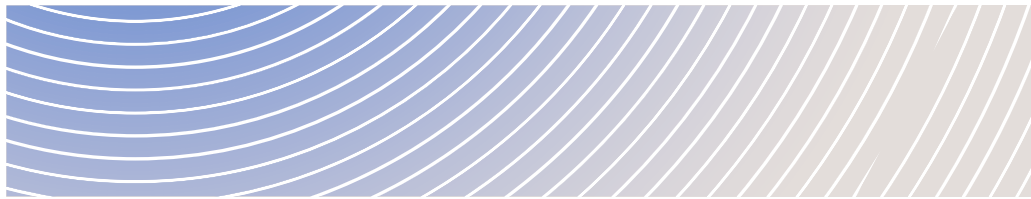


Suncor Base Mine Extension Project



TAILORED IMPACT STATEMENT GUIDELINES PURSUANT TO THE *IMPACT
ASSESSMENT ACT*

May 31, 2021



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List of Abbreviations and Acronyms

Abbreviation/Acronym	Definition
AAQO	Alberta Ambient Air Quality Objectives and Standards
the Act	<i>Impact Assessment Act</i>
Agency	Impact Assessment Agency of Canada
BAT/BEP	Best Available Technologies / Best Environmental Practices
BCRs	Bird Conservation Regions
CAAQS	Canadian Ambient Air Quality Standards
CCME	Canadian Council of Ministers of the Environment
COPC	Contaminant of Potential Concern
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
Declaration	United Nations Declaration on the Rights of Indigenous Peoples
ECCC	Environment and Climate Change Canada
GBA+	Gender Based Analysis Plus
GHG	Greenhouse Gas
GIS	Geographic Information Systems
Guidelines	Tailored Impact Statement Guidelines
HHRA	Human Health Risk Assessment
HIA	Health Impact Assessment
IVOC	Intermediate Volatile Organic Compounds
LSA	Local Study Area
Minister	Minister of Environment and Climate Change
Internet Site	Impact Assessment Agency of Canada's website
NAAQO	National Ambient Air Quality Objectives
NOC	National Occupational Classification
OCAP	Ownership, Control, Access and Possession
OHWM	Ordinary High Water Mark



OSMP	Oil Sands Monitoring Program
PACs	Polycyclic Aromatic Compounds
PAD	Peace-Athabasca Delta
Project	Suncor Base Mine Extension Project
Registry	Canadian Impact Assessment Registry
RSA	Regional Study Area
SACC	Strategic Assessment of Climate Change
SAGD	Steam-assisted Gravity Drainage
SARA	<i>Species at Risk Act</i>
SOAs	Secondary Organic Aerosols
Suncor	Suncor Energy Inc.
SVOCs	Semi-volatile Organic Compounds
VC	Valued Component
VOCs	Volatile Organic Compounds
WBEA	Wood Buffalo Environmental Association



Glossary

Term	Definition
Biodiversity	Variability of living organisms of all origins, including, in particular, the terrestrial, marine and other aquatic ecosystems and the ecological system of which they are part. This includes diversity within species, among species and among ecosystems.
Contaminant of potential concern	A contaminant at a site that has the potential to adversely affect a human or non-human biological receptor, or any chemical substance for which the concentration in an environmental medium is likely to be high due to the project's activities.
Direct or incidental effect	Effects that result from federal decisions that would permit a designated project to be carried out or federal funding that would enable the designated project.
Effects	Positive or negative consequences of changes to the environment or to health, social or economic conditions that are likely to be caused by the carrying out of the project. This includes direct and incidental effects, as well as cumulative effects.
Gender	Refers to the roles and behaviours that society associates with being female or male. Rigid gender norms can result in stereotyping and curb our expectations of both women and men. A society's understanding of gender changes over time and varies from culture to culture.
Gender-based Analysis Plus	An analytical framework that guides the assessment of how designated projects may have different positive and negative impacts on diverse groups of people or communities. The "plus" in GBA+ acknowledges the multiple identity factors that intersect with sex and gender to affect how people may experience projects differently and be differently impacted by projects. The Agency's guidance document Gender-Based Analysis Plus in Impact Assessment provides guiding principles to allow proponents to use this analytical framework in their Impact Statement.
Gender-based violence	Violence based on gender norms and unequal power dynamics, perpetrated against someone based on their gender, gender expression, gender identity, or perceived gender. It takes many forms,



including physical, economic, sexual, as well as emotional (psychological) abuse.

Human Health Risk Assessment	Assessment of the effects on the health of persons exposed to biophysical stressors, particularly increased concentrations of chemical substances present in the environment and linked to various phases of a project (construction, operation, closure and reclamation, as the case may be).
Key receptors	<p>Key receptors include sensitive receptors and other existing and reasonably foreseeable receptors that may be affected by project activities.</p> <p>Depending on the context, ecological receptors may also be considered, such as important areas of wildlife use.</p>
Receptor	The entity (e.g. organism, population, community, ecosystem, humans) that might be adversely affected by contact with or exposure to a substance of concern.
Sex	Refers to the biological and physiological characteristics that define males, females and intersex persons.
Sensitive receptor	Human receptors more sensitive to exposure to a substance of concern. Sensitive receptors may include vulnerable individuals or subgroups of a population (e.g. individuals with compromised health, children, pregnant women, seniors) and places, such as residences, health and social services institutions (e.g. hospitals, long-term care facilities, seniors' residences), educational institutions (e.g. schools, daycare centres, early childhood centres), tourism establishments (e.g. tourism information offices, museums, ski areas, summer camps, outdoor recreation areas, camp sites), and recreational areas (e.g. recreational land, urban parks, parks and conservation areas).
Subgroup	In the context of GBA+, refers to diverse groups or subgroups within the general population or communities that may be impacted by the project. This may include women, gender-diverse people, youth, elders, people with disabilities, recent immigrants, visible minorities, among others.
Traditional foods (or country foods)	All foods that do not come from commercial systems. They include all food trapped, fished, hunted, gathered or cultivated for medicinal or subsistence purposes outside the commercial food chain, including aquatic and terrestrial wildlife that is fished, trapped, hunted or



harvested for domestic consumption; fruits and vegetables harvested from the wild; plant tissue ingested for medicinal or other uses; agricultural products grown in gardens and/or home orchards, and aquatic and terrestrial wildlife produced exclusively for domestic consumption.

1. Introduction

The federal Impact Assessment process serves as a planning tool that considers a broad range of potential environmental, health, social and economic effects of designated projects identified by regulation or designated by the Minister of Environment and Climate Change (the Minister). Decisions are based on whether the potential adverse effects in areas of federal jurisdiction are in the public interest. The public interest determination is guided by the factors set out in the *Impact Assessment Act* (the Act) in section 63:

- (a) the extent to which the project contributes to sustainability;
- (b) the extent to which the adverse effects within federal jurisdiction and the adverse direct or incidental effects that are indicated in the impact assessment report in respect of the project are significant;
- (c) the implementation of the mitigation measures that the Minister or the Governor in Council, as the case may be, considers appropriate;
- (d) the impact that the project may have on any Indigenous peoples and any adverse impact that the designated project may have on the rights of the Indigenous peoples¹ of Canada recognized and affirmed by section 35 of the *Constitution Act, 1982*; and
- (e) the extent to which the effects of the project may hinder or contribute to the Government of Canada's ability to meet its environmental obligations and its commitments in respect of climate change.

A key element for the federal impact assessment process is the introduction of Tailored Impact Statement Guidelines (Guidelines)², which will provide the proponent with direction and requirements for the preparation of an Impact Statement. The Guidelines have been specifically tailored for the Suncor Base Mine Extension Project (the project), by the Impact Assessment Agency of Canada (the Agency). The tailoring is based on the nature, complexity and context of the project, and is informed and guided by consultation and engagement that occurs with the public, Indigenous communities, jurisdictions, federal authorities and other interested parties during the Planning phase of the impact assessment process.

In order to support the Government of Canada's objective of "one project, one assessment", the Guidelines have also been tailored to identify where the federal and provincial assessment processes have shared information needs. While the information requirements may be shared, the impact assessment will respect the jurisdiction of each governing body. The draft version of Suncor Energy Inc.'s (Suncor) proposed Terms of Reference is included as *Annex I – Draft Terms of Reference* in the Guidelines. At the time of issuance of these Guidelines, the provincial Terms of Reference are not finalized.

¹ These Guidelines use the term "Indigenous peoples" to represent the "aboriginal peoples of Canada" which includes Indian, Inuit and Métis peoples as defined in subsection 35(2) of the *Constitution Act, 1982*, and "rights of Indigenous peoples" is used to reflect the full scope of Aboriginal and Treaty rights recognized and affirmed by section 35 of the *Constitution Act, 1982*.

² As set out in paragraph 18(1)(b) of the *Impact Assessment Act*.



The Guidelines were finalized following a comment period on the draft version of the Guidelines, which ran from February 26 to May 7, 2021.

The proponent may present the information in the Impact Statement in the manner it deems most appropriate. While the Guidelines do not prescribe a preferred structure for the Impact Statement, it is recommended to follow a structure similar to the Guidelines to facilitate the review of the Impact Statement and participation in the process.

