Rook I Project Mine Terrace Layout

Processing

Processing refers to the activities that would occur after uranium ore is received at the ore storage stockpile and up to the point of the uranium concentrate being packaged for transportation off site.

Uranium ore processing for the Project would include acid leaching, solvent extraction, uranium precipitation, and calcining. The acid leaching method, assisted by hydrogen peroxide, would extract uranium from the ore received from the underground mine. This uranium would be purified by a solvent extraction method using a strong acid stripping technique and solidified by hydrogen peroxide. The uranium would then be dried and calcined at high temperature to create a marketable product of uranium concentrate.

The proposed plant would process a maximum of 1,300 tonnes per day of uranium ore, with an annual production capacity of up to 30 million pounds per year of uranium concentrate.

The process plant would include ten key process circuits, as outlined below:

- ore sorting and blending
- grinding
- leaching
- liquids and solids separation
- solvent extraction
- gypsum precipitation
- yellowcake precipitation
- drying, calcination, and packaging
- tailings neutralization and paste plant
- effluent treatment

The basic milling process to be implemented to convert ore into packaged uranium concentrate is illustrated in Figure 2.3-4.

The majority of Project process facilities and other ancillary facilities to support process plant operation would be located on the mill terrace (Figure 2.3-5).

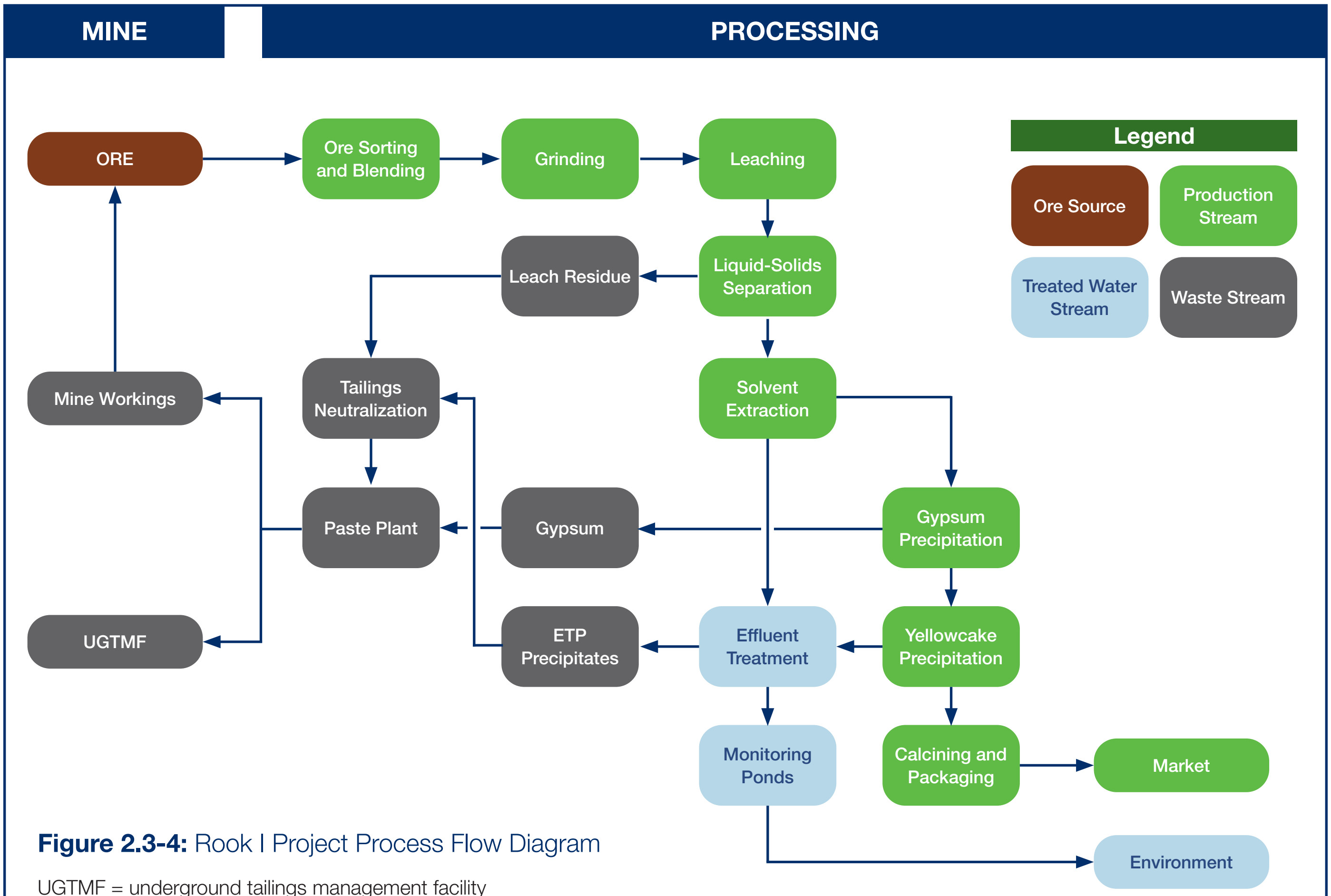


Figure 2.3-4: Rook I Project Process Flow Diagram

UGTMF = underground tailings management facility
ETP = effluent treatment plant

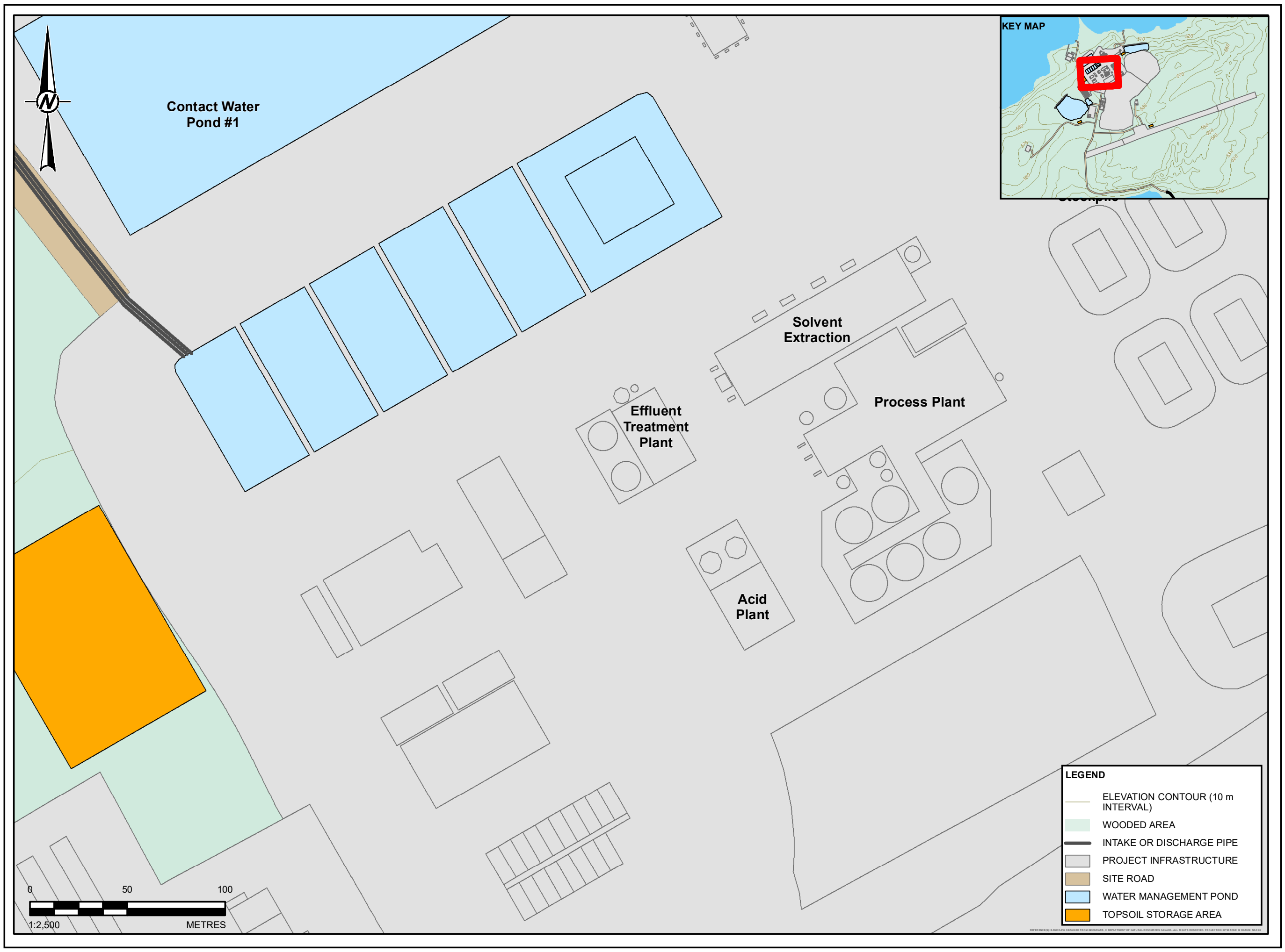


Figure 2.3-5: Rook I Project Mill Terrace Layout

Tailings Management

Tailings management infrastructure would include the structures, systems, and components required to safely process, deliver, and permanently deposit engineered paste tailings underground. Tailings would be stored in both mined-out underground production stopes and a purpose-built UGTMF, which would include mined-out chambers dedicated to the permanent disposal of tailings (Figure 2.3-6). To provide sufficient storage for tailings during Operations, the UGTMF chamber size requirements and development schedule would be derived from, and adapted to, the ore processing schedule.

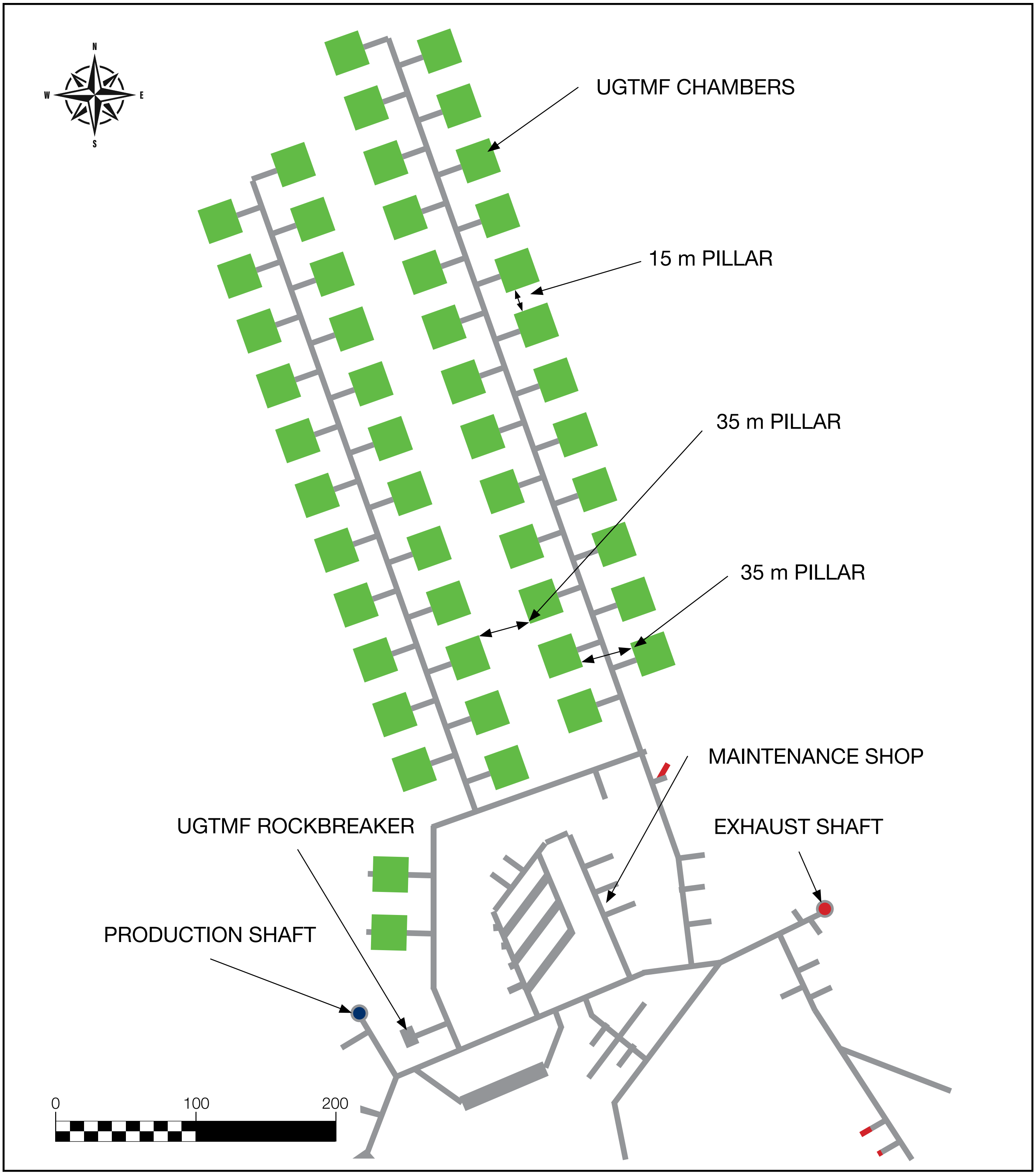


Figure 2.3-6: Rook I Project Underground Tailings Management Facility General Layout

UGTMF = underground tailings management facility.

The UGTMF represents a key environmental design feature that would safely and permanently store tailings underground, reduce the Project footprint on surface, and substantially minimize the associated risks to the environment throughout and beyond the Project lifespan. The permanent storage of tailings underground would also facilitate progressive reclamation, ongoing decommissioning, and long-term disposal of waste from the process plant during Operations.

The tailings management system would include a paste plant and a system of conveyors, silos, and pumps to mix the solid waste streams and generate the cemented paste products for underground disposal. Tailings from the proposed Project would consist of the following materials:

- neutralized leached residue;
- gypsum; and
- effluent treatment plant precipitate.

Approximately 13.7 million cubic metres (m^3), or 17.7 million tonnes, of tailings would be generated during the proposed Project lifespan.

Tailings are a non-economic by-product of processing ore.

For the Project, all tailings generated during processing would be stored underground as a cemented product, either used to backfill mining areas or deposited in custom-built underground tailings storage chambers. All tailings storage locations would be in highly competent basement rock.

Storage of tailings underground greatly reduces the potential surface footprint of the Project.

Mine Rock Management

Mine rock is defined as any naturally occurring material that would be removed from underground areas. Mine rock is divided into four classifications for the Project: ore, special waste rock, potentially acid generating waste rock, and non-potentially acid generating waste rock (Table 2.3-1). Mine rock management refers to the structures, systems, and components required to transport and store the different classifications of mine rock generated from underground activities.

Table 2.3-1: Rook I Project Mine Rock Classifications

Mine Rock Term	Details
Ore	Ore is mine rock sourced from underground with 0.26% U_3O_8 or greater. Ore would be temporarily stored in the ore storage stockpile. Ore would be processed throughout Operations and material remaining after processing disposed in the UGTMF for permanent storage.
Special waste rock	Special waste is mine rock with insufficient grade to be considered ore (i.e., greater than 0.03%, but less than 0.26%, U_3O_8). All special waste would be temporarily stored in the special waste rock stockpile. Special waste would be processed throughout Operations and material remaining after processing disposed in the UGTMF for permanent storage.
Potentially acid generating waste rock	Potentially acid generating waste rock is mine rock with less than 0.03% U_3O_8 and greater than or equal to 0.1% sulphur. All potentially acid generating waste rock would be stored in the potentially acid generating WRSA.
Non-potentially acid generating waste rock	Non-potentially acid generating (i.e., clean) waste rock is mine rock with less than 0.03% U_3O_8 and less than 0.1% sulphur. All non-potentially acid generating waste rock would either be stockpiled for use as construction material at site or be stored in the non-potentially acid generating WRSA.

U_3O_8 = triuranium octoxide | UGTMF = underground tailings management facility | WRSA = waste rock storage area

Special waste rock is mine rock that is mineralized (i.e., contains uranium); however, has insufficient grade to be considered ore (i.e., is not economic). All special waste would be temporarily stored in the special waste rock stockpile. Prior to Closure, special waste rock would be processed and the resulting tailings permanently stored underground.

Four separate facilities would be used to store the different classifications of mine rock on surface (Figure 2.3-7):

- **ore storage stockpile** to temporarily store ore during Operations (capacity of approximately 26,000 m^3); dual lined with high density polyethylene to contain and collect water from a probable maximum precipitation, 24-hour event plus 1 m freeboard, and seepage;
- **special waste rock stockpile** to temporarily store special waste during Operations (capacity of approximately 60,000 m^3); dual lined with high density polyethylene to contain and collect water from a probable maximum precipitation, 24-hour event plus 1 m freeboard, and seepage;
- **potentially acid generating WRSA** for permanent on-surface storage (capacity of approximately 5.8 million m^3); lined with high density polyethylene to contain and collect water from a probable maximum precipitation, 24-hour event, and seepage; and
- **non-potentially acid generating WRSA** for permanent on-surface storage (capacity of approximately 8.0 million m^3); unlined with water management infrastructure to collect water from a 1-in-100-year, 24-hour precipitation event.

Mine rock management facilities would be sized with sufficient storage capacities and associated water management systems to accommodate the planned mine rock volume over the life of the mine.

During development of the potentially acid generating WRSA, potentially acid generating waste rock would be placed in alternating lifts of waste rock and borrow material to provide engineered source control (i.e., material with lower flow properties) to reduce the advective air flux through the placed material, thereby reducing potential effects to the environment.

The top of the finished potentially acid generating and non-potentially acid generating WRSAs would be tied into the hill to the south of the mill terrace, and the overall height would not exceed the highest nearby topography. At closure of these facilities, engineered cover systems (e.g., growth medium) would overlay the final WRSA landforms.

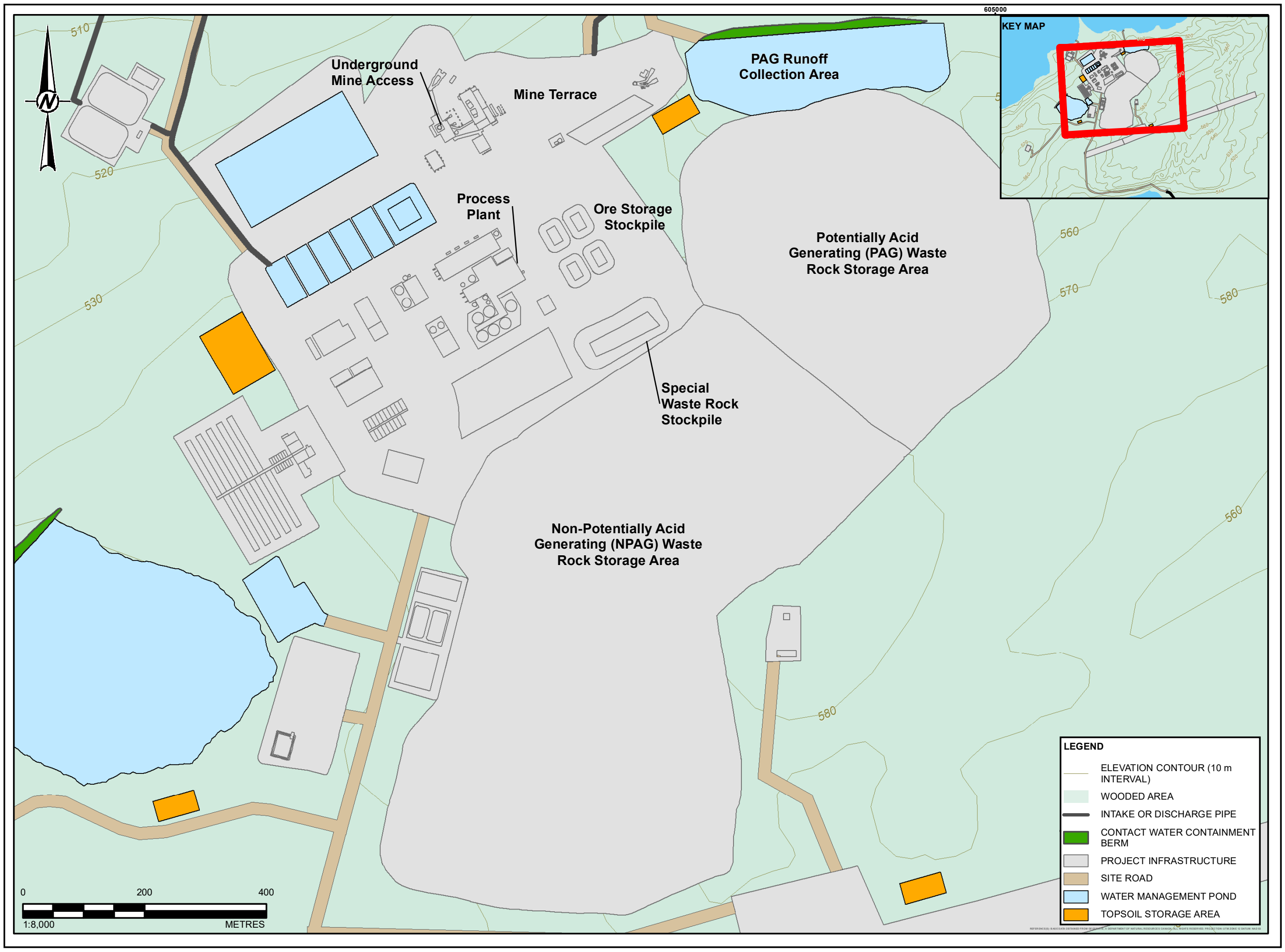


Figure 2.3-7: Mine Rock Storage Locations at the Rook I Project

Site Water Management

Site water would be managed using infrastructure developed to appropriately contain, monitor, treat (as required), and release water to the environment. Surface water infrastructure would include a system of intakes, pumps, pipelines, storage tanks, diversion and conveyance structures, ponds, treatment plants, and discharge structures.

For the Project, site water has been classified for management as defined in Table 2.3-2.

Table 2.3-2: Rook I Project Water Management Classifications

Site Water Term	Description	General Management Approach
Fresh water	Surface water sourced from Patterson Lake for use at the Project site for domestic consumption and to support various demands on site (e.g., process plant).	Reduce fresh water consumption to minimize fresh water withdrawals.
Non-contact water	Water that has not been physically, chemically, or radiologically altered by Project activities (e.g., construction, mining, milling).	Divert non-contact water to the extent practicable and allow for discharge directly to the receiving environment. Manage non-contact water that cannot be diverted away as contact water.
Contact water	Water that may have been physically, chemically, or radiologically altered by Project activities.	Collect, capture, and contain contact water. Reuse contact water where possible. Treat and manage water quality relative to environmental release targets as required before release to the environment. Contact water includes mine water, all runoff from surfaces disturbed by the Project, and non-diverted non-contact water.
Mine water	Water that flows into the underground workings.	Pump water from underground to surface and manage as contact water.
Release water	Project-influenced water that is suitable for release to the environment. Release water includes contact water, treated or untreated, that has been confirmed as acceptable for release relative to discharge criteria.	Discharge water, treated or untreated, that meets water quality criteria appropriate for release.
Waste water	Water that has been treated in the sewage treatment plant and is suitable for release to the environment, after being confirmed as meeting discharge criteria.	Discharge treated waste water that meets water quality criteria appropriate for release.

The site water system would draw fresh water from a single location in Patterson Lake designed to avoid uptake of sediment or organic material. The design would include a fish screen and a low intake velocity to allow juvenile fish to swim away. Fresh water would be treated and used for potable water and stored for firefighting, with most of the fresh water used for processing ore. Water would be distributed throughout the Project site and reused where possible (e.g., process plant), dependent on quality, quantity, and regulatory requirements.

Precipitation and snow melt runoff that contacts disturbed Project areas or infrastructure would be collected and directed to respective site contact water ponds and collection areas.

Water collected in the underground mine would come from groundwater, operational water use, and backfill flush water; this water would be collected in sumps and pumped to surface. Surface water management for the proposed Project would include multiple ponds and collection areas as described in Table 2.3-3.

The water management approach for the Project would use recycled treated water as much as feasible to reduce both the amount of fresh water required and the total amount of treated effluent discharged to the environment.

Site water infrastructure would be designed to maximize the diversion of non-contact surface runoff water away from Project infrastructure.

Table 2.3-3: Rook I Project Water Management Structure Summary

Water Management Structure	Description
Contact water ponds	Two lined water management ponds would collect runoff from across the Project site: contact water pond #1 and contact water pond #2. Water from contact water pond #1 would be pumped to the settling pond. Water from contact water pond #2 would be pumped to the west bermed runoff collection area if discharge criteria are met, or to the settling pond if water treatment is required.
Potentially acid generating runoff collection area	The potentially acid generating runoff collection area would receive runoff from the potentially acid generating waste rock storage area. This area would be fully lined with a single layer of high density polyethylene, and collected water would be pumped to the settling pond for further treatment, if necessary.
Settling pond	The lined settling pond would be used for general collection of contact water from across the Project site that may require treatment. Water from this pond would be treated in the effluent treatment plant, then pumped to the monitoring ponds.
Contingency pond	The lined contingency pond would be used as an additional settling pond to handle surplus volume, if required.
Monitoring ponds	Four lined monitoring ponds would receive water after treatment in the effluent treatment plant. Water would be tested and discharged if appropriate criteria are met. If criteria are not met, the water would be pumped to the settling pond for additional treatment.
West bermed runoff collection area	The west bermed runoff collection area would receive runoff from the local contributing area as well as overflow from contact water pond #2, if required. The west bermed runoff collection area would also receive water from contact water pond #2 that meets discharge criteria. The bermed area would prevent suspended solids entrained in runoff water from entering Patterson Lake by natural filtration through an unlined berm.

Excess contact water that is not required for Project purposes would be treated to meet discharge quality criteria and then released to Patterson Lake. The discharge diffuser would be located approximately 750 m offshore at a depth of approximately 10 m. Treated effluent would be either reused for Project purposes or pumped to monitoring ponds to be tested and released.

A sewage treatment plant would treat waste water, and the treated sewage outfall would be located offshore in Patterson Lake and designed to meet environmental protection discharge quality criteria.

An overview of key water management infrastructure for the Project is provided in Figure 2.3-8.

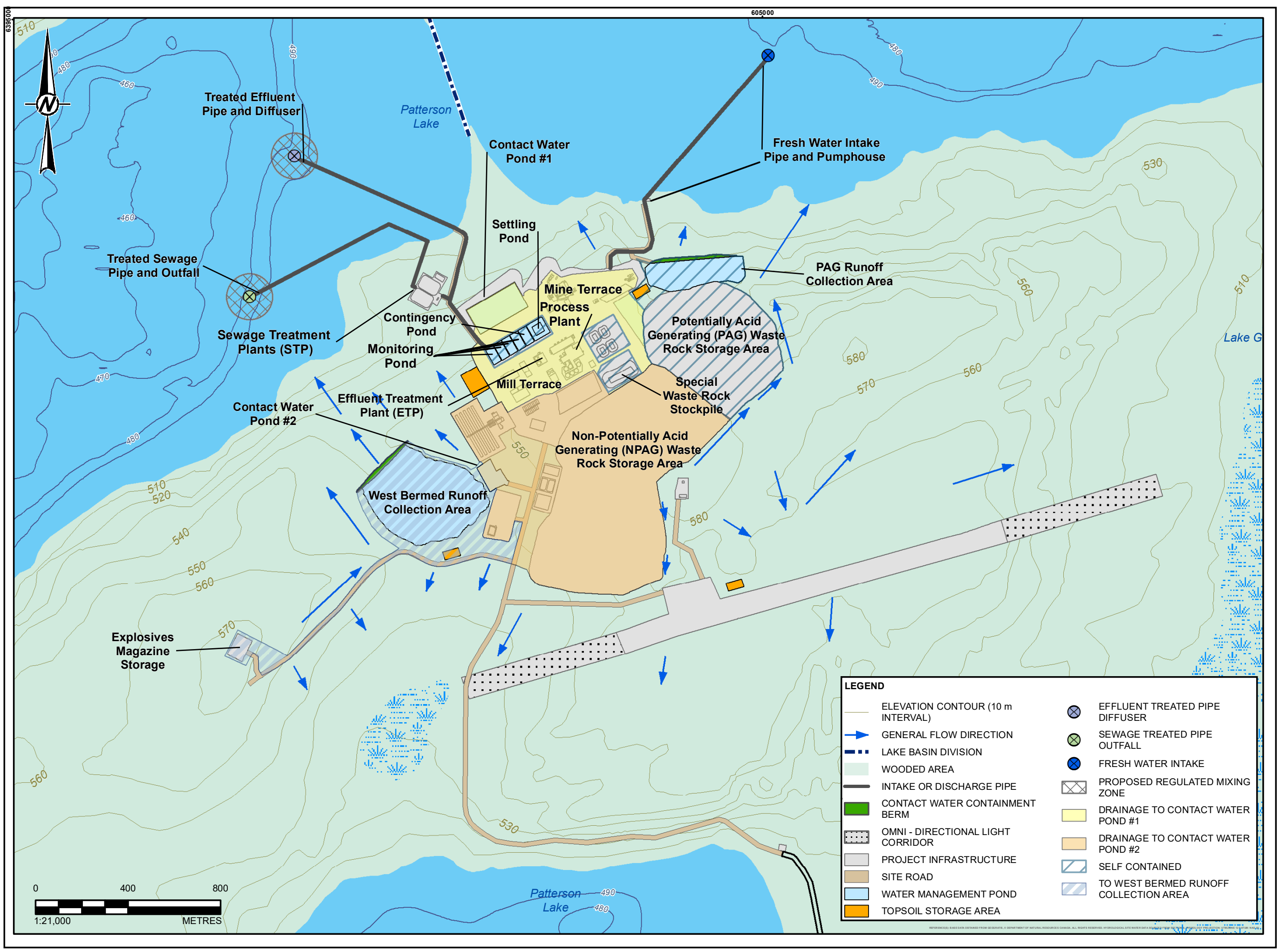


Figure 2.3-8: Rook I Project Key Water Management Infrastructure

Conventional Waste Management

Conventional waste management refers to the infrastructure and processes used for the effective collection, storage, handling, processing, and disposal of conventional waste streams.

The conventional waste streams that would be managed at the Project site include domestic solid waste, industrial waste, hazardous waste, and low-level radioactive waste. Estimated annual quantities of conventional waste generated during Construction and Operations are provided in Table 2.3-4.

Table 2.3-4: Estimated Quantities of Conventional Waste Generation

Type of Waste	Estimated for Construction (kg/year)	Estimated for Operations (kg/year)
Domestic waste	220,000 to 360,000	188,000 to 310,000
Industrial waste	400,000 to 625,000	1,400,000 to 2,400,000
Hazardous waste	430,000 to 1,100,000	380,000 to 1,060,000
Low-level radioactive waste	67,000 to 102,000	8,700,000 to 14,600,000

To the extent practicable, conventional waste streams would be minimized and segregated at the source of generation to optimize reuse, recycling, handling, processing, and disposal, using:

- indoor receptacles and outdoor collection bins designed to limit wildlife attraction located around the Project site to collect both recyclable and non-recyclable **domestic and industrial waste**;
- receptacles and facilities dedicated for specific classes of **hazardous waste**, designed with sufficient storage capacity and adequate containment, located around the Project site to temporarily store hazardous waste; and
- collection bins located within the underground mine and on surface to collect **low-level radioactive waste**. These bins would be colour-coded and labelled to clearly differentiate low-level radioactive waste from other waste streams to minimize potential cross-contamination.

Conventional waste would be primarily managed in the domestic/industrial waste management area, a compacted gravel pad located southwest of the mill terrace. This area would house the waste incinerators and provide sufficient room for staging and processing (e.g., shredding, compacting) of conventional waste. The solid residual ash from the incinerators, which would be approximately 95% less than original volume of waste, would be collected and safely disposed of in drums in the underground mine.

Hazardous materials would be recycled or disposed of off site at a licensed hazardous waste disposal facility, and hydrocarbon-contaminated soils would be landfarmed on site in accordance with applicable provincial and federal requirements.

Supporting Infrastructure

Additional on-site surface infrastructure would be required to support mining and milling at the Project site, with key components including (Figure 2.3-9):

- worker accommodations and associated facilities and utilities (i.e., camp);
- maintenance shop, warehouse building, and wash bays;
- airstrip and associated facilities;
- power supply and distribution facilities;
- fuel storage facilities;
- information technology (IT) and communications facilities; and
- site roads and access facilities.

Additional support facilities would also include office and administration buildings, supplementary warehousing, and cold storage.

Camp: The camp for the proposed Project would be a modular, single-story facility that would provide accommodation for all workers staying at the Project site. The camp would be designed for a maximum capacity of 350 workers during Construction. Residential wings of the camp would be added or removed as the total worker requirements change through the Project lifespan.

Maintenance / Warehousing: The maintenance shop and warehouse would include a rigid frame, clear-span fabric-shell building located on the mill terrace. A wash bay building would be located south of the maintenance and warehouse building for cleaning vehicles before maintenance.

Airstrip: The gravel airstrip would be located approximately 1 km south of the mill terrace and consist of a 1,600 m by 30 m runway. The airstrip would include instrumentation, approach requirements, and edge lighting for low visibility and/or occasional nighttime operation.

Power: Electricity for both surface and underground operations would be supplied by an on-site liquified natural gas (LNG) power plant. The 13.8-kilovolt LNG power plant would be located in the northwest corner of the mill terrace and would consist of nine LNG-fired reciprocating engines (i.e., generators), each rated for 3.329 megawatts (MW) of electrical output. Power would be distributed throughout the site by overhead and buried routing. Prior to the initial portion of the LNG power plant being commissioned, diesel generators would be brought to the Project site to provide power.

Due to the remote location of the Project, there would be no access to the provincial power grid. Electricity for both surface and underground operations would be supplied by an on-site LNG power plant with associated fuel storage and power distribution infrastructure.

Fuel storage: The Project would require various fuel sources to power the LNG power plant and the stationary and mobile equipment fleet. A total of 28 LNG storage tanks would be required, each 64 m^3; this total volume equates to four days of fuel storage if the power plant were to run at 100% capacity, 24 hours a day, plus the fuel required for mine heating in the winter months. Diesel fuel would be stored in two 102,000 L diesel tanks, equivalent to three weeks' worth of fuel usage. Fuel for underground use would be transported in bladders or pails to the underground fuel and lubricant stations.

IT and communications: The IT and communication systems would be installed throughout the Project footprint to provide constant and consistent connectivity for voice, video, and data transmission. A communication tower and building would be located near the airstrip, with an incoming fibre optic connection from La Loche to its termination at the communication building. The IT and communication systems would be installed throughout the site, including underground.

Roads and access: Site roads would include haul roads, primary roads, and service roads. Haul roads would have a road surface width of 12 m for two-way traffic. A subsurface high density polyethylene liner would be installed on selected road portions where mineralized material is transported to maximize capture and containment of potential contact water. Site primary roads would have a surface width of up to 10 m for two-way traffic and service roads would have a surface width of up to 6 m for one-way traffic. A gatehouse located on the southeast end of the Project footprint would be the single point of ground access to the site to control incoming and outgoing traffic.

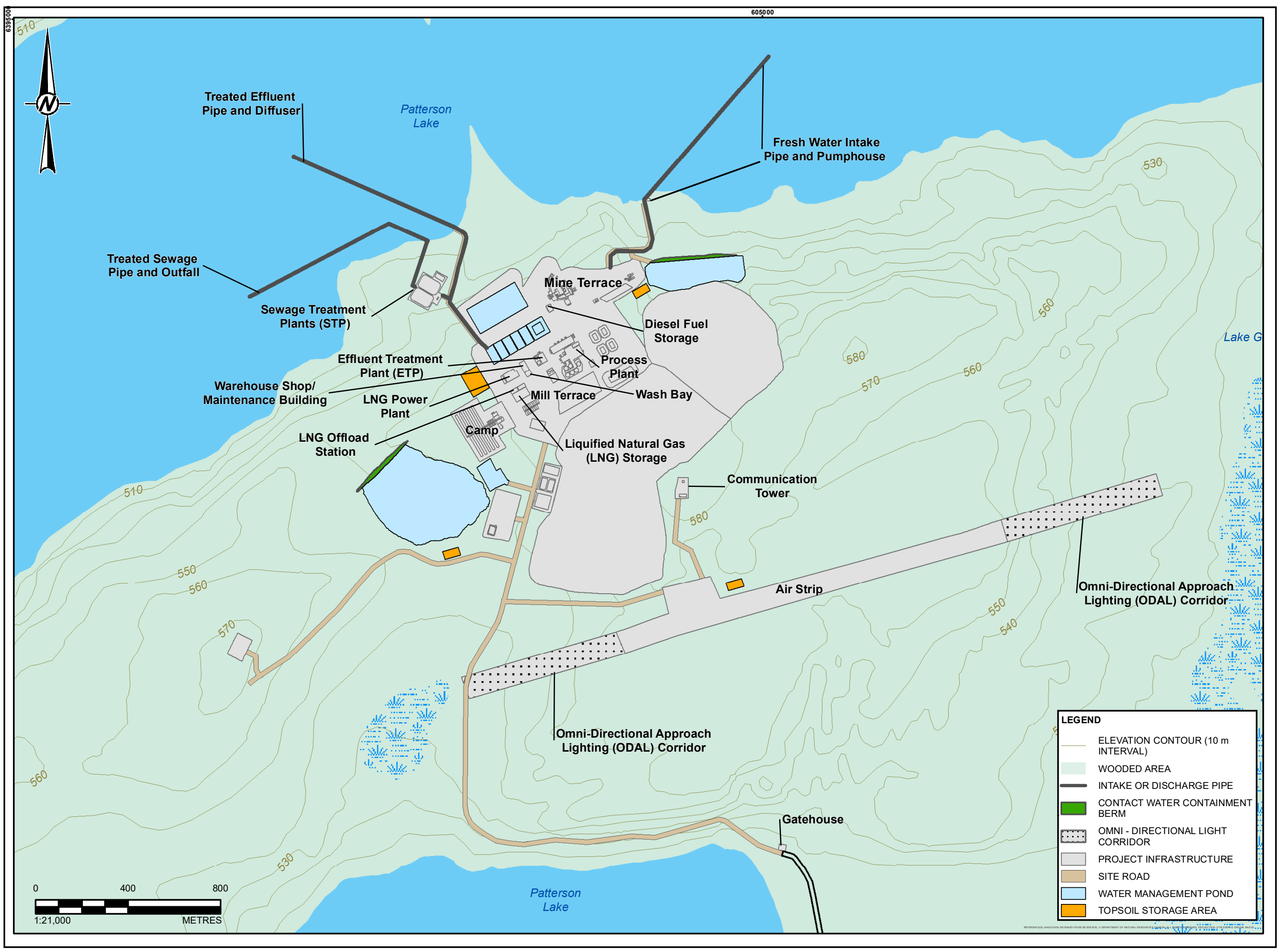


Figure 2.3-9: Rook I Project Supporting Infrastructure

Off-Site Infrastructure and Transportation

The only off-site infrastructure associated with the proposed Project would be the existing 13 km access road that extends from the Highway 955 turnoff to the gatehouse at the southern end of the Project footprint and a fibre optic line running from the town of La Loche.

Year-round vehicle and heavy equipment access to the Project would require upgrading the existing 13 km access road. The upgraded road would be used to transport equipment, materials, personnel, and supplies to and from the Project site, as well as the hauling of the packaged uranium concentrate off site.

During Construction, until the airstrip is completed, contractors would be transported to the Project site by bus from La Loche. During Operations and Closure, staff and contractors would be transported to and from the Project site by aircraft.

Project Design Features for Long-Term Environmental Protection

Key Project design features include:

- deposition of tailings underground to eliminate surface tailings storage infrastructure and its associated risks and potential long-term effects to land and water;
- permanent underground tailings storage with engineered barriers to minimize seepage into groundwater and potential effects on aquatic organisms in Patterson Lake and the people who may use these resources;
- consolidation and limiting the total Project footprint as much as practical to:
    - minimize the loss of land use by Indigenous Peoples and others;
    - minimize loss of wildlife habitat;
    - increase the ease and rate of reclamation; and
    - focus on end land use;
- separate management and storage strategies for potentially acid generating and non-potentially acid generating materials;
- installation of an engineered cover on potentially acid generating material to minimize the long-term risks from seepage of constituents into the ground and surface waters;
- a focus on holistic water management that maximizes non-contact water diversion and provides for controlled release of treated contact water meeting discharge criteria;
- design and placement of the treated water diffuser to reduce potential effects on the water and fish habitat of Patterson Lake; and
- use of primarily LNG for power generation to reduce Project GHG emissions.

2.3.3 Project Phases

Project activities would be conducted in phases to support the safe and efficient construction, commissioning, operation, decommissioning, and reclamation of the components required to support the extraction of uranium ore and the production of uranium concentrate. The lifespan of the Project is 43 years from Construction through Operations and Closure (i.e., Decommissioning and Reclamation). A description of each Project phase, including the estimated duration, is presented in Table 2.3-5.

Table 2.3-5: Proposed Project Lifespan

Project Phase	Phase Description	Duration (Years)
Construction	Includes site preparation; mine, process plant, and additional infrastructure development; transportation of people and materials to and from the Project; and all activities associated with commissioning the Project up until Operations commences.	4
Operations	Includes all activities associated with mining and processing ore; tailings management; management of waste rock, domestic waste, and hazardous materials; water management; release of treated effluent; site maintenance; progressive reclamation; and transportation of people and materials to and from the Project up until Decommissioning and Reclamation commences.	24
Decommissioning and Reclamation (i.e., Closure)	Includes two stages: Active Closure Stage and Transitional Monitoring Stage. • Active Closure Stage: includes active decommissioning and reclamation activities that occur post-Operations such as backfilling mine workings, removal of physical infrastructure, recontouring and revegetating disturbed areas, waste disposal and removal, and any other activities required to achieve decommissioning objectives and return the site to a safe and stable condition prior to the Transitional Monitoring Stage. The duration of the Active Closure Stage is expected to be five years. • Transitional Monitoring Stage: includes monitoring and reporting activities that occur post-Active Closure Stage that would continue until monitoring and reporting verifies that the performance criteria have been met. Once performance criteria have been fully demonstrated, an application to be released from the CNSC licence would be submitted to the CNSC for approval. Once release from the CNSC licence is achieved, and upon Provincial approval, the land would be transferred under Provincial management through the Institutional Control Program. The duration of the Transitional Monitoring Stage is nominally 10 years; however, NexGen acknowledges this duration would be dependent on the achievement of performance criteria.	15

The focus of Construction would be to construct and commission all proposed Project components required to support the commencement of uranium concentrate production. The construction and commissioning of the proposed Project would be completed over a four-year period. The overall construction sequence would generally follow the order of activities listed below, with overlap occurring between some activities:

- Establish the gatehouse to manage access to the Project footprint.
- Upgrade existing roads and develop new roads to allow for the safe, efficient transportation of materials and equipment.
- Install the camp, including the potable water treatment plant, sewage treatment plant, and fresh water intake.
- Establish fuel storage, power, and basic utilities and begin staging equipment, fuel, and materials to support construction activities.
- Construct the on-site airstrip and associated infrastructure.
- Clear and grub the mine and mill terrace areas.
- Strip topsoil layers, subsoil material, and organic materials and stockpile for future reclamation.
- Use cut and fill excavation to create mine and mill terrace areas.
- Establish waste and water management infrastructure (e.g., ponds, effluent treatment plant, domestic/industrial waste management area).
- Develop surface infrastructure to support underground activities (e.g., production shaft headframe, freeze plants).
- Establish the exhaust shaft and production shaft and begin underground development.
- Begin construction and commissioning of the process plant (e.g., mill building, batch plant, paste plant).
- Develop and commission other infrastructure and services in preparation for Operations.