Irrespective of the preferred structure for the Impact Statement, it is essential that the Impact Statement address all requirements outlined in the Guidelines. If the proponent does not submit the information required in the Guidelines, it should include an explanation justifying the exclusion. To facilitate the review of the Impact Statement, the proponent must provide a table of concordance that indicates where each requirement of the Guidelines is addressed.

The proponent must provide the information in a machine-readable, accessible format, to support the Government of Canada's commitment to open science and data and facilitate the sharing of information with the public through the Canadian Impact Assessment Registry (the Registry) and the Government of Canada's open science and data platform. The proponent should contact the Agency to obtain additional direction regarding the format and distribution of the Impact Statement.

1.1. Factors to be considered in the Impact Assessment

The Guidelines correspond to factors listed in subsection 22(1) of the Act and prescribe that the impact assessment of a designated project must take into account:

- (a) the changes to the environment or to health, social or economic conditions and the positive and negative consequences of these changes that are likely to be caused by the carrying out of the designated project, including:
 - (i) the effects of malfunctions or accidents that may occur in connection with the designated project;
 - (ii) any cumulative effects that are likely to result from the designated project in combination with other physical activities that have been or will be carried out; and
 - (iii) the result of any interaction between those effects;
- (b) mitigation measures that are technically and economically feasible and that would mitigate any adverse effects of the designated project;
- (c) the impact that the designated project may have on any Indigenous group and any adverse impact that the designated project may have on the rights of the Indigenous peoples of Canada recognized and affirmed by section 35 of the *Constitution Act, 1982*;
- (d) the purpose of and need for the designated project;
- (e) alternative means of carrying out the designated project that are technically and economically feasible, including through the use of best available technologies, and the effects of those means;

- (f) any alternatives to the designated project that are technically and economically feasible and are directly related to the designated project;
- (g) Indigenous knowledge provided with respect to the designated project;
- (h) the extent to which the designated project contributes to sustainability;
- (i) the extent to which the effects of the designated project hinder or contribute to the Government of Canada's ability to meet its environmental obligations and its commitments in respect of climate change;
- (j) any change to the designated project that may be caused by the environment;
- (k) the requirements of the follow-up program in respect of the designated project;
- (l) considerations related to Indigenous cultures with respect to the designated project;
- (m) community knowledge provided with respect to the designated project;
- (n) comments received from the public;
- (o) comments from a jurisdiction that are received in the course of consultations conducted under section 21 of the Act;
- (p) any relevant assessment referred to in sections 92, 93 or 95 of the Act;
- (q) any assessment of the effects of the designated project that is conducted by or on behalf of an Indigenous governing body and that is provided with respect to the designated project;
- (r) any study or plan that is conducted or prepared by a jurisdiction – or an Indigenous governing body not referred to in paragraph (f) or (g) of the definition *jurisdiction* in section 2 of the Act – that is in respect of a region related to the designated project and that has been provided with respect to the project; and
- (s) the intersection of sex and gender with other identity factors.

The impact assessment of the project has been referred to an independent review panel by the Minister. In accordance with paragraph 22(1)(t) of the Act, any other matter relevant to the impact assessment that the Agency would require to be taken into account would be detailed in the Terms of Reference for the review panel.

The scope of the factors in paragraphs 22(1)(a) to (f), (h) to (l), and (s) that are to be taken into account, including the extent of their relevance to the impact assessment, is determined by the Agency and is outlined in the Guidelines.

2. Proponent information

2.1. The proponent

The Impact Statement must:

- provide contact information for proponent representatives for the project (e.g. name, address, phone, fax, email);

- identify the proponent(s) and, where applicable, the name of the legal entity(ies) that would develop, manage and operate the project;
- describe corporate structure, including roles and responsibilities of key personnel;
- specify the mechanism used to ensure that corporate policies will be implemented and respected for the project; and
- identify key personnel, contractors, and/or sub-contractors responsible for preparing the Impact Statement.

2.2. Qualifications of individuals preparing the Impact Statement

The proponent must:

- provide information on the individuals who prepared the sections within the Impact Statement; and
- demonstrate that qualified individuals have prepared the information or studies provided. Where possible, the proponent should use experts who are members of a professional body or recognized association.

A qualified individual would include someone who may be relied on by the proponent to provide advice within their area of expertise, as demonstrated by:

- formal education, training or certification;
- experience in relevant area;
- credibility or standing as a holder of Indigenous or community knowledge.

3. Project description

3.1. Project overview

The Impact Statement must:

- describe the project, key project components and activities, scheduling details, the timing of each phase of the project and other key features.

As the extension project is part of a larger sequence of projects, the Impact Statement must outline the larger context and integration with, or leverage of, existing components. The Impact Statement must make clear where existing project components and activities are being used or transferred from the existing Base Mine operations (e.g. existing activities and components described in Table 3 of the proponent's [Detailed Project Description](#) that are operating under existing approvals) and would be captured within the current baseline, versus where components and activities are new or additional. While it is important to understand the scale and scope of the proposed project components and activities, this clarity is required to ensure that approved and operating components are not inadvertently subject to re-assessment.

3.2. Project location

The Impact Statement must describe the geographical setting and socio-ecological context in which the project is to take place. The description should focus on aspects of the project and its setting that are important in order to understand the potential environmental, health, social and economic effects and impacts of the project.

The following information must be included and, where appropriate, located on map(s):

- geographic coordinates (i.e. longitude/latitude using international standard representation in degrees, minutes, seconds) for the centre of the main project site;
- project footprint, showing the project boundaries, including lands and properties owned or leased by the proponent);
- the surface areas, location and spacing of project components (see section 3.4 *Project components and activities*);
- adjacent resource lease boundaries and jurisdictional boundaries;
- existing services and infrastructure and adjacent land and aquatic uses in the region including:
 - roads;
 - municipalities and administrative regions;
 - resource development projects already underway (e.g. mines, steam-assisted gravity drainage (SAGD) operations, exploration wells, quarries, and forestry operations); and
 - local businesses and industries such as fisheries and outfitters, and any other relevant uses.
 - Where Indigenous communities have identified and approved their inclusion in the Impact Statement, other relevant uses may include hunting, trapping, fishing, gathering, and engaging in spiritual practices;
- distance of the project components to any federal lands and the location of any federal lands within the regional study area, including lands in a reserve or lands to be added to a reserve, within the meaning of subsection 2(1) of the *Indian Act*;
- treaty areas, traditional territories, Indigenous communities, and Métis harvesting zones, including potentially impacted areas of the Northwest Territories;
- all permanent, intermittent, or ephemeral waterbodies and watersheds potentially affected by the project, including the identification of navigable waterways;
- environmentally sensitive areas potentially affected by the project, such as national, provincial, and regional parks, UNESCO World Heritage Sites, other protected areas, ecological reserves, and locations identified by impacted Indigenous communities as sensitive or culturally important;
- ecological classification of the landscape according to provincial and federal systems (e.g. ecosites, ecoregions, ecodistricts and ecozones) (see [Introduction to the Ecological Land Classification \(ELC\)](#) and [Ecozones Introduction](#)); and
- lands subject to conservation agreements.

Maps are to be provided to the Agency as electronic geospatial data file(s) compliant with requirements set out in Appendix 1 – Additional guidance under *Documentation*.

3.3. Regulatory framework

The Impact Statement must identify:

- any federal power, duty or function that may be exercised that would permit the carrying out (in whole or in part) of the project or associated activities;
- legislation and other regulatory approvals that are applicable to the project at the federal, provincial, regional and municipal levels, including those denoted in the [Permitting Plan](#);
- a list of federal, provincial or territorial greenhouse gases (GHG) legislation, policies, or regulations that will apply to the project;
- government policies and resource management plans, planning or study initiatives relevant to the project and the impact assessment and their implications, including relevant local, sub-regional, and regional studies and strategic assessments;
- any treaty, self-government, land claims or other agreements between federal or provincial governments and Indigenous communities that are pertinent to the project and the impact assessment;
- existing Indigenous governance systems and Indigenous laws relevant to the project or the impact assessment, as identified by Indigenous communities;
- any relevant land use plans, policies and frameworks, land zoning, and community plans, including cumulative effects management frameworks and any Indigenous land use and development plans;
- information on land lease agreement or land tenure, when applicable; and
- municipal, regional, provincial or national objectives, standards, regulations or guidelines, by-laws, or ordinances that have been used by the proponent to assist in the evaluation of any predicted environmental, health, social or economic effects or impacts.

3.4. Project components and activities

The Impact Statement must:

- describe project components, associated and ancillary works, and other characteristics to assist in understanding the potential environmental, health, social and economic effects, and impacts on Indigenous peoples and their rights, as identified by the Indigenous communities. Include descriptions of the components and activities identified in sections 2.1, 2.5 and 2.6 of Suncor's proposed Terms of Reference (Annex I);
- describe project activities to be carried out during each project phase (site preparation, construction, operation, closure and reclamation). Project activities that should be considered in this description are outlined in Appendix 1 – Additional guidance under *List of project activities*;
- include a summary of any change made to the project as originally proposed in the [Detailed Project Description](#), including the reasons for these changes;

- provide sufficient detail to support analysis regarding the project's impacts in the context of potential interaction between valued components (VCs);
- include the location, magnitude and scale of each project activity, and a schedule including, as applicable, the activity's expected start date, duration, time of year, time of day (e.g. night operations), and frequency, for all project phases; and
- highlight activities that involve periods of increased disturbance to environmental, health, social and economic conditions or impacts on Indigenous peoples, taking into account differences among Indigenous communities.

The description above must be supported by maps, as outlined in section 3.2 *Project location*.

Several requirements included in section 2 of Annex I may also be relevant to subsequent sections of these Guidelines. The Impact Statement may include the information and cross-reference as is most logical, including the Terms of Reference (Annex I) requirements for:

- benefits of the project (section 2.1 [H]);
- criteria to identify constraints and how the Project has been designed to accommodate those constraints, such as Indigenous traditional land and water use, known traplines, cumulative environmental and social impacts in the region (section 2.2);
- involvement in regional and cooperative efforts and opportunities for sharing infrastructure and coordinating reclamation plans (section 2.3);
- process and infrastructure alternatives (section 2.4);
- air emissions management (section 2.7);
- water management information (section 2.8), including for water supply, surface water, and wastewater management;
- waste management information (section 2.9);
- conservation and reclamation (section 2.10); and
- environmental management systems (section 2.11).

3.5. Workforce requirements

The Impact Statement must describe the anticipated labour requirements, employee programs and policies, and workforce development opportunities for the project, including:

- opportunities for employment, outlining the anticipated number of full-time and part-time positions to be created, and how this can change during the project;
- continued employment opportunities for employees of the existing Base Plant and mine post-closure;
- anticipated workforce region of origin (i.e. local, regional, out-of-province, or international employees);
- the skill and education levels required for the positions;
- investment in training opportunities;

- expected workforce requirements based on the National Occupational Classification system and timelines for employment opportunities;
- working conditions and anticipated work scheduling for construction and operation (e.g. hours of work, rotational schedules, workers' modes of travel to work sites, fly-in/fly-out);
- anticipated hiring policies, including hiring programs;
- workplace policies and programs for Indigenous employment, workforce diversity and employment of women and other underrepresented groups;
- employee assistance programs and benefits programs; and
- workplace policies and programs, including codes of conduct, workplace safety programs and cultural training programs.

Workforce requirements must take Gender Based Analysis Plus (GBA+) into consideration (see the Glossary and guidance on the *Application of GBA+* in Appendix 1 – Additional guidance). The information must be presented in sufficient detail to analyse how vulnerable or underrepresented groups will be taken into account, including Indigenous communities and other relevant community subgroups.

4. Project purpose, need and alternatives considered

The proponent must identify the purpose of and need for the project, the alternative means of carrying out the project, and the alternatives to the project in its Impact Statement. The proponent should consult Agency guidance documents, particularly the documents [Guidance: "Need for", "Purpose of", "Alternatives to" and "Alternative Means"](#) and [Policy Context: "Need for", "Purpose of", "Alternatives to" and "Alternative means"](#).

4.1. Purpose of the project

The Impact Statement must outline what is to be achieved by carrying out the project. The Impact Statement should broadly classify the project (e.g. bitumen extraction/processing) and indicate the target market (e.g. international, domestic, local, etc.), where applicable. The *purpose of* statement should include any objectives the proponent has in carrying out the project.

The proponent is encouraged to consider the perspectives of participants (i.e. public, Indigenous communities, governments) in establishing objectives that relate to the intended effect of the project on society.

4.2. Need for the project

The Impact Statement must describe the underlying opportunity or issue that the project intends to seize or solve and should be described from the perspective of the proponent. In many cases, the need for the project can be described in terms of the demand for a resource. The proponent should provide supporting

information that demonstrates the need for the project, including the comments or views of Indigenous peoples, the public and other participants on the proponent's need statement.

The Impact Statement must demonstrate how the following considerations informed the assessment of the need for, and viability of, the project:

- in relation to the national and global demand for bitumen and bitumen products, including an evaluation of the demand for these products during the operating years of the project;
- the current climate context;
- the potential for local and international markets to significantly reduce their demand for bitumen and bitumen products in the coming years; and
- the possibility of a decline of renewable energy prices.

4.3. Alternatives to the project

Under section 22(f) of the Act, the Agency or a review panel must consider any alternatives to the project that are economically and technically feasible and are directly related to the designated project.

The proponent's [Detailed Project Description](#) identifies that alternatives to the project "include development of a different Suncor-owned oil sands lease, and import of bitumen from existing bitumen production operators (p.21)" to support the purpose of the project to "sustain the supply of bitumen to the existing upgraders at Suncor's Base Plant when the mineable bitumen resource at Base Plant is depleted" with bitumen froth production "required in 2030 to support safe and stable upgrader operations (p.12)".

The Impact Statement must:

- present a rationale for selecting the proposed project over the development of different Suncor-owned oil sands leases and import of bitumen from existing bitumen production operators.
 - The rationale must include a qualitative overview of the advantages and disadvantages of the economically and technically feasible alternatives to the project based on relevant considerations, such as environmental, health, social, economic and technical benefits and costs; and
- discuss the manner in which the perspectives of Indigenous peoples, the public and other participants have informed the advantages and disadvantages for the various alternatives, where applicable.

4.4. Alternative means of carrying out the project

The following requirements provide key steps of the alternative means assessment outlined in the Agency's document [Guidance: "Need for", "Purpose of", "Alternatives to" and "Alternative Means"](#). The proponent should consult the Agency's guidance for further detail.

The Impact Statement must identify and consider the potential environmental, health, social and economic effects and the impacts on the rights of Indigenous peoples of alternative means of carrying out the project that are technically and economically feasible.



The Impact Statement must:

- describe alternative means of carrying out the project that are technically and economically feasible, including providing a description of:
 - the criteria used to determine the technical and economic feasibility of possible alternative means;
 - the best available technologies considered and applied in determining alternative means; and
 - each possible alternative means in sufficient and appropriate detail;
- identify the potential adverse and positive environmental, health, social or economic effects associated with alternative means, including impacts on the rights of Indigenous peoples, as identified by Indigenous communities.
 - The application of GBA+ to the effects analysis to describe disproportionate effects for diverse subgroups is required;
 - The proponent must also consider the views or information provided by Indigenous communities, the public and other participants in establishing parameters to compare the possible alternative means;
- identify the alternative means of carrying out the project that were assessed, based on consideration of potential effects and impacts to of Indigenous peoples right, technical and economic feasibility, and use of best available technologies. Other factors may be
 - considered if applicable (e.g. regulatory constraints);
- describe the methodology and criteria used to select the preferred means and excluded alternative means, including consideration of trade-offs between the preferred and alternative means (e.g. ranking matrices, weighing factors, qualitative analyses); and
- identify the preferred means, which is – or are, if more than one – presented in the Impact Statement as the project.

Should there be potential effects from the project on critical habitat or residences of a species listed under the *Species at Risk Act*, the Impact Statement must:

- describe potential risks to critical habitat or residences for each possible alternative means;
- include a description of how the effects could be avoided, and whether avoidance may be achieved through alternative means of carrying out the project; and
- if all alternative means present potential effects on critical habitat or residences, explain how avoidance may be achieved by alternatives to the project.

Based on the proponent's [Detailed Project Description](#) and comments received from participants during the Planning phase, the Impact Statement must consider assessing alternative means for the following project elements and components:

- access to the project site;
- location of key project components, including a list of facilities and infrastructures for which locations may only be determined later (see also section 2.2 of Annex I);
- route for any linear or other infrastructure development or modification, including means for transportation of bitumen to existing processing facilities (see also section 2.4 of Annex I);

- location and design of facilities, including the primary extraction facility;
- technology for bitumen extraction (see section 2.4 of Annex I);
- closure and reclamation options, including closure drainage options;
- thermal energy and electric power sources for the project site, and other stationary sources to provide heat or steam to the project (see section 2.2 of Annex I);
- hazardous materials and waste disposal and management methods, including remediation and treatment of contaminated materials;
- tailings management, technologies and location (see sections 2.4 and 2.9 of Annex I);
- excavation methods and management of excavated materials, including materials that may be a source of wind-blown dust;
- best available technologies and best management practices to control air emissions, including dust, and ensure air quality management for area and point sources, mobile sources, as well as sources of fugitive air emissions (see section 2.7 of Annex I);
- options for crossing, diversion and dewatering of watercourses and waterbodies, including wetlands;
- management of water supply and wastewater, including technologies to minimize water withdrawals, location of final effluent discharge points, water treatment technologies, and techniques to control effluent quality; and
- timing options for various components and activities during all phases of the project.

If there are no applicable alternatives for the elements listed above, the proponent must provide a justification.

The information provided to satisfy the requirements of section 2.4 of Annex I may be referenced where relevant to meet the requirements above, such as for the assessment of alternative means for process and infrastructure, including for tailings management.