The focus of Operations would be the safe, economic recovery of uranium ore and delivery of uranium concentrate to the market. Mine development would be divided into three primary phases: exhaust shaft development, production shaft development, and development between the upper levels and lower levels of the underground mine. The production plan would focus on optimizing underground ramp-up and maximizing productivity. During Operations, UGTMF chambers would be progressively developed to provide sufficient capacity to store tailings underground. Mine rock, site water, and conventional waste management activities would be conducted in conformance with established processes.

Progressive decommissioning and reclamation would also occur during Operations, which would enhance environmental protection by minimizing the duration that Project facilities would be exposed to natural elements (e.g., wind, water) and advance the timeline of achieving closure objectives. Areas of the Project that are no longer required would be decommissioned and reclaimed as soon as feasible.

Progressive reclamation is a recognized industry best practice where infrastructure and lands that are no longer required for the operation of the mine or process plant are decommissioned and reclaimed while the site remains operational.

Monitoring would be performed during Closure to confirm that closure objectives have been met, the Project site is safe and stable, and ecological conditions are appropriate to transfer the land to the Province of Saskatchewan.

The final Project phase is Closure, which is expected to occur over 15 years and would include two stages: Active Closure and Transitional Monitoring. **NexGen's preliminary objective is to reclaim the landscape to allow for unrestricted land use by members of local Indigenous Groups and communities. This objective would be supported through the establishment of functional, self-sustaining, locally common ecosystems as soon as practical.**

2.3.4 Alternatives Assessment

The assessment of alternative means (also known as alternatives assessment) was used to select alternatives that were considered in the EA for the proposed Project. NexGen evaluated the relative advantages and disadvantages of a range of feasible alternatives following the applicable guidelines from the Canadian Environmental Assessment Agency (CEA Agency 2015) and Government of Saskatchewan (2021).

Alternatives assessments were considered during scoping, prefeasibility, and feasibility studies for the Project to understand how alternatives or options compared to each other. Assessments were completed by an integrated group of subject matter experts, including members of the project development, environmental, and socio-economic teams for the Project. The assessment of alternatives was informed by NexGen's vision and values and input received from Indigenous Groups, local communities, and regulatory authorities through engagement activities.

Table 2.3-6 lists the alternatives assessments that were evaluated for the Project. The order of alternatives assessments was established recognizing that each alternative can limit and influence other assessments. The order of assessments, along with Project aspect categories, is generally reflective of the order in which alternatives assessments were completed for the Project.

Alternatives were assessed either through a multiple accounts analysis or through a screening-level assessment:

- **Complex alternatives with high interdependencies and/or potential significance to achieving Project success used a multiple accounts analysis assessment (ECCC 2016).** This assessment approach was used for mine waste (i.e., tailings, gypsum, and waste rock), effluent treatment plant technology, and conventional and demolition waste disposal alternatives assessments.
- **For all other alternatives assessments that were considered less complex, a screening-level assessment was employed.** These screening-level assessments were associated with Project aspects such as mining, processing, and water source and treated effluent discharge locations, as well as supporting infrastructure (e.g., road alignments, camp locations, power sources).

Alternative means are the various technically and economically feasible ways considered by a proponent that would allow a designated project to be carried out.

(CEA Agency 2015).

The assessment of alternative means for the Project, called alternatives assessments, involved the systematic evaluation and comparison of the relative advantages and disadvantages of a range of feasible alternatives.

Assessment was used to facilitate the selection of an alternative that, on balance, best met a combined set of decision criteria that considered environmental, technical, economic, and social aspects. The selected alternative was then used as a basis for the assessment of effects in the EA.

Table 2.3-6: List of Project Alternatives Assessments

Project Aspect Categories	Project Alternatives Assessments
Mining	• Primary mining method • Underground mining method
Processing	• Process plant location • Process stripping method • Final product type
Mine waste management	• Mine waste storage – tailings • Mine waste storage – gypsum • Mine waste storage – waste rock
Supporting infrastructure	• Power supply type • Fuel delivery method • Camp location • Airstrip location • Site road alignment
Water management	• Effluent treatment technology • Treated effluent discharge location • Fresh water supply – source • Fresh water supply – location • Sewage treatment technology
Conventional waste management	• Domestic waste • Industrial waste • Hazardous waste • Low-level radioactive waste
Decommissioning demolition waste	• Clean waste • Low-level radioactive waste • Hazardous waste

Local Indigenous Groups and communities have indicated that they value minimal effects on the surface and to Patterson Lake.

Members of the Clearwater River Dene Nation Joint Working Group expressed a preference for underground mining for these reasons.

Compared to the on-site hybrid system option, carrying an on-site LNG power plant through the EA was considered a more conservative approach (i.e., higher potential GHG emissions) while further evaluation on potential integration of a hybrid power system incorporating renewable energy (i.e., lower potential GHG emissions) is completed.

Once potential alternative options were identified based on technical and economic feasibility, **each alternative option was assessed against four key assessment categories: environmental considerations, technical feasibility, economic feasibility, and social considerations.**

Within each key assessment category, standardized sub-categories were considered, with attention given to selecting sub-categories and indicator criteria that were effect-driven, value-relevant, non-redundant, and consistent with options analysis best practice. From this point, alternative-specific criteria for the selected sub-categories were defined with the intent of describing the material differences (i.e., differentiating aspects) among the options of each alternatives assessment.

A summary of key alternative assessments completed for the Project, including the alternative options considered and ultimately selected alternative, is provided in Table 2.3-7.

Table 2.3-7: Summary of Key Alternative Assessments for the Rook I Project

Project Alternatives	Alternative Options	Selected Alternative
Primary mining method	• open pit • underground	**Underground mining**, based on economic feasibility of accessing the full extent of the target ore, minimizing surface disturbance, and ability to store tailings underground.
Process plant location	• on site • off site	**On-site process plant**, influenced by the ability to control the design process and remove the requirement for high-volume, long-distance ore transport, which would result in increased carbon emissions.
Process stripping method	• ammonia stripping • strong acid stripping	**Strong acid stripping**, influenced by expected effluent quality (i.e., no ammonia in effluent), easier management of waste and by-products and handling requirements for reagents, comparatively better environmental performance for the process plant, and reduced potential for adverse effects to health and safety.
Mine waste storage – tailings	• underground with paste • in-pit with slurry • surface with paste at two different locations	**Underground with paste**, based on site-specific conditions (e.g., crystalline basement rock) and consistent with best practice for minimizing the volume of tailings and water placed in external tailings facilities (GTR 2020).
Mine waste storage – waste rock	• unsegregated and unlined • unsegregated and lined • unsegregated, engineered source control, lined • segregated, non-potentially acid generating unlined, potentially acid generating lined • segregated, non-potentially acid generating unlined, potentially acid generating engineered source control and lined	**Segregated, non-potentially acid generating unlined, potentially acid generating engineered source control and lined**, based on reduced potential to affect Patterson Lake water quality; lower cost for lining compared to fully lined, unsegregated alternatives; and potential for progressive reclamation during Operations.

Project Alternatives	Alternative Options	Selected Alternative
Power supply type	• grid power • on-site diesel power plant • on-site LNG power plant • on-site hybrid system of power plant and renewable energy supply	**On-site LNG power plant**, based on the lack of existing grid power infrastructure and timelines to build a dedicated powerline and the need for a reliable power supply.
Effluent treatment technology	• two-stage precipitation using lime • two-stage precipitation using caustic • one-stage precipitation followed by reverse osmosis • one-stage precipitation followed by ion exchange or adsorption	**Two-stage precipitation using lime**, reflective of a simple and reliable design with robustness and flexibility / adaptability to changing conditions. The assessment considered an appropriate technology selection to support a conservative approach for the EA, recognizing this analysis will continue to be refined in accordance with draft regulatory documentation (i.e., CNSC REGDOC-2.9.2) and through subsequent stages of engineering and licensing.
Treated effluent discharge location	• East Basin, near shore • East Basin / West Basin divide, near shore • West Basin, near shore • West Basin, near shore, close to effluent pond • West Basin, optimal depth • West Basin, maximum depth	**West Basin, optimal depth**, based on avoiding key fish habitat and installations around shorelines of Patterson Lake and favourable ambient currents to promote mixing in the receiving environment.

LNG = liquified natural gas.

2.3.5 Integrated Management System

NexGen is responsible for, and committed to, protecting the health and safety of workers and the public and the environment. To support these commitments, **NexGen is developing an Integrated Management System (IMS) for the proposed Project that will provide a common, transparent, risk-informed process framework for both Project activities and achieving excellence in employee safety, radiation safety, and environmental protection** by:

- defining the organization and its context;
- complying with all applicable requirements;
- setting meaningful objectives and targets;
- effectively managing resources, information, communication, work, and change;
- identifying and resolving problems to prevent reoccurrence;
- monitoring results and performing assessments;
- seeking, sharing, and using experience; and
- continually improving the management system.

The IMS would apply to all on-site Project-related licensed activities during Construction, Operations, and Closure and to all Project workers (including contractors) and visitors.

The IMS and its associated processes would be part of a management system hierarchy that would incorporate NexGen's vision and values, a governing IMS Policy, an IMS Manual, programs, and supporting documentation, as shown in Figure 2.3-10. The IMS processes would enable a common integrated approach across program topics that would minimize redundant or duplicated work and maximize the use of shared processes to complete work in a consistent, safe, and reliable manner.

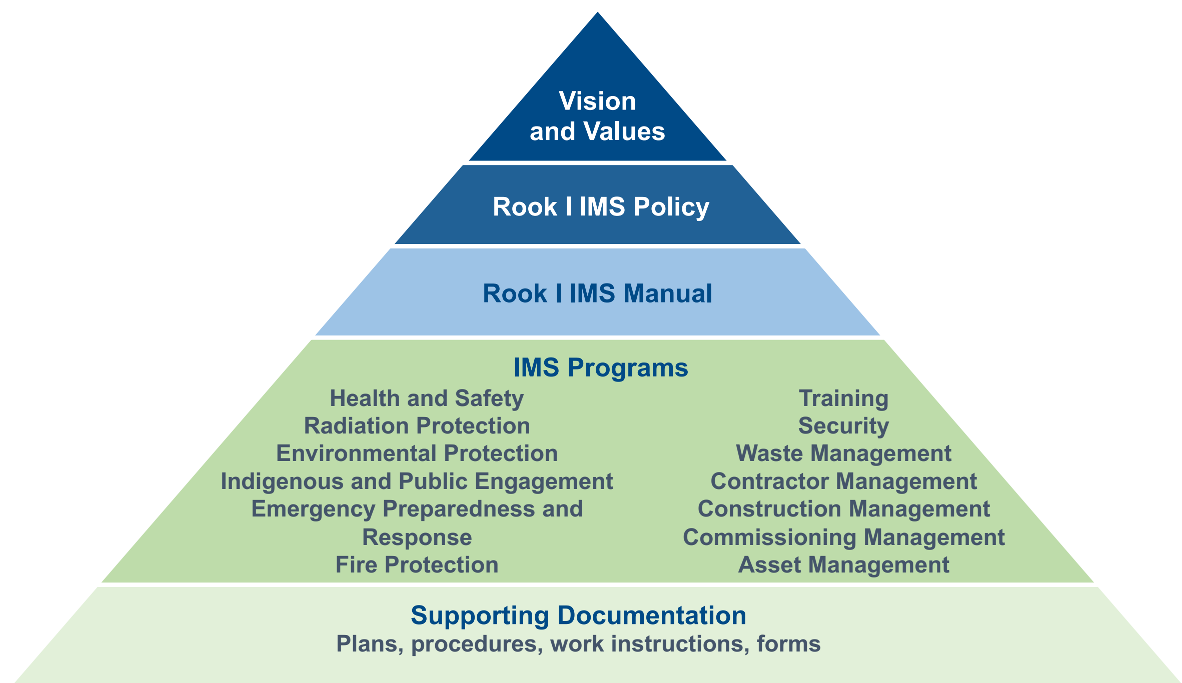


Figure 2.3-10: Rook I Integrated Management System Framework

IMS = Integrated Management System.

CNSC Safety and Control Areas

To ensure that nuclear industry licensees in Canada meet all of their regulatory requirements and expectations, the CNSC assesses, evaluates, reviews, and verifies how well licensees are complying with these requirements. CNSC staff base their evaluation on safety and control areas.

Each safety and control area includes technical areas and topics, which are selected based on the specific class and activity risks.

In total, there are 14 safety and control areas that can be broadly sorted into three functional areas:

- management;
- facility and equipment; and
- core controls and processes.

(CNSC n.d.)

NexGen is developing an IMS for the proposed Project that is consistent with the CNSC safety and control areas.

The IMS Policy would document NexGen's commitment to the management system and articulate the principles and expectations for protecting the health, safety, and well-being of workers; preserving the environment; engaging with Indigenous communities and members of the public; complying with legal and other requirements; and continually improving management system processes and performance.

The IMS Manual would outline NexGen's management system processes that provide a common framework for licensed activities supporting the Project. This unified framework would include processes for implementing compliance measures, enabling continual improvement, and fostering a culture where protecting the health and safety of workers and preserving the environment are principal considerations guiding overall decisions and daily actions.

The IMS Programs are organized into categories consistent with the CNSC safety and control areas and other matters of regulatory interest as shown in Table 2.3-8. The topics presented reflect the programs that would be in place during Project Construction. Additional programs may be added as the Project advances to Operations and Closure. Each program would be supported by lower-level management-system-controlled documents (e.g., plan, procedures, work instructions) that describe topic-specific processes in greater detail.

Table 2.3-8: Rook I Integrated Management System Program-Level Documents

Program	Description
Health and Safety	Framework for fostering a health and safety culture and identifying, managing, and controlling occupational health and safety hazards (including industrial hygiene).
Radiation Protection	Framework to address radiation protection and hazard control. Includes worker qualifications and competency, controls to maintain exposures to levels considered as low as reasonably achievable, monitoring, tracking, and reporting.
Environmental Protection	Framework for the protection and preservation of the environment. Includes description of environmental aspects, risk assessment, release mechanisms to environmental media, pollution prevention and environmental protection measures, response mechanisms to unplanned environmental releases, monitoring, inspection, tracking, and reporting.
Indigenous and Public Engagement	Framework for providing Indigenous Groups, communities, and members of the public with timely, regular information regarding activities. Includes identification of audiences, communication methods, mechanisms for receiving feedback, tracking, and reporting.
Emergency Preparedness and Response	Framework for the measures to prepare for, respond to, and mitigate the effect of emergencies. Includes identification of potential emergency situations, planning for emergencies, communication protocols, training, and testing response plans.
Fire Protection	Framework for effective fire prevention, control, and mitigation. Includes fire hazard assessment, pre-incident planning, fire safety controls, and inspections.
Training	Framework for ensuring the ongoing qualification of employees and contracted workers through a systematic approach to training. Includes training program development, delivery, tracking, and monitoring.
Security	Framework for maintaining security measures to prevent loss of nuclear substances and prevent deliberately destructive acts. Includes risk assessment, control measures, access management, and monitoring.
Waste Management	Framework for the safe and environmentally responsible management of all waste streams. Includes minimization, identification, classification, segregation, handling, and disposal.
Contractor Management	Framework for verifying that contractors working at the Project site comply with all internal requirements related to health, safety, environment, and security. Includes risk evaluation, roles and responsibilities, training, oversight, and performance standards.
Construction Management	Describes the construction processes including Project design, mobilization, and execution.
Commissioning Management	Describes the commissioning processes (i.e., component and system testing and confirmation of capability to operate within design basis).
Asset Management	Describes the processes for selecting, acquiring, maintaining, and dispositioning assets (e.g., equipment, materials).

2.3.6 Project Design and Systems Review and Validation

The general approach to an EA entails a systematic consideration of how project components, activities, and systems may interact with and affect the biophysical and socio-economic environments. It is recognized that **review and optimization of Project components and activities would be undertaken throughout the Project lifespan with the objective of identifying opportunities to further enhance the environmental, technical, economic, and social performance of the proposed Project.** Where potential adverse effects are identified, either during design, Construction, Operations, or Closure, feasible environmental design features and/or mitigation practices would be implemented to avoid and minimize the potential adverse effects.

Project review and optimization would be proactively pursued following the precautionary principle, and with the intent that any potential design iterations and mitigations would be improvements on, and within the current considerations of, the assumptions carried within the EA (i.e., within the scope of the Project as defined for assessment).

As part of the design validation completed for the EA, effects of the environment and accidents and malfunctions were assessed, as summarized below.

Effects of the Environment

A hazard scenario identifies how a specific natural hazard may adversely affect the Project and provides a basic description of the potential effects to infrastructure and activities to support a risk assessment and mitigation planning.

The assessment of effects of the environment on the proposed Project led to the identification of seven natural hazard categories and 26 hazard scenarios.

The assessment of the effects of the environment on the Project considered how natural hazards might affect Project infrastructure and activities during different Project phases. The general approach for the assessment of effects of the environment on the Project included: natural hazard scenario identification; environmental design feature evaluation; risk measurement, as a function of likelihood and severity; and risk evaluation.

The potentially consequential natural hazards identified for the Project consisted of wildfire, drought, major precipitation events, severe snowstorms, tornadoes and severe thunderstorms, extreme temperatures, and seismic events.

With the exception of seismic events, the hazard scenarios were developed based on climate-infrastructure interactions and climate vulnerabilities by Project activity. The results of a site-specific analysis of climate variables indicate the future is likely to be warmer and wetter on an annual basis. These projected changes may contribute to increases in the frequency and severity of wildfires, major precipitation events, summer storms, and extreme heat events.

The assessment of the effects of the environment on the Project considered proposed environmental design features, management practices, and other

mitigation measures intended to reduce risks. The assessment results were as follows:

- Hazards considered to be low risk were drought, major precipitation events, severe snowstorms, tornadoes and severe thunderstorms, and seismic events. Some wildfire and extreme temperature scenarios were also considered to be low risk.
- Hazards considered to be moderate risk were wildfires, if fire reaches fuel storage tanks and/or the explosives storage facility and causes damage to, or loss of, infrastructure; and extreme temperatures, if the pipes and equipment that manage air, fuel, water, sewage, and tailings were to freeze.

It is anticipated that potential effects from environmental hazards can largely be addressed through engineering design and compliance with codes and standards that provide sufficient margins of safety to prevent damage to Project infrastructure. This would include incorporation of prevention measures that would minimize the probability of the hazard scenario from occurring and control measures that would mitigate the severity of consequence of the potential effect, should it occur.

The potential risks associated with natural hazards and future climate change would continue to be considered in future engineering and design as a part of the continual improvement process and through implementation of NexGen's Climate Adaptation Framework.

The potential risks of environmental hazards on the Project and the effectiveness of mitigations would continue to be assessed according to the risk management processes described in the IMS Manual and the Environmental Protection Program, and in accordance with provincial, CNSC, and other regulatory requirements.

Accidents and Malfunctions

The assessment of accidents and malfunctions and transportation-related risks characterized the potential effects on the environment and public safety. The general approach for the assessment of accidents and malfunctions and transportation-related risks included the following steps: hazard identification; environmental design feature and mitigation evaluation; risk measurement, as a function of likelihood and consequence; and risk evaluation.

The risk of accidents and malfunctions and transportation-related risks would be reduced and mitigated through design, administrative controls, and adoption of safety measures, following the hierarchy of controls (Figure 2.3-11).

The proposed Project design was optimized to minimize the possibility of accidents and malfunctions so that their effects, should they occur, would be responded to with a minimum of danger to people and potential effects to the environment.

Accidents and malfunctions are events or conditions caused by industrial hazards that are not part of the normal activity or operation of a project as planned.

- **An accident is defined as any unintended event, including operating errors, equipment failures, and other mishaps, the consequences or potential consequences of which are significant from the point of view of protection or safety.**
- **A malfunction is defined as a failure in the normal functioning of equipment, infrastructure, or systems that could result in potentially significant consequences.**
- **Transportation-related risks refers to potential traffic accidents or events that may occur and the potential for the consequent release of contaminants to the environment.**

Of 93 identified potentially hazardous situations that could be caused by potential accidents and malfunctions, six scenarios were carried forward for detailed analysis, including risk evaluation, which determined that five were low risk. Only the potential failure of the acid plant tail gas scrubber (an air emission treatment to remove sulphur dioxide gas) was deemed to be low to moderate risk. However, given that the risk would be managed with gas sensors, regular inspections and maintenance, and on-site emergency response, and because the hazard scenario indicated minimal off-site exposure, no additional mitigation would be necessary.

The transportation risk assessment considered five main scenarios, with variations such as different waterbody locations of potential spills and accidents, of which four were deemed to be low risk. Only the vehicle-human contact scenario was found to be moderate risk. Given the proposed safeguards (e.g., driver training, speed limits, adjusting speed according to conditions, spill and emergency response planning, pedestrian and cyclist priority on roadways), this risk was deemed to be tolerable and as low as reasonably possible.

The potential accident and malfunctions hazards associated with the Project, and the effectiveness of designs and mitigations, would continue to be assessed according to the risk management processes described in the IMS Manual and the Environmental Protection Program, and in accordance with provincial, CNSC, and other regulatory requirements.

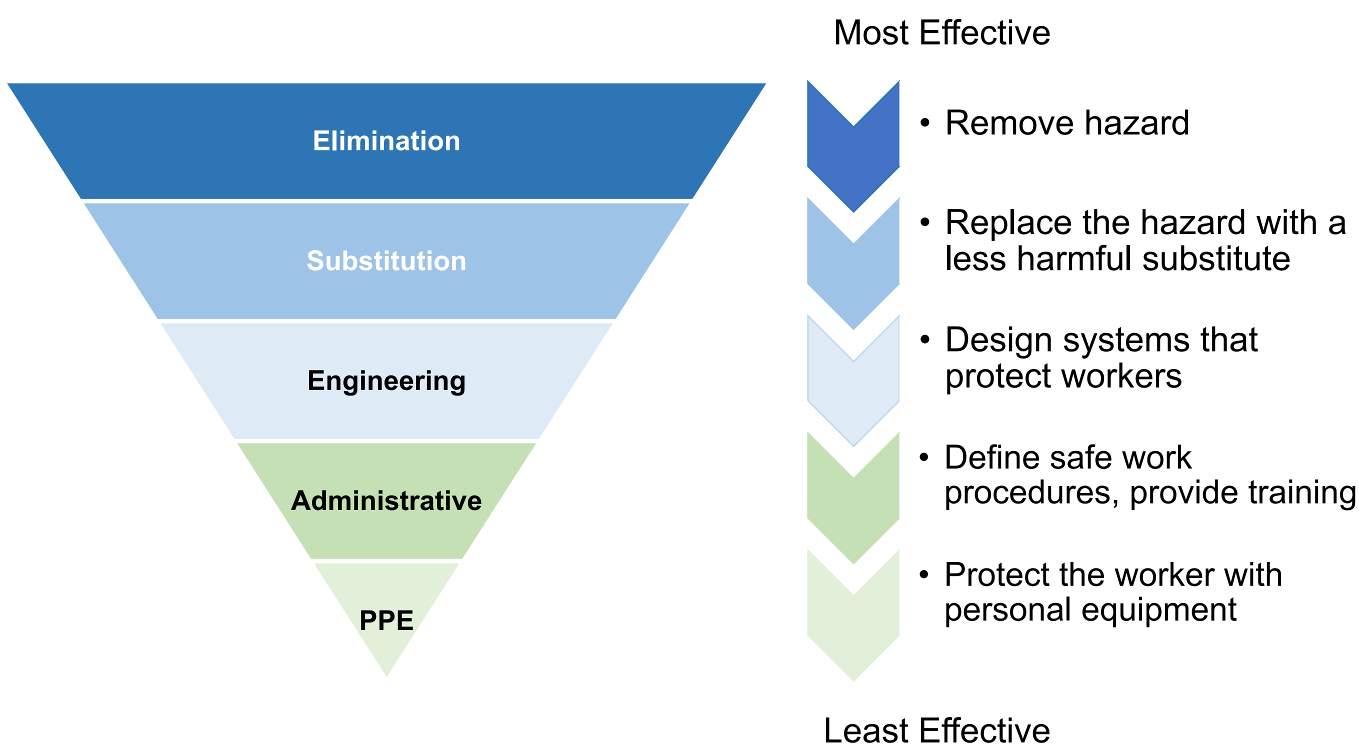


Figure 2.3-11: Hierarchy of Controls

3 Regulatory Framework

3.1

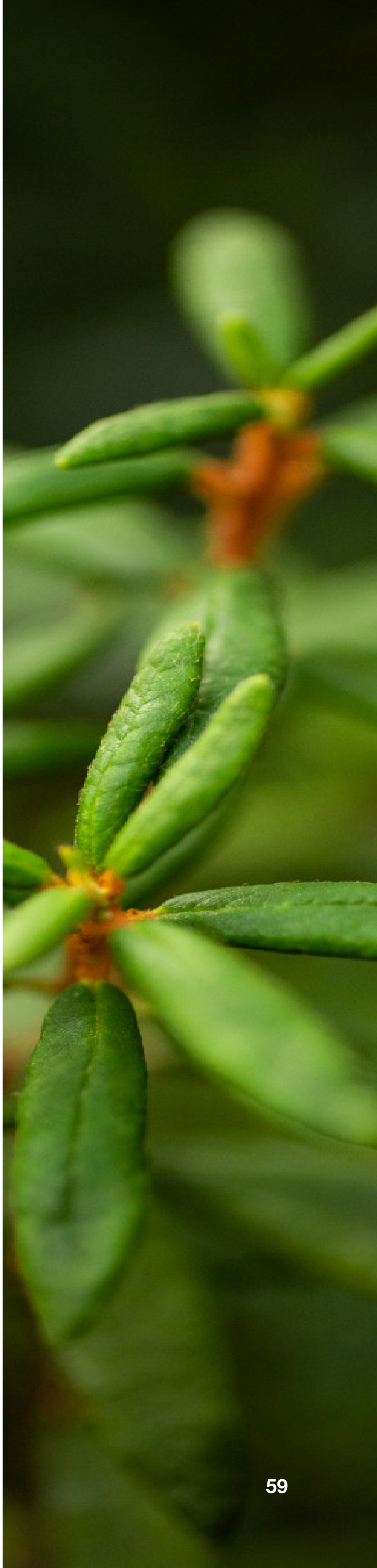
Environmental Assessment

To initiate the regulatory approval process for the proposed Project, NexGen submitted a Project Description and Terms of Reference to the CNSC and ENV in April 2019.

These documents were subsequently accepted, which confirmed that, based on the nature of the proposed Project and legislative EA criteria, both federal and provincial EAs would be required. The CNSC and ENV also provided guidance on the EA process for the respective federal and provincial approvals.

As the regulatory process for the proposed Project was initiated prior to the new federal *Impact Assessment Act* (August 2019), the assessment is governed federally by the *Canadian Environmental Assessment Act, 2012* (CEAA 2012). The CNSC is the sole federal responsible authority for conducting EAs for uranium and nuclear projects, as these projects fall under the *Nuclear Safety and Control Act*. The CNSC uses the EA as a tool to determine whether a licence applicant is qualified and will make sufficient provisions for the protection of the environment and the health and safety of persons while carrying out the licensed activity. As a uranium project, the EA is required to fulfill the federal requirements under both CEAA 2012 and the *Nuclear Safety and Control Act*.

In Saskatchewan, a provincial EA is required before proceeding with a 'development' as defined in *The Environmental Assessment Act*. NexGen self-declared the proposed Project as a development in March 2019; as a result, the assessment is governed provincially under *The Environmental Assessment Act*. Environmental Assessments in Saskatchewan are overseen by the Saskatchewan Environmental Assessment and Stewardship Branch (SEASB) of the ENV.



3.1.1 Cooperative Federal and Provincial Review Process

The proposed Project is subject to both a federal and a provincial EA process and would require federal and provincial licences, approvals, and permits prior to commencing Construction.

Both the CNSC and ENV are life cycle regulators, meaning that they provide approvals at each stage of a Project as it moves from Construction through Operations to Closure.

In accordance with the Canada-Saskatchewan Agreement on Environmental Assessment Cooperation (2005), the CNSC and SEASB will complete their respective EAs under a cooperative provincial-federal EA process. Under this agreement, federal and provincial regulatory agencies cooperate to share information and reduce regulatory duplication where possible, while each conducting a comprehensive assessment. Within this cooperative process, both federal and provincial requirements still apply and must be satisfied with respect to all applicable acts, regulations, and guidelines.

The CNSC acts as the lead agency overseeing the federal EA process and is responsible for coordinating activities in cooperation with other federal agencies and departments that may be involved in the federal EA review process including:

- Environment and Climate Change Canada;
- Health Canada;
- Natural Resources Canada;
- Parks Canada; and
- Transport Canada.

The SEASB acts as the lead agency overseeing the provincial EA process and is responsible for coordinating activities in cooperation with other provincial ministries, agencies, and authorities including:

- the Ministries of Environment, Agriculture, Education, Energy and Resources, Government Relations, Highways, and Labour Relations and Workplace Safety;
- the Water Security Agency; and
- the Saskatchewan Health Authority.

An overview of the federal and provincial cooperative EA process is provided in Figure 3.1-1.

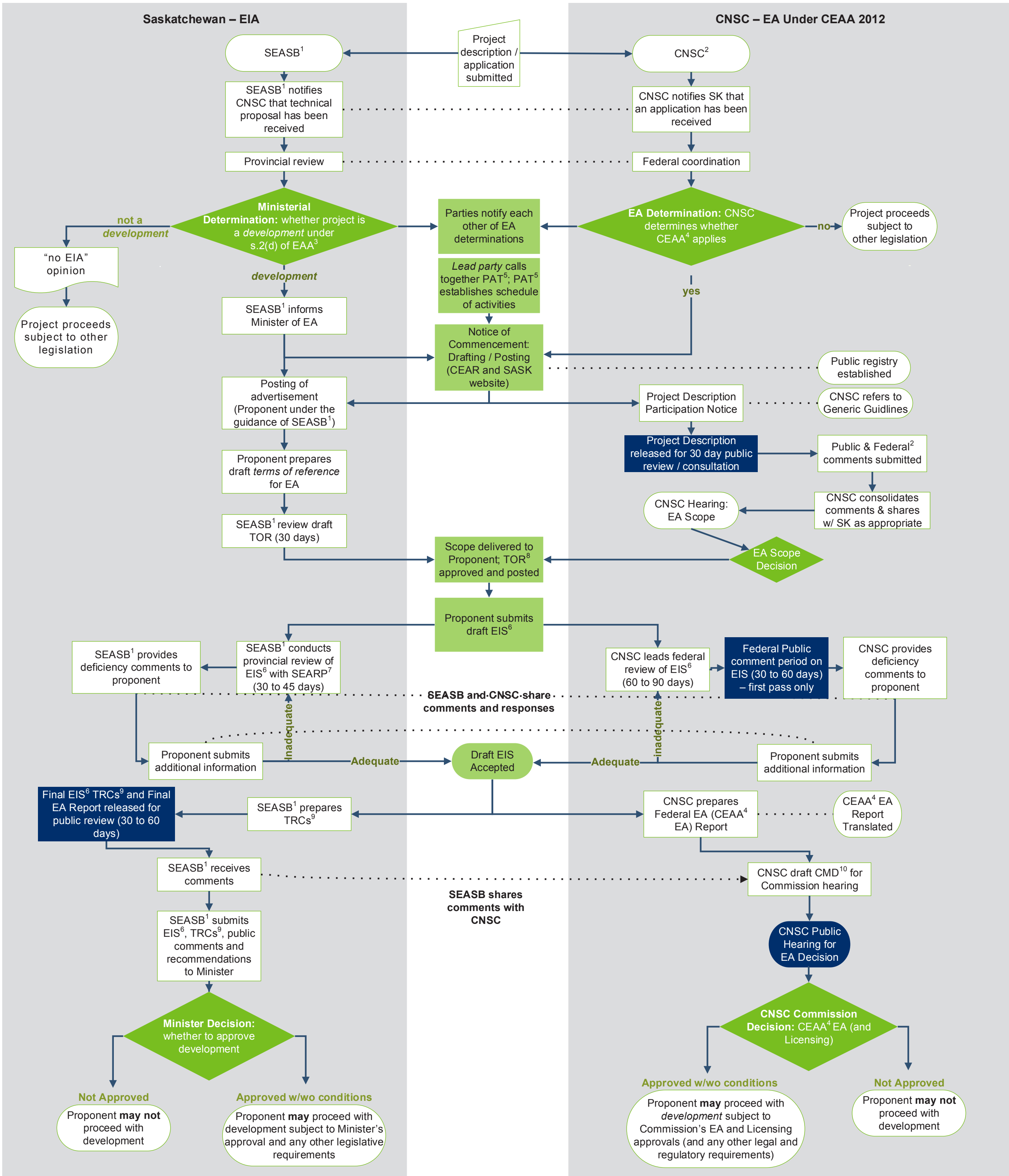


Figure 3.1-1: Federal and Provincial Cooperative Environmental Assessment Process (Source: CNSC 2021a)

1. Saskatchewan Environmental Assessment Stewardship Branch (SEASB)
2. Canadian Nuclear Safety Commission (CNSC) – Responsible Authority (RA)
3. *The Environmental Assessment Act* (EAA) (Saskatchewan)
4. *Canadian Environmental Assessment Act* (CEAA 2012)
5. Project administration team
6. Environmental Impact Statement
7. Saskatchewan Environmental Assessment Review Panel
8. Terms of Reference
9. Technical review comments
10. Commission Member Document

= Formal public comment period

EIA = Environmental Impact Assessment.

3.1.2 Environmental Assessment Decision

Indigenous and public participation opportunities carried out by the CNSC, ENV, and NexGen will occur throughout the EA review process.

Federally, following internal and public review of the EIS, the CNSC will use the EIS and other information received during the EA process to prepare an EA Report that will inform an approval decision by the Commission. The EA Report will include CNSC staff conclusions regarding the potential environmental effects, proposed mitigation measures, and whether the Project is likely to result in significant adverse environmental effects, as well as follow-up program requirements. Public and Indigenous input will be solicited and comments considered in finalizing the EA Report. The Commission will then hold a public hearing, after which it will make a final determination, which will be issued in a formal Notice of Decision.

Provincially, following internal and public review of the EIS, the SEASB will use information received during the EA process to prepare a recommendation to the Saskatchewan Minister of Environment. The Minister must then decide whether there would be adequate safeguards and protection for the environment, should the proposed Project proceed, and if so, will issue a ministerial approval.

Both the federal and provincial EA approvals, if issued, will include terms and conditions that will need to be met by NexGen for the protection of health, safety, and the environment.

3.2

Federal and Provincial Licensing and Permitting Requirements

Should the EA be approved by both the CNSC and ENV, NexGen would then need to obtain all relevant federal and provincial permits, licences, and approvals.

These include:

- permits for camp operations, water use, waste discharges, and air emissions;
- licences to build a uranium mine and mill; and
- land surface leases.

The Project would require a licence issued by the CNSC under the federal *Nuclear Safety and Control Act*. Three phases of licensed activities would be required over the Project lifespan: to prepare a site and construct, to operate, and to decommission. NexGen is implementing an integrated approach to the EA and licensing processes for the Project whereby information to support the licence application is submitted to the CNSC in a staged manner to ensure alignment between the EA and licensing documentation.

The Project would also require ENV approvals under the provincial *Environmental Management and Protection Act* and associated regulations. Under these regulations, NexGen would require approvals to construct, install, alter, or extend a pollutant control facility; to operate a pollutant control facility; and eventually, to permanently decommission a pollutant control facility. The Project would also be subject to The Mineral Industry Environmental Protection Regulations, 1996, which specify requirements for the maintenance of decommissioning and reclamation plans and financial assurance instruments during Operations. In addition, NexGen would require approval for the acquisition of surface rights, which would be obtained through negotiation of a mineral surface lease agreement with the Province of Saskatchewan.

As the Project moves through the EA, licensing, permitting, and other regulatory approval processes, NexGen will continue to engage Indigenous Groups, regulators, and members of the public.

Summary of Engagement 4

4

Summary of Engagement

NexGen's values and governance policies and applicable regulatory requirements inform the company's overall approach to engagement for the proposed Project. NexGen acknowledges and respects the interests and aspirations of those potentially affected by the Project and is fostering relationships that facilitate collaboration and maximize benefits to local Indigenous Groups and community members and other stakeholders.

Indigenous Group and stakeholder identification represented a primary step in the development of NexGen's engagement approach. NexGen has worked closely with those expressing interest in the proposed Project to develop meaningful relationships. For example, prior to beginning the EA process in 2019, NexGen regularly engaged with local Indigenous Groups and communities on proposed exploration activities and early aspects of Project development.

The engagement approach for the Project has been developed to inform and enhance the EA and related planning and preparation for development of the proposed Project. Engagement methods have been developed in agreement with Indigenous Groups and stakeholders to meet these objectives and foster relationships based on respect, trust, and a shared vision of optimizing Project outcomes.

Implementation of the engagement program for the Project has faced challenges. These challenges were associated with the global COVID-19 pandemic, forest fires near the local communities and Project site, competing events and activities in communities, and other associated logistical challenges. A flexible approach has been key in delivering a successful engagement program, and NexGen will continue to adapt its approach to maintain an engagement program that evolves to meet changing needs.

4.1

Indigenous Engagement

The Indigenous engagement program is built on knowledge of community values, a commitment to high standards, and an understanding of lessons learned from other existing uranium operations in northern Saskatchewan. Engagement has been and will continue to be early, often, and lasting.

4.1.1 Identification of Indigenous Groups for Engagement

As NexGen advanced development of the proposed Project, a review was undertaken to identify those Indigenous communities that may be affected by, or have an interest in, the Project. Identification of potentially affected or interested Indigenous Groups and communities was informed through direct correspondence and discussion with Indigenous leaders, community members, and other organizations in the region; review of publicly available information; and guidance provided by federal and provincial agencies, including letters sent by the CNSC and ENV inviting Indigenous Groups to participate in the EA process. Through this review process, four primary Indigenous Groups were identified as the focus of engagement activities:

- Clearwater River Dene Nation (CRDN);
- Métis Nation—Saskatchewan (MN-S);
- Birch Narrows Dene Nation (BNDN); and
- Buffalo River Dene Nation (BRDN).

Joint Working Groups were established in late 2019 with each of the four primary Indigenous Groups as a means of early engagement and collaboration between representatives of NexGen and each Indigenous Group and to facilitate regular, ongoing engagement during the EA process. The JWGs were also established to include a broader group of voices and perspectives from the community during the EA process.

In addition to the primary Indigenous Groups, NexGen has also been engaging with other Indigenous Groups that may have an interest in the proposed Project:

- English River First Nation;
- Athabasca Chipewyan First Nation;
- Black Lake Denesųłiné First Nation, represented by the Ya'thi Néné Lands and Resources (YNLR); and
- Fond du Lac Denesųłiné First Nation, represented by the YNLR.

Primary Indigenous Groups were invited to engage fully with NexGen while other Indigenous Groups were initially informed of the Project by the CNSC and ENV and invited by NexGen to remain informed throughout the EA process.

4.1.2 Indigenous Engagement Approach

To help facilitate engagement with the primary Indigenous Groups, NexGen entered into confidential Study Agreements with each of the CRDN, MN-S, BNDN, and BRDN. The Study Agreements formalized the engagement approaches that would support each primary Indigenous Group's participation in the EA process, particularly to:

- develop a Joint Working Group (JWG) structure for each Indigenous Group to support the inclusion of Indigenous Knowledge into the EA process and to facilitate regular, ongoing engagement;
- assist in the identification of valued components (VCs) for the EA;
- explore special interest topics for each Indigenous Group;
- support Indigenous Knowledge and Traditional Land Use (IKTLU) Studies in various forms particular to each Indigenous Group; and
- establish a Community Coordinator position in each Indigenous Group to act as the primary contact between NexGen and the Indigenous Group.

In addition, each Study Agreement commits NexGen to providing capacity funding for the JWG engagement, retention of technical support by the Indigenous Group, and completion of the self-directed IKTLU Studies. The Study Agreements also commit NexGen and each Indigenous Group to negotiate in good faith to formalize a Benefit Agreement, and for NexGen to provide funding to assist in negotiating such an agreement.

Indigenous Knowledge and Land Use Studies

Indigenous Knowledge and Land Use (IKTLU) Studies include all land use studies developed by the potentially affected Indigenous Groups for the Project, including:

- **Traditional Land Use and Occupancy studies;**
- **Traditional Knowledge and Use studies; and**
- **Indigenous Rights and Knowledge studies.**

Five IKTLU Studies were conducted for the proposed Project, each developed and self-directed by the respective Indigenous Group and funded by NexGen.

To date, NexGen has signed Benefit Agreements with the CRDN, BNDN, and BRDN, and is currently negotiating a Benefit Agreement with the MN-S. The agreements include provisions for ongoing engagement and for financial and human resources to support Indigenous cultural and traditional values as well as environmental stewardship, employment, training, and economic development.

Engagement activities with primary Indigenous Groups have generally included site tours, formal written correspondence (e.g., emails, letters), and meetings (e.g., in-person, phone, virtual/video), including the JWG meetings.

For the other Indigenous Groups, engagement activities have included information sharing through written and phone correspondence and meetings, when requested. NexGen also signed a Study Funding Agreement in 2020 with the YNLR (on behalf of the Black Lake Denesųłiné First Nation and Fond du Lac Denesųłiné First Nation) as the YNLR identified an interest in sharing Indigenous Knowledge through an IKTLU Study. The Study Funding Agreement between NexGen and the YNLR was strictly for funding an IKTLU Study.

Benefit Agreements define the environmental, cultural, economic, employment, and other benefits to be provided to primary Indigenous Groups by NexGen in respect of the Project and confirm the consent and support by each community for the Project throughout its lifespan, including reclamation.