The assessment of alternatives should be informed by the following information sources, where applicable:

- any regional or strategic assessment;
- any study or plan that is conducted or prepared by a jurisdiction or an Indigenous governing body related to the area affected by the project and provided with respect to the project;
- any relevant assessment of the effects of the project that is conducted by, or on behalf of, an Indigenous governing body and that is provided with respect to the project;
- Indigenous knowledge, community knowledge, comments received by the public, and comments received from jurisdictions;
- other studies or assessments realized by other proponents; and
- existing studies, assessment or publications that may be applicable to the project and conducted by the proponent in partnership with other parties or for regulatory purposes, such as:
 - the Voyageur project application;
 - research or monitoring studies previously undertaken by the proponent or accessible through proponent's participation in initiatives such as the Canadian Oil Sands Innovation Alliance (COSIA), Alberta Innovates, and federal research initiatives conducted in collaboration with governmental or

academic institutions (e.g. National Research Council of Canada, Natural Sciences and Engineering Research Council of Canada); and

- reports published as part of Canada-Alberta oil sands environmental monitoring on the state of the environment, including surface water, wetlands, terrestrial and aquatic biodiversity, groundwater, air and cumulative effects.

5. Description of public participation and views

5.1. Summary of public engagement activities

The Impact Statement must describe the proponent's ongoing and proposed public engagement activities regarding the project.

The Impact Statement must provide a description of efforts made to distribute project information and provide a description of information and materials that were distributed during the consultation process. The Impact Statement must indicate, for example, the methods used; where the consultation was held; the persons, organizations and diverse groups consulted; the views expressed; and the extent to which this information was integrated in the design of the project as well as in the Impact Statement.

Engagement activities must be inclusive and ensure that interested members of the public have an opportunity to share their views. They must also consider the language needs of the people being engaged.

The proponent should consult Agency guidance documents on this topic, particularly the [Framework: Public Participation under the Impact Assessment Act](#), and [Guidance: Public Participation under the Impact Assessment Act](#).

5.2. Analysis and response to questions, comments and issues raised

The Impact Statement must:

- provide a summary of key issues related to the project that were identified through engagement with the public, including concerns related to potential environmental, health, social and economic effects, potential cumulative effects, and the potential for disproportionate effects for diverse subgroups;
- describe how questions and comments raised by the public influenced project design, construction, operation, closure, reclamation, mitigation, monitoring and follow-up;
- describe any outstanding issues raised by the public and ways to address them, such as alternative means, specific mitigation measures or specific monitoring and follow-up programs to deal with uncertainties;

- identify public concerns that were not addressed, if any, and provide the reasons why these concerns were not addressed; and
- describe plans to maintain public engagement, if the project were to be approved and proceed, to ensure that the public will have an appropriate forum for expressing their views on the ongoing development, operation, closure and reclamation of the project, and on follow-up and monitoring programs (see also section 1 of Annex I).

6. Description of engagement with Indigenous communities

The proponent must engage with Indigenous communities at the earliest reasonable opportunity, in order to identify and understand the potential impacts of the project on Indigenous peoples and their rights, including their lands, territories and resources, and to incorporate Indigenous knowledge into the impact assessment. Engagement with Indigenous communities is required to inform the impact assessment and identify measures to avoid or minimize potential impacts on Indigenous peoples and their rights from the project. This engagement may also identify potential positive outcomes, including measures that could improve the underlying baseline conditions that support the exercise of rights. Ideally, the project will be designed not only in such a way as to minimize its negative effects, but also to maximize its positive impact on the quality of life of Indigenous peoples.

Engagement with Indigenous communities must involve ongoing information sharing and collaboration between the proponent and Indigenous communities to contribute to the development and validation of conclusions and assessment findings related to potential impacts and pathways of effects on Indigenous peoples and their rights. The results of any engagement with each Indigenous community must be presented in the Impact Statement, and, as best as possible, convey the perspective of the Indigenous peoples.

To the extent possible, information should be presented separately for each Indigenous community involved in the assessment, and describe contextual information about the members within an Indigenous community (e.g. women, men, elders, youth, individuals with disabilities, and two-spirited people). The Impact Statement may also consider presenting information at different scales but must include a justification, such as in the case where communities have expressed a preference in that regard for certain VCs (e.g. use of a regional scale vs. community-specific).

The engagement efforts should be consistent with the Government of Canada's commitment to implement the United Nations Declaration on the Rights of Indigenous Peoples (the Declaration) as a comprehensive international human rights instrument and Canada's roadmap for reconciliation. The Declaration emphasizes the importance of recognizing and upholding the rights of Indigenous peoples and ensuring that there is effective and meaningful participation of Indigenous communities in decisions that affect them, their communities, and territories. The Declaration also emphasizes the need to work together in partnership and respect, as articulated through the principle of free, prior and informed consent. This principle reflects working together in good faith on decisions that impact Indigenous peoples, with the intention to achieve consensus.

The record of engagement and inclusion of Indigenous knowledge in the Impact Statement should demonstrate that the proponent sought to build consensus and obtain the agreement of Indigenous communities regarding information presented in the Impact Statement.

The proponent must strive to collaborate or partner with potentially affected Indigenous communities in completing its Impact Statement. The Agency notes that not all Indigenous communities may be willing to collaborate with the proponent, therefore, the proponent must demonstrate they have made best efforts at collaboration and provide the Agency with an explanation regarding circumstances where collaboration was not possible. The proponent should continue sharing information and analyses with the Indigenous community(ies), to use publicly available sources of information to support the assessment, and to document their efforts in that respect.

The proponent must consult the Agency's guidance documents on Indigenous participation and engagement listed under heading *Indigenous participation and engagement* of Appendix 2 – Reference documents.

6.1. Indigenous knowledge considerations

Indigenous knowledge³ is holistic and when integrated in impact assessment, it informs the assessment on areas including the biophysical environment, as well as social, cultural, economic, and health aspects, Indigenous governance, resource use, and mitigation. Indigenous knowledge should be brought together on equitable footing with scientific or technical aspects to inform the impact assessment including the environmental, health, social, economic and rights assessments and best practices and mitigation. It is important that Indigenous knowledge, where available to the proponent, be included for all of these aspects in the impact assessment, not only to look at potential impacts of the project on Indigenous communities. It is also important to capture the context in which Indigenous communities provide their Indigenous knowledge and to convey it in a culturally appropriate manner.

Community-specific engagement protocols and procedures around Indigenous knowledge in assessment processes should be understood, respected, and implemented. The proponent must indicate where Indigenous knowledge that was provided was not included in the assessment and provide a rationale.

Indigenous knowledge, whether publicly available or directly shared with the proponent, should not be included without written consent and validation from the Indigenous community, regardless of the source of the Indigenous knowledge. The guidance document [Protecting Confidential Indigenous Knowledge under the Impact Assessment Act](#), to which the proponent must refer, describes the approaches to be favoured. Appropriate, culturally-based Indigenous methodology for integrating Indigenous knowledge and community input into the impact assessment is necessary to appropriately and ethically assess potential effects and significance of those effects from an Indigenous perspective.

³ The Government of Canada recognizes that Indigenous Peoples refer to their knowledge in different ways, characteristic of their unique languages. Within the context of these Tailored Impact Statement Guidelines, the term Indigenous knowledge is used to refer to all Indigenous ways of knowing. The proponent is encouraged to respect the terminology preferences of the Indigenous communities involved in the assessment.

The proponent must also refer to the Agency's guidance document [Indigenous Knowledge under the Impact Assessment Act: Procedures for Working with Indigenous Communities](#).

6.2. Record of engagement

The Impact Statement must provide a record of engagement that describes all efforts, successful and unsuccessful, taken to seek the views of each potentially affected Indigenous community with respect to the project. This record of engagement is to include all engagement activities undertaken prior to the submission of the Impact Statement.

At a minimum, the proponent must engage with the Indigenous communities identified⁴ by the Crown in the [Indigenous Engagement and Partnership Plan](#) issued along with the Notice of Commencement for the project. The purpose of this engagement is to gain an understanding of the issues and concerns of potentially affected Indigenous communities, and to inform an assessment of the potential adverse impacts of the project on Indigenous peoples and their rights.

The record of engagement must include:

- the proponent's Indigenous engagement policy, as well as established policies and stated principles related to the collection of traditional knowledge and traditional land use information;
- the list of Indigenous communities engaged by the proponent, including those that the proponent was unsuccessful in engaging;
- the list of Indigenous communities wishing to be engaged but omitted by the proponent from engagement and the reasons for their omission;
- where applicable, a copy of each community-specific engagement plan developed collaboratively by the Indigenous community and the proponent for the project. If only one engagement plan was developed solely by the proponent for engagement with all Indigenous groups, provide a rationale for this approach);
- the engagement activities undertaken with each Indigenous community, including the date, means (e.g. face-to-face, virtual, teleconference, etc.) and results of engagement;
- a description of the outcomes of conversations with each Indigenous community about how they wish to be consulted by the proponent;
- the results of any engagement and the perspectives of the Indigenous peoples involved;
- the list of the consultation protocols provided by Indigenous communities to the proponent, if applicable. A copy of the consultation protocols must be included when available in writing;any

⁴ The list of Indigenous communities identified during the Planning phase may change as knowledge of the effects and potential impacts of the project is gained, or if the project or its components are modified during the impact assessment. The Agency reserves the right to modify the list in the Indigenous Engagement and Partnership Plan based on additional information gathered during the impact assessment.

agreements pertaining to engagement that are finalized or in progress, with anticipated mutually agreed upon timelines to complete;