Benefit Agreements do not abrogate, extinguish, or constitute the abandonment of any existing Indigenous inherent or treaty rights that are recognized and affirmed pursuant to Section 35 of the *Constitution Act, 1982*. Importantly, the Benefit Agreements are entered into in recognition of the Aboriginal and treaty rights of each primary Indigenous Group.

4.1.3 Indigenous Engagement Summary

Engagement with the primary Indigenous Groups began during pre-exploration activities and has continued since that time, with more in-depth dialogue about the proposed Project from 2019 to present.

A summary of the primary Indigenous Group key engagement activities up until 28 February 2022 is shown in Table 4.1-1.

Engagement with other Indigenous Groups has been conducted primarily through meetings and written and phone correspondence. A summary of the other Indigenous Group key engagement activities up until 28 February 2022 is shown in Table 4.1-2.

Through Project engagement activities, Indigenous Groups have identified interests, issues, and concerns that NexGen has integrated, where possible, into both Project design and the EA. Table 4.1-3 presents a summary of the key interests and issues identified by Indigenous Groups and how they have been addressed in the EIS.

NexGen has worked and will continue to work with Indigenous Groups and the local communities to understand issues and is committed to meaningfully addressing issues, as will be further documented during the EA process. Following submission of the EIS, continued engagement will further validate that all identified issues have been accurately understood by NexGen and whether these issues have been addressed.

Table 4.1-1: Summary of Primary Indigenous Group Key Engagement Activities

Method of Engagement	Number of Primary Indigenous Group Activities				Scope of Engagement Activity
	BNDN	BRDN	CRDN	MN-S	
Correspondence (emails/letters)	109	114	134	164	• IKTLU Studies and Study Agreements • site tours, meetings, and workshop coordination • notification of proposed Project application submission • issue and concern identification and follow-up • consultation requests • capacity funding and economic opportunities
Meetings (in-person/video)	15	9	21	20	• exploration drilling and road construction • business and economic opportunities • community and youth workshops and interviews • Project updates • CNSC review process
Joint Working Group (meetings)	13	15	4	8	• proposed Project design • employment and business opportunities • baseline environmental studies • effects modelling and assessment results
Site tours	1	1	1	2	• site tours

Note: Table includes key correspondence, which is formal.

BNDN = Birch Narrows Dene Nation
BRDN = Buffalo River Dene Nation
CRDN = Clearwater River Dene Nation
MN-S = Métis Nation – Saskatchewan
IKTLU = Indigenous Knowledge and Traditional Land Use
CNSC = Canadian Nuclear Safety Commission

Table 4.1-2: Summary of Other Indigenous Group Key Engagement Activities

Method of Engagement	Number of Other Indigenous Group Activities					Scope of Engagement Activity
	ACFN	BLDFN	ERFN	FLDFN	YNLR	
Emails/letters of correspondence	9	2	1	1	20	Project information and activities updates, business and employment opportunities, IKTLU Studies
Meetings (i.e., in-person / video)	0	3	1	4	9	Project information and activities updates, CNSC presentations

Note: Table includes key correspondence, which is formal.

ACFN = Athabasca Chipewyan First Nation
BLDFN = Black Lake Denesųłiné First Nation
ERFN = English River First Nation
YNLR = Ya'thi Néné Lands and Resources
FLDFN = Fond du Lac Denesųłiné First Nation
IKTLU = Indigenous Knowledge and Traditional Land Use
CNSC = Canadian Nuclear Safety Commission

Table 4.1-3: Summary of Key Issues Identified by Indigenous Groups

Component or Topic	Topic of Interest, Issue, or Concern	How Addressed in the Environmental Impact Statement
Atmosphere	Cumulative air quality effects, including radon and dust	As part of the air quality assessment, modelling was completed for several criteria air contaminants including dust and radon. Modelling was completed for both the Project and in consideration of potential effects from other projects. Air quality modelling predictions were forwarded to surface water quality and sediment quality, terrain and soils, vegetation, wildlife and wildlife habitat, and human health assessments for consideration with respect to potential effects on those technical disciplines.
Water	Surface water quality, especially in Patterson Lake and the Clearwater River watershed, including cumulative effects	An assessment of alternative means was undertaken that focused on selecting Project design features such as tailings, waste rock, and site water management in a manner that would minimize effects to the environment. Modelling and assessment for hydrogeology, hydrology, and surface water quality were completed to predict water quality in Patterson Lake and downstream to the confluence of the Clearwater and Mirror rivers. Assessment activities took a conservative approach and considered potential effects from other projects and both existing climate and climate change scenarios.
	Project and cumulative effects to water quality affecting fish and fish health (especially in Patterson Lake) and subsistence and commercial fishing	The fish and fish habitat assessment incorporated the results of an ecological risk assessment and aquatic health assessment that included water quality predictions for Construction, Operations, and Closure as well as a far-future scenario. The assessment also considered potential effects from other projects and both existing climate and climate change scenarios. The results of the fish and fish habitat assessment were then incorporated into the assessments of Indigenous land and resource use, which considered subsistence fish harvesting and consumption, and other land and resource use, which considered commercial fishing.
Land	Potential effects to wildlife hunted and trapped, including wildlife health	The wildlife and wildlife habitat assessment evaluated potential effects to 11 species, including those expressed by Indigenous Groups as important for hunting and trapping purposes. The wildlife and wildlife habitat assessment considered effects associated with direct habitat loss, alterations to habitat types, and potential changes to wildlife health. To assess potential changes to wildlife health, an ecological risk assessment was completed that considered changes to air quality and water quality. Effects were considered for both the Project and in consideration of potential effects from other projects. The results from the wildlife and wildlife habitat assessment were forwarded to the assessments of Indigenous land and resource use and other land and resource use, where potential effects could be assessed with respect to traditional harvesting and trapping activities, respectively.

Component or Topic	Topic of Interest, Issue, or Concern	How Addressed in the Environmental Impact Statement
People	Loss of land on lease area, especially Patterson Lake and surrounding areas, affecting ability to hunt, travel, and transmit traditional knowledge to younger generations	Changes to access to and area available for Indigenous land and resource use as a result of the Project and the Project combined with other projects were evaluated in the Indigenous land and resource use assessment. The continued ability to participate in Indigenous land and resource use activities was evaluated in the assessment, which included consideration of the ability to hunt, travel, and transmit traditional knowledge to future generations.
	Human health concerns from cumulative effects, including those from potentially contaminated resources	The human health assessment considered potential effects of the Project and cumulative effects of the Project and other projects on human receptors. Receptors chosen for the human health assessment were based on input received from Indigenous Groups and local communities through engagement activities and IKTLU Studies. The human health assessment was informed by a risk assessment that considered ways that potential Project effects could effect humans such as breathing air; drinking water; ingesting country foods including fish, game, or berries; and skin contact with water, soil, or sediment. The risk assessment also considered exposure to radiation.
	Increased competition with non-Indigenous recreational land users	The Indigenous land and resource use assessment considered potential changes to the availability of fish, plants, and wildlife for harvesting as a result of competition for resources due to increased access to and familiarity with the local area.
	Negative effects on community well-being from increased income and an influx of workers and capital	The potential effects to community well-being resulting from increased income and an influx of workers and capital were evaluated in the economy and community well-being assessments. The economy assessment considered both the potential for in-migration of residents into the local communities and potential effects to traditional economy participation as a result of increased income. These results were subsequently considered in the community well-being assessment, which also considered potential amplification of community issues from increased disposable income.
	Employment, training, and business opportunities for community members, with an emphasis on local hiring	NexGen's commitment to prioritizing training, employment, and business opportunities for local communities is described throughout the EIS. In the economy assessment, Project-related employment, education and training, and contracting opportunities were used as measurement indicators and in the assessment endpoints. Education, training, business, and contracting opportunities for local communities were subsequently discussed within the assessment.

IKTLU = Indigenous Knowledge and Traditional Land Use
EIS = Environmental Impact Statement

4.2

Engagement with Regulatory Authorities

Prior to formally entering the EA process in 2019, NexGen held introductory meetings with federal and provincial regulatory agencies.

Since entering the EA process, NexGen has engaged with the following regulatory authorities at regular intervals:

- CNSC, including the EA Division and the Uranium Mines and Mills Division; and
- ENV.

Engagement on specific topics has also been conducted with other regulatory authorities, including:

- Saskatchewan Health Authority;
- Saskatchewan Labour and Workforce Safety; and
- Saskatchewan Water Security Agency.

The primary objective of regulatory engagement is to provide proactive, open, and transparent information about the proposed Project and the activities completed as part the EA process. NexGen uses a variety of engagement methods to meet Project and regulatory agency needs. Regulatory engagement activities consist of presentations, technical workshops, meetings, site tours, and written correspondence (e.g., technical support documentation and memoranda) intended to:

- familiarize regulatory agencies with the Project;
- validate NexGen's approach to technical and Project-specific aspects of the EA;
- provide context for the approaches that will be reflected in the EA;
- provide updates on engagement activities conducted for the Project; and
- provide a means of dialogue relating to general aspects of the Project.

When possible, workshops, presentations, and meetings are conducted jointly with federal and provincial regulatory agencies, consistent with the harmonized federal-provincial EA process.

As the EA has progressed, regulatory engagement activities have evolved to include regular meetings and technical workshops. Table 4.2-1 presents a summary of regulatory key engagement activities up to 28 February 2022.

The topics of interest raised during engagement with regulatory authorities were wide-ranging and related to the authorities' regulatory responsibilities. Examples included air (emissions and modelling), water (effluent management, groundwater, and modelling), land (waste management, vegetation, and wildlife), people (human health, Indigenous and public engagement, land and resource use, and radiation and safety), Project components and design, and the EA process and EIS methods. NexGen has made its best efforts to document information sought by regulatory agencies in the EIS, and any future topics of interest and related issues will continue to be addressed through the EA and applicable licensing, permitting, and approval processes.

Table 4.2-1: Summary of Regulatory Key Engagement Activities

Regulatory Authority	Method	Number of Activities	Scope of Engagement Activity
Canadian Nuclear Safety Commission	Meetings	65	Project updates, public and Indigenous engagement updates, licensing and management system development, site tours
	Technical workshops	13	Discussion of baseline programs, modelling and assessment approaches and results, mine waste and water management, Project design concepts
Saskatchewan Ministry of Environment	Meetings	30	Project updates, public and Indigenous engagement updates
	Technical workshops	14	Discussion of baseline programs, modelling and assessment approaches and results, mine waste and water management, Project design concepts
Saskatchewan Health Agency	Technical workshops	4	Discussion of modelling input and assumptions, valued components, and human health risk assessment
Saskatchewan Labour and Workforce Safety	Technical workshops	1	Discussion of transportation risk assessment, accidents and malfunctions assessment approach and methodology, and approach to occupational health and safety
Saskatchewan Water Security Agency	Technical workshops	3	Discussion of water modelling and assessment approaches

Note: Meetings and technical workshops often involved multiple regulatory authorities.

4.3

Public Engagement

Public engagement includes engagement with members of the public (e.g., residents) and groups (e.g., local service providers, businesses, special interest groups).

Identification of members of the public and groups for engagement was primarily based on proximity to the proposed Project, potential interaction with the Project (i.e., potential to experience direct or indirect effects), and expressed or potential interest in the Project. Identification was conducted through a combination of NexGen engagement team members' extended history and familiarity with local communities and activities within the region, knowledge and relationships built through early engagement activities, establishment of the local priority area, introductions or identification by Indigenous Groups and regulators, and expressed interest by the public.

Public engagement activities for the proposed Project included community information sessions (Table 4.3-1), key person interviews completed as part of the socio-economic baseline for the EA, meetings, written correspondence, and the distribution of engagement materials. Members of the public and key stakeholders that participated included:

- Northern Settlements of Descharme Lake, Bear Creek, and Garson Lake;
- Northern Villages of La Loche, Buffalo Narrows, Michel Village, Île-à-la-Crosse, and Beauval;
- Northern Hamlets of Black Lake, Turnor Lake, and St. George's Hill;
- local businesses;
- La Loche Economic Development Corporation;
- Meadow Lake Tribal Council;
- N-19 Trappers Association;
- RCMP;
- Northern Saskatchewan Environmental Quality Committee; and
- Saskatchewan Environmental Society.

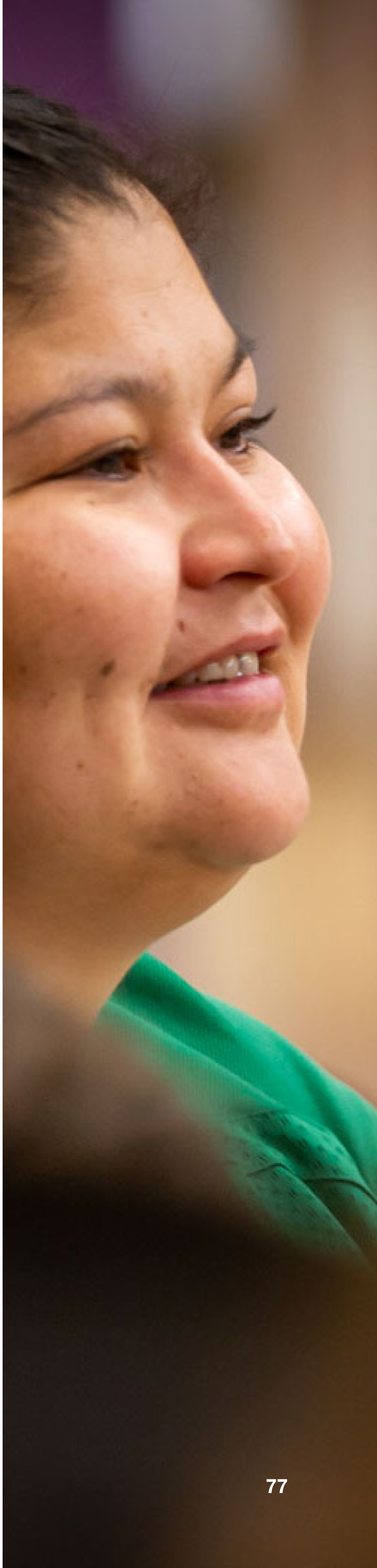


Table 4.3-1: 2019 Community Information Sessions

Location	Date	Target Communities	Signed Attendees
La Loche Community Hall La Loche, Saskatchewan	24 June 2019	• La Loche • Descharme Lake • Bear Creek • Black Point • Garson Lake	163
Birch Narrows Dene Nation Arena Turnor Lake, Saskatchewan	25 June 2019	• Turnor Lake	32
Jennie Deneyu Sylvestre Memorial Arena Buffalo River Dene Nation, Saskatchewan	26 June 2019	• Dillon • Michel Village • St. George's Hill	27
Lakeview Complex Buffalo Narrows, Saskatchewan	27 June 2019	• Buffalo Narrows	44

Key person interviews were conducted with community members including business owners, principals and staff of schools, housing clerks, the RCMP, healthcare directors, and band counsellors. Topics covered during key person interviews included health, education, economic development, social services, and community well-being.

NexGen has also worked closely with other stakeholders including employees, people living and working within the local area, cabin owners, service providers, youth, shareholders, federal and provincial government, local and provincial service providers, interested citizens, the nuclear power industry, and the global mining community.

Topics of discussion during public engagement activities included NexGen's commitment to environmental stewardship; health and safety; reclamation and land use; regulatory compliance; transparency; effective risk management; environmental, social, and governance standards; responsible economic development; strong community and Indigenous relations; and sustainable economic opportunities.

Stakeholders who participated in public engagement events were also usually members of an Indigenous Group; therefore, many of the topics of interest and issues and concerns raised were similar to those heard through the JWG meetings. Key topics of interest included employment opportunities, effects on land and land uses, long-term community benefits, and the importance of community engagement throughout the Project lifespan.

4.4

Indigenous and Local Knowledge

The inclusion of Indigenous and Local Knowledge in the EA process may be considered under CEAA 2012 and *The Environmental Assessment Act*; however, NexGen has committed to actively exploring avenues for inclusion of Indigenous and Local Knowledge beyond the EA process.

NexGen has chosen to pursue an approach based on regulatory guidance, available literature, international best practices, and Project team experience. Consideration was also given to guidance for incorporating Indigenous and Local Knowledge under the 2019 federal *Impact Assessment Act*.

In order to facilitate proper use of Indigenous Knowledge and Local Knowledge in the EA, deriving appropriate definitions for both of these terms was important. The process for establishing these definitions included consideration of regulatory guidance, input from Indigenous Groups, and relevant literature. For the purposes of the EA:

- **Indigenous Knowledge** is specifically defined as information sanctioned (i.e., authoritative permission or approval given) by an Indigenous Group as an official statement, document, or position.
- **Local Knowledge** represents information from a local citizen or community representative, but without Indigenous Group or Elder sanction.

Indigenous Knowledge was primarily received from JWG meetings and the IKTLU Studies, though it was occasionally provided through other means (e.g., presentation of information from an Indigenous Group to NexGen).

Local Knowledge was provided to NexGen through a variety of Indigenous and public engagement activities. In general, these activities fell into one of two different categories: Project engagement activities and EA environmental and socio-economic baseline programs. Project engagement included a broad range of activities such as meetings with local community members, organizations, and municipalities; JWG breakout sessions; site tours; and community events. Local Knowledge obtained

The following principles guided the identification of Indigenous and Local Knowledge and the way it would be applied throughout the Project lifespan:

- **establish and maintain collaborative relationships;**
- **adhere to community-based protocols for gathering, using, and managing Indigenous Knowledge;**
- **understand and respect the value of Indigenous Knowledge;**
- **confirm informed consent for use of Indigenous Knowledge;**
- **respect local ownership and control of Indigenous Knowledge; and**
- **protect sensitive Indigenous Knowledge.**

through the EA environmental and socio-economic baseline programs was primarily derived through key person interviews, as well as workshops with youth (i.e., local high school students) and trappers active in the area of the proposed Project.

Consistent with NexGen's life cycle approach to engagement, both the Project design and EA have been influenced by Indigenous and Local Knowledge and feedback received. With respect to Project planning and design, key examples include the underground storage of tailings, minimization of the Project footprint, and reduction of surface infrastructure, which are all consistent with the expressed preferences heard through engagement with local Indigenous Groups and communities. For the EA, Indigenous and Local Knowledge was incorporated in the various stages of the assessment process including but not limited to VCs and intermediate components; assessment methods; existing conditions; scoping and pathways analysis; mitigation measures; and monitoring, follow-up, and adaptive management.

Evaluation of the environmental, technical, economic, and social performance of the proposed Project design is an ongoing process that would be reviewed and optimized with the integration of Indigenous and Local Knowledge as the Project evolves through the EA process, licensing and permitting, and ultimately, if the Project is approved, Construction, Operations, and Closure.

4.5

Moving Forward

A primary goal of NexGen's engagement program is to develop and foster strong relationships with local Indigenous Groups and surrounding communities, regulators, and the public.

Continued engagement is key to facilitating a successful Project and to optimize opportunities for local community members. NexGen is committed to meaningful engagement with Project-affected Indigenous Groups and communities, regulators, and members of the public throughout the Project lifespan (Figure 4.5-1).

As NexGen proceeds through the regulatory process and advances development of the proposed Project, engagement activities will evolve as necessary to include the perspectives and insights of Indigenous Groups, local communities, and stakeholders in a manner that provides opportunities for effective information exchange and dialogue specific to each stage of the Project, if approved. This process will include an adaptive approach to engagement to allow for adequate opportunity to respond to the needs of local communities as new information becomes available, while also respecting specific government policies and/or legislation.

NexGen's Engagement Approach

Encouraging progressive, broader thinking balanced with technical competence and a deep and abiding respect for the local Indigenous Peoples' and communities' understanding of the local area, site specifics, and industry best practice is key in NexGen's engagement approach.

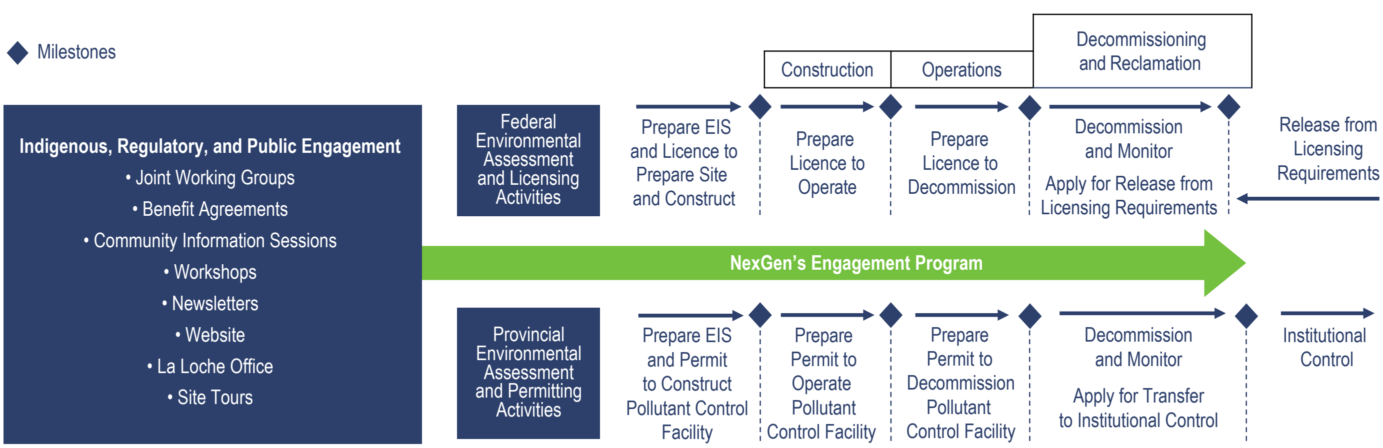


Figure 4.5-1: Engagement Throughout the Project Lifespan

EIS = Environmental Impact Statement.

Summary of the Environmental Assessment

5

5

Summary of the Environmental Assessment

An environmental assessment (EA) looks at the potential adverse effects and benefits of a project on the atmosphere, water, land, and people. It allows regulatory agencies to make an informed decision on whether a project should proceed. The EA is included in a document called an Environmental Impact Statement (EIS).

The Master Executive Summary is organized according to technical disciplines, which are fields of study that examine aspects of the biophysical and socio-economic environment (e.g., air quality, hydrology, Indigenous land and resource use).

Section 5 of the Master Executive Summary provides a summary of the approach and methods and key findings of the Project EA. Section 5.1 includes the general approach applied by each technical discipline. Sections 5.2 to 5.5 describe the potential effects of the Project by category—Atmosphere, Water, Land, and People.

Within each technical discipline subsection, the following key elements are described:

- measurement indicators;
- existing conditions;
- Project interactions;
- environmental design features and mitigation measures;
- key findings; and
- proposed monitoring and management of potential effects.

5.1

Approach and Methods

Each technical discipline assessment involved a systematic consideration of how the proposed Project components and activities could interact with the respective biophysical and/or socio-economic components of the environment. While the general EA approach was followed across technical disciplines, this systematic consideration resulted in occasional variations in approach and methods.

The main assessment steps and linkages for the proposed Project are described in Sections 5.1.1 to 5.1.6 and illustrated in Figure 5.1-1. The assessment for each technical discipline involved the following steps:

1. assessment scoping;
2. pathway analysis;
3. residual effects analysis;
4. significance determination;
5. prediction confidence and uncertainty; and
6. proposed monitoring, follow-up, and adaptive management.

Throughout this process, the technical discipline assessments incorporated environmental design features, mitigation, and Indigenous and Local Knowledge.

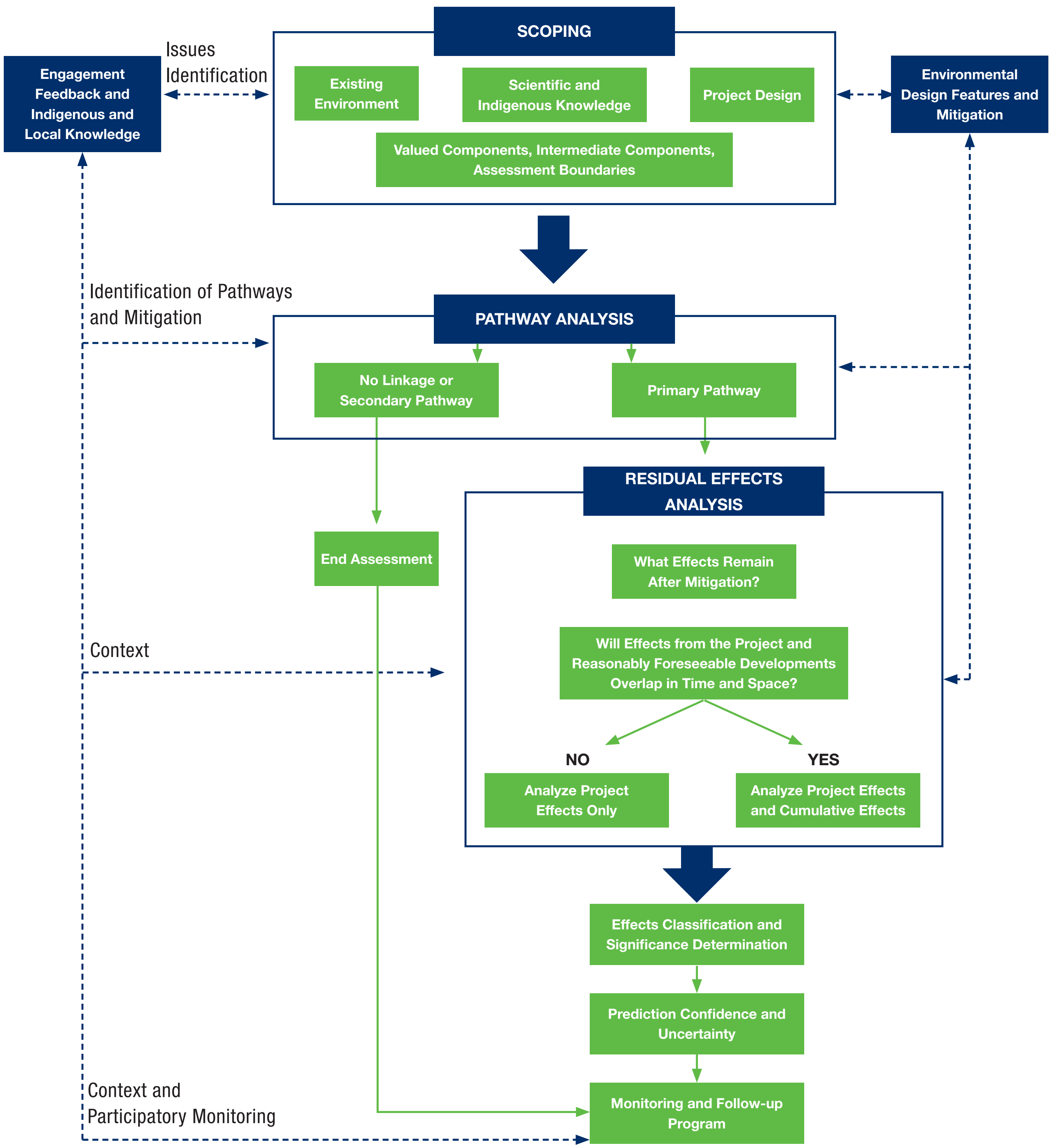


Figure 5.1-1: Environmental Assessment Steps and Linkages

5.1.1 Scoping

The initial step in the development of the EA was assessment scoping, which involved selecting valued components (VCs) and intermediate components, defining assessment endpoints and measurement indicators, setting assessment boundaries, and establishing existing conditions.

Valued Components

The selection of VCs involved identifying aspects of the biophysical and socio-economic environments that have scientific, social, cultural, economic, historical, archaeological, or aesthetic importance. Valued components were selected using the results from baseline studies, Indigenous Knowledge and Traditional Land Use (IKTLU) Studies, and feedback from engagement with Indigenous Groups, regulators, and the public.

The following factors were considered when developing the list of VCs for the proposed Project:

- **Potential for interaction with the proposed Project** and degree of interaction, including presence, abundance, and amount of spatial overlap of a VC.
- **Sensitivity of a VC to potential Project effects** and level of damage or harm that could be realized should an adverse effect occur.
- **Species conservation status** or concern (e.g., rarity, sensitivity, uniqueness).
- **Indigenous and Local Knowledge**:
    - » shared at community engagement sessions in La Loche, Turnor Lake, Buffalo River, and Buffalo Narrows;
    - » provided through IKTLU Studies; and
    - » acquired through discussions with Joint Working Groups (JWGs).
- **Ecological, socio-economic, and cultural value to Indigenous Groups, communities, government agencies, and the public**.
- **Federal requirements** as presented in Appendix C, *Environmental Effects for an Environmental Assessment Under CEAA 2012* of REGDOC 2.9.1 (CNSC 2020).
- **Recent experience with similar projects** in Saskatchewan and other jurisdictions in Canada.
- **Avoidance of redundancy with other VCs** (if two potential VCs represented the same attributes, mitigation actions, and potential effects from the proposed Project, only one was evaluated as part of the assessment).

Assessment Endpoints and Measurement Indicators

Each VC assessment used assessment endpoints and measurement indicators to provide a structure for the analyses.

Assessment Endpoints

Assessment endpoints are qualitative expressions that represent the key properties of VCs that should be protected. Assessment endpoints provide additional definition to VCs to support assessments of residual effects and help determine their significance.

Assessment endpoints also incorporate the concept of sustainability, which is defined in this context as "the ability to protect the environment, contribute to the social and economic well-being of the people of Canada, and preserve their health in a manner that benefits present and future generations" (IAAC 2020a). That is, sustainable development allows this generation's needs to be met without compromising the ability of future generations to do the same.

Sustainability concepts, scientific principles, and the outcomes from engagement activities and IKTLU Studies were used to help define the assessment endpoints for biophysical and socio-economic VCs. As examples, the assessment endpoint for certain biophysical VCs (e.g., fish, wildlife) considered the maintenance of self-sustaining and ecologically effective populations; the assessment endpoint for the socio-economic VC of community well-being considered the ability to maintain the current way of life.

The concepts of environmental sustainability and social sustainability were applied to the assessments:

- **Environmental sustainability considers the maintenance of ecological integrity.**
- **Social sustainability considers economic stability and healthy communities.**

Measurement Indicators

As assessment endpoints are typically not quantifiable, one or more measurement indicators were linked to each assessment endpoint to inform conclusions on the ability to maintain or achieve the assessment endpoint, and thereby characterize effects on a VC. The measurement indicators included those that were:

- **quantitative** (e.g., concentrations of metals in surface water; amount of employment and income); and
- **qualitative** (e.g., expected movement and behaviour of wildlife in response to noise and human activity; expected changes in community cohesion).

The measurement indicators provided the primary factors for discussing the uncertainty of effects on VCs. Measurement indicators also provide the primary factors for discussing the uncertainty of effects on VCs and, subsequently, can be key variables for study in potential follow-up and monitoring programs.

The significance of effects from the proposed Project on a VC was evaluated by linking changes in one or more measurement indicators to the VC in the context of the associated influences on the assessment endpoint(s). Determination of whether an effect on a VC was significant or not significant required the compilation and interpretation of effects to measurement indicators and subsequent prediction of whether the assessment endpoint was maintained or achieved.

Intermediate Components

Intermediate components include physical attributes of the biophysical environment or media upon which VCs rely, such as air quality and hydrology. Intermediate components were selected and assessed using the same process described for VCs. However, unlike VCs, intermediate components do not have assessment endpoints or significance criteria. The significance of changes in intermediate components can only be evaluated in the context of related influences to VCs, which are the ultimate receptors. The linkages from intermediate components to VCs that are assessed for significance are shown in Figure 5.1-2.

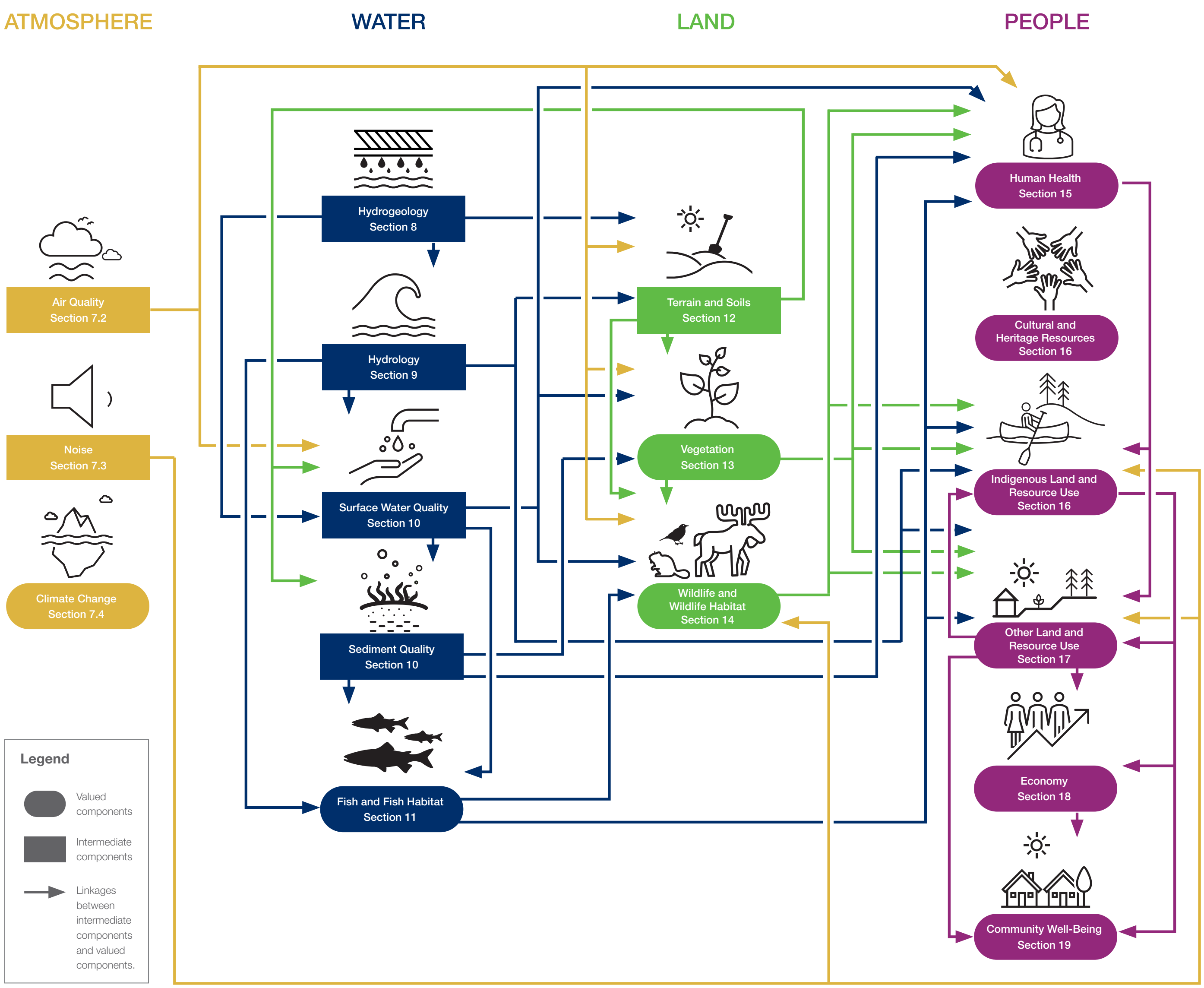


Figure 5.1-2: Environmental Assessment Technical Discipline Linkage Diagram

Assessment Boundaries

Defining the assessment boundaries for each discipline was a key element of the scoping process, and included both spatial (i.e., physical and geographic) and temporal (i.e., timing and duration) considerations.

Spatial Considerations

To determine the most relevant scale for a Project-VC interaction, the approach to describing existing conditions and predicting effects from the proposed Project on VCs involved multiple spatial scales as responses of biophysical and socio-economic environments are unique.

Spatial scales typically include a minimum of:

- **a site study area (i.e., Project footprint);**
- **a local study area; and**
- **a regional study area.**

However, for this EA, additional scales were also established for certain valued components and intermediate components.

Spatial boundaries were selected for VCs and intermediate components using the following criteria:

- physical extent of the proposed Project footprint;
- physical extent of ecological and socio-economic systems (e.g., watershed boundaries of potentially affected lakes and streams, jurisdictional boundaries of potentially affected Indigenous communities);
- spatial extent of expected Project-related effects, including beyond the site study area; and
- geographic distribution, movement, and spatial interaction of VCs and intermediate components.

The local study areas (LSAs) used within discipline assessments were defined at a scale where most or all of the expected effects of the Project on VCs or intermediate components would be expected.

The far-future scenario is not a phase of the proposed Project; it encompasses the long-term period of the extremely slow migration of constituents from the proposed underground tailings management facility and waste rock storage areas to the environment.

The far-future scenario is applicable to:

- **groundwater and surface water quality intermediate components; and**
- **fish and fish habitat and human health valued components.**

The regional study areas (RSAs) used within discipline assessments included larger areas designed to provide broader context for the assessment of Project effects on VCs and intermediate components and the appropriate scale to assess cumulative effects from the Project combined with existing conditions and other reasonably foreseeable developments (RFDs).

Temporal Considerations

The temporal scope for most VCs and intermediate components is the 43-year period from the start of Construction to the end of Decommissioning and Reclamation (i.e., Closure) of the proposed Project. The temporal boundaries were specific to the VCs and intermediate components and considered defined Project phases as described in Section 2.3.3.

A far-future scenario was developed to assess effects that could, in particular circumstances, extend beyond the Closure Phase. While it is not possible to precisely predict processes that are thousands of years into the future, the far-future scenario is a reasonable representation of the long-term return to steady-state conditions.

For some VCs and intermediate components, residual effects were assessed for all phases of the proposed Project; for others, residual effects were only relevant to specific Project phases. The assessment of VCs and intermediate components was completed for those phases or periods (i.e., temporal snapshots) of the proposed Project when adverse effects are predicted to be most pronounced. Where required, these snapshots were taken at several points within a Project phase or phases so that effects were not underestimated (i.e., a precautionary approach was applied).

Assessment Cases

Assessment cases are development scenarios that distinguish existing, proposed, and future projects to allow for comparative results of each. Three assessment cases were applied in the assessment to estimate the incremental and cumulative effects from the Project and other developments:

- **A Base Case**, to describe the existing environment in the LSA and RSA before the inclusion of the proposed Project and to provide an understanding of the current physical, biological, economic, social, and cultural conditions that may be influenced by the Project. The Base Case includes the combined effects from previous, existing, and approved (but not necessarily constructed) projects and activities.
- **An Application Case**, to predict the combined effects of the Base Case with the effects from the Project and to assess incremental, Project-specific changes to VCs and intermediate components.
- **A Reasonably Foreseeable Development Case**, combining the Base Case, Application Case, and RFDs that have not yet been approved to identify and assess potential cumulative effects on VCs, and intermediate components relative to existing conditions.

The Fission Patterson Lake South Property, which is a planned uranium mine by Fission Uranium Corp. that would be situated on Patterson Lake to the southwest of the Project, was designated as an RFD and applied to the RFD Case for applicable VCs and intermediate components. As the Fission Patterson Lake South Property project has not yet submitted an EA application, the lifespan and project interactions were estimated or assumed based on available information.

Project interaction matrices for the atmosphere, water, land, and people disciplines are shown in Section 5.2 to Section 5.5.

Existing Conditions Characterization

Each technical discipline section of the EIS includes a subsection that describes and characterizes the existing conditions for the relevant VCs or intermediate components. Baseline studies were conducted to support the characterization of the existing conditions; these included the collection of both environmental field data (e.g., surface water quality, wildlife) and socio-economic data (e.g., interviews, feedback from engagement). Information used to support the description of existing conditions also included available Indigenous and Local Knowledge from engagement and IKTLU Studies, published and unpublished materials, and other available data and information obtained from government and industry.

Identification of Pathway

For an effect to occur, there must be a source (i.e., a facility or activity) that interacts with the biophysical or socio-economic environment that results in a measurable change to a measurement indicator of a valued component or intermediate component.

Figure 5.1-3: Project-Environment Interaction

5.1.2 Pathway Analysis

A pathways analysis is a process used to develop an understanding of how a project may affect valued components and intermediate components.

Potential effect pathways for a project are identified, and mitigation that can be incorporated to avoid or minimize adverse effects is reviewed to assess if there is still potential for a project to cause residual effects after incorporation of mitigation.

This process helps focus further, more detailed assessments of key interactions between a project and the environment.

A pathways analysis was used to develop an understanding of how proposed Project facilities and activities could affect VCs and intermediate components. This process involved identifying the plausible pathways and environmental design features and mitigations, followed by screening each pathway to determine whether the mitigation would address the potential effect such that the pathway would be eliminated or result in a negligible adverse effect.

Identification of Pathway

The first step in the pathways analysis was to identify the pathways by which a proposed Project facility or activity could affect the environment. This step was conducted by developing a Project-environment interactions matrix that identified potential interactions among Project facilities or activities and VCs and intermediate components. A comprehensive list of effect pathways was then developed based on the following information:

- description of the Project and potential effect scoping provided by the Project development, environmental, and socio-economic teams;
- input from Indigenous, regulatory, and public engagement;
- results of baseline studies;
- scientific knowledge;
- previous experience with mining projects; and
- consideration of potential effects identified in the Terms of Reference (Section 3.1.1).

Identification of Environmental Design Features and Mitigation

Following pathways identification, environmental design features and mitigation measures were considered that could be incorporated to remove a pathway or limit the effects on VCs and intermediate components. This step included the application of the precautionary principle. Environmental design features included Project design elements (e.g., centralized infrastructure); environmental best practices; and management policies, programs, plans, and procedures. Mitigation measures included measures to eliminate, reduce, control, or offset the adverse effects of the Project.

Environmental design features and mitigation measures were developed through an iterative process between the Project's design engineers and environmental scientists, and considered direct and indirect input from Indigenous communities and regulatory authorities. Knowledge of the features and measures was then applied to each pathway to understand the expected degree and extent of Project-related changes to the environment and the associated residual effects on VCs and intermediate components.

Pathway Screening

Following the identification of pathways and environmental design features and mitigation measures, pathway screening provided a qualitative assessment to focus on the pathways that required a more quantitative or comprehensive assessment of effects on VCs and intermediate components. The pathway screening process involved applying scientific knowledge and logic, understanding the effectiveness of mitigation, incorporating feedback from Indigenous Groups and communities, and considering prior experience with mining projects.

Environmental design features and mitigation measures followed a hierarchy from most to least effective or preferable:

- **avoiding the effect entirely, such as by limiting the area of the proposed Project footprint to avoid disturbing wetland habitats;**
- **minimizing the effect through technology or management practices, such as implementing a sediment and erosion control plan;**
- **reclaiming and rehabilitating any areas that must be disturbed, such as saving topsoil and revegetating disturbed areas to restore them to functional ecosystems; and**
- **assigning offsets when effects cannot be eliminated through the first three methods, such as by offsetting loss of woodland caribou habitat.**

Each pathway was then categorized as one of the following:

Described but not advanced for further assessment

- **No pathway:** The pathway could be removed (i.e., effect would be avoided) by avoidance and/or additional mitigation measures so that the proposed Project would result in no measurable environmental change relative to existing conditions or guideline values, and therefore would have no residual effect on a VC or intermediate component.

Described but not advanced for further assessment

- **Secondary pathway:** The pathway could result in a minor environmental change relative to existing conditions or guideline values, even with the application of mitigation; however, the change is sufficiently small as to have a negligible residual effect on a VC or intermediate component (e.g., an increase in an air quality parameter that is negligible compared to the range of existing values and is well within the guideline for that parameter). As a result, the pathway would not be expected to contribute to effects of RFDs and cause a significant effect.

Carried forward to the residual effects analysis and classification

- **Primary pathway:** The pathway was likely to result in an environmental change relative to existing conditions or guideline values, even with the application of mitigation, that could cause a greater-than-negligible effect on a VC or intermediate component.

Positive interactions or outcomes (e.g., economic benefits) were identified in the applicable technical disciplines but were not assessed for significance.

5.1.3 Residual Effects Analysis

Residual effects are those effects that remain after effective mitigation has been implemented.

Residual effects analysis is a method to determine the residual effects for a given valued component or intermediate component.

Primary pathways were carried forward to the residual effects analysis, which described the residual incremental and cumulative adverse effects from previous and existing developments and the proposed Project (Application Case), and from previous and existing developments, the proposed Project, and RFDs (RFD Case), if applicable. The predicted environmental changes for primary pathways were evaluated using quantitative and qualitative data from field studies, modelling results, scientific literature, government publications, personal communications, and monitoring reports.

The criteria for the residual effects classification included direction, magnitude, geographic extent, duration, reversibility, frequency, and probability of occurrence. Expected changes were expressed quantitatively (where possible) or qualitatively (where necessary) for each primary pathway that influenced a VC or intermediate component within the assessment boundaries.

Significance Determination

Following the classification of residual adverse effects, a determination of significance was completed for VCs. Significance determination was completed based on a weight-of-evidence approach by evaluating the following against assessment endpoints defined for each VC:

- magnitude, geographic extent, duration, reversibility, frequency, and probability of occurrence of the residual adverse effect for each applicable measurement indicator and related intermediate component(s);
- applicable ecological or socio-economic context; and
- uncertainty in effects predictions.

Residual adverse effects on VCs were determined to be either significant or not significant.

Prediction Confidence and Uncertainty

Following significance determination, the EA identified key sources of uncertainty and described how they were addressed to increase confidence that effects would not be larger than predicted. The level of confidence in the effects analyses was related to the following factors:

- adequacy of the baseline data for providing an understanding of existing conditions;
- direction, magnitude, and spatial extent of future fluctuations in ecological and socio-economic variables, independent of effects from the proposed Project and other developments;
- assumptions, conditions, and constraints of model inputs;
- understanding of Project-related effects on complex social-ecological systems that contain interactions across different scales of time and space;
- knowledge and experience with the type of effects in the environmental or socio-economic system;
- knowledge of the effectiveness of proposed Project environmental design features or mitigation measures for avoiding or minimizing effects; and
- uncertainties associated with the exact location, physical footprint, activity level, and timing and rate of future developments.

To address uncertainty in these elements, the assessment applied:

- **a precautionary approach** using the largest magnitude, duration, and geographic extent of potential adverse effects where a range of potential outcomes was possible; and
- **a conservative approach** where information was limited so that effects were typically overestimated (e.g., defining the key input variables in a model to produce a conservatively high effect prediction).

Uncertainty in the effectiveness of proposed mitigation measures was also incorporated. If uncertainty was high, the analysis applied a precautionary approach and mitigation was not considered sufficient to remove a pathway.

As a result of these approaches, uncertainty was addressed in a manner that increased the level of confidence that residual effects would not be larger than predicted. Information derived from the evaluation of prediction confidence and uncertainty was then used to inform the development of monitoring and adaptive management initiatives that could further reduce uncertainty over time.

Monitoring, Follow-Up, and Adaptive Management

Adaptive management is a planned and systematic process for continual improvement of environmental management policies and practices by assessing the effectiveness of these practices and the associated outcomes.

(CEA Agency 2009; CNSC 2021)

As the final step in the technical discipline assessments, environmental monitoring programs were proposed to address uncertainties associated with the effects predictions and to evaluate the performance of the proposed Project. Monitoring programs would be included in NexGen's Integrated Management System (Section 2.4). Independent environmental monitoring by local Indigenous Groups would also be implemented to verify Project performance and determine if mitigations and controls are effective in protecting the receiving environment.

Adaptive management measures were also proposed in specific cases to address uncertainties and to plan for additional mitigation.

Proposed monitoring and adaptive management are described for each VC and intermediate component in Section 5.2 to Section 5.5.

5.2

Atmosphere

Section 5.2 discusses the effects of the proposed Project on components of the atmospheric environment; specifically, air quality, noise, and climate change. Atmosphere is directly linked to components of water, land, and people (Section 5.3 to Section 5.5).

NexGen's approach to the assessments recognized the desire by Indigenous Groups to access clean, fresh air when practising traditional activities, which contribute to community well-being. The assessment approach considered the interrelationships of different components of the biophysical environment and the vital role of air quality to the health of aquatic and terrestrial systems.

NexGen assessed the atmosphere-related components within unique LSAs and RSAs (Figure 5.2-2).

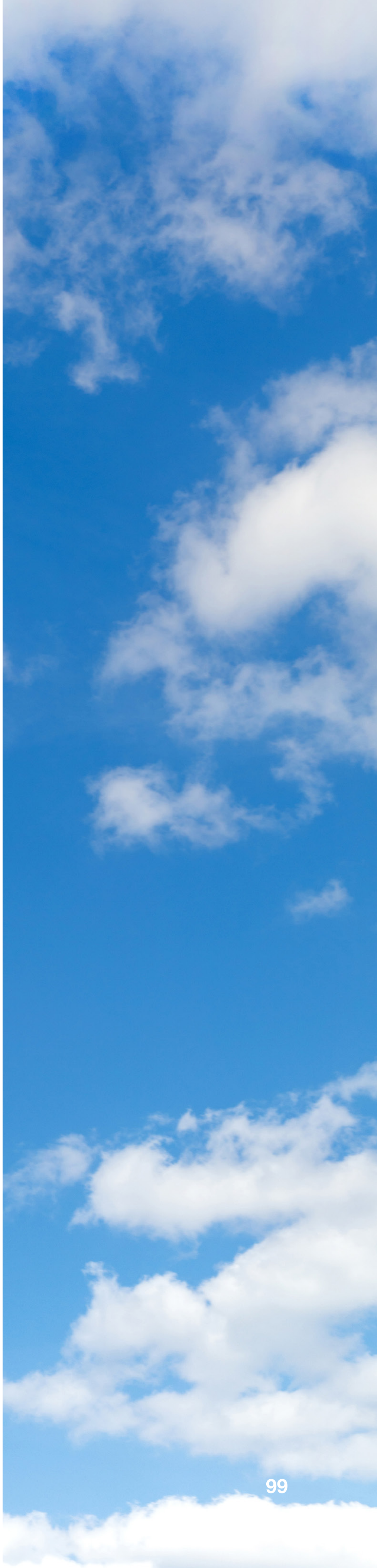
For air quality, spatial boundaries were delineated that centred on the proposed Project site:

- The LSA is a 900 km^2 area that includes surrounding local lakes (i.e., Beet Lake, Broach Lake, Forrest Lake, Jed Lake, Naomi Lake, and Patterson Lake) that are important to the assessments of other technical disciplines.
- The RSA is a 6,400 km^2 area that encompasses large waterbodies (e.g., Preston Lake, Lloyd Lake) and includes areas where air concentrations are likely to be at background levels of less than 10% of the applicable criteria.

For noise, spatial boundaries were delineated around the boundary of the maximum disturbance area:

- The LSA is defined as lands within a 1.5 km buffer.
- The RSA is defined as lands within a 10 km buffer.

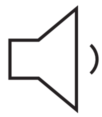
For climate change, as greenhouse gas (GHG) emissions are both regional and global in nature, the study areas were aligned with federal administrative inventory boundaries.



Potential Project effects were assessed by the three atmospheric technical disciplines, which included two intermediate components and one VC:

Intermediate Components

- **Air quality** was selected as an intermediate component based on the connection to water, soil, and the health of vegetation, wildlife, and people.



- **Noise** was selected as an intermediate component due to its influence on Indigenous and other land and resource use and the sensitivity of some wildlife to noise.

Maximum disturbance area is the 981 ha area where direct effects of the proposed Project on soils, vegetation, and wildlife could occur. The maximum disturbance area assumes disturbance of an area approximately four times larger than the currently anticipated Project footprint so that adverse effects are not underestimated.

Valued Components

- **Climate change** was selected as a VC based on its socio-economic and cultural importance, as well as federal and provincial commitments to decreasing GHG emissions and the potential for proposed Project emissions to contribute to climate change.

Project interactions for atmospheric components are shown in the Project interactions matrix for atmosphere (Figure 5.2-1). Project activities and mitigations that are common to the three atmospheric components include:

Fugitive emissions are air emissions that do not pass through a stack (e.g., road dust, wind erosion).

Stack emissions are air emissions released through a stack, chimney, or vent.

- **Combustion of fossil fuels in mobile vehicles and heavy equipment**, which includes the vehicles used for transportation within, to, and from the proposed Project site and the equipment used for land clearing, site preparation, construction, and handling of waste rock and ore. These activities also generate road dust and wind erosion (i.e., fugitive emissions).
- **Combustion of fossil fuels in stationary equipment**, which includes the process plant, calciner, power generators, mine heaters, and waste incinerators (i.e., stack emissions).
- **Drilling and blasting activities**, which are required to construct the proposed underground mine. Drilling and blasting would occur underground during Construction to develop the production shaft and exhaust shaft. During Operations, blasting would be conducted to develop the underground mine and underground tailings management facility (UGTMF).

These Project interactions have the potential to affect air quality, noise, and climate change.

Figure 5.2-1: Project Interactions Matrix for Atmosphere

✓ = interaction is anticipated (i.e., primary or secondary pathway, or positive interaction).

		Atmosphere		
Project Phase or Far-Future Scenario	**Key Project Component/Activity**	**Air Quality**	**Noise**	**Climate Change**
Construction	Land clearing, site preparation and construction of facilities and infrastructure, underground shaft / mine development	✓	✓	✓
	Site traffic, transportation of personnel and materials to and from the site	✓	✓	✓
Operations	Site traffic, transportation of personnel and materials to and from the site	✓	✓	✓
	Process plant and underground operations, underground tailings management facility	✓	✓	✓
	Handling and storage of waste rock, special waste rock, and ore	✓	✓	✓
	Effluent treatment plant and treated effluent discharge			
	Water intake for fresh water and process water			
	Power generation	✓	✓	✓
	Non-hazardous waste incineration	✓		✓
	Additional infrastructure (e.g., roads, airstrip, camp, maintenance shop, offices), water storage and effluent monitoring ponds	✓	✓	✓
Decommissioning and Reclamation	Site traffic, transportation of personnel and materials to and from the site	✓	✓	✓
	Removal of infrastructure, restoration and revegetation of facilities and infrastructure	✓	✓	✓
Far-future scenario	Potential for long-term migration of constituents of potential concern from underground facility and waste rock storage areas. Not a Project phase.			

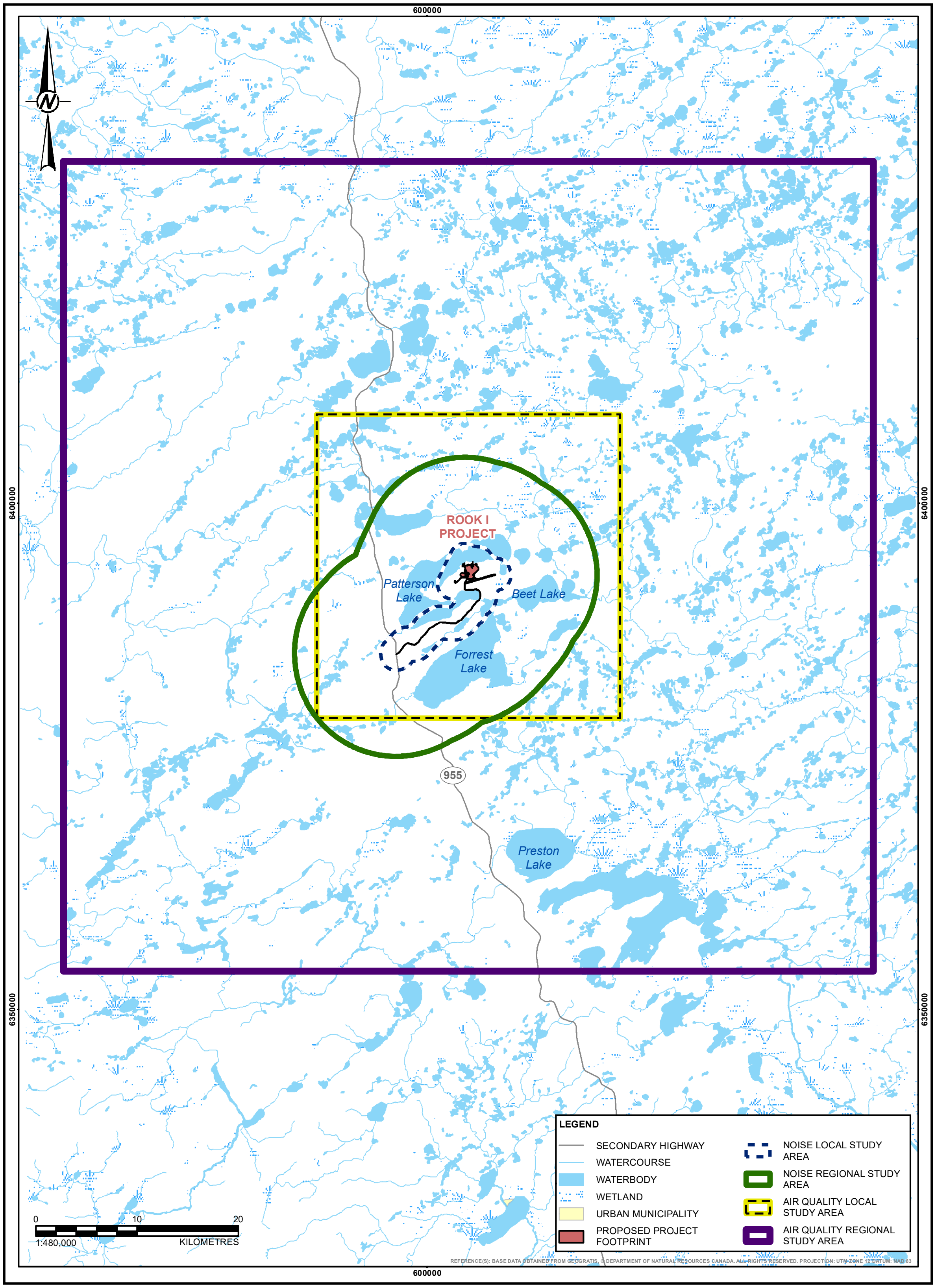


Figure 5.2-2: Map of Atmospheric Study Areas

5.2.1 Air Quality

Measurement Indicators

The measurement indicators for air quality were nitrogen dioxide, sulphur dioxide, sulphuric acid, carbon monoxide, particulate matter with a nominal diameter of 2.5 µm or less ($PM_{2.5}$), particulate matter with a nominal diameter of 10 µm or less (PM_{10}), and total suspended particulates.

Existing Conditions

Existing atmospheric conditions, including air quality and meteorology, were established as part of a baseline study that consisted of both desktop analyses and a field program. The desktop review included analyses of publicly available data for ambient air quality, meteorology, and climate within the RSA. The field program monitored continuous and intermittent air quality and meteorology (e.g., temperature, precipitation, wind speed and direction, relative humidity, incoming solar radiation) at the Project site since 2018.

The existing conditions are as follows:

- Nitrogen dioxide and sulphur dioxide concentrations remained within the annual Saskatchewan Ambient Air Quality Standards (SAAQS) (i.e., below thresholds) in the LSA (Government of Saskatchewan 2015).
- $PM_{2.5}$ was generally within the 24-hour and annual air quality standards (i.e., below thresholds), with occasional exceedances of 24-hour SAAQS from wildfire smoke.
- PM_{10} exceedances of the 24-hour SAAQS were recorded in 2019, which were attributed to wildfire smoke. There were no exceedances of SAAQS in 2020.
- Background concentrations of $PM_{2.5}$, PM_{10}, total suspended particulates, carbon dioxide, nitrogen dioxide, and sulphur dioxide were representative of a rural setting, relatively unaffected by external influences on air quality.

Members of the Métis Nation – Saskatchewan, Birch Narrows Dene Nation, and Buffalo River Dene Nation commented that "clean fresh air" is one of the things they appreciate the most about where they live.

Project Interactions

All Project interactions assessed by the air quality component are listed in Section 5.2.

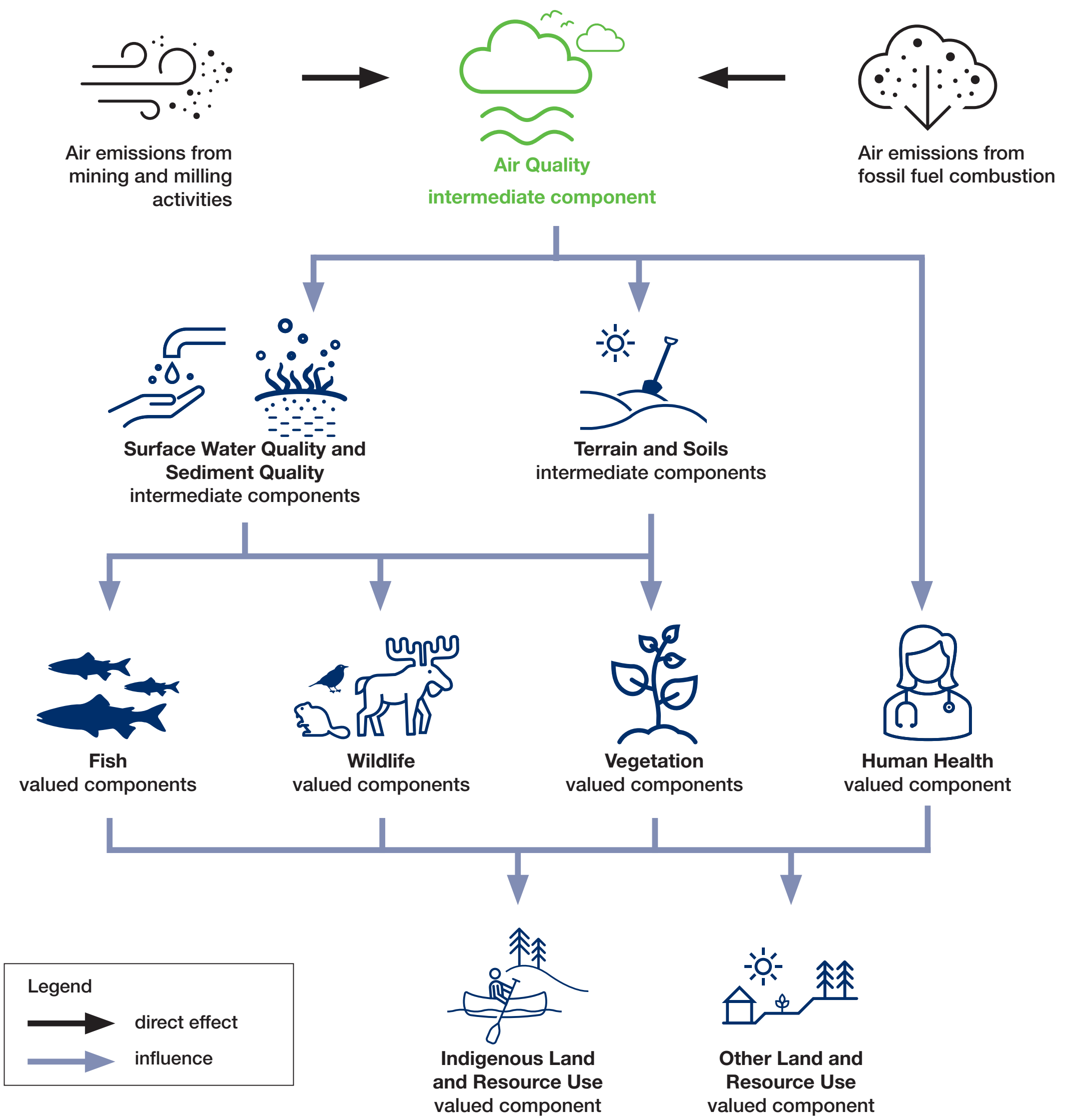


Figure 5.2-3: Linkage Diagram of Project Effects on Air Quality and Influenced Valued Components

Environmental Design Features and Mitigation Measures

Key environmental design features and mitigation measures were identified to reduce potential adverse effects on air quality:

- primarily using LNG for on-site power generation, which generates lower emissions per unit of energy produced than diesel;
- optimizing haul route distances and limiting the idling of motorized vehicles and heavy equipment to reduce fuel consumption and fugitive dust emissions; and
- using pollution control technologies on exhaust stacks and Tier 4 diesel mobile equipment, where available, for underground operations.

Based on potential interactions between the proposed Project and the environment, and considering the mitigations that would be applied, two primary pathways were assessed for air quality:

- Criteria air contaminant (CAC) emissions during Construction and Operations, as potential Project activities (e.g., combustion of fossil fuels in stationary equipment, mobile vehicles, and heavy equipment) could affect air quality.
- CAC emissions during Closure, as mobile and stationary combustion sources could affect air quality.

Key Findings

The residual effects analysis used a dispersion modelling approach (AERMOD) to predict concentrations of CACs and compare the predictions to baseline conditions and relevant air quality criteria.

The key findings from the air quality assessment were:

- **Overall air quality:** Air quality would reflect detectable changes from existing conditions; however, most of the CACs (i.e., nitrogen dioxide, sulphur dioxide, sulphuric acid, carbon monoxide, and $PM_{2.5}$) are predicted to remain compliant with the SAAQS through all phases of the Project.
- **PM_{10} and total suspended particulates:** Short-term concentrations of 24-hour PM_{10} and 24-hour total suspended particulates would be above the SAAQS; however, the exceedance frequencies remain low and the exceedance areas are localized to the maximum disturbance area.
- **Duration of effect of CACs:** The duration of the predicted effect of CACs on air quality is limited to the period when emissions are being released (i.e., 4 years during Construction, 24 years during Operations, and 5 years during the Active Closure Stage), as the effects would immediately cease when emissions are no longer being released.

These results were carried forward into the assessments of surface water quality and sediment quality, terrain and soils, fish and fish habitat, wildlife and wildlife habitat, vegetation, human health, Indigenous land and resource use, and other land and resource use.

There is a moderate to high degree of confidence in the predictions provided by the air quality assessment. The methods included baseline studies and an industry standard air dispersion model that accounted for all potential Project emissions. The air dispersion model was inherently conservative because it was configured to predict maximum concentrations. These steps reduced the likelihood of underestimating air quality effects.

The American Meteorological Society / Environmental Protection Agency Regulatory Model (AERMOD) is an air quality model.

Monitoring and Management of Potential Effects

Monitoring and managing potential effects to air quality would involve implementing:

- an Environmental Protection Program;
- an Industrial Air Source Environmental Protection Plan; and
- the current baseline monitoring program for meteorological parameters, which would continue through all phases of the Project, with some potential modification in response to future licensing and permitting requirements.

5.2.2 Noise

Measurement Indicators

The measurement indicators for noise were energy equivalent sound level for the daytime period, energy equivalent sound level for the nighttime period, combined day-night sound levels, and maximum sound level.

Existing Conditions

To assess existing conditions, a baseline field study was undertaken at three locations in the RSA. The study measured existing noise levels that could be experienced by wildlife and Indigenous and other land and resource users. The locations were selected to be representative of different settings: swampy areas near Forrest Lake, rocky areas near Patterson Lake, and general forest environments. Baseline noise levels were estimated at 16 receptors selected for the assessment.

The existing conditions are as follows:

- Contributing sources of noise were wind in the vegetation, birds and other wildlife, waves, and recreational users at the Forrest Lake location.
- Existing daytime and nighttime noise levels near large waterbodies were generally consistent with noise levels one would expect to observe within an average home.
- Noise levels were generally greatest during the daytime and near exposed waterbodies.

Indigenous Knowledge and Traditional Land Use Studies completed by the Clearwater River Dene Nation, Métis Nation—Saskatchewan, Birch Narrows Dene Nation, and Buffalo River Dene Nation all expressed concern regarding potential effects of noise on wildlife.

Project Interactions

In addition to the Project interactions listed in Section 5.2, noise emissions from all mining equipment and activities would result in increased noise levels during Construction, Operations, and Closure of the proposed Project. Sources of noise would include land clearing; site preparation; construction of facilities and infrastructure; underground mine development; power plant operation; airstrip traffic; processing and underground operations; and decommissioning and reclamation activities.

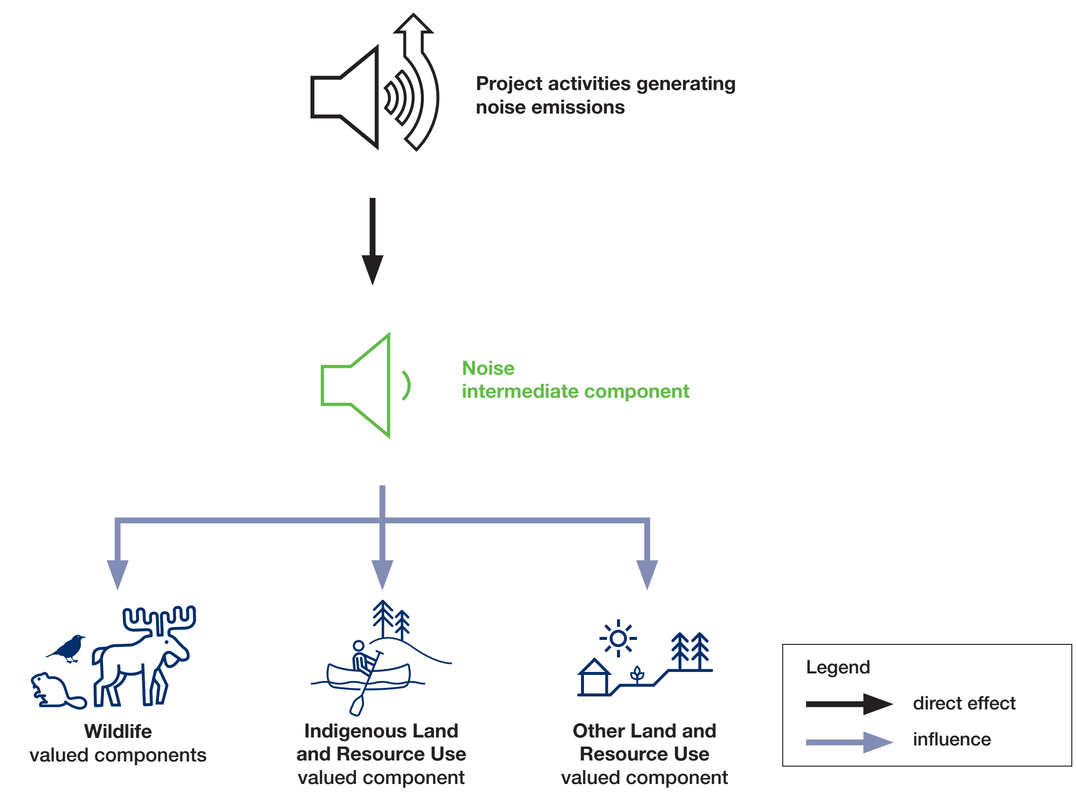


Figure 5.2-4: Linkage Diagram of Project Effects on Noise and Influenced Valued Components

Environmental Design Features and Mitigation Measures

Key environmental design features and mitigation measures were identified to reduce potential adverse effects of noise:

- attenuating (i.e., reducing or dampening) noise from particular structures and equipment; and
- maintaining potential Project roads (e.g., eliminating ruts, keeping level running surfaces).

Based on potential interactions between the proposed Project and the environment and considering the mitigations that would be applied, the following two primary pathways were assessed for noise:

- Noise from equipment and activities during Construction and Operations, which would increase over existing baseline conditions.
- Noise from equipment and activities during Closure, which would increase over existing baseline conditions.

Key Findings

To complete the residual effects analysis, computer models were used to predict noise levels at the receptors. Temporal snapshots were selected to conservatively capture maximum noise effects. Effects were assessed using guidance and thresholds from Environment and Climate Change Canada (2009), Health Canada (2017), and the Alberta Energy Regulator (2007). Predicted noise levels were also used to calculate the percentage of a typical population that would be highly annoyed (a metric used by Health Canada) by combined day-night sound levels from the various activities and equipment, and maximum noise levels from the proposed Project and the Fission Patterson Lake South Property airstrips.

The key findings from the noise assessment were:

- **Noise levels:** Detectable increases in noise levels are predicted for the Application Case and RFD Case.
- **Cumulative noise levels:** Cumulative noise levels are predicted to be of low magnitude and would remain below regulatory thresholds established by Environment and Climate Change Canada, Health Canada, and the Alberta Energy Regulator at all 16 receptors.

Changes in the noise environment were assumed to be continuous through the lifespan of the proposed Project, but would return to baseline conditions at the end of the Closure Phase when activities cease.

These results were carried forward into the assessments of wildlife and wildlife habitat, Indigenous land and resource use, and other land and resource use.

There is a moderate to high degree of confidence in the predictions provided by the noise assessment. Uncertainty in the noise assessment was addressed by making conservative assumptions that overestimated potential effects (i.e., a precautionary assessment). The predicted effects are considered to be overestimates of the magnitude of noise levels that would be realized under typical or average environmental conditions during all phases of the proposed Project.

Monitoring and Management of Potential Effects

Monitoring and managing potential effects of noise would involve implementing a discipline-specific follow-up study, which would be conducted at receptors in or near the proposed Project footprint to obtain representative daytime and nighttime noise values for each receptor. Those values would then be compared to model predictions.

5.2.3 Climate Change

Measurement Indicators

The measurement indicators for climate change were GHG emissions of carbon dioxide, GHG emissions of methane, and GHG emissions of nitrous oxide. Collectively, these were expressed as megatonnes of carbon dioxide equivalent (Mt CO_2e).

Existing Conditions

Existing conditions for GHG emissions were characterized using the provincial and federal GHG emissions levels prescribed by Environment and Climate Change Canada (2021). These GHG emission levels were used as a basis for evaluating potential climate changes that result from the proposed Project. The existing conditions are as follows:

- Canada's total annual GHG emissions reported for 2019 were 730 Mt CO_2e. Based on the available emissions data reported for 2017, Canada represented 1.5% of total global GHG emissions.
- Saskatchewan's emissions for 2019 were estimated to be 75 Mt CO_2e.

Members of the Clearwater River Dene Nation and Birch Narrows Dene Nation noted that forest fires are more common and larger in size than in the past.

Project Interactions

All Project interactions assessed by climate change are listed in Section 5.2.

Environmental Design Features and Mitigation Measures

Key environmental design and mitigation measures to reduce potential effects of GHG emissions would include:

- primarily using LNG for on-site power generation;
- using heat recovery systems for heating certain site processes and buildings; and
- efficiently managing energy and equipment at the proposed Project site.

Based on potential interactions between the proposed Project and the environment, and considering the mitigations that would be applied, one primary pathway was assessed for climate change:

- Project GHG emissions and contributions to climate change.

This pathway was carried forward to the residual effects analysis, which was conducted to determine the potential effects from the proposed Project on climate change. A specific assessment of the RFD Case was not completed as the Application Case provided all required information for the federal government to consider the proposed Project relative to future developments.

Key Findings

The residual effects analysis calculated the estimated annual direct GHG emissions for each GHG compound (i.e., carbon dioxide, methane, and nitrous oxide) as well as for the total carbon dioxide equivalent emissions. The estimated maximum annual GHG emissions from each Project phase on provincial, national sector, and federal levels were assessed through comparison to the most recent available emission totals for Saskatchewan and Canada.

The key findings from the climate change assessment were:

- **Project GHG emissions would have an adverse effect on climate change** due to the global and permanent nature of GHG emissions.

  However, total emissions are expected to be low in magnitude, with the proposed Project contributing less than 0.3% of the provincial annual total emissions and less than 0.02% of the federal annual total emissions.
- **Project GHG emissions would not meaningfully affect Saskatchewan and Canada's abilities to reach climate change commitments** within the current regulatory framework.
- The **downstream effects of the proposed Project would increase Canada's ability to meet national emission reduction targets** due to the low GHG emissions associated with nuclear power generation compared to coal and natural gas power generation.
- The proposed **Project could also support Canada's transition to a low carbon economy** by providing the country with the fuel needed from cleaner energy sources.

Effects to the climate change VC as a result of the Project are predicted to be not significant.

Results of the climate change VC assessment were not carried forward to other technical disciplines; however, potential changes to temperature and precipitation due to climate change were considered by applicable technical disciplines as described in the following subsections.

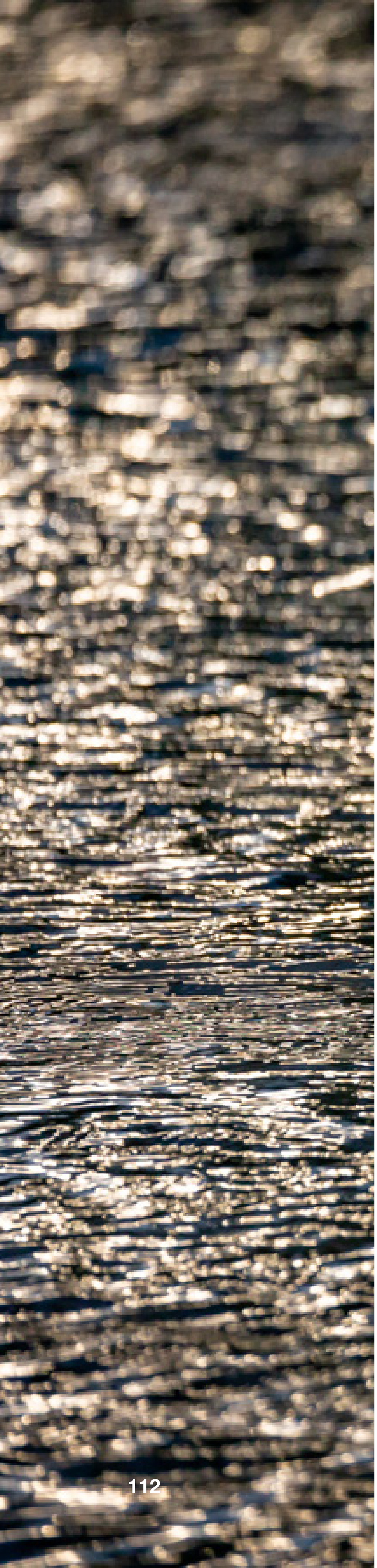
Key findings, continued . . .

There is a high level of confidence associated with the predictions provided by the climate change assessment. Uncertainty was addressed by making assumptions that overestimated potential effects. For example, when calculating the potential GHG emissions, a worst-case scenario was assumed (i.e., GHG emissions were calculated based on the maximum expected value in any given year). This precautionary approach yielded an estimate of the maximum annual GHG emissions from the Project, though GHG emissions are anticipated to be lower than predicted.

Monitoring and Management of Potential Effects

Monitoring and managing potential effects to climate change would involve implementing:

- a framework for quantifying and reporting annual Project GHG emissions if the Project exceeds the federal 10 kilotonnes reporting threshold; and
- a Net-Zero Framework to provide a preliminary assessment of potential alternative technologies and practices that could be used to reduce GHG emissions during the lifespan of the proposed Project.



5.3

Water

Section 5.3 discusses the effects of the proposed Project on components of the aquatic environment, particularly hydrogeology, hydrology, surface water quality and sediment quality, and fish and fish habitat.

NexGen's approach to the assessments recognized the intrinsic value and cultural significance of waterbodies and watercourses to local Indigenous Groups communities for human health (e.g., drinking water), ecological health (e.g., health of wildlife and fish), harvesting, transportation, and recreation. Patterson Lake is a culturally significant area where traditional Indigenous activities have been practised for generations.

NexGen assessed the water-related components within a defined aquatic LSA and RSA (Figure 5.3-2).

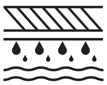
The LSA was defined to capture direct effects to water as a result of the Project. The RSA was defined to be ecologically relevant in size so as to enable a confident assessment of direct and indirect effects on water and cumulative effects from other RFDs.

Both aquatic study areas are within the Clearwater River watershed:

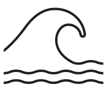
- The LSA extends from the Clearwater River headwaters to just downstream of the Naomi Lake outlet, covering a surface area of 685 km^2.
- The RSA extends from the Clearwater River headwaters to just upstream of the Mirror River confluence, covering a surface area of 1,076 km^2.

Potential Project effects were assessed by the four water technical disciplines, which included four intermediate components and four VCs:

Intermediate Components



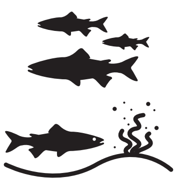
- **Hydrogeology** was selected as an intermediate component based on the connection to hydrology and surface water quality, such as potentially affecting the surface water balance or the chemical loading to surface waters, and the associated influence on the health and function of aquatic and terrestrial ecosystems and people.



- **Hydrology** was selected as an intermediate component based on the connection to human use, fish and fish habitat, and the health and function of aquatic and terrestrial ecosystems. Changes to water levels or flow rates in the environment could affect the suitability of water for these end uses.

- **Surface water quality and sediment quality** were selected as intermediate components based on how changes could influence the health of fish, plants, and wildlife, and the people that value and/or use natural resources.

Valued Components



- **Fish and fish habitat** were assessed for four valued components: lake trout, lake whitefish, northern pike, and walleye. The selection of these VCs was based on their importance to the healthy functioning of aquatic and terrestrial ecosystems and food webs, their cultural and traditional value, and as an economic resource for local communities.

Project interactions for water components are shown in the Project interactions matrix for water (Figure 5.3-1). Project activities and mitigations that are common to all water components are:

- **Underground mine development**, which has the potential to affect groundwater quantities in multiple ways. During Construction and Operations, groundwater would be managed to allow for underground mining by pumping groundwater to the surface. The pumped water would then be combined with other Project-affected waters collected on surface. Water would be monitored, treated, and released to Patterson Lake once it has been confirmed as being of acceptable quality.
- **Storage of materials in the UGTMF** to avoid the environmental effects of an above-ground tailings facility. Cemented paste tailings would be used to reduce the mass loading of solutes that would migrate from the UGTMF to Patterson Lake. The reduction in loadings would mitigate potential effects of solute seepage to surface water quality, sediment quality, and fish and fish habitat.

Approach to the Environmental Assessment

NexGen recognized the intrinsic value and cultural significance of waterbodies and watercourses to:

- Indigenous Peoples and local communities;
- ecological health; and
- harvesting, transportation, and recreation.

"Water is the most important thing, vital to life."

~ member of the
Birch Narrows Dene Nation
Joint Working Group

- **Handling and storage of waste rock** to mitigate seepage of potentially acid generating waste rock in the waste rock storage area (WRSA). Waste rock has the potential to affect groundwater quality and surface water quality in Patterson Lake and waterbodies and watercourses farther downstream, which could then affect fish and fish habitat. Handling and storage of waste rock would involve the use of engineered containment and diversion of runoff and seepage to the effluent treatment plant during Operations. After Closure, engineered source control (i.e., the placement of layered materials during construction of the stockpile) in the potentially acid generating WRSA would limit infiltration and oxygen ingress to reduce the loading of metals and other solutes to groundwater, and subsequently to surface waters.
- **On-site water management** to mitigate effects to hydrology, surface water quality, and sediment quality by diverting water around and through the site, as appropriate. This system would maintain water quality of non-contact waters while containing and diverting potentially acid generating waste rock, special waste rock, and ore runoff and seepage to the effluent treatment plant. Collecting and treating mineralized waters have the potential to affect hydrology by changing the timing of flows to the environment.
- **Treatment and discharge of process plant effluent and sewage** to mitigate effects to surface water quality, sediment quality, and fish and fish habitat. As mining and processing activities and domestic uses would change the quality of water, effluent and sewage treatment plants would be operated to reduce the discharge of constituents to the aquatic environment and promote their rapid dispersion. Treated water would be tested and verified against discharge criteria prior to release.

These Project interactions have the potential to affect hydrogeology, hydrology, surface water quality, sediment quality, and fish and fish habitat.

Figure 5.3-1: Project Interactions Matrix for Water

✓ = interaction is anticipated (i.e., primary or secondary pathway, or positive interaction).