- an explanation for cases where engagement efforts have proven unsuccessful;
- a description of how project information is frequently and transparently shared with Indigenous peoples;
- a description of the preferred methods for sharing information, including alternative solutions implemented for people and locations where technological resources are limited or language barriers exist (e.g. translation of documents, provision of summaries in Indigenous languages);
- a description of how Indigenous groups were provided with a reasonable opportunity to review draft sections of the Impact Statement prior to them being filed, where disagreements occurred, and how disagreements were considered;
- a description of how Indigenous expertise will be sought to assist with the carrying out of the project, should it be approved;
- a description of how Indigenous knowledge and Indigenous standards, thresholds (e.g. Fort McKay Air Quality Permissible Limits, Indigenous Water and Sediment Quality Criteria, etc.) and best practices, informed the project design, assessment and mitigation; future planned engagement activities, and if none are planned, rationale for not undertaking future engagement activities;
- a description of efforts to engage diverse segments of each Indigenous community in culturally appropriate ways, including groups identified by gender, age or other community relevant factors (e.g. hunters, trappers, and other harvesters) to support the collection of information needed to complete the GBA+;
- a description of how engagement activities by the proponent were intended to ensure Indigenous communities were provided an opportunity to evaluate the project's potential positive and negative effects on their members, communities, and activities, and impacts to rights, as identified by the Indigenous community(ies). This could include activities aimed at providing appropriate capacity funding to support the creation and operation of community-driven communication mechanisms that facilitate the flow of information and the advancement of project efforts in each affected Indigenous community, including local contracting;
- sufficient information to demonstrate that the capacity needs of Indigenous communities were taken into account, and that timelines were adequately communicated for the review of information in the Impact Statement, including, where applicable, specific procedures for drafting sections of the Impact Statement; and
- provisions for Indigenous groups to undertake Indigenous-led studies and assessments to fully consider impacts to Indigenous rights and culture.

It is expected that the engagement activities for the preparation of the Impact Statement should be carried out with integrity and transparency, without conflicts of interest, in good faith, and conducted in a manner that is attentive to the concerns of Indigenous communities and committed to producing mutually beneficial outcomes.

6.3. Analysis and response to questions, comments, and issues raised

The Impact Statement must provide an analysis of any potential effects and impacts to Indigenous peoples and of all input received from Indigenous communities with respect to the project, including its contribution to cumulative effects. This analysis is to include all Indigenous knowledge and input received by Indigenous communities prior to, and since commencing, the impact assessment process. This analysis should serve to inform the identification of potential effects and impacts on any applicable VCs, impacts on Indigenous peoples and their rights, and proposed measures to mitigate or accommodate for adverse impacts, enhance or optimize positive effects.

The analysis may be summarized in the relevant section on effects to a VC. The location and level of detail of the information in the Impact Statement will depend on its importance to the selected VCs.

It is recommended that the proponent organize and analyze information relevant to Indigenous communities in separate sections for each one potentially affected by the project, either by nation, community, or other grouping based on the preference expressed by those people. Where applicable, the information and analysis must also be sufficiently disaggregated to support the GBA+ analysis of disproportionate effects (see Appendix 1 – Additional guidance under *Application of GBA+* for more details on GBA+). In all cases, ethical guidelines and culturally appropriate protocols governing research, data collection and confidentiality must be followed.

The Impact Statement must:

- consider and incorporate Indigenous knowledge, spiritual practices, cultural beliefs, laws and norms in the assessment, including whether the project would be inconsistent with Indigenous laws and norms;
- describe the potential effects and impacts to environmental, health, social, cultural and economic conditions of each Indigenous community, informed by the Indigenous community(ies) involved in the assessment and must include both adverse and positive effects;
- describe the rights or interests of each Indigenous community, including those that the communities themselves have identified, that may be impacted by the project;
- provide an analysis of the extent of the potential effects on each Indigenous community, and the views of Indigenous communities regarding the extent of impact on the exercise of rights;
- describe the potential effects and impacts to lands in a reserve within the meaning of subsection 2(1) of the *Indian Act*. Note that section 2 of the *Impact Assessment Act* defines federal lands as including “reserves, surrendered lands and any other lands that are set apart for the use and benefit of a band and that are subject to the *Indian Act*, and all waters on and airspace above those reserves or lands”;
- describe the type of information received from Indigenous communities (observations, questions, issues, comments, knowledge, expertise or other);
- append any specific studies or assessments provided by Indigenous communities, if permission has been obtained from the Indigenous community concerned to publish them;

- describe how the information gathered during the Planning phase of the impact assessment was considered and integrated into the analysis, including the documents uploaded to the Registry by Indigenous communities during that phase of the impact assessment;
- describe the potential effects and impacts specific to lands within an Indigenous community or hamlet, Indigenous-community owned or held lands (e.g. leased lands), Indigenous-held Registered Fur Management Area and community-identified traditional territory within the regional study area;
- identify the sources of information used in the analyses of potential impacts to rights, as well as assumptions and methodologies used for the analyses;
- detail the main issues, questions and comments raised during the engagement activities by each Indigenous community and the proponent's responses, including how matters have been addressed in the Impact Statement or will be addressed in the future;
- integrate the perspectives of Indigenous youth, women, two-spirited people, individuals with disabilities, and Elders where provided;
- indicate where and how the information received was integrated into or contributed to decisions regarding the project or its impact assessment, including in:
 - scoping of assessment factors, such as spatial and temporal study boundaries;
 - selection of VCs, including the identification of sensitive receptors;
 - development and collection of baseline information;
 - project design and activities planning;
 - the construction, operation, closure and reclamation plans;
 - the evaluation of alternative means of carrying out the project;
 - characterization of the potential environmental, health, social, cultural, spiritual and economic effects of the project for each Indigenous community and their rights and potential mitigation or accommodation measures;
 - effects pathways and analyses;
 - tailings management and water treatment plans; and
 - Indigenous participation in mitigation, follow-up and monitoring activities should the project proceed;
- describe how Indigenous expertise and knowledge is considered throughout all phases of project planning and development, should the project be approved; and
- provide, where potential impacts on the rights of Indigenous peoples are identified, a description of how each impact would be avoided, mitigated, managed, or otherwise accommodated, for each Indigenous community separately.

7. Assessment methodology

7.1. Baseline methodology

The Impact Statement must provide a description of the environmental, health, social and economic setting directly and incidentally related to the project. This should include the existing environmental, health, social and economic components, interrelations and interactions as well as the variability in these components, processes and interactions over time scales and spatial boundaries appropriate to the project. Meaningful dialogue with participants and Indigenous communities provides input that may describe how these components and processes are interrelated, and can allow the establishment of a common understanding of the Indigenous knowledge perspective on the project's potential effects and impacts.

The Impact Statement must:

- provide descriptions of the information sources used to determine pre-development and baseline conditions, and the rationale for their selection. The rationale should identify any associated and applicable limitations or uncertainty pertaining to the information;
- provide descriptions of the information sources used, and for the protocols and methods chosen for data collection, sampling, survey, statistical analyses, modelling and research. Descriptions must be sufficiently detailed to corroborate the validity and accuracy of the baseline information collected. Relevant sources of baseline information are listed in Appendix 1 – Additional guidance under *Sources of baseline information*;
- present baseline data in a manner that allows for the assessment of conditions for each temporal scenario, including the identification of changes due to the project, and trends over time where possible, at the scale of all relevant study areas;
- where applicable, provide a rationale for the choice of sampling program, survey design, and analytical methods. Examples of relevant considerations include: how the method will enable comparisons between project effects and baseline conditions, and follow-up monitoring; whether data can be collected in an equivalent manner before, during and after project activities; how natural variability is taken into account; the ability to detect change for a given variable; and the capacity to conduct power analyses;
- where applicable, describe modelling methods used or developed to describe baseline conditions. Include assumptions, calculations of margins of error and other relevant statistical information, as well as whether and how models were validated using independent field or monitoring data from appropriate locations in local and regional study areas. Where discrepancies are observed between modelling predictions and field or monitoring data, explain how the description of baseline conditions accounted for the differences;
- in cases where surrogate data from reference sites are used, rather than specific measurements at the project site, demonstrate how the baseline data are representative of site conditions;
- identify any thresholds relevant to understanding the baseline conditions for biophysical components and any change that has occurred over time or is predicted to occur over time;

- identify if additional steps were taken to address known gaps in baseline information. For instance, while there may be a rise in census participation from Indigenous communities, the information may not be publicly available;
- utilize Indigenous knowledge and input to establish baseline conditions. Identify where, in the Impact Statement, Indigenous knowledge and input were considered in establishing baseline conditions, including for pre-development conditions. Explain how Indigenous knowledge and input was acquired and how its inclusion was verified; and
- apply GBA+ as described in Appendix 1 – Additional guidance under *Application of GBA+*, and related guidance documents in Appendix 2 – Reference documents.

The proponent should also consult Appendix 1 – Additional guidance under *Use of an ecosystem approach* for requirements and guidance pertaining to using an ecosystem approach and Appendix 1 – Additional guidance under *Documentation* to provide adequate documentation. Guidance documents and relevant resources for baseline methodology are included under Appendix 2 – Reference documents.

7.2. Selection of valued components

The Impact Statement must identify and describe valued components (VCs) that will serve as focal points for the assessment. VCs consist of components that are of particular concern or interest to inform the assessment of environmental, health, social and economic conditions potentially affected by the project.