Project Phase or Far-Future Scenario	Key Project Component/Activity	Water			
		Hydro-geology	Hydrology	Surface Water Quality and Sediment Quality	Fish VCs
Construction	Land clearing, site preparation and construction of facilities and infrastructure, underground shaft / mine development	✓	✓	✓	✓
	Site traffic, transportation of personnel and materials to and from the site			✓	✓
Operations	Site traffic, transportation of personnel and materials to and from the site			✓	✓
	Process plant and underground operations, underground tailings management facility	✓	✓	✓	✓
	Handling and storage of waste rock, special waste rock, and ore	✓	✓	✓	✓
	Effluent treatment plant and treated effluent discharge		✓	✓	✓
	Water intake for fresh water and process water		✓		✓
	Power generation			✓	✓
	Non-hazardous waste incineration			✓	✓
	Additional infrastructure (e.g., roads, airstrip, camp, maintenance shop, offices), water storage and effluent monitoring ponds		✓	✓	✓
Decommissioning and Reclamation	Site traffic, transportation of personnel and materials to and from the site			✓	✓
	Removal of infrastructure, restoration and revegetation of facilities and infrastructure		✓	✓	✓
Far-future scenario	Potential for long-term migration of constituents of potential concern from underground facility and waste rock storage areas. Not a Project phase.	✓		✓	✓

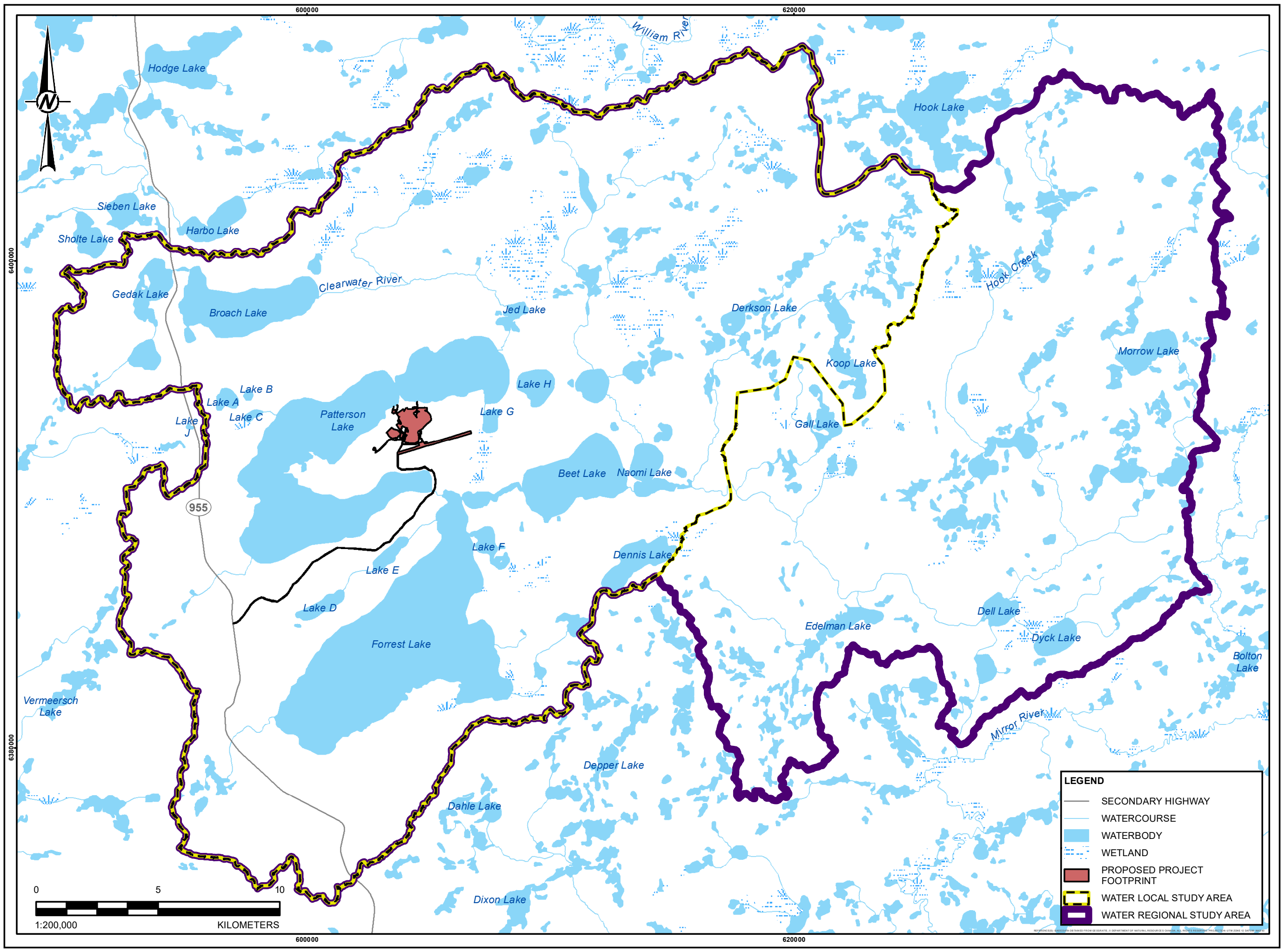


Figure 5.3-2: Map of Water Study Areas

5.3.1 Hydrogeology

Measurement Indicators

The measurement indicators for hydrogeology were groundwater elevations, groundwater flow directions and rates, and groundwater quality.

Existing Conditions

Existing hydrogeological conditions within the RSA were established through field studies (e.g., testing hydraulic response, sampling groundwater) and desktop analyses (e.g., interpreting drilling records, hydraulic response test results). The technical review also included identifying hydrostratigraphic units, based primarily on geological units that exhibited similar hydraulic properties and structures.

A Hydrostratigraphic unit is a geologic formation, part of a formation, or group of formations in which there are similar hydrogeologic characteristics, allowing grouping into aquifers or confining layers.

The existing conditions are as follows:

- The basement rock has relatively low porosity and permeability. The primary hydraulic pathways are inferred to be fractures, faults, and shear zones, which, as enhanced conductivity features, define the overall hydraulic conditions of the basement rock.
- The layers of the overlying Athabasca Group sandstone bedrock are the dominant areas where groundwater flow occurs, and are the primary aquifers below the surface of the Project site.
- Interbedded zones of clay-rich cementation act as aquitards, inhibiting the vertical movement of water. The vertical hydraulic conductivity in these layers is lower than the horizontal hydraulic conductivity.
- Overlying, unconsolidated glacial drift deposits are present. Based on the relatively coarse-grained nature of these deposits in the LSA, they are considered to be an unconfined aquifer.
- Deep groundwater predominantly flows west to east, controlled by regional topography. Deep groundwater also flows north and upward toward Patterson Lake.
- Shallow groundwater flow patterns mimic those of the local topography, infiltrating in highlands and discharging in low-lying waterbodies and drainages. At the peninsula where the Project would be located, there is a shallow groundwater flow divide running approximately west to east, south of the proposed mine. Shallow groundwater in the glacial drift deposits flows north and south from this divide, discharging to Patterson Lake in both directions.

Information collected through the baseline studies was used to derive model scenarios that enabled the prediction of Project-related changes to the measurement indicators.

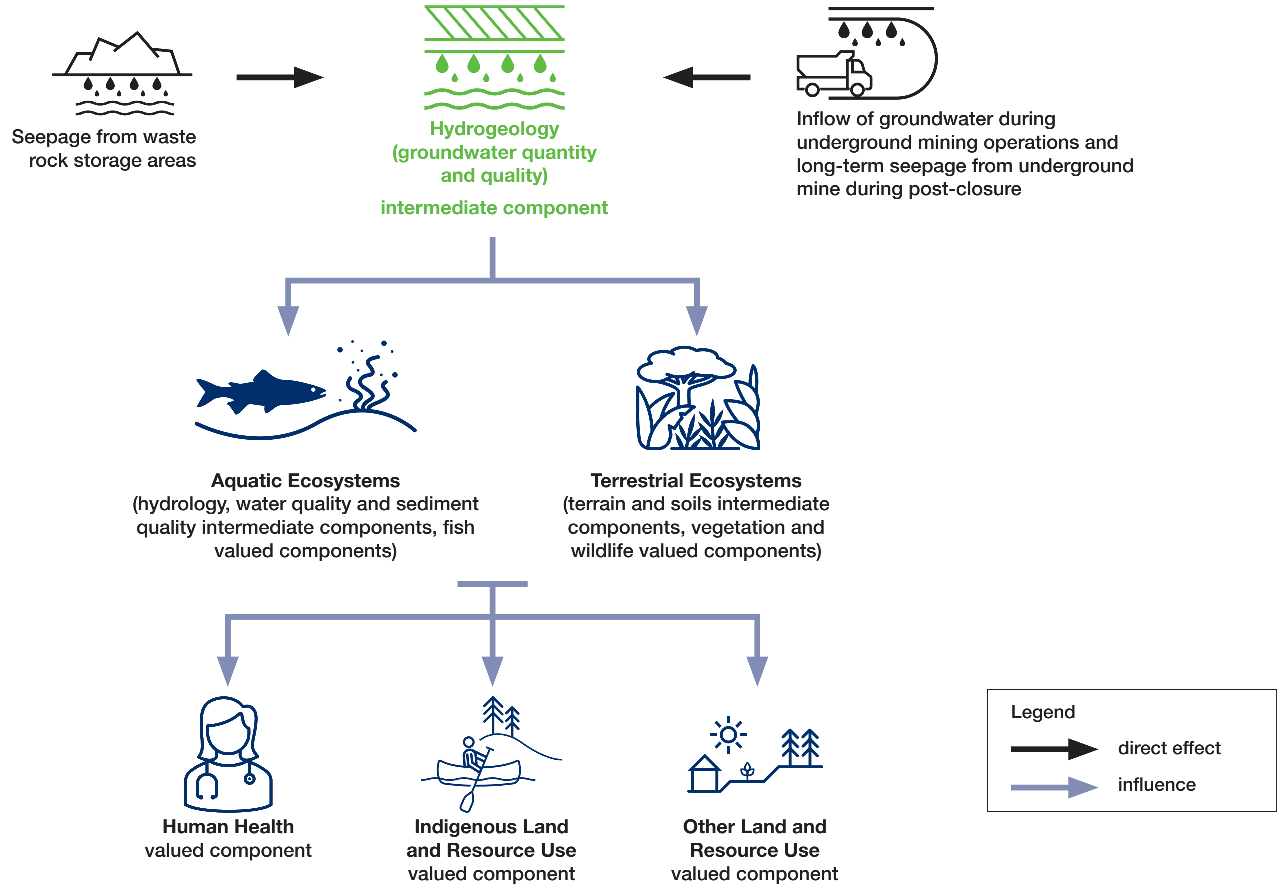


Figure 5.3-3: Linkage Diagram of Project Effects on Hydrogeology and Influenced Valued Components

Project Interactions

In addition to the Project interactions listed in Section 5.3, site preparation activities were assessed for hydrogeology.

Environmental Design Features and Mitigation Measures

In addition to the environmental design features and mitigation measures mentioned in Section 5.3, key measures that were identified to reduce potential effects to hydrogeology during the proposed Project's lifespan include:

- isolating mine workings from groundwater inflows through high permeability strata with a hydrostatic liner in-shaft;
- segregating and storing potentially acid generating material and non-potentially acid generating material; and
- designing, maintaining, and monitoring the mine dewatering system to control the flow of groundwater discharge.

Based on potential interactions between the proposed Project and the environment, and considering the mitigations that would be applied, the following four primary pathways were assessed for hydrogeology:

- Groundwater inflow to the underground mine, which may affect surface water elevations and flow rates.
- Seepage from the WRSAs to Patterson Lake during Construction, Operations, and Closure, which may alter groundwater, surface water quality, and sediment quality.
- Seepage from the WRSAs to Patterson Lake after Closure, which may adversely affect groundwater, surface water quality, and sediment quality.
- Seepage from the UGTMF and backfilled mine stopes to Patterson Lake after Closure, which may adversely affect groundwater, surface water quality, and sediment quality.

Key Findings

The hydrogeological conditions observed in the technical studies were used to develop a three-dimensional numerical groundwater flow model to predict residual effects on hydrogeological conditions within the RSA through all Project phases and for a far-future scenario.

The key findings from the hydrogeology assessment were:

- **Groundwater elevation:** During Operations, seepage to the mine would result in a depressurization of the surrounding bedrock, which would be observed as a reduction in groundwater elevation (i.e., drawdown).
- **Water balance:** During Operations, the groundwater seepage collected from the underground mine would be monitored, treated, re-monitored, and discharged to Patterson Lake, resulting in a long-term net change of zero to the overall water balance of the surface water system.
- **Groundwater migration:** Groundwater originating at the UGTMF and mine stope backfill source areas is predicted to slowly migrate upward primarily through the fault and shear zones, then laterally through the sandstone, before discharging into Patterson Lake.
- **Travel time:** Seepage from beneath the WRSAs is predicted to infiltrate vertically downward to the water table, then laterally toward Patterson Lake in both northerly and southerly directions. For the shallow groundwater flow paths, the approximate travel time from the WRSAs to Patterson Lake is estimated to be 43 years to the north and 77 years to the south. The travel time from the underground mine to the discharge location at Patterson Lake is estimated to be approximately 1,000 years.
- **Solutes:** Peak mass loadings of solutes are predicted to be driven primarily by waste rock and reflooded mine workings for most solutes.

Key findings, continued . . .

These results were carried forward into the assessments of hydrology, surface water quality and sediment quality, fish and fish habitat, terrain and soils, vegetation, wildlife and wildlife habitat, human health, Indigenous land use and resource use, and other land and resource use.

There is a moderate degree of confidence in the predictions. To gain an understanding of the potential influence of uncertainty in model simulations, a sensitivity analysis was completed where individual input parameters were adjusted and the model output was compared to the Application Case results. This approach was adopted to assess the potential variability in the simulated results as a function of both conceptual model uncertainty (i.e., alternative model scenarios) and general uncertainty in the model input parameters. The sensitivity analysis showed that reduction in the uncertainty of the source terms for the WRSAs, and to a lesser degree, the underground reflooded mine, would result in greater robustness of the model predictions. These source terms would be refined through monitoring.

Monitoring and Management of Potential Effects

Monitoring and managing potential effects to hydrogeology would involve implementing:

- monitoring and management plans, including a Groundwater Protection and Monitoring Plan and a Mine Waste Management Plan;
- a Decommissioning and Reclamation Plan; and
- an adaptive management plan to manage seepage from the WRSAs after Closure, which would reduce uncertainty and support Project design during Operations, if necessary, to mitigate post-Closure conditions.

5.3.2 Hydrology

Measurement Indicators

The measurement indicators for hydrology were water surface elevations, watercourse flow rates, stream channel parameters, and fluvial sediment transport.

Existing Conditions

Existing hydrological conditions were established for the RSA through field-based studies, desktop analyses (e.g., numerical modelling), and community engagement. The baseline studies characterized existing aspects of the natural environment in the LSA and RSA including geomorphology, stream channel parameters, stream hydraulics, and fluvial sediment transport along the Clearwater River and its tributaries.

The existing conditions are as follows:

- The ground surface is highly permeable. Water typically infiltrates the ground and moves via subsurface pathways to waterbodies or watercourses.
- There is an abundance of waterbodies from small wetlands to larger lakes; however, there are relatively few watercourses on the landscape because of the permeable ground surface.
- Water primarily enters the system as snowfall or rainfall, with some groundwater contributions, as is typical of colder regions in Canada.
- Waterbodies and watercourses usually have a common seasonal pattern, with higher water levels and flows during spring and summer, and lower water levels and flows during the rest of the year.
- Surface water flows vary over the year, due to fluctuations of hydrological processes driven by changes in precipitation and air temperature and energy inputs from solar radiation. The Clearwater River flows increase in a downstream direction as tributary inflows increase. The seasonal variability in flow and water levels is low compared to watercourse-dominated systems outside of the RSA.

Information collected through Project baseline studies was used to derive model scenarios that enabled the prediction of Project-related changes to the measurement indicators.

Project Interactions

In addition to the Project interactions listed in Section 5.3, the following Project activities were assessed for hydrology:

- site preparation;
- construction of facilities and infrastructure; and
- final removal of infrastructure.

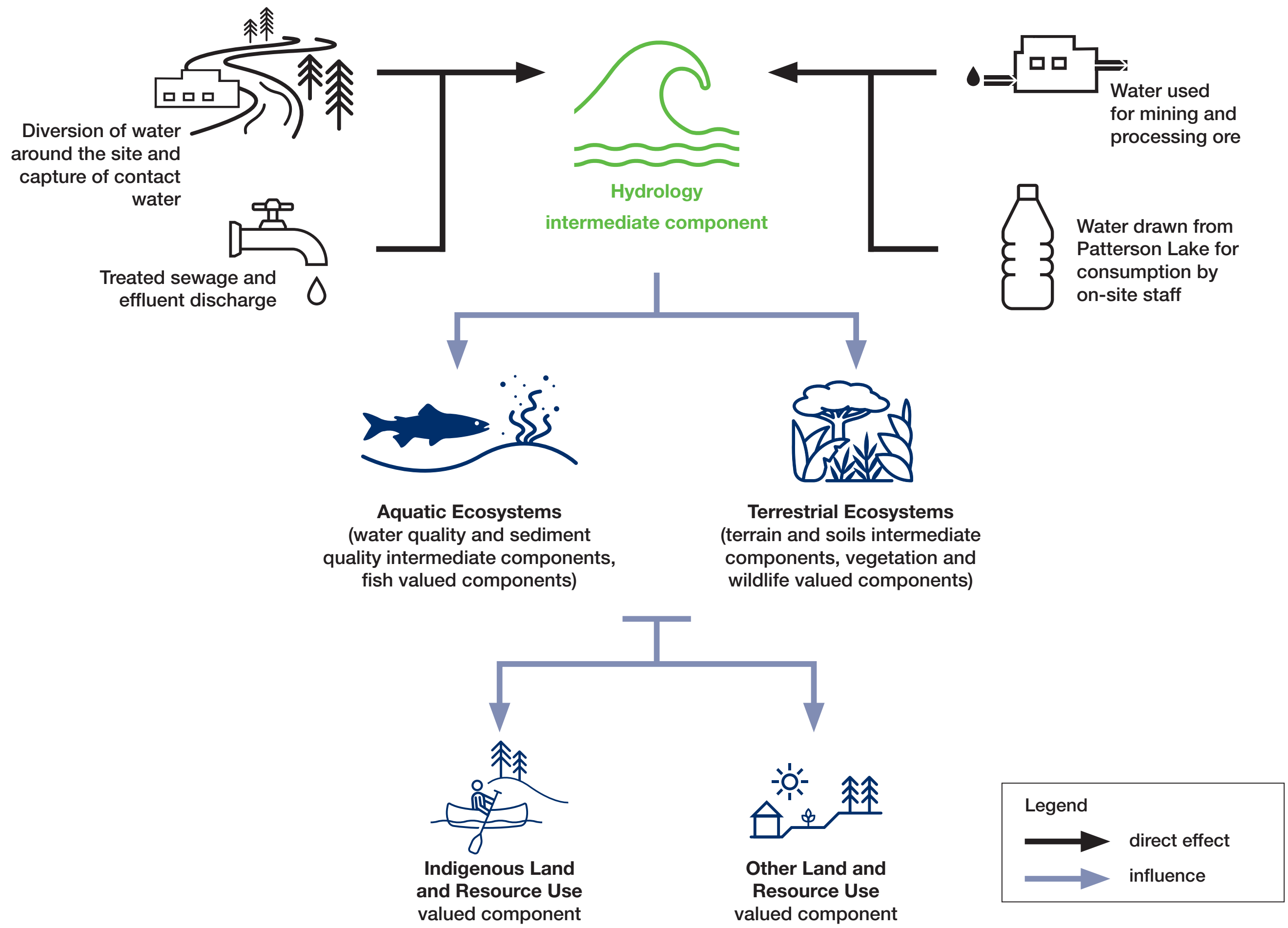


Figure 5.3-4: Linkage Diagram of Project Effects on Hydrology and Influenced Valued Components

Environmental Design Features and Mitigation Measures

In addition to the environmental design features and mitigation measures noted in Section 5.3, the key measures that were identified to reduce potential effects to hydrology during the proposed Project's lifespan include:

- using erosion control;
- ground contouring of disturbed and reclaimed areas; and
- implementing progressive reclamation and revegetating disturbed areas.

Based on potential interactions between the proposed Project and the environment and considering the mitigations that would be applied, the following three primary pathways were assessed for hydrology:

- Diversion of site runoff from its natural course and change in drainage areas during Operations and Closure, which may affect the timing and quantity of water reporting to Patterson Lake.

- Changes in water balance and hydrological processes during Operations and Closure, which may affect basin yields in the upstream contributing area, and, in turn, affect water surface elevations of waterbodies, as well as watercourse flows.
- Changes in watercourse flows during Operations, which may cause erosion downstream, alter stream channel sediment transport and parameters, and affect shoreline integrity.

Key Findings

Models were developed to predict residual effects on the hydrological regime. A regional hydrological model and a fluvial sediment transport model were developed for the Clearwater River downstream of Patterson Lake to evaluate a range of conditions that could be encountered during the Project lifespan. The key findings of the hydrology assessment were:

- **Flow rates and water surface elevations (Patterson Lake):** From Construction through to the completion of the Active Closure Stage, the proposed Project would result in a net discharge of water to Patterson Lake, resulting in small, but undetectable, increases in waterbody water surface elevations, which would diminish downstream of Patterson Lake as the watershed area and ambient flows increase.
- **Flow rates and water surface elevations (Clearwater River):** The RFD Case indicated that increases are expected in water surface elevations and in watercourse flow rates on the Clearwater River downstream of Patterson Lake. However, Clearwater River water surface elevations and flow rates are predicted to remain within the range of natural seasonal and annual variability, and are not expected to impede the ability of people to navigate the waters. Changes would likely be undetectable.
- **Stream channel parameters:** Small changes in stream channel parameters are anticipated as a result of an increase in the mean annual daily flow downstream from the proposed Project. Changes would be negligible (i.e., likely undetectable) as a result of the proposed Project and the Fission Patterson Lake South Property.
- **Erosion and sedimentation:** Increases to watercourse flow rates are predicted to result in corresponding increases in erosion at the upstream reaches and increased sedimentation at downstream reaches of the Clearwater River. All assessment cases predict negligible changes in the net transport of sediment between Patterson Lake and Forrest Lake compared to existing conditions.
- **Climate change** is predicted to have larger effects on water surface elevations and flow rates than the combined effects of the Project and the Fission Patterson Lake South Property.

Both the Clearwater River Dene Nation and the Métis Nation – Saskatchewan identified that the Clearwater River is part of an extensive travel network used by their ancestors and current members.

The hydrology assessment found that changes in water surface elevations and flow rates in the Clearwater River are not expected to impede the ability of people to navigate the waters.

Key findings, continued . . .

These results were carried forward into the assessments of surface water quality and sediment quality, fish and fish habitat, terrain and soils, vegetation, wildlife and wildlife habitat, Indigenous land and resource use, and other land and resource use.

Predictions based on these methods are associated with a high degree of confidence, as the methods adopted for the hydrology assessment included extensive baseline studies and quantitative modelling, and resulted in an understanding of the hydrological system, provided context for natural variability and responses to climate, and allowed for the quantitative assessment of Project effects.

Monitoring and Management of Potential Effects

Monitoring and managing potential effects to hydrology would involve continuing:

- hydrometric monitoring that was initiated for baseline studies to verify the predictions of minimal changes in water surface elevations and watercourse flows over the duration of the proposed Project; and
- remotely operated telemetry stations to provide continual data from select hydrometric stations.

5.3.3 Surface Water Quality and Sediment Quality

Measurement Indicators

The measurement indicators for surface water quality were water quality constituent concentrations (i.e., risk to aquatic and terrestrial life), drinking water quality constituent concentrations, and productivity status constituent concentrations (i.e., the ability of a waterbody to support certain aquatic ecosystems).

The measurement indicator for sediment quality was sediment quality constituent concentrations (i.e., risk to aquatic life).

Existing Conditions

Existing surface water quality conditions were established for the RSA through field surveys carried out between 2015 and 2020 at 18 waterbodies and watercourses, including Patterson Lake and the Clearwater River. The existing conditions are as follows:

- Water quality was consistent with typical lakes and rivers in the Canadian Shield. It has a high level of clarity, near-neutral pH, and wide-ranging, seasonally varying surface water temperatures.
- Surface waters were consistently low in dissolved solids.
- Concentrations of the dominant major ions (e.g., calcium, sulphate) and total metals were mainly below water quality guideline levels. The only exceptions were total and dissolved iron, which are naturally elevated.

Existing sediment quality conditions were established for the RSA through field surveys carried out between 2018 and 2019 at eight lakes and the Clearwater River below Naomi Lake. Existing conditions are as follows:

- The top layer (i.e., 0 cm to 2 cm) of sediment consisted of a mixture of coarse sand, fine sand, and silt, with some variance in the proportion of these fractions among waterbodies.
- There was notable variability in the sediment composition of Patterson Lake among basins and study years.
- Sediment concentrations of metals and radionuclides were generally low and below environmental thresholds in waterbodies, with the exceptions of arsenic, vanadium, and polonium-210, which are naturally elevated.

Information collected through Project baseline studies was used to derive model scenarios that enabled the prediction of Project-related changes to the measurement indicators.

Project Interactions

In addition to Project interactions listed in Section 5.3, Patterson Lake and surrounding lakes were also assessed for potential effects from the deposition of metals and other chemicals via air emissions as listed in Section 5.2.

Environmental Design Features and Mitigation Measures

In addition to the environmental design features and mitigation measures noted in Section 5.3, other key measures identified to reduce potential effects to surface water quality and sediment quality during the proposed Project's lifespan include:

- recycling and reusing process water; and
- implementing robust site water management practices.

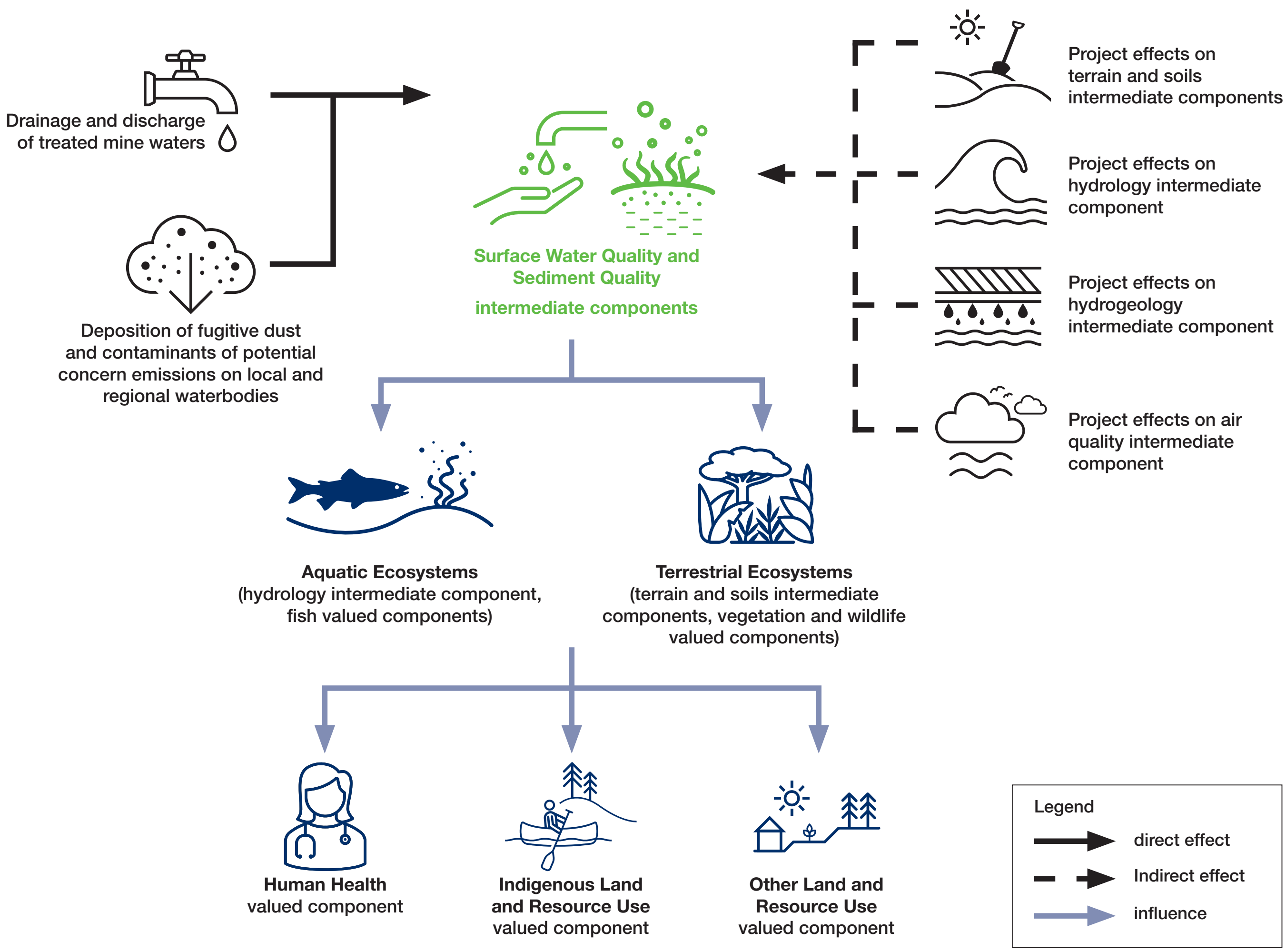


Figure 5.3-5: Linkage Diagram of Project Effects on Surface Water Quality and Sediment Quality and Influenced Valued Components

Based on potential interactions between the proposed Project and the environment and considering the mitigations that would be applied, the following six primary pathways were assessed for surface water quality:

- Deposition of fugitive dust emissions (e.g., particulate matter, metals, radionuclides) on local and regional waterbodies and watercourses during Construction, Operations, and Closure.
- Deposition of criteria air contaminant emissions (e.g., particulate matter) on local and regional waterbodies and watercourses during Construction, Operations, and Closure.
- Direct discharge of treated effluent to Patterson Lake during Construction, Operations, and Closure.

- Direct discharge of treated sewage to Patterson Lake during Construction, Operations, and Closure.
- Seepage from the WRSAs during Construction and Operations to groundwater, which may flow into Patterson Lake.
- Runoff and seepage from the WRSAs and UGTMF to Patterson Lake following Closure.

The assessment did not identify any primary pathways for sediment quality. Environmental design features (e.g., treated effluent diffuser design) and management practices (e.g., sediment and erosion control) were deemed to adequately mitigate effects to sediment quality.

Key Findings

A set of water quality models was used to predict changes in surface water quality at the point of discharge and in the receiving environment. The predicted concentrations were compared to their respective thresholds that were derived from applicable water quality and drinking water guidelines, objectives, or standards.

The key findings from the surface water quality and sediment quality assessments were:

- **Overall constituent concentrations:** During the lifespan of the proposed Project in the Application Case and the RFD Case, overall constituent concentrations would increase locally; however, the predicted concentrations would not result in any threshold exceedances for any measurement indicator during Construction or Operations.
- **Localized constituent concentrations:** During the lifespan of the Project, the air deposition effects would result in minor, localized changes to surface water constituent concentrations; however, such changes would not result in any threshold exceedances in the Application Case or RFD Case.
- **Metals and radionuclides:** In the far-future scenario, infiltration and seepages from the Project footprint to the groundwater regime would result in a long-term, continuous migration of metals and radionuclides from the UGTMF and WRSAs to the receiving environment; however, increased concentrations of cobalt and copper were the only constituents that are predicted to exceed water quality thresholds in the Application Case and RFD Case under this scenario.

Indigenous Knowledge and Traditional Land Use Studies completed by the Clearwater River Dene Nation, Métis Nation – Saskatchewan, Birch Narrows Dene Nation, Buffalo River Dene Nation, and Ya'thi Néné Lands and Resources highlighted that lakes, rivers, and other waterways support fishing, trapping for aquatic and other fur-bearing animals, hunting for moose, the gathering of medicinal plants, and are a source of drinking water.

Key findings, continued . . .

- **Potentially acid generating WRSA:** During the lifespan of the Project, mitigation applied to the potentially acid generating WRSA is predicted to result in reductions in the far-future mass loading of cobalt and copper and other constituents to Patterson Lake via groundwater.

These results were carried forward into the assessments of fish and fish habitat, vegetation, wildlife and wildlife habitat, human health, Indigenous land use and resource use, and other land and resource use.

There is a high degree of confidence in the predictions related to the surface water quality and sediment quality assessments in that the assessments have not underestimated potential effects of the Project. The approach included a comprehensive understanding of the existing surface water quality and sediment quality conditions, the proposed mine plan at the time of the assessments, and the conservatism associated with the modelling.

Monitoring and Management of Potential Effects

Monitoring and managing potential effects to surface water quality and sediment quality would involve implementing:

- an Environmental Protection Program and control and monitoring of on-site water management infrastructure for site contact water;
- an Effluent Monitoring Plan to monitor components that meet Metal and Diamond Mining Effluent Regulation (MDMER) requirements at the final point of discharge, as well as other release criteria identified through the licensing process;
- monitoring of surface water quality prior to the release of non-mineralized contact water, treated contact water, and treated sewage to the environment;
- an adaptive management plan for copper and cobalt to refine source terms, reduce uncertainty in future predictions, and adapt the level of mitigation in response to operational datasets; and
- an Environmental Monitoring Plan to establish surface water quality monitoring at the edge of the regulatory mixing zone.

5.3.4 Fish and Fish Habitat

Measurement Indicators

The measurement indicators for fish and fish habitat were habitat availability, habitat distribution, and survival and reproduction.

Existing Conditions

Existing fish and fish habitat conditions were established for the RSA through field surveys and desktop analyses between 2015 and 2020. Several waterbodies were surveyed including Beet Lake, Broach Lake, Forrest Lake, Naomi Lake, Patterson Lake, and sections of the Clearwater River.

The existing conditions are as follows:

- The most abundant large-bodied fish species captured were white sucker, lake whitefish, yellow perch, longnose sucker, northern pike, walleye, burbot, and lake trout. Commonly captured small-bodied species included trout perch, spottail shiner, and lake chub. These species are typical of northern temperate waterbodies and watercourses in Saskatchewan.
- Of the 17 fish species identified, none had designated conservation status by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC 2021) or the *Species at Risk Act* (aquatic species list), and none would be considered rare or unique to the area according to Saskatchewan's Conservation Data Centre taxa lists (SKCDC 2021).
- The four fish species that are VCs (i.e., lake trout, lake whitefish, northern pike, and walleye) are widely distributed throughout the LSA.

Summaries of fish habitat conditions, including lake trophic status, lower trophic level community conditions, and fish communities, were provided to characterize the Base Case against which the Project-related changes to the measurement indicators were evaluated. This information was considered along with the hydrology and surface water quality and sediment quality information described in Sections 5.3.2 and 5.3.3, respectively.

Project Interactions

In addition to Project interactions listed in Section 5.3, the following Project effects were assessed for fish and fish habitat:

- direct physical habitat loss and disturbance associated with the Construction and Operation phases (e.g., fresh water intake, treated effluent diffuser, treated sewage outfall in Patterson Lake);

- changes to the availability of the riparian zone vegetation that is adjacent to Patterson Lake; and
- sediment release during in-water construction and from ground disturbance.

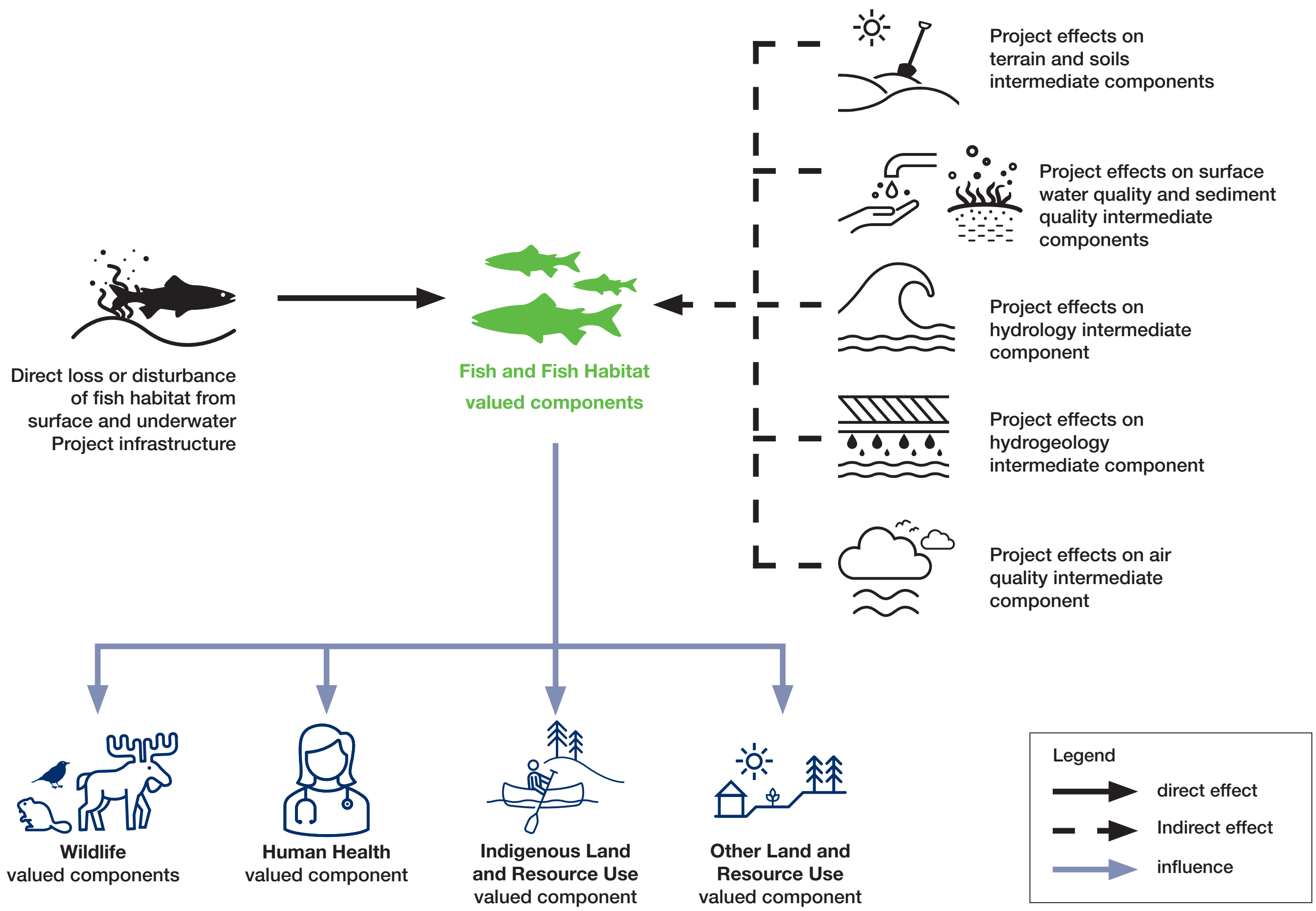


Figure 5.3-6: Linkage Diagram of Project Effects on Fish and Fish Habitat Valued Components and Influence on other Valued Component

Environmental Design Features and Mitigation Measures

In addition to the environmental design features and mitigation measures noted in Section 5.3, key measures that were identified to reduce potential effects to fish and fish habitat during the proposed Project's lifespan include:

- implementing best management practices for erosion and sediment control;
- reclaiming and revegetating disturbed areas;

- reusing and recycling water wherever possible through on-site water management infrastructure and systems to minimize the amount of fresh water withdrawn from Patterson Lake; and
- designing proposed Project infrastructure such as the fresh water intake, treated effluent diffuser, and treated sewage outfall to minimize the physical footprint and associated habitat loss or disturbance in Patterson Lake.

Based on potential interactions between the proposed Project and the environment and considering the mitigations that would be applied, one primary pathway was assessed for fish and fish habitat:

- Changes in surface water quality due to runoff and seepage from the WRSAs and groundwater flow from the UGTMF after Closure. This runoff and seepage may alter surface water quality in Patterson Lake and adversely affect fish habitat availability, survival, and reproduction.

Key Findings

The residual effects analysis described the potential effects on fish and lower trophic level organisms that may occur due to changes in water quality after Closure in a far-future scenario. The assessment of surface water quality indicated that concentrations of copper and cobalt were predicted to increase in the receiving environment in the far future. Of these metals, only copper is predicted to exceed both water quality guidelines for the protection of aquatic life and reference values used in the aquatic health assessment. As a result, the residual effects analysis focused on assessing the potential effects associated with exposure to elevated copper concentrations in the receiving environment.

The key findings from the fish and fish habitat assessment were:

- **Habitat availability:** There is limited potential for changes in habitat availability due to exposure to predicted copper concentrations in Patterson Lake after Closure and in the far future.
  - Adverse effects on the viability and suitability of habitats for use by fish VCs are considered unlikely and any realized changes in habitat availability are unlikely to be measurable.
  - Peak copper concentrations and changes in habitat availability would be restricted to Patterson Lake North Arm – West Basin.
  - Changes to the health of lower trophic level communities (e.g., plankton, benthic invertebrates) and forage fish (e.g., lake whitefish) could alter the available food supply for fish, and consequently the quality of available habitat for fish VCs in Patterson Lake. However, the results of the aquatic health assessment completed for the Project indicated that predicted copper concentrations would be unlikely to result in population and/or community-level effects on lower trophic organisms or forage fish. Therefore, broad-scale changes to the food base for fish VCs are not expected.

Key findings, continued . . .

- » **Habitat distribution:** No adverse effects on fish VC habitat distribution are predicted to occur as a result of predicted changes to surface water quality in the aquatic receiving environment after Closure and in the far future.
- » Fish would be able to continue using existing habitats and move between habitats to carry out their life processes (e.g., spawning, rearing, overwintering).
- » There would be no effects on habitat arrangement or the spatial distribution and movement of fish in Patterson Lake.

- **Survival and reproduction:** The results of the aquatic health assessment indicated that effects on the health of fish due to direct exposure to copper in the water column, and therefore survival and reproduction, are not expected for predator fish (e.g., lake trout, walleye, northern pike) and are unlikely for forage fish (e.g., lake whitefish).
  - » Any changes in habitat quality are considered unlikely to measurably affect the survival and reproduction of fish VCs.

Incremental and cumulative effects on fish and fish habitat are predicted to be not significant. Although changes to fish VC habitat availability, habitat distribution, and survival and reproduction are possible, the predicted effects would be within the resilience and adaptability limits for the four fish VCs in the Application Case and the RFD Case.

These results were carried forward into the assessments of wildlife and wildlife habitat, human health, Indigenous land and resource use, and other land and resource use.

There is a moderate to high degree of confidence in the predictions related to the fish and fish habitat assessment. Conservatism considered in the water quality modelling and the aquatic health assessment improved the overall level of confidence that effects were not underestimated and were more likely overestimated.

Indigenous Groups spoke of the importance of fishing for subsistence, survival, and livelihood, and highlighted fishing as an important aspect of community and cultural life.

The assessment of fish and fish habitat predicted that effects from the Project would be within the resilience and adaptability limits of fish species.

Monitoring and Management of Potential Effects

Monitoring and managing potential effects to fish and fish habitat would involve implementing:

- an Environmental Monitoring Plan for the Project lifespan, which would include monitoring benthic invertebrates and fish to support the adaptive management plan for copper and cobalt; and
- an environmental effects biological monitoring study and integrating the findings into the Environmental Monitoring Plan, as required under the MDMER.

5.4

Land

Section 5.4 discusses the effects of the proposed Project on components related to land; specifically, terrain and soils, vegetation, and wildlife and wildlife habitat. The assessments also considered the potential Project effects on the quantity and quality of the land available to support overall biodiversity.

NexGen's approach to the assessment recognized Indigenous perspectives on the land, including that physical features of the landscape (e.g., ridges, river valleys, frozen lakes) contribute to a sense of place, and are often used for travel and as navigational landmarks. Features of the physical landscape also often have Indigenous place names that connect land users with their history and represent long-standing relationships with particular places. In addition, healthy land attributes, such as abundant vegetative cover, contribute to wildlife habitat and provide a source of food.