The Impact Statement must:

- indicate the source of the concerns or interests considered in the selection of VCs, including from the public, provincial or federal authorities, Indigenous communities, and other participants that would be engaged and consulted in the preparation of the Impact Statement;
- identify the reasons given by participants for their concerns and interests, such as environmental, cultural, spiritual, historical, health, social, economic, recreational, and aesthetic considerations;
- provide a rationale for the selection of VCs, based on:
 - the presence of the VC in the study area;
 - the extent to which the effects of the project and related activities have the potential to interact with the VC;
 - the extent to which the VC may be under stress from past, existing or future projects and activities (e.g. existing Base Mine operations), and natural processes;
 - the extent to which the VC is linked to Indigenous interests or rights of Indigenous peoples, and whether an Indigenous community has requested the VC;
 - the extent to which the VC is linked to federal, provincial, territorial or municipal government priorities;
 - information from any ongoing or completed regional assessment processes;
 - the possibility that an effect on the VC would be of particular concern to the public, or federal, provincial, territorial, municipal or Indigenous governments; and

- whether the potential effects of the project on the VC can be measured and monitored, or would be better ascertained through the analysis of a proxy VC.

The VCs must be selected and defined to allow for the assessment of potential adverse and positive environmental, health, social and economic effects, as well as impacts on Indigenous communities and the rights of Indigenous peoples arising from the project. The VCs must also be selected and defined to allow for the consideration of factors listed in section 1.1 *Factors to be considered in the Impact Assessment*, which are relevant to the assessment. These Guidelines are organized in broad categories that should guide the proponent in the selection and identification of VCs (see headings under sections 8 through 12 inclusively).

Based on comments from participants on the Guidelines, the following list illustrates the components that have been raised as important to consider as VCs or as part of VCs in the assessment, but it is not exhaustive:

- biodiversity and ecosystem functions, including those of Indigenous importance (e.g. connectivity, intact core areas, resource abundance);
- terrain and soils;
- hydrology and hydrogeology;
- surface water and groundwater quality and quantity, including for cultural values, navigation, drinking water, aesthetic qualities, etc.;
- air quality and GHG emissions;
- climate change – in terms of impacts from climate change on the project, consideration of climate change scenarios to assess project effects, as well as in terms of the project's GHG emissions and contribution to climate change;
- noise and light;
- species and groups of species of importance to Indigenous communities, such as: moose, caribou, white-tailed deer, gray wolf, beaver, lynx, marten, fishers, otters, black bear, ducks, game birds, benthic invertebrates, and vegetation species and habitat types (e.g. forested and non-forested wetlands (e.g. muskeg), old growth forest, traditional plant habitat including medicinal plants, habitats associated with species at risk);
- access to, quantity and quality of traditional foods;
- fish and fish habitat, including freshwater clams;
- species at risk and their habitat;
- birds and their habitat, including migratory birds and birds of importance to Indigenous communities;
- wildlife health, fish health, ecological health (e.g. health of the Athabasca River);
- human health, including social determinants of health and separate consideration of Indigenous health using culturally-relevant indicators;
- health and well-being of Indigenous communities (e.g. housing accessibility and adequacy, presence of elders in the community, opportunities to participate in cultural activities, and community safety);
- cultural and heritage resources (including separate consideration of Indigenous cultural and heritage resources and cultural landscapes);

- non-Indigenous historical, current and future land and resource use (including compliance with land use planning objectives, recreational and commercial activities);
- historical, current and future Indigenous land and resource use, including access to the landscape and navigation for traditional purposes;
- sites and landscapes important for cultural values and for current and future use of lands and resources for traditional purposes, including tangible purposes such as hunting, trapping, fishing, gathering, harvesting, habitation, camping, orientation and travelling, and intangible purposes such as for transmission of Indigenous knowledge, teaching, language, stories, spiritual and peaceful enjoyment;
- sacred and archaeological sites;
- economy, including employment;
- infrastructure and services, including relocation of roads and infrastructure;
- Indigenous culture and way of life;
- community cohesion and well-being, including Indigenous and non-Indigenous communities; and
- rights of Indigenous peoples.

Concerns and interests pertaining to these components have been considered in the Guidelines and are reflected in the requirements under the following sections. The proponent is expected to finalize the selection of VCs in consultation with Indigenous communities and other participants. In the event that a VC is suggested by an Indigenous community but is excluded from the assessment, the proponent must provide a justification for its exclusion.

The proponent should refer to comments received on the [Canadian Impact Assessment Agency's Registry Site](#) for additional information to support the selection of VCs. Several comments provided on the draft version of these Guidelines contain substantial information about the importance of certain components, and the reasons why they are considered important by participants.

7.3. Spatial and temporal boundaries

The spatial and temporal boundaries determined and established for the impact assessment will vary depending on the VC and should be considered separately for each VC. The proponent must engage with Indigenous communities when defining spatial and temporal boundaries for VCs that are identified by, or related directly to, Indigenous communities.

The Impact Statement must explain how the proponent considered the information received by Indigenous peoples in its definition of spatial and temporal boundaries, particularly for VCs related to effects on Indigenous peoples.

7.3.1. Temporal Boundaries

The proponent has identified four typical development scenarios in the [Detailed Project Description](#), Appendix E, as follows:

- (a) Pre-development Scenario, scenario that existed prior to the establishment of any industrial development in the Athabasca Oil Sands Region;
- (b) Baseline Case, which includes existing conditions, existing and approved projects or activities;
- (c) Application Case, which includes the Baseline Case with the Project added; and
- (d) Planned Development Case, which describes the environmental conditions that would exist as a result of the interaction of the Project, other existing projects and other planned projects that can be reasonably expected to occur.

The proponent proposed to identify additional scenarios for all or individual components, as appropriate.

The Impact Statement must provide an explanation for how different scenarios were defined and considered, as applicable to the assessment of specific VCs. In defining the temporal boundaries of assessment scenarios, the Impact Statement must:

- define temporal boundaries for baseline conditions by taking into account past conditions. Past conditions will help establish a historical context and reveal temporal patterns or trends for VCs within the adequate spatial boundaries. Information on past conditions will also inform whether present-day conditions are representative, and how the project may affect them. This should be considered when defining the proposed *pre-development scenario* and *baseline case* and how they relate to other scenarios.
 - The use of a pre-development scenario must be considered especially for VCs related to impacts to Indigenous peoples. Comments from Indigenous communities indicated the particular importance of pre-development baseline to support the context of generationally transmitted Indigenous knowledge and land use expectations, information, and decision-making.
 - For biophysical VCs, temporal boundaries used to establish the baseline conditions must be defined to allow for the detection of all species using the study areas throughout the year and from one year to another, to reflect and take into account temporal use patterns and variability;
- define the *baseline case* to represent present-day conditions, prior to the development of the project and other reasonably foreseeable projects or activities. Should the *baseline case* include approved projects or activities that have not yet been carried out, the Impact Statement must still provide a scenario for baseline conditions that refers to current conditions (i.e. a *current case* scenario), and include approved projects as part of future temporal boundaries for the purpose of cumulative effects assessment (i.e. *Planned Development Case*);
- define temporal boundaries according to the planned schedule for all phases of the project in order to understand potential effects according to key timelines and milestones for project components and activities. If potential effects are predicted after project closure and reclamation, this should be taken into consideration in defining specific temporal boundaries. This should be considered when defining the *application case* and how it relates to the other scenarios; and
- identify and describe project effects explicitly, in order to understand the changes attributable to the project in a *project-only case* or an *application case*, rather than only described as a relative measure compared to the *pre-development scenario* or a *baseline case* (or *current case*).

The proponent should consult the document [Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012](#) for further guidance on establishing temporal boundaries.

7.3.2. Spatial Boundaries

The Impact Statement must:

- establish study area boundaries that encompass the spatial boundaries of the project including any associated project components or related activities (i.e. project area);
- establish study area boundaries that encompass the anticipated boundaries of the project effects and local and regional scales (i.e. local study area (LSA) and regional study area (RSA));
- provide a rationale for each boundary, considering:
 - the appropriate scale and spatial extent of potential project effects, which are expected to vary depending on the VC;
 - the physical location of potential receptors, including movement patterns and life cycle requirements, where applicable;
 - the relationship between VCs, including between species, their habitat, and habitat functions (i.e. using an ecosystem approach), as well as spatial linkages between all VCs;
 - community knowledge and Indigenous traditional knowledge;
 - current or traditional land and resource use by Indigenous peoples;
 - the rights of Indigenous peoples, including cultural and spiritual practices; and
 - physical, ecological, technical, social, health, economic and cultural considerations; and
- explain how the size, nature and location of past, present and foreseeable projects and activities was taken into consideration to define regional study areas. Identify and provide a rationale for which projects and activities were included or excluded.

Based on comments from participants on the Guidelines, the Impact Statement must explain how the following concerns have been taken into account in defining spatial boundaries for potential project effects and cumulative effects:

- effects at the scale of potentially affected watershed, including those overlapping with other projects to the north (Athabasca, Peace, Slave and Mackenzie rivers basins);
- effects on terrestrial resources, including McClelland Lake Fen complex, to capture the footprint of Fort Hills Mine and other mines along the Athabasca River;
- effects on the Athabasca river, to Horse River, and Clearwater River, including smaller tributaries that have connections to this area (e.g. fish health and commercial fisheries);
- effects within the Gregoire Lake watershed;
- effects on the Peace-Athabasca Delta;
- effects on the Slave River and the Slave River Delta, Northwest Territories; and
- effects in Saskatchewan due to changes in air emissions.
 - See recommendation from Environment and Climate Change Canada in [Registry document #129](#) to inform the selection of the regional study area for air quality.

The proponent should also consult Appendix 1 – Additional guidance for requirements and guidance pertaining to using an ecosystem approach, to providing adequate documentation, and to the establishment of spatial boundaries.

The proponent should also consult the document [Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012](#) for further guidance on establishing spatial boundaries.

7.4. Effects assessment methodology

The Impact Statement must:

- describe in detail the project’s potential direct and indirect adverse and positive effects in relation to each phase of the project (construction, operation, closure and reclamation);
- assess effects based upon a comparison of baseline conditions and the predicted future conditions with the project and without the project;
- describe effects based on criteria to quantify or qualify adverse effects, taking into account any important contextual factors. For example:
 - effects should be described in terms of their context, magnitude, geographic extent, timing, duration and frequency, and whether effects are reversible or irreversible. It may be more appropriate to use other criteria depending on the nature of the effects, such as directionality, causation and probability;
 - timing, duration and frequency for biophysical VCs may need to be defined based on the biological context (e.g. duration may be defined in relation to life history cycles, and timing in relation to migration patterns); and
 - provide information about the probability or likelihood of the effect;
- if detailed description of effects cannot be provided, provide a rationale for the absence of details, and a general description of the potential effects and related project activities (e.g. activities and effects related to closure and reclamation);
- describe the analytical methods selected to assess effects, and explain how they were chosen, include consideration of how they would enable comparison with actual effects at the stage of follow-up in a statistically and scientifically defensible manner and include clearly stated assumptions for all predictions and clearly describe how each assumption has been tested;
- discuss the degree of scientific uncertainty related to the data, information, and methods used. For quantitative predictions based on models, detail model assumptions, parameters, the quality of the data and the degree of certainty of the predictions obtained, including an explanation of model calibration, validation and model performance metrics used;
- discuss the degree of confidence in the predictions and conclusions of the effects assessment;
- for predictions that may be affected by climate change, discuss how the range of potential climates informed the assessment, including predicted changes in climate extremes;
- consider and describe the interactions among the environmental, health, social and economic effects and impacts on rights of Indigenous peoples;

- document the origin and take into account the tolerance thresholds regarding the potential adverse effects that Indigenous peoples have identified;
- utilize Indigenous knowledge and input to assess and describe effects. Identify where, in the Impact Statement, Indigenous knowledge and input were considered to assess effects. Explain how Indigenous knowledge and input was acquired and how its inclusion was verified; and
- take into account GBA+ as described in Appendix 1 – Additional guidance under *Application of GBA+*, and related guidance documents in Appendix 2 – Reference documents.

The proponent should also consult Appendix 1 – Additional guidance for requirements and guidance pertaining to using an ecosystem approach and to providing adequate documentation, and to the establishment of spatial boundaries.

Guidance documents and relevant resources for baseline methodology are included under Appendix 2 – Reference documents.

7.5. Mitigation and enhancement measures

The Impact Statement must identify technically and economically feasible measures to mitigate the project's adverse environmental, health, social and economic effects. Conversely, the proponent can identify enhancement measures to increase positive effects, such as local and regional training efforts, investment in infrastructure and services, and projects to rehabilitate degraded environments.

The “hierarchy of mitigation measures” is described in Appendix 1 – Additional guidance under *Mitigation hierarchy*.

The Impact Statement must:

- describe the current mitigation practices, policies, and commitments being applied as part of standard practices within the existing operations, as well as their effectiveness as mitigation measures;
- describe the standard mitigation practices, policies and commitments that constitute proven technically and economically feasible mitigation measures and that are to be applied within the project design, and whether such practices differ from the existing ‘business as usual’ practices;
- specify the interventions, the work, the ecological footprint reduction techniques, the existing best technology, the best environmental practices, the corrective actions and any addition anticipated in the various phases of the project with a view to eliminating or mitigating the adverse effects of the project;
- describe any new or innovative mitigation measures being proposed, including technological innovations, and provide detailed information on the nature of these measures, their implementation and anticipated effectiveness, management and related requirements of the follow-up program;
- provide an assessment of the anticipated effectiveness of the technically and economically feasible mitigation measures and describe all relevant uncertainties. The assessment must:
 - provide the reasons for determining if the mitigation measure will reduce the extent to which the adverse effects are significant;

- to the extent possible, provide relevant information to demonstrate anticipated mitigation effectiveness, including technical information from analogous projects and projects in the region, peer-reviewed studies, and local Indigenous and community knowledge; and
- if there is little experience or some question as to the effectiveness of any measures, describe the potential risks and effects should those measures not be effective or malfunction;
- write mitigation measures as specific commitments that clearly describe how and when the proponent intends to implement them and their desired outcomes. Measures are to be specific, achievable, measurable and verifiable, and described in a manner that avoids ambiguity in intent, interpretation and implementation;
- identify other technically and economically feasible mitigation measures that were considered but are not proposed for implementation, and explain why they were rejected. Justify any trade-offs between cost savings and effectiveness of the various forms of mitigation measures;
- describe how the effectiveness of the chosen mitigation measures will be measured, monitored, and if possible, improved over the course of the project life;
- explain how mitigation measures have been designed or selected to account for future climates, including the design of the closure landscape;
- describe the approach that would be taken if a mitigation measure is no longer feasible while the project is carried out, or does not perform as expected;
- describe any environmental protection plan being prepared for the project and, if applicable, the environmental management system through which plans will be delivered. The plan(s) must provide an overall perspective on how potentially adverse effects would be minimized and managed over time;
- discuss the mechanisms the proponent would use to require its contractors and sub-contractors to comply with these commitments and policies and with auditing and enforcement programs;
- identify the party responsible for the implementation of mitigation measures and the system of accountability; and
- explain how mitigation and enhancement measures were developed in consultation with communities and Indigenous peoples, as well as federal, provincial and municipal authorities.

Effects from the project that remain after other mitigation measures are applied may need to be offset by implementing compensatory measures. Where compensatory measures are proposed as measures to mitigate remaining effects on species at risk and their critical habitats or residences, fish and fish habitat, or wetland functions, the Impact Statement must include offsetting or compensation plans for consideration during the impact assessment process. Guidance on the preparation of compensation plans is outlined in Appendix 1 – Additional guidance under *Compensation and offset plans*.

8. Biophysical environment

Although the requirements set out in these Guidelines are separated by environmental, health, social and economic conditions, the Impact Statement must consider and describe how environmental, health, social and economic VCs interact and are interconnected.

Similarly, although requirements pertaining to engagement and assessment methodologies are outlined in earlier sections, they must be applied in the context of the sections that follow.

8.1. Meteorological environment

8.1.1. Baseline conditions

The Impact Statement must describe the local and regional climate in sufficient detail to highlight weather variations and characteristics of the region, and sub-regions, are affected by project activities and components, including:

- provide mean, maximum and minimum temperatures;
- provide typical wind speed and direction;
- identify the potential for extreme weather events such as wind, precipitation and temperature extremes;
- provide a summary of, and reference to, data sources and unique weather station identifiers for hourly meteorological data gathered from a minimum of one year of study to support dispersion and regional air quality modelling in order to capture the normal variability of meteorological conditions (e.g. for wind speed and direction, air temperature, dew point temperature or humidity, air pressure and precipitation data, evapotranspiration); and
- consider the influence of climate change in the description of the local and regional climate and in the risks of extreme weather events.

8.2. Geology and geological hazards

8.2.1. Baseline conditions

The Impact Statement must:

- describe the geology of surficial deposits and bedrock, where relevant, at an appropriate scale. Include a table of geologic and lithologic descriptions, geological maps and cross-sections of appropriate scale;
- describe the geomorphology, topography and geotechnical characteristics of areas proposed for construction of major project components, including the presence or absence of permafrost and its distribution;
- provide a characterization of the geochemical composition of the materials to be excavated, including normally occurring radioactive materials;
- identify and provide maps of any areas with potential for acid-generating materials and provide geochemical characterization of potential for metal leaching and acid drainage, for major and trace elements, including oxidation of primary sulphides and secondary soluble sulphate minerals, as applicable; and

- identify any geological hazards that exist in the areas planned for project facilities and infrastructure, including:
 - a history of seismic activity in the area, including induced earthquakes, and any secondary effects, such as the risk of landslides and liquefaction;
 - a discussion pertaining to the potential presence of active faults; and
 - a history of landslides, slope erosion and the potential for instability or landslides, and subsidence during and following project activities.

8.3. Topography, soil and sediment

8.3.1. Baseline conditions

The Impact Statement must:

- describe the landforms, terrain, soils and sediments within the local and regional study areas, including sediment stratigraphy. Provide maps to illustrate surficial geology and cross-sections of appropriate scale, as well as soil series;
- identify and map landforms associated with important wildlife habitat features (see list provided in Appendix 1 – Additional guidance under *Habitat features*);
- provide a description and location of any erosion-sensitive soils (see also section 3.9 of Annex I) and areas of ground instability;
- provide maps depicting soil depth by horizon and soil order within the project area to support soil salvage and reclamation efforts;
- describe the suitability and availability of reclamation material (soils, suitable overburden) (see also section 3.9 of Annex I), taking into account the acid generating and metal leaching potential of overburden to be used, if applicable;
- identify soils within the local and regional study areas susceptible to potential acidification (by soil type) (see also section 3.9 of Annex I);
- describe the historical land use and the potential for contamination of soils and sediments; and
- describe any known or suspected soil contamination within the study area that could be re-suspended, released or otherwise disturbed as a result of the project.