NexGen assessed the land-related components at different spatial scales. The selection of the assessment study areas considered VC-specific and ecosystem-centred attributes and boundaries, and the predicted spatial extent (i.e., zone of influence) of Project effects and other existing and future activities / developments (Figure 5.4-2):

- The maximum disturbance area covers 981 ha or 9.81 km^2, and is the smallest scale of assessment where the potential direct effects of the proposed Project on terrain and soils, vegetation, and wildlife and wildlife habitat can be assessed accurately and precisely. To address uncertainty in the final design of the Project, the assessment assumed a maximum disturbance area that is four times larger than the site study area so that adverse effects were not underestimated.
- The LSA is approximately 28.3 km^2, and is defined by a 500 m buffer around the maximum disturbance area. The LSA provides local context for assessing potential Project effects and includes disturbances from previous and existing human-related activities (e.g., NexGen's existing exploration camp, public trails, cutlines).

- The RSA is approximately 1,075 km^2 and includes the LSA, Beet Lake, Forrest Lake, Naomi Lake, and the watershed east and north of the confluence of the Clearwater and Mirror rivers.

NexGen's approach to the assessment recognized Indigenous perspectives on the land. Features of the physical landscape often have Indigenous place names that connect land users with their history and represent long-standing relationships with particular places.

Potential Project effects were assessed by the three land technical disciplines, which included two intermediate components and 15 VCs:

Intermediate Components

- **Terrain and soils** were selected as intermediate components based on the potential for the Project to influence the establishment of plant species and vegetation communities, and associated wildlife habitats and species, over time.

Valued Components

- **Vegetation** includes four VCs based on ecological and socio-economic / cultural importance, and the importance of vegetation as both a traditional and current food source for people and wildlife. Vegetation VCs included upland ecosystems, wetland ecosystems, riparian ecosystems, and traditional use plant species.
- **Wildlife and wildlife habitat** includes 11 VCs based on their ecological and socio-cultural importance, and the importance of wildlife as both a traditional and current food source for people. Wildlife and wildlife habitat VCs included woodland caribou, moose, grey wolf, black bear, beaver, little brown myotis, olive-sided flycatcher, rusty blackbird, common goldeneye, mallard, and Canadian toad.

Project interactions for land components are shown in the Project interactions matrix for land (Figure 5.4-1). Project activities and mitigations that are common to the three land components are:

- **Land clearing, site preparation, and construction of facilities and infrastructure**, which have the potential to result in physical alterations to the landscape (e.g., re-sloping, re-grading) during all phases of the Project. Physical alterations may affect the quantity, quality, and distribution of soil available at the site, which in turn would affect soil productivity and the types of ecosystems that could be reclaimed on the landscape.
- **Handling and storage of waste rock, special waste rock, and ore**, which would be stored on surface and would affect the landscape during all phases of the Project. Seepage may occur from the storage areas and may potentially cause changes to soil quality or influence vegetation growth and wildlife health.
- **Development and use of water management infrastructure**, as the construction of these facilities would result in alterations to the land surface and may adversely affect wildlife habitat availability and distribution.

- **Removal of infrastructure, restoration, and revegetation**, as while the purpose of these activities is to restore the land to conditions that are similar to those present before mining commences, such alterations to the landscape may influence soils, vegetation, and wildlife habitat in the future.
- **Environmental design features**, such as the UGTMF and access road alignment, are intended to minimize the Project's effects. In addition, the proposed Project footprint was optimized and would be limited to the extent practicable to minimize disturbances to terrain and soils, vegetation, and wildlife and wildlife habitat.
- **Additional mitigation measures**, such as:
    - » using clearing equipment that minimizes surface disturbance (e.g., equipment with low ground pressure tracks or tires);
    - » limiting the steepness and length of slopes of disturbed areas and stockpiled soils; and
    - » progressively reclaiming, restoring, and revegetating disturbed areas and areas where non-permanent Project components have been removed.

These Project interactions have the potential to affect terrain and soils, vegetation, and wildlife and wildlife habitat.

Figure 5.4-1: Project Interaction Matrix for Land

✓ = interaction is anticipated (i.e., primary or secondary pathway, or positive interaction).

		Land		
Project Phase or Far-Future Scenario	**Key Project Component/Activity**	**Terrain and Soils**	**Vegetation VCs**	**Wildlife VCs**
Construction	Land clearing, site preparation and construction of facilities and infrastructure, underground shaft / mine development	✓	✓	✓
	Site traffic, transportation of personnel and materials to and from the site	✓	✓	✓
Operations	Site traffic, transportation of personnel and materials to and from the site	✓	✓	✓
	Process plant and underground operations, underground tailings management facility	✓	✓	✓
	Handling and storage of waste rock, special waste rock, and ore	✓	✓	✓
	Effluent treatment plant and treated effluent discharge		✓	✓
	Water intake for fresh water and process water			
	Power generation	✓	✓	✓
	Non-hazardous waste incineration	✓	✓	✓
	Additional infrastructure (e.g., roads, airstrip, camp, maintenance shop, offices), water storage and effluent monitoring ponds	✓	✓	✓
Decommissioning and Reclamation	Site traffic, transportation of personnel and materials to and from the site	✓	✓	✓
	Removal of infrastructure, restoration and revegetation of facilities and infrastructure	✓	✓	✓
Far-future scenario	Potential for long-term migration of constituents of potential concern from underground facility and waste rock storage areas. Not a Project phase.		✓	✓

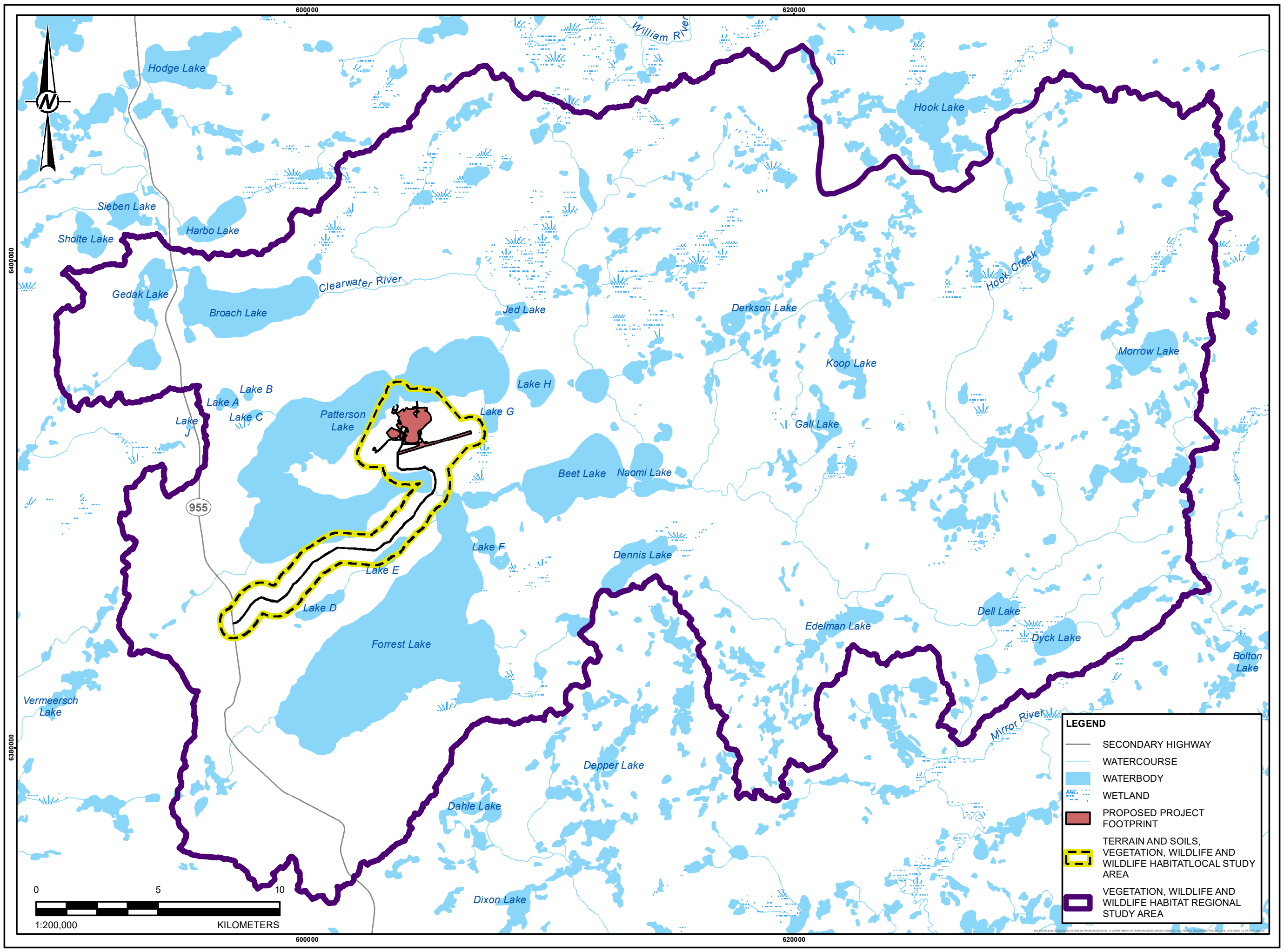


Figure 5.4-2: Map of Land Study Areas

5.4.1 Terrain and Soils

Measurement Indicators

The measurement indicators for terrain and soils were the quantity and distribution of terrain units, quantity and distribution of soil map units, and soil quality.

Existing Conditions

Existing terrain and soil conditions were established as part of baseline studies conducted in 2018 and 2019 using a combination of desktop review and field studies. The findings of the baseline studies were used to establish physical and chemical characteristics for both terrain and soils within the LSA, such as baseline metals chemistry, erosion potential, sensitivity to acidification, suitability for reclamation, and permafrost potential. In total, 118 soil inspection sites were surveyed, and terrain and soil data and samples were collected for soil classification, mapping descriptions, and chemical analysis.

The existing conditions are as follows:

- Terrain in the LSA is primarily undulating to hummocky upland landscape. The slope of the local terrain ranges from relatively level to slopes of 25% or greater, with an average slope of about 7%.
- The LSA is composed of four terrain units, distributed as follows:
  - 79% glaciofluvial deposits;
  - 14% water;
  - 4% fen peat (i.e., organic); and
  - 4% anthropogenic (i.e., human-derived) disturbance.
- Mineral soils are dominant, with some organic soils present for the soil-covered areas of the LSA. Mineral soil map units consist almost entirely of forested soils (i.e., Brunisols), with small amounts of Gleysols and Mesisols. Organic soil map units consist almost entirely of Mesisols with small amounts of Gleysols and Brunisols.

Project Interactions

Potential Project effects that were assessed for terrain and soils are listed in Section 5.4.

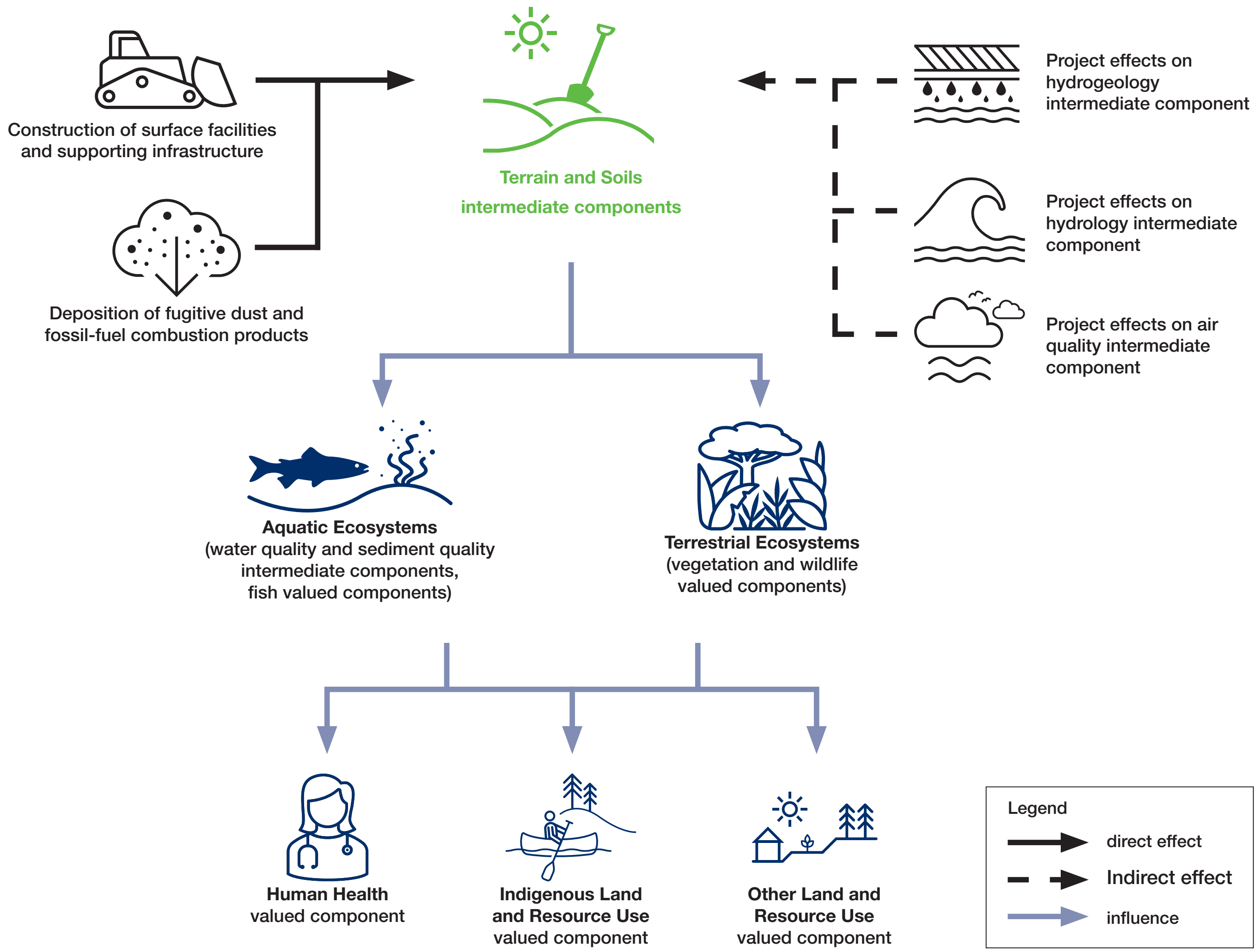


Figure 5.4-3: Linkage Diagram of Project Effects on Terrain and Soils and Influenced Valued Components

Environmental Design Features and Mitigation Measures

The key environmental design features and mitigation measures that were identified to reduce potential effects on terrain and soils are listed in Section 5.4.

Based on potential interactions between the proposed Project and the environment and considering the mitigations that would be applied, one primary pathway was assessed for terrain and soils:

- Alteration of terrain and soil conditions (i.e., quantity, quality, distribution), which may adversely affect soil productivity and the types of ecosystems that can be reclaimed on the landscape.

Key Findings

A residual effects analysis was conducted to determine the potential effects of the Project on terrain and soils. The key findings from the terrain and soils assessment were:

- **Unique features:** No unique terrain or soil features are present within the LSA.
- **Permanent features:** There would be a permanent change to natural terrain and soil units where the proposed Project features are permanent (e.g., WRSAs).
- **Reclamation:** Progressive reclamation during Operations and reclamation during Closure would reverse effects on disturbed terrain and soil map units. Reclamation would also provide productive soils to support the establishment and succession of vegetation communities with similar function to natural ecosystems.

  Soils would be reclaimed during the Active Closure Stage, with vegetation ecosystems predicted to be established beyond Closure, particularly for mature forest types.
- **Cumulative effects:** The potential effects on terrain and soils that could result from the Project are not predicted to overlap with effects from the Fission Patterson Lake South Property. Therefore, there was negligible potential for cumulative effects on terrain and soils, and an RFD Case was not assessed.

These results were carried forward into the assessments of surface water quality and sediment quality, vegetation, wildlife and wildlife habitat, human health, Indigenous land and resource use, and other land and resource use.

There is a moderate to high degree of confidence in predictions related to the changes to terrain and soils. Uncertainty was addressed by making assumptions that conservatively overestimated potential effects (i.e., a precautionary assessment). There is some residual uncertainty regarding the quantity and distribution of reclaimed terrain and soils units and the level of soil productivity for revegetation during and after Closure; monitoring is proposed to evaluate the progress of reclamation activities.

Monitoring and Management of Potential Effects

Monitoring and managing potential effects to terrain and soils would involve implementing:

- an Environmental Protection Program and associated environmental monitoring during all phases of the proposed Project; and

- additional monitoring and adaptive management to achieve successful long-term reclamation of terrain and soils to support the establishment of vegetation and wildlife communities on reclaimed lands.

5.4.2 Vegetation

Measurement Indicators

The vegetation assessment used different measurement indicators for different VCs. The measurement indicators for the ecosystem VCs were ecosystem availability, ecosystem distribution, and ecosystem condition. For the traditional use plant species VC, the measurement indicators were habitat availability and habitat distribution.

Existing Conditions

Existing vegetation conditions were characterized through field programs for the LSA and the RSA in 2018 and 2019. The studies included ecosite and fire mapping, vegetation inventories, rare plant surveys, and wetland classification.

The existing conditions are as follows:

- The RSA is mostly composed of upland ecosystems (i.e., deciduous, mixed, and coniferous forests).
- Wetland ecosystems and anthropogenic (i.e., human-caused) disturbances are less prevalent, comprising 12.5% and 0.4% of the RSA, respectively.
- Blueberry, bog cranberry, jack pine, and mosses are the most commonly found traditional use plant species among the 28 plant species identified as most important by Indigenous Groups. Several traditional use plant species were frequently observed within wetland ecosystems.
- More than half of the RSA (61%, or over 65,000 ha) has burned in fires over the past 40 years.

Gathering plants for food, medicinal, spiritual, and ceremonial purposes was identified as an important traditional activity for Indigenous Groups and an important aspect of culture and community well-being.

Project Interactions

In addition to the potential Project interactions listed in Section 5.4, the deposition of metals from air emissions was also assessed for vegetation.

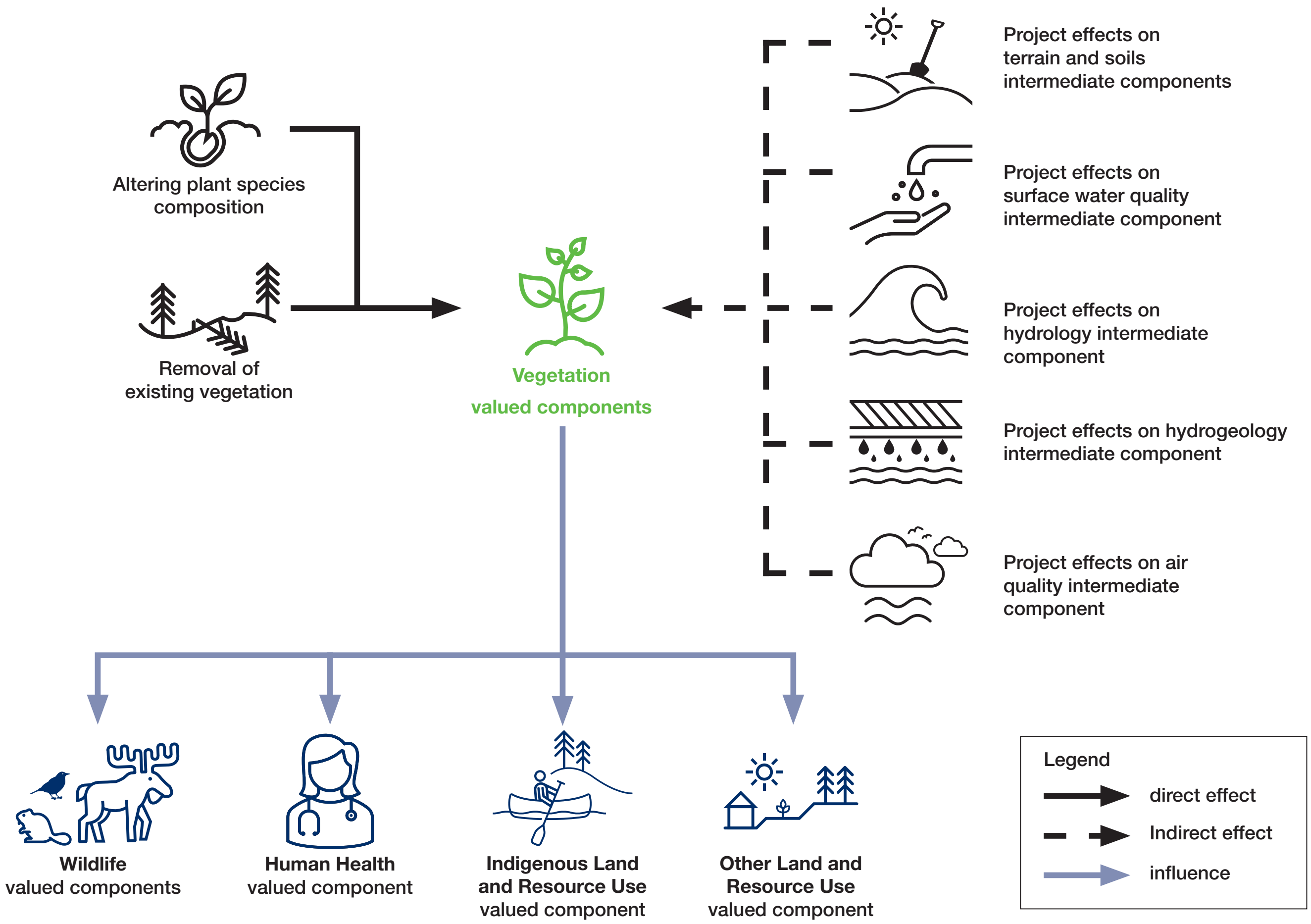


Figure 5.4-4: Linkage Diagram of Project Effects on Vegetation Valued Components and Influence on other Valued Components

Environmental Design Features and Mitigation Measures

In addition to the environmental design features and mitigation measures noted in Section 5.4, key measures that were identified to reduce potential effects to vegetation include:

- using native species or non-aggressive, non-native species for revegetation;
- adhering to Canada's *Federal Policy on Wetland Conservation* (Government of Canada 1991) to have no net loss of wetland functions;
- scheduling work in sensitive areas to avoid periods where significant effects could occur; and
- providing setbacks to avoid known rare plants.

Based on potential interactions between the proposed Project and the environment and considering the mitigations that would be applied, two primary pathways were assessed for vegetation VCs:

- Direct loss of vegetation, which includes the direct loss, alteration, and fragmentation of upland, wetland, and riparian ecosystems and traditional use plants.
- Alteration of final terrain, soil conditions, and the composition of plant species that could change the types of ecosystems and traditional use plants that could be reclaimed on the landscape, and in turn, adversely affect the availability, distribution, and condition of vegetation.

Key Findings

The vegetation assessment considered aspects of biodiversity by using both coarse- and fine-filter approaches. The coarse-filter approach focused on ecosystems as a whole while the complementary fine-filter approach focused on assessing effects on specific plant species identified as important by Indigenous Groups (i.e., for traditional uses). The key findings from the vegetation assessment were:

- **Upland ecosystems:** The proposed Project would contribute to a low magnitude loss of upland ecosystems (approximately 1.2% of the RSA), confined to the Project's maximum disturbance area.
  - » Fragmentation of upland ecosystems would occur as a result of the Project; however, they would remain abundant and well-connected across the RSA.
- **Wetland ecosystems:** The proposed Project would contribute to a low magnitude loss in the availability of wetland ecosystems (less than 0.1% of the RSA) and be limited to the Project's maximum disturbance area.
  - » Fragmentation of wetland ecosystems would occur as a result of the Project and the Fission Patterson Lake South Property; however, this would be limited and localized to the area around Patterson Lake and a portion of the RSA already influenced by existing disturbances (e.g., Highway 955, seismic lines, cutlines), resulting in almost no change to connectivity among wetland ecosystems in most of the RSA.
  - » Once wetlands are removed, the loss would be continuous and permanent until the functional habitats are reclaimed or offset.
- **Riparian ecosystems:** The proposed Project would contribute to a low magnitude loss of riparian ecosystems (approximately 0.4% of the RSA) and changes to riparian habitat availability would be confined to the Project's maximum disturbance area.
  - » Despite some fragmentation, most riparian wetland ecosystems would remain abundant and well-connected across the RSA.

Key findings, continued . . .

- » The loss of riparian ecosystems would result in minor, localized changes in riparian distribution around Patterson Lake.
- » For those land classification units within riparian ecosystems, the effects for upland ecosystems would be long-term; the effects for wetland ecosystems would be permanent.

- **Traditional use plants:** The proposed Project would contribute to a loss of approximately 282 ha of traditional use plant habitat (1.1% of the RSA), limited to the Project's maximum disturbance area.
  - » Cumulatively, the Project and the Fission Patterson Lake South Property are predicted to contribute to a loss in availability of approximately 732 ha (2.9% of the RSA) of traditional use plant habitat.
  - » Traditional use plant habitat is predicted to remain abundant across the RSA.
- **Effects on biodiversity:** For most ecosystems and traditional use plant communities, the residual effects are predicted to be reversible over the long term. With the exception of wetland ecosystems, the natural ecosystems and plant communities would regenerate after reclamation. While changes in the Application Case and RFD Case are expected to increase landscape fragmentation, biodiversity in the RSA would be maintained and be similar to existing conditions.

Incremental and cumulative effects on the four vegetation VCs are predicted to be not significant. Overall, upland, wetland, and riparian ecosystems and traditional use plant species are predicted to remain self-sustaining and ecologically effective.

These results were carried forward into the assessments of wildlife and wildlife habitat, human health, Indigenous land and resource use, and other land and resource use.

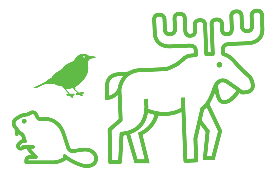
There is a moderate to high degree of confidence in the vegetation assessment. While there was some uncertainty about the quantity, distribution, and function of reclaimed upland and wetland ecosystems during and after Closure, this was addressed by taking a conservative approach to estimating potential effects (e.g., expecting that reclaimed vegetation communities may not have the same structure as under existing conditions, but would be ecologically functional).

Monitoring and Management of Potential Effects

Monitoring and managing potential effects to vegetation would involve:

- implementing a surveillance follow-up study to identify and manage new occurrences of prohibited, noxious, or nuisance species designated in Saskatchewan's *Weed Control Act;*
- monitoring and follow-up to delineate activity setbacks that would help avoid or mitigate direct disturbances to provincially tracked vascular plants during Construction;
- implementing a detailed Decommissioning and Reclamation Plan to meet provincial requirements and expectations after Closure; and
- further monitoring and follow-up to verify that reclamation is on a successful trajectory.

5.4.3 Wildlife and Wildlife Habitat



Measurement Indicators

The measurement indicators for wildlife and wildlife habitat were habitat availability, habitat distribution, and survival and reproduction.

In addition to the LSA and the RSA, the assessment for woodland caribou considered effects at the scale of the woodland caribou home range and the SK2 West Caribou Administration Unit (Figure 5.4-5).

Existing Conditions

Existing conditions for wildlife and wildlife habitat were based on field studies, desktop reviews, and habitat mapping carried out between 2018 and 2020. The field studies included winter track count surveys, small mammal trapping and tissue analysis, waterfowl and raptor nest surveys, amphibian acoustic surveys, and breeding bird surveys. The desktop analyses included reviews of scientific and technical literature and species at risk resources (e.g., the federal Species at Risk Public Registry). Habitat mapping provided an estimate of available habitat and its distribution as a result of forest fires and human activity during the past 40 years.

The existing conditions for wildlife and wildlife habitat are as follows:

- Conditions are suitable for self-sustaining populations of beaver, black bear, Canadian toad, common goldeneye, grey wolf, mallard, moose, and olive-sided flycatcher, despite some anthropogenic disturbance.

- While white nose syndrome is not currently known within the RSA, little brown myotis may be at risk to the disease, which has been detected in eastern Saskatchewan.
- Rusty blackbird habitat is rated as poor suitability in the majority of the RSA as there are large patches of open land cover associated with recent burns and early stage regenerating ecosites that may affect their movements. However, the magnitude of the effect is uncertain as adult rusty blackbirds often forage in multiple unconnected wetlands within their home range.
- With respect to woodland caribou:
  - » The woodland caribou population in the SK2 West is not likely to be self-sustaining as the amount of natural and anthropogenic disturbance at existing conditions has resulted in the amount of critical habitat for caribou being below the minimum 65% undisturbed critical habitat threshold necessary to support a self-sustaining population (ECCC 2020).
  - » The woodland caribou population in the SK1 West is considered to be self-sustaining, according to a recent study and Environment and Climate Change Canada's critical habitat assessment (McLoughlin et al. 2019; ECCC 2020).
  - » Woodland caribou in the caribou home range (which includes the LSA) may be experiencing some physiological stress and avoidance of the area due to exploration activities and road and trail use; however, the level of stress is unknown.

Indigenous Groups have reported that recent reduced abundance and a shift in the distribution of caribou is attributed to several factors including forest fires, overhunting, and mining and mineral exploration activities.

Project Interactions

In addition to Project interactions listed in Section 5.4, the following Project interactions were assessed for wildlife and wildlife habitat:

- installation of the fibre optic line and overhead power lines;
- presence of people, air traffic, lights, dust, smells, and noise causing sensory disturbance;
- creation of above-ground pipelines, snowbanks, and other obstructions;
- vehicle-wildlife collisions and increased access for predators and harvesting wildlife;
- attraction of wildlife to products and waste on site; and
- fugitive emissions of metals and radionuclides, as listed in Section 5.2.

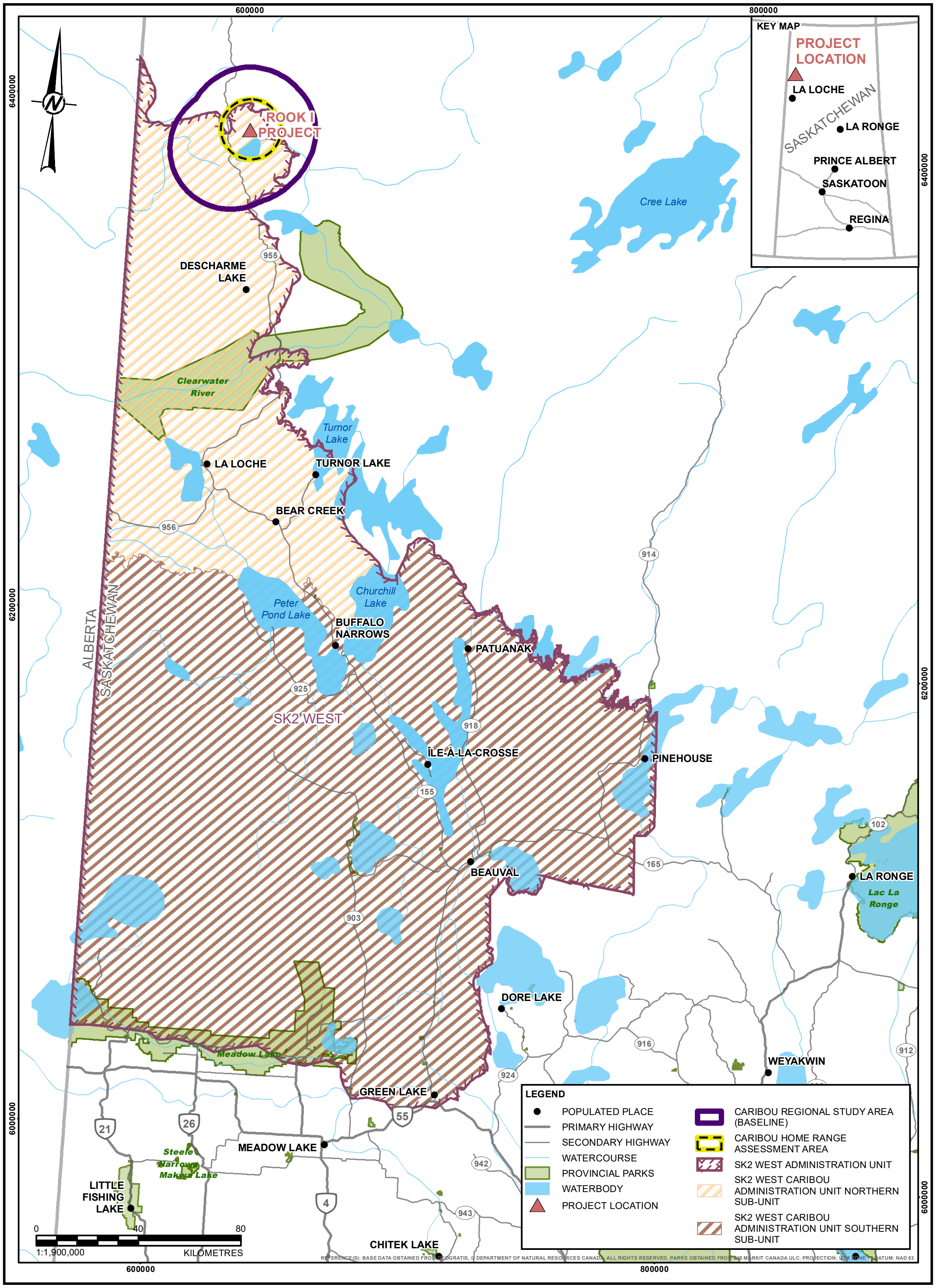


Figure 5.4-5: Map of Woodland Caribou Baseline and Assessment Study Areas

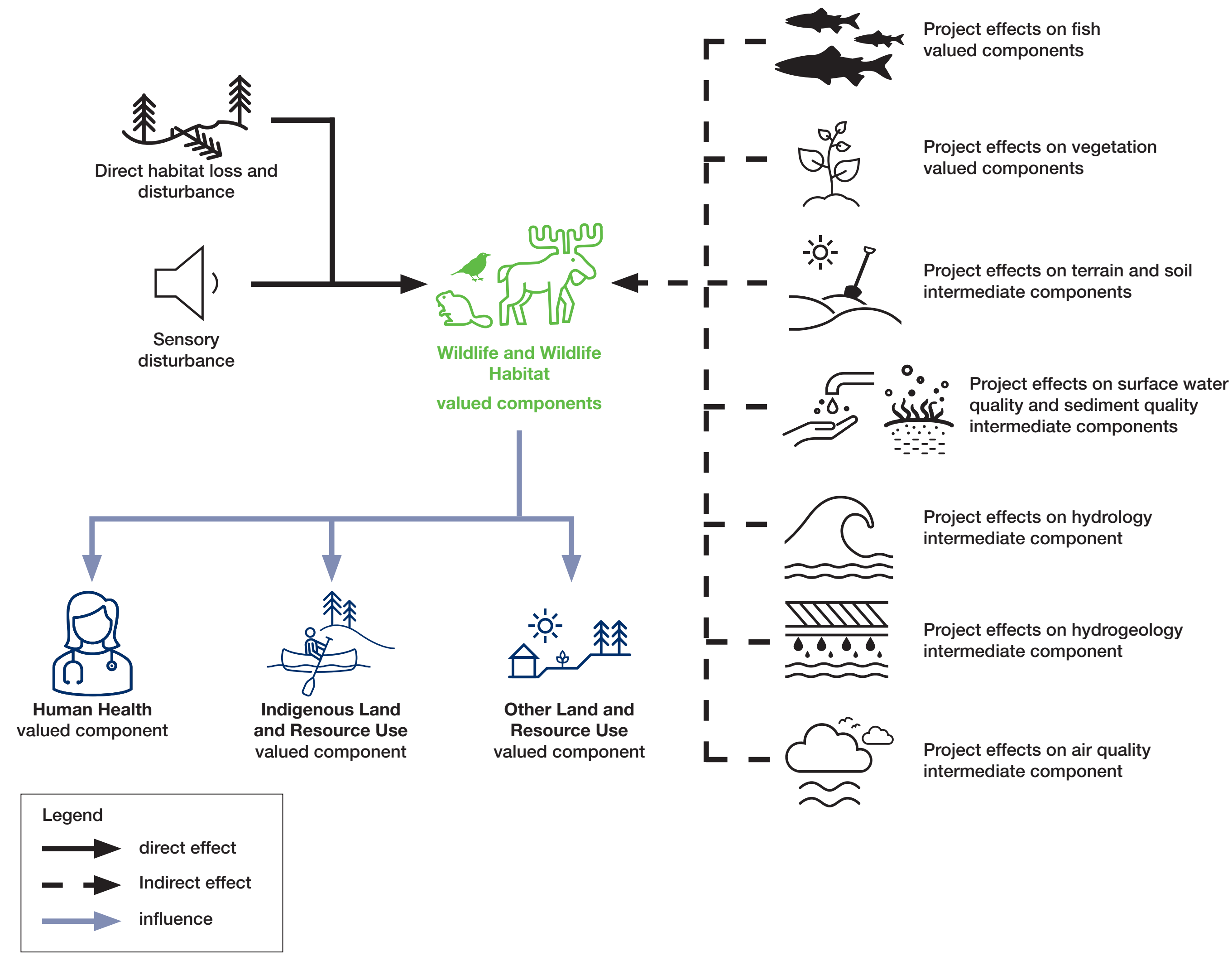


Figure 5.4-6: Linkage Diagram of Project Effects on Wildlife and Wildlife Habitat and Influenced Valued Components

Environmental Design Features and Mitigation Measures

In addition to the environmental design features and mitigation measures noted in Section 5.4, key measures that were identified to reduce potential effects to wildlife and wildlife habitat include:

- To minimize wildlife habitat loss in the RSA:
    - » realigning the site road within the Project footprint west of the airstrip to avoid a wetland; and
    - » minimizing sensory disturbance (e.g., dust, noise, lights).
- To help preserve habitat distribution and connectivity:
    - » enacting wildlife encounter protocols;
    - » limiting snowbank heights along the access road;
    - » creating enforced speed limits; and
    - » erecting signage to minimize potential disruption of connectivity and movement around and across Project infrastructure.
- To limit effects on the survival and reproduction of wildlife:
    - » scheduling work to avoid sensitive areas / periods;
    - » enclosing equipment; and
    - » using noise suppression equipment.

Based on potential interactions between the proposed Project and the environment and considering the mitigations that would be applied, three primary pathways were assessed for wildlife and wildlife habitat:

- Habitat loss, as the direct removal or alteration of soil and vegetation may cause a loss of wildlife habitat and affect wildlife abundance and distribution.
- Habitat alteration, as the alteration of final terrain and soil conditions and plant species composition could change the types of ecosystems that can be reclaimed on the landscape and adversely affect wildlife habitat availability and distribution, and survival and reproduction.
- Sensory disturbance, as the presence of people, air traffic, lights, dust, smells, and noise may alter wildlife movement and behaviour and adversely affect wildlife habitat availability and abundance and distribution.

Key Findings

Project effects on wildlife would begin during Construction with the removal and alteration of habitat and continue through Operations and Closure. These effects would also continue for a period after Closure until reversed or determined to be permanent. In consideration of these factors, effects on each of the wildlife VCs were analyzed and predicted from Construction through Closure and typically beyond to generate the maximum potential spatial and

Key findings, continued . . .

temporal extent of effects and provide confident and ecologically relevant effects predictions.

The key findings from the wildlife and wildlife habitat assessment were:

- **Wildlife habitat loss, habitat alteration, and sensory disturbance are predicted to occur for all VCs** during Construction, Operations, and Closure. However, during Operations and Closure, wildlife habitats would be restored to the extent possible through progressive and final reclamation.
    - Some residual effects would be irreversible such as potential changes to wetlands (if required) and permanent alteration of the landscape from the WRSAs.
    - Residual effects associated with all other reclaimed habitat would be reversible, with the duration of effects being VC-specific and dependent on the time required to establish functional habitat.
- **The magnitude of loss of suitable wildlife habitat as a result of the Project would be less than 1.5% of the RSA for all VCs.**
- **Cumulative habitat loss of suitable wildlife habitat in the RFD Case would be less than 3.5% of the RSA for all VCs.**

Incremental and cumulative effects on wildlife and wildlife habitat VCs are predicted to be not significant, except for woodland caribou. With mitigation measures that reduce sensory disturbances to wildlife, there would be limited effects on survival and reproduction. All VC populations would be expected to remain self-sustaining and ecologically effective except woodland caribou, which is not self-sustaining in the Base Case (i.e., under existing conditions). Woodland caribou are discussed further in Section 6.1.

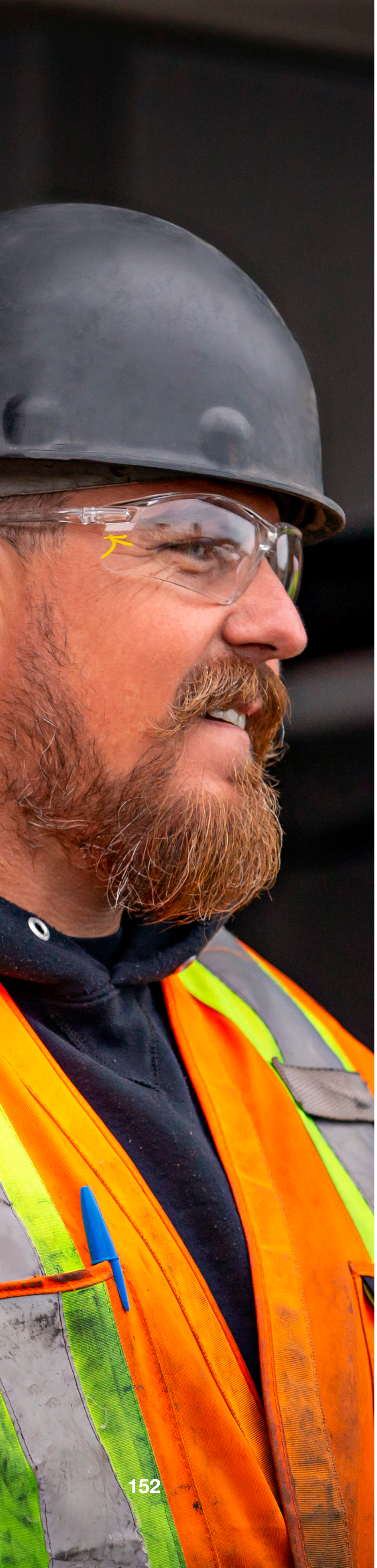
These results were carried forward into the assessments of human health, Indigenous land and resource use, and other land and resource use.

There is a moderate to high degree of confidence in predictions related to the changes to wildlife and wildlife habitat VCs, and best management practices during the Project lifespan would be implemented to mitigate effects on wildlife and wildlife habitat. Where there was some uncertainty about the quantity, distribution, and ecological function of reclaimed ecosites (i.e., wildlife habitat) during and after Closure, this uncertainty was addressed by making assumptions that conservatively overestimated potential effects (e.g., expecting that reclaimed vegetation communities would likely not have the same structure as natural ecosites, but would be ecologically functional for wildlife).

Monitoring and Management of Potential Effects

Monitoring and managing potential effects to wildlife and wildlife habitat would involve implementing:

- an Environmental Protection Program to monitor the efficacy of mitigation measures and guide any future measures that should be implemented;
- targeted mitigation measures in areas to limit human-wildlife conflicts, such as wildlife surveillance monitoring of the Project site and access road; and
- a Caribou Mitigation and Offsetting Plan, for which development would include engagement with the Province and Indigenous Groups.



5.5

People

Section 5.5 discusses the effects of the proposed Project on components related to people, which includes human health, cultural and heritage resources, Indigenous land and resource use, other land and resource use, economy, and community well-being.

NexGen's approach to the assessment recognized the interconnectedness of people to the atmosphere, water, and land, and the importance of preserving cultural, heritage, spiritual, and economic values.

The assessments considered the variation in scale among different effects to people. For example, potential effects to human health are likely to be localized, while effects to the economy may be experienced at a regional or broader scale. Accordingly, NexGen assessed the people-related components within unique study areas that varied by technical discipline, and which were defined as follows:

Human Health

- The LSA for human health extends from the Clearwater River headwaters to just downstream of the Naomi Lake outlet, covering a surface area of 685 km^2.
- The RSA for human health extends from the Clearwater River headwaters to just upstream of the Mirror River confluence, covering a surface area of 1,076 km^2.

Cultural Heritage

- The cultural heritage VC assessment did not use an LSA or RSA. The cultural heritage study area covers the Project footprint, and included the shore area of Patterson Lake where the main Project infrastructure would be located (130 ha); a large, level upland area where the airstrip would be located (17 ha); and, the shore area of Patterson Lake along the access road south of the main infrastructure (33 ha).

Indigenous Land and Resource Use

- The LSA for Indigenous land and resource use covers the Clearwater River watershed boundaries where ecosystems could potentially be directly or indirectly affected, and the Highway 955 corridor north of La Loche where changes to traffic volumes and traffic disturbances may affect Indigenous land and resource use activities, which is defined as a 1,200 m wide corridor to capture road and roadside effects. The LSA covers approximately 1,247 km^2.
- The RSA for Indigenous land and resource use is defined as the spatial area within Fur Blocks N-15, N-17, N-19, and N-21. The RSA covers approximately 43,577 km^2.

Indigenous Groups commented on the potential for Project-related contaminants to enter the food chain within the Clearwater River watershed through effects to water quality in Patterson Lake, the associated effects on aquatic and terrestrial health, and in turn, the safety of wild foods and human health.

Other Land and Resource Use

- The LSA for other land and resource use covers the Clearwater River watershed boundaries where ecosystems could potentially be directly or indirectly affected, and the Highway 955 corridor north of La Loche where changes to traffic volumes and traffic disturbances may affect other land and resource use activities, which is defined as a 1,200 m wide corridor to capture road and roadside effects. The LSA covers approximately 1,257 km^2.
- The RSA for other land and resource use is defined as the spatial area within Fur Block N-19. The RSA covers approximately 6,499 km^2.

Economy and Community Well-Being

The LSA for economy and community well-being includes the local communities that are either along Highway 155 or have close ties to Patterson Lake and includes:

- Clearwater River Dene Nation;
- Clearwater Clear Lake (Métis Nation – Saskatchewan name for Northern Region 2);
- La Loche (Métis Local 39);
- Birch Narrows Dene Nation;
- Turnor Lake (Métis Local 40);
- Buffalo River Dene Nation / Dillon;
- Buffalo Narrows (Métis Local 62);
- Bear Creek (Métis Local 156);
- Descharme Lake;
- Garson Lake;
- Black Point (Métis Local 162);
- Michel Village (Métis Local 65); and
- St. George's Hill (Métis Local 70).

The RSA for economy and community well-being is the Northern Saskatchewan Administrative District as defined in *The Northern Municipalities Act, 2010* and has the same boundaries as Census Division No. 18, as defined by Statistics Canada.

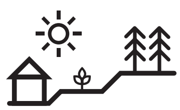
Potential Project effects were assessed for the four people technical disciplines, which included six VCs:

Valued Components

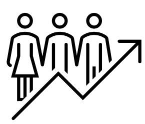
- **Human health** was identified as a VC, as protection of human health is one of NexGen's core values and represents a key priority identified by Indigenous Groups, communities, and regulators.

- **Cultural heritage** was identified as a VC based on its importance to Indigenous Groups, and because archaeological sites are protected under *The Heritage Property Act* of Saskatchewan.

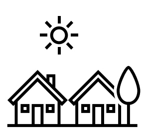
- **Indigenous land and resource use** was identified as a VC based on the importance of the area of the proposed Project for traditional land use and cultural continuity. This VC reflects the importance of traditional fishing, gathering, hunting, and trapping to Indigenous Groups for subsistence and cultural purposes.



- **Other land and resource use** was identified as a VC based on key economic activities and features of the social setting in northern Saskatchewan, including commercial and recreational land and resource uses.



- **Economy** was identified as a VC as the proposed Project would create employment, contracting, and training opportunities for the local community workforce and businesses. The Project is also expected to generate taxes, royalties, and other payments that contribute to provincial and federal government revenues.



- **Community well-being** was identified as a VC based on the importance of community well-being to Indigenous Groups and local communities, precedents set in literature, and professional experience.

The Project interactions that may affect people-related VCs are the same as those listed for atmospheric, water, and land VCs and intermediate components (Section 5.2 to Section 5.4). As shown in the linkage diagram (Figure 5.1-2), environmental effects to those VCs and intermediate components have the potential to affect people, including health, land use abilities, socio-economic status, and overall well-being.

Project interactions for people-related VCs are shown in the Project interactions matrix for people (Figure 5.5-1). Project activities and mitigations that are common to many of the six components related to the assessment of people are:

- **Mining and processing of uranium ore**, which has the potential to affect human health through inhalation of radon gas and dust containing metals and radionuclides or through release in effluents. The use of LNG for on-site power generation, air pollution control technologies and procedures, as well as treating water releases to the surrounding environment would mitigate effects to air, water, fish, vegetation, wildlife, and land and resource users.
- **Clearing for construction and access controls around the industrial site**, which would reduce the areas available for land and resource use by Indigenous Peoples and other land users. The Project was designed to minimize the disturbance footprint and subsequent effects on land and resource use including the availability of fish, plants, and wildlife for harvesting.
- **Transportation of equipment, supplies, and people**, which would increase traffic along Highway 955 and the access road and potentially increase the safety risk for other road users. Access road design and security, ground transportation, and emergency response programs would include processes for educating workers and contractors on measures to be taken for the safety of all road users.
- **Construction and operation of the Project**, which could cause sensory disturbance from lights and noise, and affect the visual aesthetics. The Project is designed to minimize sensory disturbances to limit effects on the quality of the land use experience.
- **Employment, contract opportunities, revenues, and education and training**, which would provide benefits to the community economy and well-being. These benefits would be enhanced through Project programs to maximize the opportunities for local community members.
- **Benefit Agreements with primary Indigenous Groups** include commitments to help conserve the cultural continuity, provide benefits, and mitigate effects on Indigenous land and resource use.
- **The Indigenous and Public Engagement Program** combined with the **independent Indigenous monitoring program and Environmental Committees** would be important in verifying and communicating the environmental performance of the Project to community members to mitigate perceptions about the effects of the Project on the environment and to help preserve the intergenerational sharing of knowledge, cultural continuity, and overall community well-being.

These Project interactions have the potential to affect human health, cultural and heritage resources, Indigenous land and resource use, other land and resource use, economy, and community well-being.

Figure 5.5-1: Project Interaction Matrix for People

✓ = interaction is anticipated (i.e., primary or secondary pathway, or positive interaction).

		People				
Project Phase or Far-Future Scenario	**Key Project Component/Activity**	**Human Health VCs**	**Cultural and Heritage Resources**	**Indigenous Land and Resource Use**	**Other Land and Resource Use**	**Economy**
Construction	Land clearing, site preparation and construction of facilities and infrastructure, underground shaft / mine development	✓	✓	✓	✓	✓
	Site traffic, transportation of personnel and materials to and from the site	✓		✓	✓	✓
Operations	Site traffic, transportation of personnel and materials to and from the site	✓		✓	✓	✓
	Process plant and underground operations, underground tailings management facility	✓		✓	✓	✓
	Handling and storage of waste rock, special waste rock, and ore	✓		✓	✓	✓
	Effluent treatment plant and treated effluent discharge	✓		✓	✓	✓
	Water intake for fresh water and process water			✓	✓	✓
	Power generation	✓		✓	✓	✓
	Non-hazardous waste incineration	✓		✓	✓	✓
	Additional infrastructure (e.g., roads, airstrip, camp, maintenance shop, offices), water storage and effluent monitoring ponds	✓	✓	✓	✓	✓
Decommissioning and Reclamation	Site traffic, transportation of personnel and materials to and from the site	✓		✓	✓	✓
	Removal of infrastructure, restoration and revegetation of facilities and infrastructure	✓	✓	✓	✓	✓
Far-future scenario	Potential for long-term migration of constituents of potential concern from underground facility and waste rock storage areas. Not a Project phase.	✓				

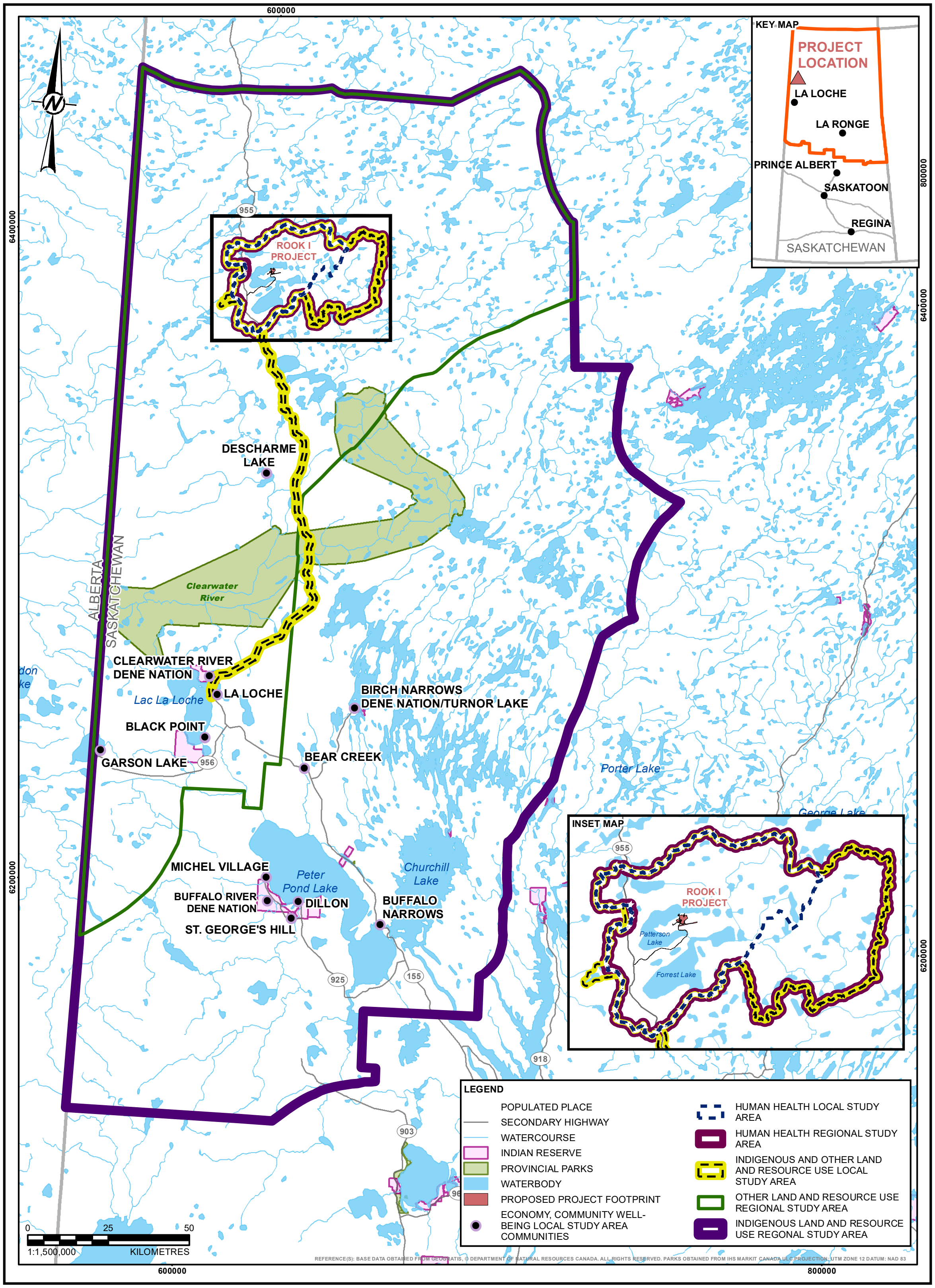


Figure 5.5-2: Map of People Study Areas

5.5.1 Human Health

The Human Health assessment evaluated the potential for air and water emissions from the Project to cause cancer and other adverse effects to humans.

Measurement Indicators

The measurement indicators for human health were hazard quotients, incremental lifetime cancer risk, and radiation dose.

Existing Conditions

Existing human health conditions were established using the best available information, including baseline environmental monitoring data, estimates of source terms, and Traditional Food diet (i.e., consumption rates and food types). Data from several other disciplines were included in a human health risk assessment including surface water quality; sediment quality; fish tissue for northern pike, lake whitefish, and aquatic macrophytes; air quality; soil quality; blueberry and lichen quality; and wildlife baseline information.

Existing conditions are as follows:

- Baseline air quality is indicative of a rural setting, relatively unaffected by outside influences on air quality. Baseline air quality was generally within the Saskatchewan Ambient Air Quality Standards and other relevant standards (i.e., below thresholds). Air quality conditions can generally be classified as good based on the monitoring conducted.
- Concentrations of surface water constituents were generally within water quality standards (i.e., below thresholds, good quality) for both aquatic and terrestrial life and drinking water within the LSA waterbodies and watercourses, with some exceptions (i.e., iron, manganese, lead, nickel, and arsenic in some samples).
- Soil samples collected from locations in the anticipated Project footprint and the LSA as part of the baseline monitoring program indicated that soil quality was generally within the selected soil quality guidelines for protection of human and ecological health with the exceptions of boron, sulphur, and uranium at individual locations.
- There are no known existing anthropogenic sources of radiation or radioactivity in the LSA and RSA.

Measurement indicators for human health

Hazard quotient: A measure of the ratio of the predicted exposure to a non-carcinogen (i.e., a non-cancer-causing substance) relative to the toxicity reference value.

Incremental lifetime cancer risk: The predicted increase (i.e., above background cancer risk) in lifetime cancer risk from exposure to a carcinogen related to Project activities.

Radiation dose: A measure of the risk to the overall health of the human body due to an exposure to ionizing radiation.

Project Interactions

Potential Project interactions that were assessed by human health are listed in Section 5.5.

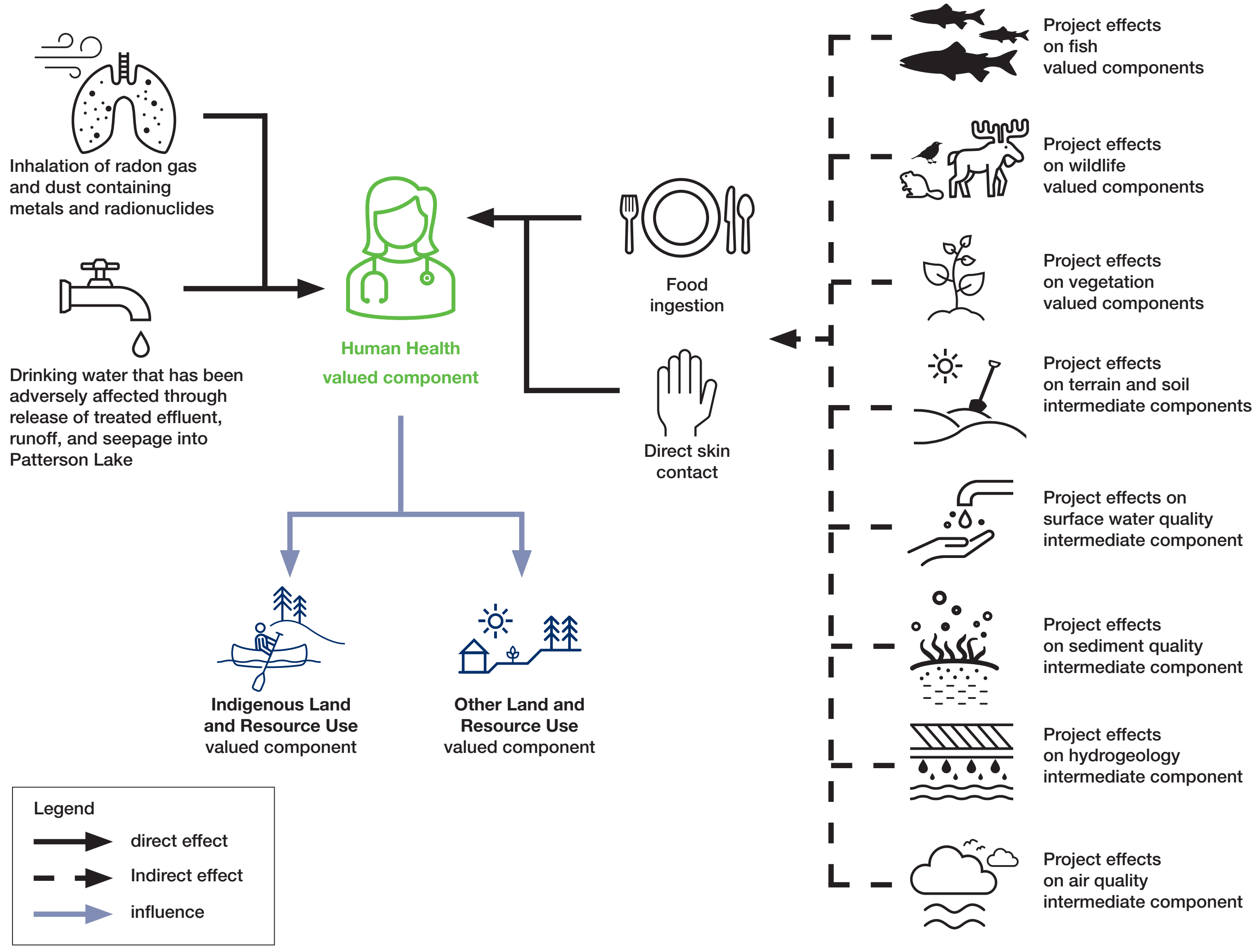


Figure 5.5-3: Linkage Diagram of Project Effects on Human Health and Influenced Valued Components

The Human Health Risk Assessment

Potential adverse effects on human health during all Project phases and the far-future projection were evaluated through completion of a human health risk assessment, which was composed of the four following steps:

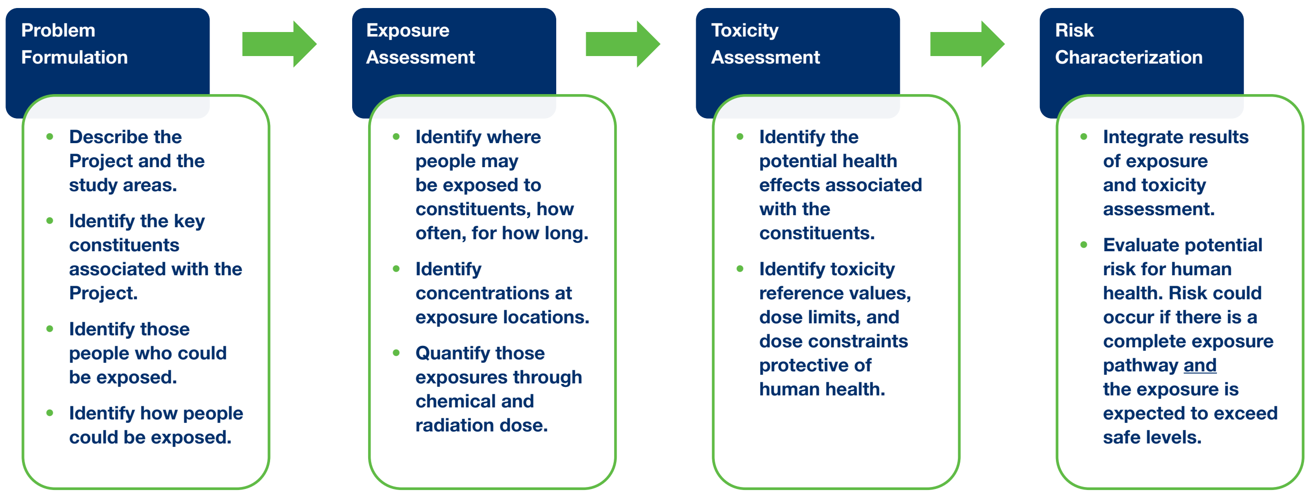


Figure 5.5-4: Human Health Risk Assessment Process

Risks were evaluated using hazard quotients for non-carcinogens (e.g., cobalt, copper, molybdenum, uranium) and incremental lifetime cancer risk for carcinogens (i.e., arsenic). The incremental lifetime cancer risk was estimated and compared against the negligible cancer risk level of 1 in 100,000 recommended by Health Canada (2021). Radionuclides, including the uranium-238 series and radon, were also included as constituents and their radiation doses were evaluated as these constituents are of interest to Indigenous Groups and the public.

Risks were evaluated for four distinct types of human receptors: camp worker, subsistence harvester, seasonal resident / lodge operator, and future permanent resident following Closure.

Environmental Design Features and Mitigation Measures

Environmental design features and mitigation measures for human health include those listed for atmospheric, water, and land VCs and intermediate components.

Based on potential interactions between the proposed Project and the environment and considering the mitigations that would be applied, the following six primary pathways were assessed for human health:

- Emission and deposition of fugitive dust and radon, as fugitive dust (e.g., metals, radionuclides) and radon emissions may adversely affect human health receptors through inhalation. In addition, radon emissions and the deposition of fugitive dust may cause changes in soil and water quality and may adversely affect human health receptors through food ingestion.
- Emission and deposition of criteria air contaminants and suspended solids, as emissions of these compounds may result in changes to air quality that may adversely affect human health receptors through inhalation. In addition, the deposition of suspended solids may cause changes in soil and water quality that may adversely affect human health receptors through food ingestion.
- Discharge of treated effluent, as the release of treated effluent into Patterson Lake may cause changes to surface water quality (and indirectly, sediment quality) that may adversely affect human health receptors through drinking water and food ingestion.
- Site runoff, as site runoff may cause changes to surface water quality (and indirectly, sediment quality) that may adversely affect human health receptors through food ingestion.
- Seepage from the WRSAs, as seepage from the WRSAs may cause changes in groundwater quality and surface water quality in Patterson Lake that may adversely affect human health receptors.
- Post-Closure runoff and seepage from the WRSAs and groundwater flow from the UGTMF, as these waters may affect groundwater quality that could alter surface water quality in Patterson Lake after Closure; changes to surface water quality may adversely affect human health.

The important role that traditional plants play in human health was highlighted through the Indigenous Knowledge and Traditional Land Use Studies completed for the Project.

Key Findings

The key findings from the human health assessment were:

- **Hazard quotient:** For the assessment of non-carcinogens, **no significant adverse effect on any human receptors would be likely during the Project lifespan**. This finding applies to the Application Case and the RFD Case, including the far-future projection.
- **Incremental lifetime cancer risk:** For the assessment of risk for carcinogens (i.e., arsenic), the incremental lifetime cancer risk is negligible to very low for each of the four human receptor types, including the far-future projection.
  - » For the subsistence harvester receptor, the risk would exceed the negligible cancer risk level of 1 in 100,000 (i.e., 4 in 100,000) at Patterson Lake South Arm (just outside the Project footprint); however, the predicted incremental risks are in the negligible to very low category.

Key findings, continued . . .

- **Radiation dose:** No discernable health effects are anticipated due to potential exposure to potential radioactive releases from the Project. The incremental radiation doses to all types of human receptor are predicted to be below the regulatory public dose limit. The incremental radon concentration at the camp worker location would be below the CNSC limit for the Application Case and RFD Case.

Incremental and cumulative effects on human health are predicted to be not significant.

These results were carried forward into the assessments of Indigenous land and resource use and other land and resource use.

Overall, there was a high degree of confidence in the predictions related to the human health assessment. The human health assessment was undertaken in a manner that would not underestimate residual adverse effects. The assumptions used to characterize human health receptors and develop the conceptual site model followed industry best practices. Where possible, site-specific information was incorporated. Where information was unavailable, in the model and the selected exposure factors, the uncertainties from the toxicity assessment included a conservative approach built into the radiation dose limit and dose constraint, as well as the toxicity reference values.

Monitoring and Management of Potential Effects

Monitoring and managing potential effects to human health would involve implementing:

- an Environmental Monitoring Plan, to monitor air, surface water, sediment, soil quality, fish and benthic invertebrate tissue, country foods, and traditional use plant species;
- an Effluent Monitoring Plan to monitor releases to the environment; and
- a targeted Traditional Foods study with Indigenous Groups, focused on validating or modifying the dietary assumptions made in the human health risk assessment.

5.5.2 Cultural and Heritage Resources

The **Cultural and Heritage Resources** assessment considered archaeological sites protected under *The Heritage Property Act* of Saskatchewan.

Measurement Indicators

The measurement indicator for cultural heritage was changes to the number, quality, and significance of archaeology and heritage sites in the heritage study area.

Existing Conditions

Existing cultural heritage conditions were assessed through completion of a Heritage Resource Impact Assessment (HRIA) for the proposed Project. A heritage study area was established for the assessment that encompassed the anticipated Project footprint, which would represent the area of direct disturbance of any heritage sites. A total of 180 ha were assessed using a combination of pedestrian reconnaissance, post-effect inspections of disturbed areas, and the excavation of subsurface shovel probes.

The HRIA did not discover any heritage resources.

Project Interactions

Land clearing could affect unknown heritage resources, which are legally protected under *The Heritage Property Act* of Saskatchewan. The HRIA was completed to avoid the risk of affecting heritage sites. On review of the HRIA, the Saskatchewan Ministry of Parks, Culture and Sport (Heritage Conservation Branch) confirmed that the HRIA met all requirements of Section 63 of *The Heritage Property Act* of Saskatchewan and directed that no further assessment was required.

Figure 5.5-5: Linkage Diagram of Project Effects on Cultural and Heritage Resources and Influenced Valued Components

Environmental Design Features and Mitigation Measures

Proposed mitigation measures that reduce the potential effects on cultural heritage resources include:

- limiting the Project footprint to the extent practical by optimizing designs to minimize land disturbance and using existing infrastructure; and
- implementing a 'chance find' procedure (i.e., procedures to follow if equipment operators unearth artifacts) during land clearing activities.

Key Findings

The key findings from the cultural and heritage resources assessment were:

- **The heritage resource field studies did not identify any heritage resources** for the Project footprint.
- On review of the HRIA, the Saskatchewan Heritage Conservation Branch confirmed that the HRIA met all requirements of Section 63 of *The Heritage Property Act* of Saskatchewan and directed that **no further assessment was required**.

Any changes to final Project design would be checked with the Province's Heritage Conservation Branch, with further field studies completed prior to clearing, if required. Final checks prior to construction plus implementation of the 'chance find' procedure are expected to protect archaeological and heritage resources. **Therefore, effects to the cultural and heritage resources VC are predicted to be not significant.**

Monitoring and Management of Potential Effects

Monitoring and managing potential effects to cultural and heritage resources would involve implementing:

- a 'chance find' procedure that would be used to identify and manage any unanticipated archaeological materials or other cultural and heritage resources discovered during land clearing activities at the Project site.

5.5.3 Indigenous Land and Resource Use

Measurement Indicators

The measurement indicators selected for Indigenous land and resource use were access to, and area available for, Indigenous land and resource use; the availability and quality of fish, plants, and wildlife for harvesting; and the quality of the Indigenous land use experience.

Existing Conditions

Existing conditions were informed by IKTLU Studies; information provided through the JWG meetings; information provided during a 2021 trapper's workshop; other regulatory documents, including comments from the CRDN on the licence renewal for the Cluff Lake Mine; and archival and historical documents supporting the understanding of historical use and existing effects from industrial development.

The existing conditions are as follows:

- Throughout the RSA, the CRDN, MN-S, BNDN, BRDN, and Athabasca Denesų̈łiné practice Indigenous land and resource use activities, including hunting, trapping, fishing, plant gathering, and use of cultural sites, habitation sites, and travel routes.
- In the LSA, Indigenous land and resource use is actively pursued by the CRDN, MN-S, and BNDN, and, to a lesser extent, the BRDN.
- Indigenous-led, land-based learning programs are supporting the effort to revitalize traditional activities, support community well-being, and provide opportunities for younger generations to learn traditional ways of life and connect with their culture.

The Patterson Lake area is an important land-use area for the CRDN and MN-S. In the IKTLU Studies, the CRDN described it as being, "situated within the core heartland of the Nation's primary traditional use and occupancy areas 'Up North'" and as "historically and currently recognized as a 'good for everything' harvesting area, which may have sustained CRDN members through time beyond living memory." The MN-S IKTLU Study stated that it has "historical and current value and is paramount to its members, and their lifeblood."

Indigenous Groups described how knowledge of the lands and waters in the Patterson Lake area has been passed down through the generations. Over time, Indigenous Groups have continued to pursue land and resource activities throughout the RSA despite industrial development, government policies that have displaced or discouraged activities, land disturbances and access restrictions, and natural events such as forest fires.

The Indigenous Land and Resource Use assessment focused on activities that are an expression of Aboriginal and treaty rights, including hunting, trapping, fishing, gathering for food and ceremonial purposes; places of occupancy; access and travel routes; and culturally important sites.

The Clearwater River Dene Nation, Métis Nation – Saskatchewan, Birch Narrows Dene Nation, and Buffalo River Dene Nation shared that the ability to practise traditional activities depends on having access to a healthy land base, and availability of abundant and high-quality resources, including clean air and water.

Project Interactions

Potential Project interactions that were assessed for Indigenous land and resource use are listed in Section 5.5.

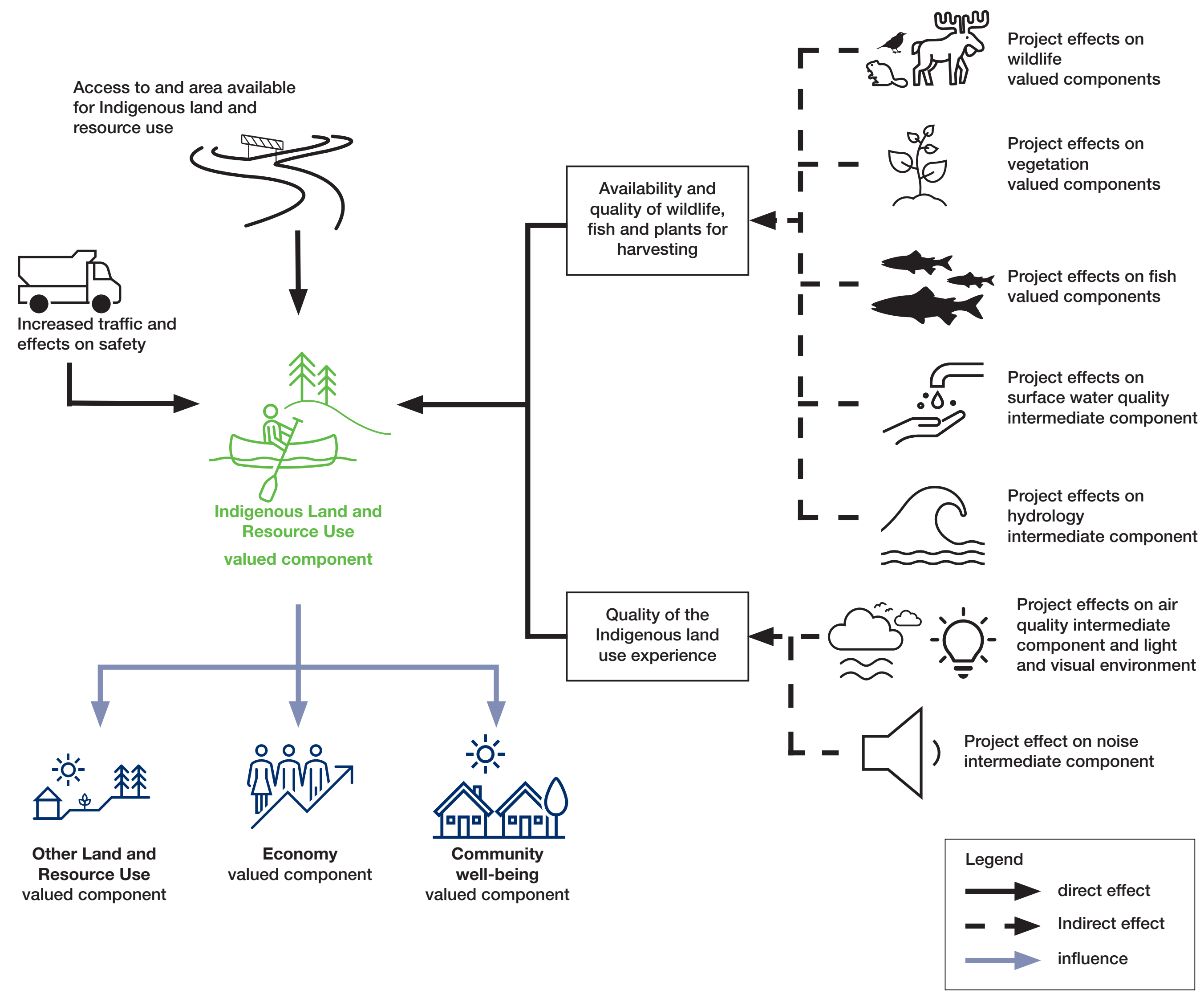


Figure 5.5-6: Linkage Diagram of Project Effects on Indigenous Land and Resource Use and Influenced Valued Components

Environmental Design Features and Mitigation Measures

Proposed environmental design features, such as the UGTMF and a limited Project footprint, were developed to minimize the Project's effects on Indigenous land and resource use.

In addition to the environmental design features and mitigation measures noted in Section 5.5, key measures that were identified to reduce potential effects to Indigenous land and resource use include:

- implementing Benefit Agreements with primary Indigenous Groups, which would include funding and human resources to support community-related initiatives, and establishing an Implementation Committee;
- establishing Environmental Committees and funding for full-time independent Indigenous monitors;
- implementing robust environmental management processes at the proposed Project site;
- designing Project facilities and infrastructure to minimize sensory disturbance;
- implementing progressive and final reclamation; and
- developing and implementing a Decommissioning and Reclamation Plan, Security Program, and Indigenous and Public Engagement Program.

Benefit Agreements between mining companies and Indigenous Groups generally provide the needed avoidance, mitigation, compensation, and shared benefits for the coexistence of project development and continued Indigenous land and resource use.

Based on potential interactions between the proposed Project and the environment and considering the mitigations that would be applied, the following three primary pathways were assessed for Indigenous land and resource use:

- Changes to access to and area available for Indigenous land and resource use, as the Project may restrict access and reduce the area available for, or displace, Indigenous land and resource use.
- Changes to the availability of fish, plants, and wildlife for harvesting, as there could be changes in abundance and distribution. These changes could reduce, or displace, opportunities for Indigenous land and resource use.
- Changes to the quality of the Indigenous land use experience, as sensory disturbances (i.e., noise, light, air emissions, and aesthetics) and safety concerns may change the quality of the Indigenous land use experience in the area surrounding the Project site. Similarly, perceptions of effects regarding the quality of water, fish, plant, and wildlife resources may adversely affect the quality of the Indigenous land and resource use experience and/or result in certain areas being avoided. Knowledge of the decommissioned site may change the perceived suitability of the area for Indigenous land and resource use in the future. In addition, these changes may affect the cultural landscape, changing the sense of place and the relationship between Indigenous Groups and the land.

Clearwater River Dene Nation is highly committed to the maintenance, continued transmission, strengthening, and revitalization of Denesųłiné identity and heritage through school curriculums and programs offered to the Nation's children in the Dene language.

Language is the principal instrument through which the Dene worldview, the wisdom of the ancestors, and the distinctive Denesųłiné ways of being are transmitted to the next generations. The Dene language cannot be divorced from the land from which it emerged; nor can the transmission of knowledge be divorced from a healthy productive land base which draws on the knowledge and experience of the ancestors, Elders, and current harvesters.

(CRDN IKTLU Study)

Key Findings

A residual effects analysis was conducted to determine the potential effects of the Project on Indigenous land and resource use. The key findings of the Indigenous land and resource use assessment were:

- **Access to and area available for Indigenous land and resource use:** During the Project lifespan, the presence of Project infrastructure would restrict access and reduce areas available for, or displace, Indigenous land and resource users.
- **Availability of fish, plants, and wildlife for harvesting:** The Project could change the availability of fish, plants, and wildlife for harvest; however, these changes would be minor.
- **Quality of the Indigenous land use experience:** Sensory disturbances, changes to aesthetics, and safety concerns may change the quality of the resource use experience for some Indigenous land and resource users in the area surrounding the Project. Similarly, perceptions of effects on the quality of the land and resources may adversely affect the quality of the experience and/or result in changes to the cultural landscape.

While Indigenous land and resource use activities could change or be displaced, the activities would be able to continue. **As a result, the residual effects on Indigenous land and resource use are predicted to be not significant for both the Application Case and the RFD Case**.

These results were carried forward into the assessments of other land and resource use, economy, and community well-being.

Overall, there was a moderate to high degree of confidence in the predictions related to the Indigenous land and resource use assessment. Uncertainty was primarily and appropriately addressed by making assumptions that conservatively overestimated rather than underestimated potential effects (i.e., a precautionary assessment), using multiple sources of information to inform the assessment (e.g., JWG meetings, IKTLU Studies, historical records), incorporating Indigenous and Local Knowledge through all steps of the assessment, and applying assessment experience and professional judgment.

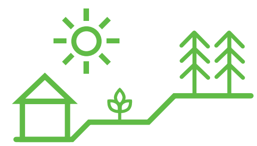
Monitoring and Management of Potential Effects

Monitoring and managing potential effects to Indigenous land and resource use would involve:

- independent Indigenous monitoring of the effects of the Project;
- regular meetings with potentially affected Indigenous land users, as applicable, both independently and as part of the Indigenous and Public Engagement Program;

- a Project feedback and grievance mechanism to record and action issues identified by local residents;
- tracking commitments made under Benefit Agreements with primary Indigenous Groups;
- monitoring the level of success of regional monitoring strategies; and
- conducting perception surveys to better understand local residents' thoughts and understanding of uranium mining.

5.5.4 Other Land and Resource Use



Measurement Indicators

The measurement indicators for other land and resource use were access to, and area available for, other land and resource use; availability of fish and wildlife for harvesting; and quality of the resources and quality of resource use experience.

Existing Conditions

The characterization of the existing environment was established by a desktop review of primary and secondary data sources to describe and evaluate the other land and resource uses. Sources for quantitative recreational hunting harvests and participation levels, commercial trapping production and value, and commercial fishing production by lake and by species were available from the Government of Saskatchewan databases, and place-based information was available from its online mapping application (HABISask).

The existing conditions are as follows:

- Commercial trapping and lodge and outfitting services are the main other land and resource use activities conducted within the LSA. There are approximately 10 active commercial fish harvesters from La Loche to Patterson Lake; however, over the past 20 years, Patterson Lake was only commercially fished in the 2016/2017 season.
- There are three lodge and outfitting operations with allocations within or partially within the LSA: Forest Lake Outfitters, Big Bear Contracting, and Lone Wolf Camps. Kisslinger Outfitters is located within the RSA and is accessed via the Highway 955 corridor. Lloyd Lake Lodge and Bolton Lake Wilderness Retreat are remote fly-in operations also located in the RSA.
- Commercial forestry activity is not conducted in the other land and resource LSA or RSA.

The Other Land and Resource Use assessment focused on commercial uses such as:

- **fishing and trapping;**
- **lodges, outfitting, and ecotourism;**
- **forestry; and**
- **mineral exploration and mining.**

It also included recreational uses such as use of parks and protected areas and fishing and hunting activities that are conducted by non-Indigenous people.

- There are five uranium operations located in northern Saskatchewan; however, there are no current active mines in the LSA or RSA. The Cluff Lake Mine was closed in 2002 and is located at the north end of Highway 955. Approximately 92 mineral dispositions have been granted to 12 companies that are within, or partially overlap, the LSA, including the Project's and Fission's mineral dispositions, which are proposed for development.

Project Interactions

Potential Project interactions that were assessed by other land and resource use are listed in Section 5.5.

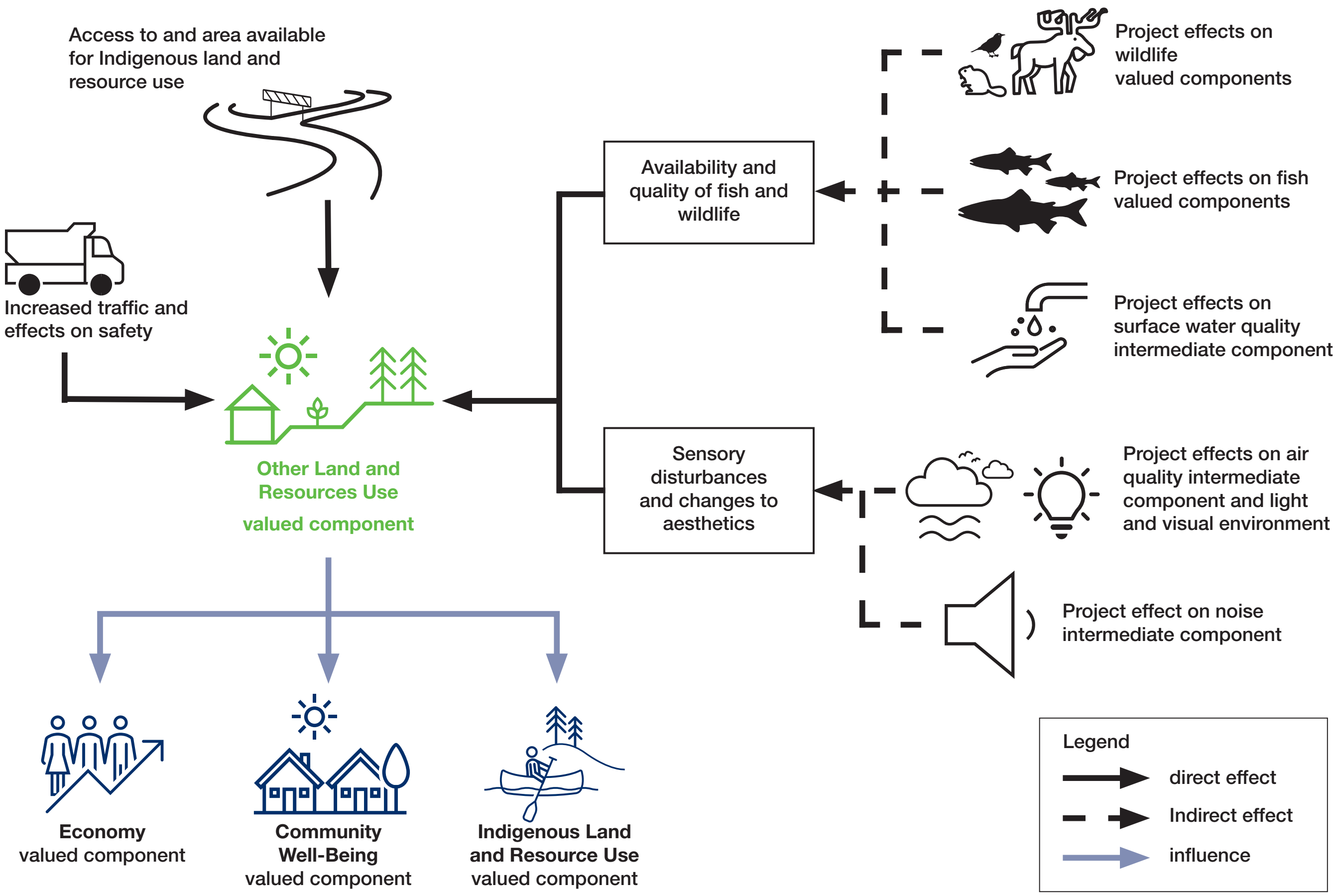


Figure 5.5-7: Linkage Diagram of Project Effects to Other Land and Resource Use and Influenced Valued Components

Environmental Design Features and Mitigation Measures

In addition to the environmental design features and mitigation measures noted in Section 5.5, other key environmental design features and proposed mitigation measures to reduce effects on other land and resource use include:

- implementing robust site environmental management processes;
- implementing progressive reclamation and revegetation of disturbed areas no longer required; and
- developing and implementing a detailed Decommissioning and Reclamation Plan and Security Program.

Based on potential interactions between the proposed Project and the environment and considering the mitigations that would be applied, the following two primary pathways were assessed for other land and resource use:

- Access to and area available for land and resource use, as the presence of proposed Project infrastructure could restrict access and reduce the area available for, or displace, other land and resource users.
- Quality of the resource use experience, as sensory disturbances, changes to aesthetics, and safety concerns could change the quality of the resource use experience for other land and resource users in the area surrounding the proposed Project. In addition, the perception of effects on the quality of the fish and wildlife resources may adversely affect the quality of the experience and/or result in certain areas being avoided, and awareness of the decommissioned site after Closure may change the perceived suitability of the area for other land and resource use in the future.

Members of the Clearwater River Dene Nation, Métis Nation – Saskatchewan, Birch Narrows Dene Nation, and Buffalo River Dene Nation indicated that trapping is primarily conducted in the winter months and that cabins within and outside the local study area support trapping activities.

Key Findings

A residual effects analysis was conducted to determine the potential effects of the Project on other land and resource use. The key findings from the other land and resource use analysis were:

- **Access to and area available for land and resource use:** During the Project lifespan, the presence of Project infrastructure would restrict access and reduce area available for, or displace, other land and resource users.
- **Availability of fish and wildlife for harvesting:** Overall, the Project is expected to have negligible effects on the availability of fish and wildlife for harvesting.
- **Quality of the resources and quality of resource use experience:** Sensory disturbances, changes to aesthetics, and safety concerns may change the quality of the resource use experience for other land and resource users in the area surrounding the Project. Similarly, perceptions of effects on the quality of the fish and wildlife resources may adversely affect the quality of the experience and/or result in certain areas being avoided. Knowledge of the decommissioned site may change the perceived suitability of the area for other land and resource use in the future.

Continued opportunities for other land and resource use are expected due to the negligible to small magnitude of local and reversible effects and the limited number of resource users that have the potential to be affected.

As a result, the residual effects on other land and resource use are predicted to be not significant for both the Application Case and the RFD Case.

These results were carried forward into the assessments of Indigenous land and resource use, economy, and community well-being.

There is a moderate to high degree of confidence in the predictions related to the changes to other land and resource use. Remaining uncertainty was primarily addressed by making assumptions that overestimated rather than underestimated potential effects (i.e., a precautionary assessment). For example, the maximum disturbance area used for the Project was conservatively sized to allow flexibility for potential future Project design changes.

Monitoring and Management of Potential Effects

Monitoring and managing potential effects to other land and resource use would involve implementing:

- monitoring and follow-up programs that verify biophysical effects predictions and effectiveness of reclamation and mitigation, identify unanticipated effects, and contribute to continual improvement and adaptive management;
- regular communication with local community members, N-19 trappers, local outfitters, and other land users;
- implementing a Security Program, which would be evaluated annually;
- developing a Decommissioning and Reclamation Plan; and
- implementing an Indigenous and Public Engagement Program that includes communication with affected lodge and outfitting operations on topics such as access management, safety, and management of other potential interactions with the Project.

5.5.5 Economy

Measurement Indicators

Nine measurement indicators were used for the economy VC:

- Local population levels: Project-induced in-migration and out-migration, and population demographic changes.
- Project-related employment: Labour force participation rate, labour force growth, employment / unemployment rates, and employment by industry.
- Indigenous community participation and employment in the traditional economy.
- Income: Personal income and household income, and wage income and traditional economy income.
- Training and education opportunities: Types of opportunities, number of positions and placement rates, and educational attainment – with each indicator measured by age cohort and gender, where possible.
- Project-related contracting opportunities.
- Project-related procurement expenditures: Purchase of goods and services generated by the Project, including direct expenditures, indirect expenditures (i.e., by sectors supplying goods and services to the Project), and induced expenditures (i.e., by businesses providing goods and services to satisfy consumer expenditures generated by direct and indirect employment), if possible.
- Business counts (indirect and induced) in the local area.

The Economy assessment considered how the Project may create employment, contracting, and training opportunities for the local community workforce and businesses and generate taxes, royalties, and other payments that may increase the revenues of provincial and federal governments. Economy is a major social determinant of health in the overall well-being of individuals and communities.

- Federal and provincial government revenues: Direct resource royalties and corporate and personal income taxes paid to the governments of Saskatchewan and Canada.

Local community residents, including members of the primary Indigenous Groups, have expressed a strong desire for employment, education, and training opportunities.

Existing Conditions

The characterization of the existing economic environment included both quantitative (e.g., statistics) and qualitative (e.g., discussions) data collection and analysis in line with Canadian and international best practice for environmental impact studies. Both primary (e.g., IKTLU Studies, interviews, questionnaires, observation, workshops, JWGs) and secondary (e.g., literature / reports, government statistics, organizational data) data sources were used.

The existing conditions are as follows:

- In local communities, employment rates are low and unemployment rates are high. In 2016, the average employment rate in the LSA was 32.5% compared to 63.5% for the province and the unemployment rate in the LSA was 28.0% compared to 7.1% for the province.
- Employment in the LSA is concentrated primarily in government-funded service sectors and Crown corporations. Educational services, public administration, and health care and social services represent the three largest employment sectors.
- The traditional economy is very important to local community members; the traditional economy acts as a sponge that absorbs labour when wage economy opportunities are limited.
- Average personal income in the LSA in 2016 was approximately 60% of the average personal income in the province.
- The level of educational attainment in the LSA is lower than the provincial average, and LSA residents frequently noted that post-secondary educational opportunities in the local communities can be limited.

Project Interactions

Potential Project interactions that were assessed by economy are listed in Section 5.5.

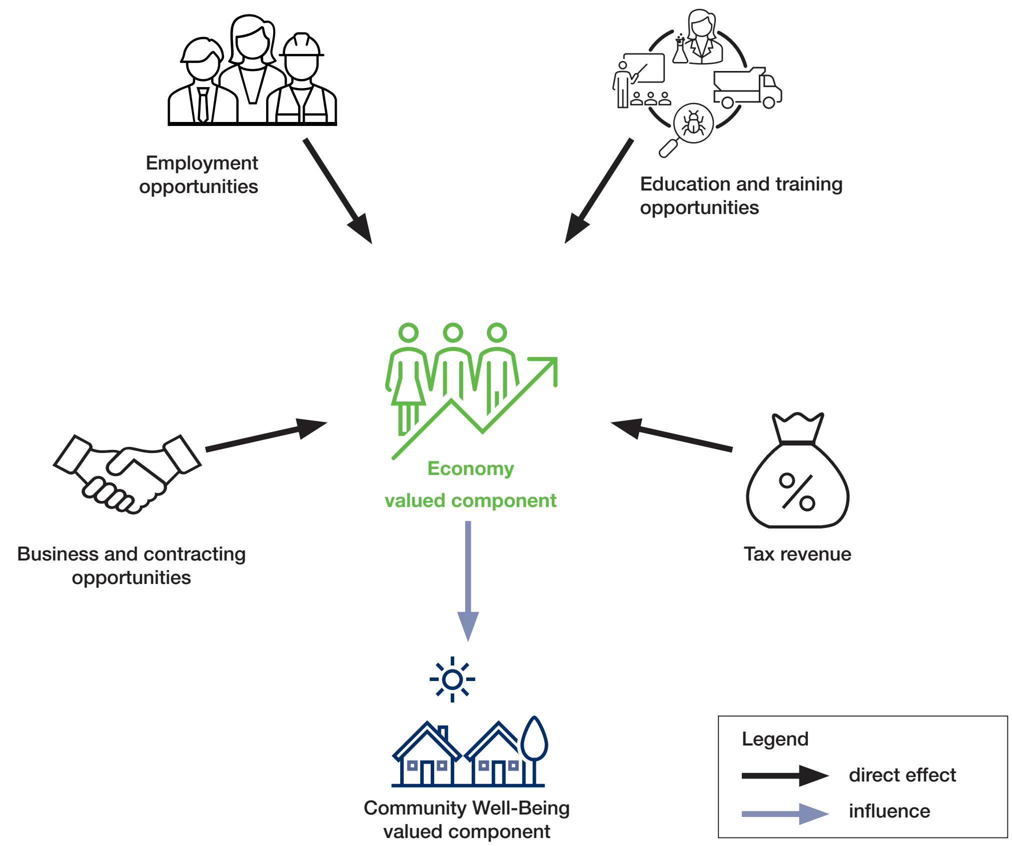


Figure 5.5-8: Linkage Diagram of Project Effects on Economy and Influenced Valued Components

Environmental Design Features and Mitigation Measures

Proposed mitigation and enhancement measures, such as the delivery of certified and accredited training and recruitment programs, the development of culturally sensitive employment policies, increasing involvement of local businesses within the LSA, and the implementation of items agreed to in Benefit Agreements with primary Indigenous Groups would reduce adverse effects and enhance beneficial effects on the economy.

After mitigation, the pathways analysis determined there would be no primary pathways from the Project. Rather, the Project would result in substantial benefits for the LSA and RSA, which would have flow-on effects on a range of socio-economic variables including health and community well-being.

As the Project interactions did not distinguish any primary pathways, a residual effects analysis was not completed. Beneficial pathways were not carried forward for further assessment, or assessed for significance; however, these pathways provided important context for how residents and communities are likely to experience the Project.

Key Findings

The key findings from the economic analysis were:

- **Employment:** Specific benefits include increased employment opportunities for LSA residents. During Construction, the peak workforce is expected to be approximately 350 workers and during Operations, the peak employment is expected to include approximately 490 positions. Local, provincial, and national indirect and induced employment benefits are also anticipated.
- **Income:** The Project would provide a substantial positive benefit through increased income opportunities for LSA residents. Construction labour costs are expected to make up approximately $384 million and Operations direct labour spending is estimated to be approximately $55 million during a typical operating year.
- **Broader Economic Benefits:** As well as beneficial effects within the LSA, the Project would generate benefits through the payment of royalties to the governments of Saskatchewan and Canada. The total estimated direct payments to government for a typical operating year were estimated at $289 million for Saskatchewan and $104 million for Canada.
- **Enhancement Measures:** Commitments made in Benefit Agreements with primary Indigenous Groups and programs developed and implemented jointly between NexGen and the local communities could further enhance income opportunities for local residents.

There is a moderate degree of confidence in predictions related to the assessment of economy. Methods used to address potential uncertainty included applying reasonable conservativeness in professional judgment based on knowledge or past industry experience in the RSA, and by making assumptions that are likely to understate rather than overestimate the economic benefits of the Project.

The analysis determined that all potential adverse economic effects from the Project could be mitigated and that the Project would result in substantial net positive economic outcomes, which would have flow-on effects on a range of socio-economic variables, including health and wellbeing. Therefore, **the Project would not be expected to create residual adverse effects, and incremental and cumulative effects on the economy are predicted to be not significant**.

These results were carried forward into the assessment of community well-being. Project benefits are further discussed in Section 6.2.

Monitoring and Management of Potential Effects

Monitoring and managing potential effects to the economy would involve implementing:

- processes to monitor progress on achieving employment and contracting targets and identify opportunities to improve employment and contracting outcomes;
- a Human Resources Development Agreement and a rolling Annual Human Resources Development Plan, anticipated as part of the Project's Mineral Surface Lease Agreement that would require reporting on efforts to meet socio-economic commitments; and
- a Benefit Agreement with each primary Indigenous Group to establish an Implementation Committee tasked with the responsibility of facilitating an effective ongoing working relationship between NexGen and the Indigenous Groups.

The **Community Well-Being** assessment focused on changes to cultural continuity, social adaptability, and demand for community infrastructure and services due to changes in the biophysical and social environments.

Well-being can broadly be considered to be "the combination of social, economic, environmental, cultural, and political conditions identified by individuals and their communities as essential for them to flourish and fulfill their potential" (Wiseman and Brasher 2008).

Common practice in Canada is to consider the social determinants of health, meaning the conditions in which people are "born, grow, live, work, and age" (World Health Organization 2022), as a framework for describing community well-being. This approach was used for the Project EA.

5.5.6 Community Well-Being

Measurement Indicators

The measurement indicators for community well-being were societal and cultural well-being, health well-being, neighbourhood and physical environment well-being, education well-being, and economic well-being. For the assessment, these indicators were represented by looking at changes to:

- Cultural continuity, incorporating changes to cultural experiences, diet (i.e., Traditional Foods), land use opportunities, and the intergenerational sharing of knowledge.
- Social adaptability, incorporating changes to population and demographics, income and employment levels, and community dynamics.
- Demand for community infrastructure and services, incorporating changes to health care, social services, recreation facilities, and services.

Existing Conditions

Existing conditions for community well-being were determined based on desktop reviews of secondary literature (e.g., statistical sources, government reports, academic reports) and supplemented by data collected from key person interviews, JWG discussions, IKTLU Studies, workshops, and other engagement activities.

The existing conditions are as follows:

- Positive factors: Aspects of home communities that 'make life good' include access to the land, bonds between family members and community members at large, and a clean environment that supplies everything that is needed to live well and contribute to community well-being.
- Negative factors: The lack of community facilities and services, housing, and employment opportunities; limited support for mental health challenges and addictions; encroaching industry on the land; and government policies that constrain land use detract from community well-being.
- Land-based programming and the transmission of knowledge are key to the well-being of the CRDN, MN-S, BNDN, and BRDN communities. Each has land-based community programming that supports the continuation of cultural activities, including school-based language classes.

Project Interactions

Potential Project interactions that were assessed by community well-being are listed in Section 5.5.

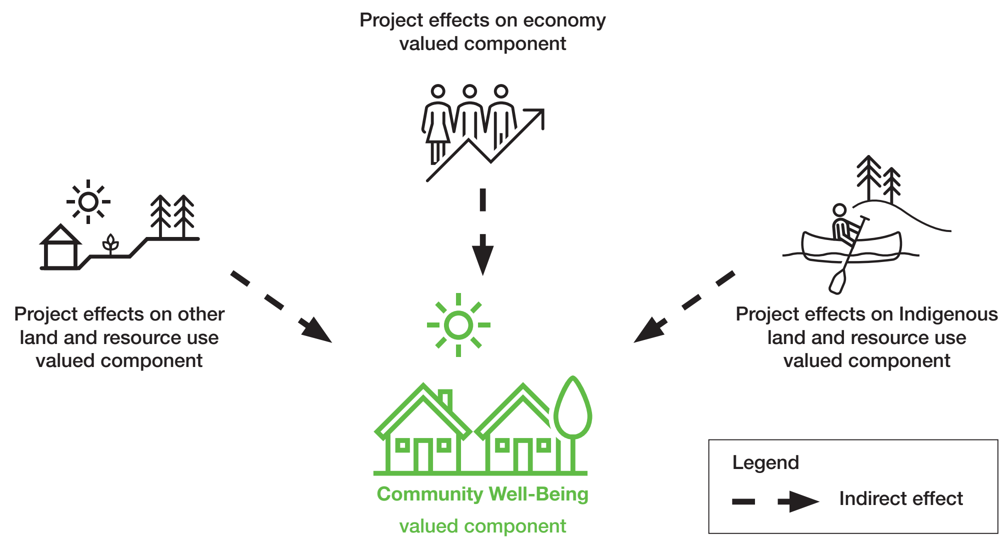


Figure 5.5-9: Linkage Diagram of Project Effects on Community Well-Being

Environmental Design Features and Mitigation Measures

In addition to the environmental design features and mitigation measures noted in Section 5.5, other key measures were identified to reduce potential effects to community well-being including:

- providing dedicated space for Elders to be available to support employees;
- developing culturally sensitive employment policies;
- developing and implementing human resource policies (e.g., an employee and family assistance program) to assist workers in finding information and referral services for family-related resources; and
- implementing terms of negotiated Benefit Agreements with primary Indigenous Groups related to culture and traditional values.

Based on potential interactions between the proposed Project and the environment, and considering the mitigations that would be applied, the following two primary pathways were assessed for community well-being:

- Access restrictions and avoidance of areas may reduce participation in traditional activities, adversely affecting cultural continuity, including the transmission of knowledge from Elders to youth.
- The worker rotation system may affect quality of life, local community cohesion, and family stability, as a result of workers having to spend time away from their communities and families.

Community well-being represented a valued component based on the combined importance of social and cultural, health, environmental, educational, and economic factors to the function and overall well-being of the local communities.

The Benefit Agreements with primary Indigenous Groups formalize NexGen's commitment to proactively engage, provide clear and timely information, support economic participation, and provide sustainable, lasting benefits beyond the proposed Project lifespan, which together are intended to reduce adverse effects and enhance beneficial effects on community well-being.

Local community youth indicated that engaging in traditional activities such as hunting, fishing, picking berries, and beading are important to community well-being.

Key Findings

The Project would be expected to produce benefits and residual adverse effects to community well-being.

The benefits to community well-being from the Project were outlined through the pathway analysis and include:

- **Increased income** for local community members, which would be expected to improve access to housing and education, increase disposable income to support participation in traditional harvesting activities, retain community youth, and improve the local economy.
- **Increased community revenue** through procurement opportunities may enhance quality of life through investments in communities (e.g., infrastructure, services).
- **Provision of revenue through the Benefit Agreements with primary Indigenous Groups.**
- **Increased educational and training opportunities** that could increase community well-being and community cohesion and create pathways to employment opportunities, increase ability of residents to engage in economic opportunities, and open pathways to other employment.

A residual effects analysis was conducted to determine the potential effects of the Project on community well-being. The potential residual adverse effects on community well-being are:

- **Cultural continuity:** There would be a local loss of cultural continuity, including transmission of knowledge, related to areas around Patterson Lake that would not be accessible during the Project lifespan.
- **Social adaptability:** Participation in the worker rotation system is expected to adversely affect social adaptability by placing increased stress on family dynamics.
- **Demand for community infrastructure and services:** Residual effects to cultural continuity and social adaptability are expected to increase demands in LSA communities for mental health services.

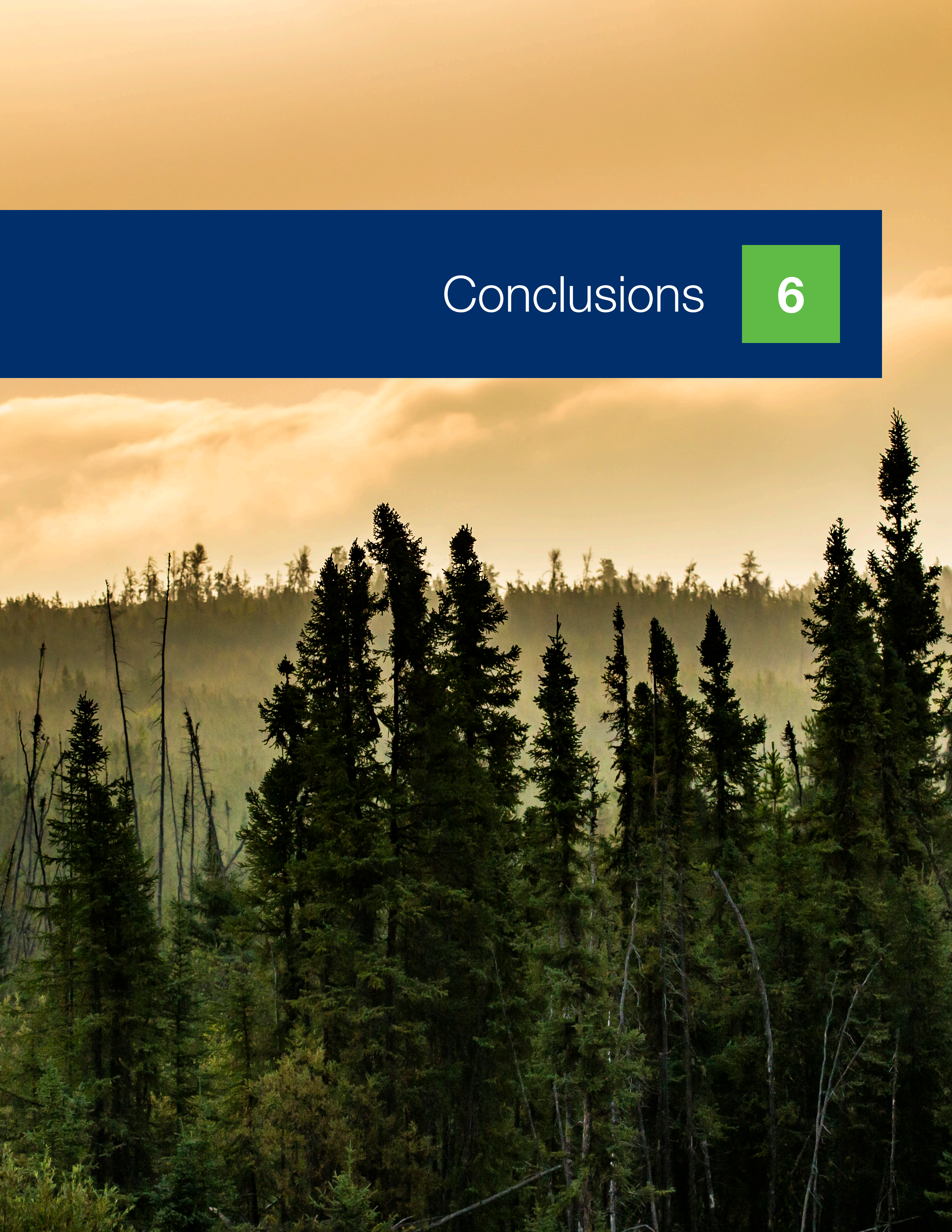
The weight of evidence from the analysis suggests that community well-being in the LSA communities would be maintained. **Therefore, incremental and cumulative effects on community well-being are predicted to be not significant.** When all the well-being elements are considered together, the Project is anticipated to result in a beneficial outcome for the LSA, particularly if mitigation and enhancements are implemented effectively.

Monitoring and Management of Potential Effects

Monitoring and managing of potential effects to community well-being would involve implementing:

- provisions of the Benefit Agreements with primary Indigenous Groups related to culture, traditional values, employment, training, and economic development;
- an Implementation Committee to provide a forum for regular communication and information exchange between NexGen and communities for effective management of the Benefit Agreement commitments and for the early resolution of issues and/or disputes that may arise;
- an Indigenous and Public Engagement Program to share information on Project plans and activities and establish a Project feedback and grievance mechanism to record and action issues identified by LSA residents or other members of the public; and
- human resource policies to assist workers in finding information and referral services for family-related resources, as required.

Conclusions 6



6.1

Significance of Residual Effects

No significant adverse effects on biophysical and socio-economic valued components were predicted for the Project or for the Project in combination with RFDs, with the exception of woodland caribou.

The wildlife and wildlife habitat assessment concluded that **effects on woodland caribou in the Base Case are already significant, as the amount of disturbance in SK2 West Caribou Administration Unit is greater than the 35% threshold value as described in the federal woodland caribou recovery strategy (ECCC 2020). Therefore, any amount of incremental habitat loss from any development**, including residual losses of habitat associated with the proposed Project, **is considered significant for woodland caribou. However, the Project is predicted to contribute little to the existing cumulative effects on woodland caribou.**

In the Application Case, the proposed Project would result in a loss of 32.4 ha of suitable woodland caribou habitat, representing less than 0.1% of available habitat in SK2 West and 0.6% of available habitat in the caribou home range. Habitat loss from the Project could displace a few individual woodland caribou, but is unlikely to have a demographic effect at the population level. Effects from habitat loss are predicted to be reversible 40 years after the Active Closure Stage, when reclaimed areas have reached defined critical habitat for woodland caribou.

In the RFD Case, the proposed Project and the Fission Patterson Lake South Property would reduce the amount of suitable woodland caribou habitat in SK2 West by less than 0.1%. Additional disturbance of habitat in the SK2 West south sub-unit may also result from forest industry activities. Overall, the combined amount of suitable habitat loss due to the Project and the Fission Patterson Lake South Property would have a negligible effect on the woodland caribou population, as it accounts for less than one woodland caribou home range.

NexGen is committed to reclaiming habitat disturbed by the Project footprint and offsetting the incremental loss of woodland caribou habitat to help achieve self-sustaining and ecologically effective woodland caribou populations. Importantly, **NexGen's commitment to implementing a Caribou Mitigation and Offsetting Plan is expected to provide a net increase in functional woodland caribou habitat.** It is also anticipated that other future developments would implement similar mitigation measures to support woodland caribou conservation.

6.2

Project Benefits

The Project represents a substantial and consistent fuel source for meeting the growing global demand for electricity and the need for expansion of low-GHG emitting energy options. The Project would be located within well-regulated provincial and federal jurisdictions and be subject to Canada's security and nuclear safeguard commitments.

Due to the low GHG emissions associated with nuclear power generation compared to coal and natural gas power generation, the downstream effects of the Project would increase Canada's ability to meet national emission reduction targets. Overall, the proposed Project would support Canada's transition to a low carbon economy by providing the country with the fuel needed for nuclear power.

Additionally, the proposed Project would provide increased opportunities for local communities and broader Saskatchewan and Canadian society through the benefits described below.

Employment

The Project would provide increased employment opportunities for local residents:

- **During Construction:** The peak workforce is expected to be approximately 350 workers, and the Project could result in 8,200 to 10,500 direct, indirect, and induced full-time equivalent positions across Canada over a four-year period.
- **During Operations:** The peak workforce is expected to be approximately 490 positions on payroll, with a long-term aspirational target of 75% of hiring from local communities. Direct, indirect, and induced employment is estimated to range from 950 to 1,200 full-time equivalent positions across Canada during a typical operating year.
- **During Closure:** Employment would continue but at a decreased level compared to Operations.

Income

The proposed Project would provide a substantial positive benefit through increased income opportunities for local residents:

- **During Construction:** Labour costs are estimated to make up approximately $384 million, or 30% of the total capital cost of $1.3 billion. The total direct, indirect, and induced labour income across Canada would range from $730 million to $885 million.
- **During Operations:** During a typical operating year, direct labour spending is estimated to be approximately $55 million, with a total direct, indirect, and induced labour income ranging between $94 million and $112 million.
- **During Closure:** Income opportunities would continue, but at a decreased level compared to Operations.

Education and Training

The proposed Project would provide education and training opportunities for local residents that would result in:

- a higher-skilled local workforce;
- opportunities for employees to advance to more senior and higher-income employment within the organization; and
- improved ability for local residents to obtain other employment in the future.

Broader Economic Benefits

Overall, the proposed Project is estimated to have a direct, indirect, and induced impact on national gross domestic product of up to $1.3 billion over the course of Construction and up to $1.1 billion in a typical year of Operations.

The Project would also generate benefits through the payment of royalties to the governments of Saskatchewan and Canada. These government revenue sources include uranium royalties, resource surcharges, mineral surface lease payments, corporate income tax, and individual income tax. The total estimated direct payments to government for a typical operating year are estimated to be $289 million for Saskatchewan and $104 million for Canada.

Specific Enhancement Measures

NexGen has signed Benefit Agreements with the Clearwater River Dene Nation, Birch Narrows Dene Nation, and Buffalo River Dene Nation, and is in the process of negotiating a Benefit Agreement with the Métis Nation – Saskatchewan. These agreements are reflective of NexGen's commitment to:

- proactively engage with local communities;
- support the educational and economic participation of affected communities; and
- seek to provide opportunities resulting in sustainable, lasting benefits to local communities beyond the proposed Project lifespan.

Commitments made in Benefit Agreements with primary Indigenous Groups and through programs developed and implemented jointly by NexGen and local communities are intended to help enhance income opportunities for local residents. Enhancement and monitoring measures are proposed to sustainably maximize opportunities related to the proposed Project. Specific measures would include:

- operating, training, and recruitment programs for construction and mining-related skills, targeted employment opportunities for local residents, and continuing to provide scholarship and summer student opportunities;
- prioritizing advancement opportunities for qualified local residents into increasingly senior positions; and
- working with local communities to establish and maintain a business registry for local businesses.

To enhance personal income and community revenue opportunities for local community members, NexGen is committed to a long-term aspirational target of 30% of the Project's external spending being awarded to local businesses (i.e., within the Northern Saskatchewan Administration District). Further to this aim, the Benefit Agreements with primary Indigenous Groups include a pillar for economic participation, which includes commitments to employment, training, and contracting opportunities.

6.3

Assessment Confidence

While uncertainty is an inherent aspect of any predictive exercise, there were no knowledge gaps that would affect the overall conclusions. Considering the precautionary approach and using conservative assumptions where necessary, there is a moderate to high degree of confidence that the effects on valued components and intermediate components have not been underestimated.

Given that biophysical and socio-economic environments change naturally and continuously through time and across space, assessments of effects and predictions about future conditions embody some degree of uncertainty (CEA Agency 2018). Each technical discipline identified the key sources of uncertainty within their assessment and described how uncertainty was addressed to increase the level of confidence that effects would not be larger than predicted.

Monitoring and management have been proposed, in part, to address uncertainties associated with the effects predictions.

6.4

Overview of Management Planning

NexGen is committed to implementing an Integrated Management System (IMS) to systematically and reliably achieve desired Project outcomes and excellence in:

- employee safety;
- radiation safety; and
- environmental protection.

The IMS for the proposed Project would provide a common framework for the management of all Project activities and be developed with reference to the applicable provincial, CNSC, and Canadian Standards Association Group requirements, as well as appropriate guidance documents. This unified framework would include processes for fostering a culture in which protecting the health and safety of workers and preserving the environment are principal considerations that guide decisions and actions, as well as processes for implementing compliance measures and enabling continual improvement.

NexGen would be responsible for implementing various monitoring and management programs and plans under the IMS. These programs and plans would include monitoring requirements and comply with all approval conditions, permits, and authorizations. As Project development can influence the nature, frequency, and locations of monitoring initiatives, the programs and plans would be further refined as the Project progresses through permitting and licensing processes, and, where applicable, would incorporate input from Indigenous Groups, regulatory agencies, and the public. The program and plans would be ‘living’ documents throughout the Project lifespan and would be updated as the mine development progresses through Operations and Closure.

As a complement to the monitoring programs and plans proposed by NexGen in the EIS, additional monitoring programs would be implemented as part of licensing to verify predicted effects, evaluate the effectiveness of mitigation, and measure

Management programs and plans are required to effectively implement the mitigation measures identified through the biophysical and socio-economic effects assessment process. NexGen is responsible for, and committed to, providing for the health and safety of its workers and the public and the protection of the environment.

compliance with future permit conditions and statutory requirements. Monitoring would also be used to address uncertainties associated with effects predictions, identify any unanticipated effects, and provide input into corrective actions or adaptive management to limit those effects. Collectively, the monitoring programs would improve the overall environmental performance of the proposed Project.

Typically, monitoring includes one or both of the following categories that may be applied during the Project lifespan:

- **Regulatory compliance monitoring:** Includes monitoring activities and programs undertaken to confirm the implementation of approved design standards, mitigation, approval conditions, and NexGen commitments.
- **Follow-up monitoring:** Includes programs designed to test the accuracy of effects predictions, reduce or address uncertainties, determine the effectiveness of mitigation, or provide appropriate feedback to operations for modifying or adopting new mitigation designs, policies, and practices. Results from these programs can be used to increase the certainty of effect predictions in future EAs.

Where relevant, conceptual monitoring programs would be proposed to confirm predictions and to address the uncertainties associated with the effects predictions and mitigation, and upon Project approval, would be included in the IMS.

Adaptive Management

NexGen's adaptive management process is a planned and systematic approach that:

- **gathers information to inform decision making;**
- **emphasizes accountability; and**
- **allows for flexibility to add or improve mitigation measures.**

Adaptive management has been identified as a key element of the proposed Project's approach to risk management. Adaptive management is a planned and systematic approach to improving knowledge over time through an iterative process that provides the information required to increase confidence to make decisions that reduce uncertainty and improve risk management outcomes. Adaptive management provides a structured approach to decision making that emphasizes accountability and explicitness, but also allows for flexibility to identify and implement new mitigation measures or to modify existing measures during the lifespan of a project.

NexGen's adaptive management process for the proposed Project would be described in the IMS Manual and used as a structured guide to develop and apply adaptive management plans. For example, if environmental monitoring detects changes that are different than predicted, the adaptive management framework in the relevant management plan would be implemented to determine if and what actions are needed to meet the underlying objectives of minimizing adverse effects and reducing uncertainty.

Adaptive management is supplemental and complementary to the continual improvement processes that would also be outlined in the IMS Manual. NexGen is committed to achieving continual improvement in environmental performance through the management systems that would be implemented for the Project.

6.5

Next Steps

At the conclusion of the Project EA, other regulatory approval processes would be required, and NexGen would continue to work with Indigenous Groups, regulators, and members of the public.

6.5.1 Licensing and Permitting

In addition to being subject to both federal and provincial EA processes, the Project would also require federal and provincial licences, approvals, and permits.

CNSC Licensing

Activities related to site preparation, construction, operations, closure, and release from licensing of uranium mines and mills, must be licensed under the *Nuclear Safety and Control Act* and applicable regulations.

NexGen is implementing an integrated approach to the EA and licensing processes for the proposed Project whereby information to support the licence application is submitted to the CNSC in a staged manner to ensure alignment between the EA and licensing documentation.

Under the integrated approach, CNSC staff conduct technical reviews of information contained in the EIS and the licence application at the same time; however, the licensing decision cannot be made until after the EA decision has been rendered. Should a licence be issued, the CNSC would maintain ongoing oversight of the licensed activities to confirm compliance through focused inspections and audits, reporting requirements, and annual updates to be submitted by NexGen.

Provincial Permits and Approvals

In addition to CNSC licensing approvals, the Project would require permits and approvals issued by provincial agencies.

Following EA approval by the Minister of Environment (should the Project receive approval), applications for the required provincial regulatory approvals would be submitted by NexGen, with relevant approvals required prior to the commencement of Project-related activities.

To protect environmental and human health, mining activities are regulated under The Mineral Industry Environmental Protection Regulations, 1996, which provide the primary permitting requirements for the Project. Under these regulations, the Project would require:

- an approval to construct, install, alter, or extend a pollutant control facility;
- an approval to operate a pollutant control facility; and
- eventually, an approval to permanently decommission a pollutant control facility.

These regulations also specify requirements for the maintenance of decommissioning and reclamation plans and financial assurance instruments during Operations.

6.5.2 Establishing Environmental Committees and Independent Indigenous Monitoring

As part of the evaluation of Project performance, Environmental Committees and independent Indigenous monitoring would provide opportunities to include Indigenous and Local Knowledge.

NexGen has proposed the formation of an Environmental Committee with each of the four primary Indigenous Groups (i.e., Clearwater River Dene Nation, Métis Nation – Saskatchewan, Birch Narrows Dene Nation, and Buffalo River Dene Nation). Each Environmental Committee would be composed of representatives from the Indigenous Group and from NexGen to provide oversight of the environmental performance of the Project and to verify the parties are implementing the regulatory and environmental commitments. The Environmental Committees would be fully funded by NexGen for the lifespan of the Project.

In addition, NexGen has proposed funding full-time, independent Indigenous Monitors to be chosen by each of the primary Indigenous Groups. Monitors would have unrestricted environmental monitoring opportunities, such as to conduct independent environmental sampling, subject to appropriate health, safety, and other reasonable site-specific policies, for the lifespan of the Project. They would also participate in annual community meetings to report openly and without restriction on the environmental performance of the Project.

6.5.3 Ongoing Engagement

NexGen views ongoing engagement and knowledge sharing as critical success factors for the Project. These practices would continue into all future Project phases. NexGen is committed to ongoing engagement throughout the Project lifespan with Indigenous Groups, regulators, and the public to safely and responsibly manage the Project in a way that benefits society.

As NexGen proceeds through the regulatory process and advances development of the Project, NexGen would take an adaptive approach to engagement to allow flexibility in meeting the needs of Indigenous Groups and local communities. Engagement activities would be aligned with applicable government policies and/or legislation.

6.6

Closing Statement

NexGen's vision is to become a world leader in delivering clean energy solutions in a manner that provides lasting benefits to local communities. With this in mind, the company has approached the proposed Project with consideration of current and future generations.

NexGen is focused on responsible and optimal development of the Project, incorporating environmental stewardship, social advancement, and sustainable long-term economic benefits for local Indigenous Groups, other community members, and stakeholders.

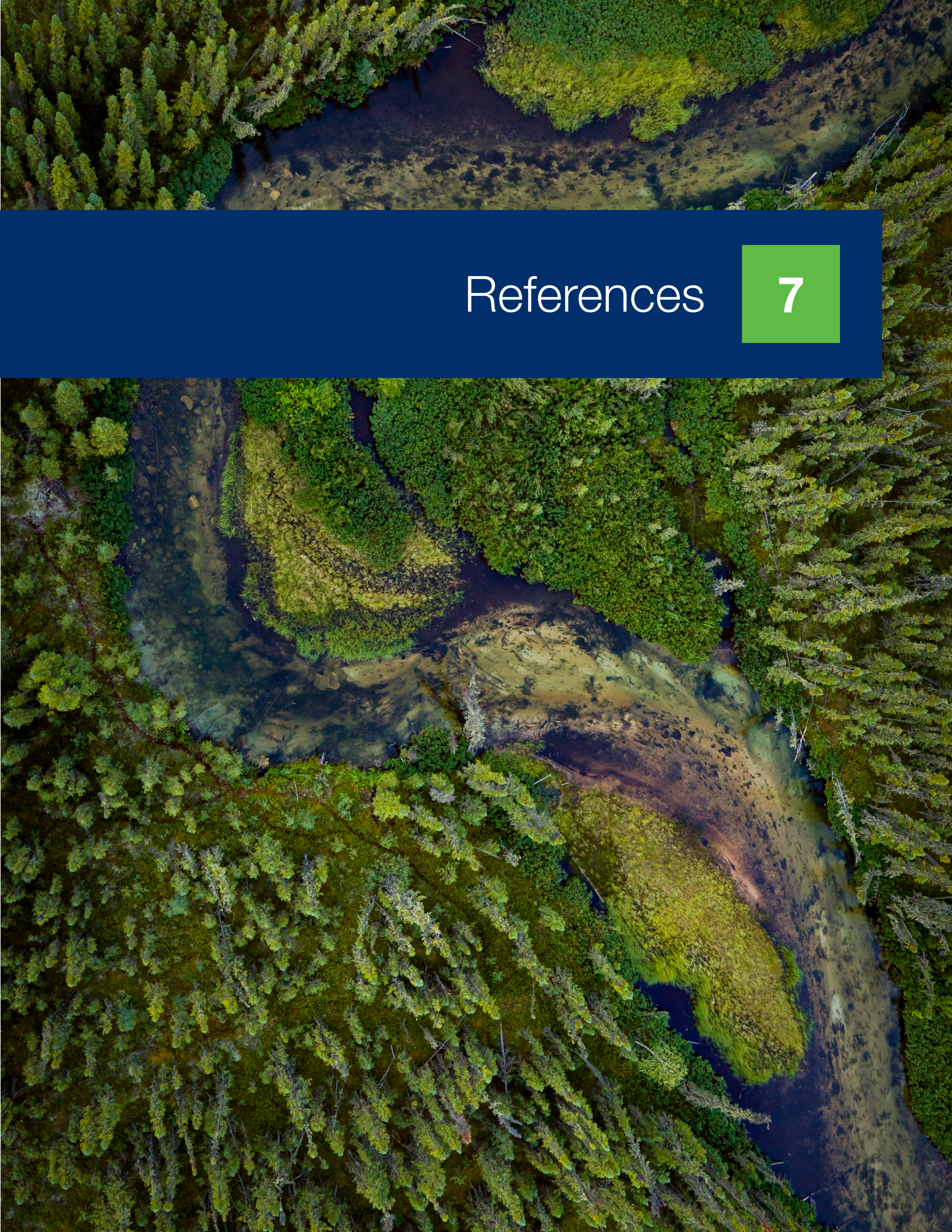
NexGen has worked closely with local communities since 2013, and engagement activities have continually evolved to promote the inclusion of Indigenous and Local Knowledge and feedback from regulatory agencies and the public. The proposed Project has been designed to meet applicable regulatory requirements and industry best management practices, and to be safe for the public and workers. The Project would also operate in well-regulated provincial and federal jurisdictions.

No significant adverse effects on biophysical and socio-economic VCs are predicted for the Project or for the Project in combination with RFDs, with the exception of woodland caribou. Effects on woodland caribou are already significant under existing conditions, and NexGen's commitment to implementing a Caribou Mitigation and Offsetting Plan is expected to provide a net increase in functional woodland caribou habitat relative to Project-related habitat loss.

The proposed Project demonstrates favourable economics, would be fully self-funded, and would not require any financial support from governments. It represents a substantial and consistent potential source of uranium for meeting the growing global demand for electricity and could meaningfully contribute to Canada's ability to meet its environmental obligations and commitments with respect to climate change.

The proposed Project would generate socio-economic benefits and opportunities for local Indigenous Groups and communities, the Province of Saskatchewan, and Canada, including increased direct local and national employment, tax and royalty revenue, and associated indirect economic benefits and employment from local to national scales.

7 References



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