8.4. Atmospheric, acoustic, and visual environment

The proponent should consult the additional guidance for requirements pertaining to the atmospheric, acoustic and visual environment provided in Appendix 1 – Additional guidance.

8.4.1. Atmospheric environment

8.4.1.1. Baseline conditions

The Impact Statement must:

- provide an assessment of the ambient air quality in the project, local and regional study areas and identify existing emissions and contaminant sources;
- provide the results of a baseline survey of ambient air quality, in particular near key receptors by identifying and quantifying emission sources for the following contaminants:
 - total suspended particulates,
 - fine particulates smaller than 2.5 microns (PM_{2.5}),
 - respirable particulates of less than 10 microns (PM₁₀),
 - carbon monoxide (CO),
 - sulphur dioxide (SO₂),
 - nitrogen oxides (NO_x),
 - volatile organic compounds (VOCs),
 - hydrogen sulphide (H₂S) and other reduced sulphur compounds,
 - polycyclic aromatic compounds (PACs), including polycyclic aromatic hydrocarbons (PAHs), alkylated PAHs, PAH transformation products, including nitro and oxy-PAHs, and dibenzothiophenes (DBTs),
 - diesel particulate matter,
 - ammonia,
 - metals related to bitumen resource extraction activities, including aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, mercury, molybdenum, nickel, selenium, silver, strontium, thallium, tin, vanadium, zinc,
 - radionuclides from Naturally Occurring Radioactive Materials (NORMs) decay (e.g. uranium and thorium),
 - any other toxic air pollutants (mobile, stationary and fugitive sources), and
 - odorous compounds;
- include information on the baseline dust levels in areas that could potentially be affected by project activities, including via transportation of workers to residences in Fort McMurray;
- compare ambient air quality results with applicable regional, provincial and federal standards. For air pollutants with standards, the proponent must use the averaging period and the statistical format associated with each numerical value.
 - Standards include the Canadian Ambient Air Quality Standards (CAAQS), National Ambient Air Quality Objectives (NAAQO), the Alberta Ambient Air Quality Objectives and Standards (AAQO), and [Fort McKay's Ambient Air Quality Permissible Levels](#).
 - The proponent must refer to the new CAAQS established by the Canadian Council of Ministers of the Environment (CCME) for PM_{2.5}, O₃, SO₂ and NO₂ to take effect in 2020 and 2025;

- identify and address issues pertaining to the quality of the monitoring data and seasonal variability in the baseline survey, and determine ambient contaminant concentrations using complete, exhaustive, and representative monitoring data, collected over an appropriate duration (multi-year) and geographic scope. Data validation, quality control methods, and any assumptions made must also be described; and
- provide dispersion modelling to establish a baseline case for existing pollutant sources and odorous compounds, and to determine the spatial distribution of pollutants and odorous compounds in local and regional study areas.

8.4.1.2. Changes to the atmospheric environment

The Impact Statement must:

- provide a detailed description of emission sources of air pollutants from the project listed under 8.4.1.1 *Baseline conditions*, including all point sources, area sources, and mobile and road sources and identify if these emissions differ from the existing Base Mine operations;
- provide a detailed methodology and assumptions used to estimate emissions of air pollutants at all phases;
- estimate the deposition of dust and other contaminants on sensitive receptors (including Fort McMurray and Fort MacKay communities) and transportation of dust into communities via project activities or worker vehicles;
- provide a description and assessment of odorous compounds potentially associated with the project. Consider relevant thresholds. Consider the additive nature of odorous compounds, as well as the typical magnitude, extent, duration and frequency of odour events experienced at key receptor points;
- predict the fate of emissions resulting from all project sources for all emissions listed under 8.4.1.1 *Baseline conditions*, by using atmospheric dispersion and regional air quality modelling;
- predict ground-level pollutant concentrations, and plot predicted concentrations using appropriately scaled contour maps to visualize the extent of dispersion, sensitive receptors, and changes in spatial distribution of emissions at local and regional scales;
- provide rationale for the choice of air quality model, including the type and magnitude of emissions, the complexity of sources, terrain, and meteorology;
- provide emission rates for all project and regional sources within the study areas, including emission factors and all related assumptions and related parameters that would enable calculations to be reproduced. Include details on methodology, uncertainty assessment and references, and provide sample calculations;
- provide detailed information on emission estimation methodologies for all project phases, including details on the configuration of the atmospheric dispersion and regional air quality models used (e.g. meteorology, land use, modelling domain, receptor grid density, land users, default options and chemical and physical transformation parameters, where applicable);
- assess the uncertainty in the modeled air pollutant concentrations using relevant range of model inputs. All sources of uncertainty should be taken into account, including:
 - model uncertainty, including a consideration for how uncertainty in modelled predictions may vary spatially and temporally;

- uncertainty in baseline concentration estimates;
- uncertainty in the estimates of meteorological inputs; and
- uncertainty in estimates of source emissions (from sources attributable to the project, and externally). Uncertainty in source estimates should take into account available information from studies and monitoring activities that are regionally relevant, and which have shown apparent discrepancies between reported and observed emissions (e.g. Wood Buffalo Environmental Association studies, Oil Sands Monitoring Program, and findings in [*Differences between measured and reported volatile organic compound emissions from oil sands facilities in Alberta, Canada*](#));
- determine, through comparison between baseline case, project-only and application-case scenarios, whether the formation of secondary pollutants resulting from the project has the potential to raise concentrations above baseline levels for key receptors within the study areas and over the life of the project – if so, identify and characterize these pollutants;
- compare the predicted air quality results with applicable regional, provincial and federal standards and management thresholds for ambient air quality and community-based air quality and odour guidelines (see list of applicable standards under baseline conditions above);
- conduct a source contribution analysis to assess the relative contributions of project and non-project emission sources on pollutant concentrations at key receptors. The source contribution analysis should be conducted for pollutants that exceed 10% of the relevant guidance or standard value at key receptors. Emission sources should be grouped into appropriate categories, such as mine fleet, mine face, haul roads, material handling, tailings storage areas, etc.; and
- describe any positive changes.

Secondary organic compounds

The Impact Statement must quantify secondary organic compounds due to the project, by using the following approach:

- quantify the emissions of gas-phase precursor compounds of secondary organic aerosols (SOA) for each relevant source;
- identify the individual chemical compounds considered as SOA precursor emissions (VOCs, IVOCs and SVOCs). In addition, group total organic gas-phase emissions on the basis of volatility for each source, to use in the estimation of SOAs; and
- estimate the concentration of SOAs (as PM_{2.5}) with a regional air quality model using the quantified SOA precursor emissions for the baseline case, project-only, and application case scenarios. SOA precursor emissions from other oil sands projects in the region may be approximated by scaling measured emissions from these facilities to production levels. The model should provide an accurate estimation of SOA formation that will be included with primary PM_{2.5} emissions to arrive at a total PM_{2.5} burden.

Acid deposition

The Impact Statement must assess the potential for the project's emissions of acidifying pollutants to contribute to acid deposition at the regional scale, by using the following approach:

- conduct regional air-quality model simulations using baseline case, project-only and application case scenarios to predict acidifying deposition using emissions of NO_x and SO₂ from processing facilities and mining activities that are part of the project;
- using modeled acidifying deposition rates, assess the potential for the project to contribute to ecosystem damage by estimating exceedances of critical loads (an effective measure of ecosystem sensitivity) in the region. Critical loads must be estimated using methods consistent with the internationally recognized [UNECE Convention on Long-Range Transboundary Air Pollution](#), including:
 - [Manual on methodologies and criteria for modelling and mapping critical loads and levels and air pollution effects, risks and trends](#), and
 - [Estimates of exceedances of critical loads for acidifying deposition in Alberta and Saskatchewan](#);
- include summaries of the emissions associated with baseline case, project-only and application case scenarios for sulphur, nitrogen, and base cation emissions; and
- compare potential effects with critical thresholds, considering current and historical loadings, buffering capacity, and critical loads.

8.4.1.3. Mitigation and enhancement measures

The Impact Statement must:

- provide a description of all the methods and practices to be deployed to reduce and control emissions (e.g. control equipment, heat or gas recovery system) and options to reduce mine fleet emissions. If the best available technologies are not selected in the project design, the proponent must provide a rationale to justify the technologies selected;
- document and justify how the contaminant emission reduction efficiencies were applied in the calculation of emission rates, including details of all assumptions associated with these mitigation measures and their feasibility;
- provide a description of methodology to measure and verify the efficiency of contaminant emission reduction measures;
- provide a description of existing and planned measures to reduce odours and dust, including a description of improvements to existing infrastructure, equipment and operational practices as applicable, supplemented with quantitative data or records that demonstrate the efficiency of existing mitigation measures; and
- develop and implement strategies compliant with regional and national commitments, such as the CCME's commitment regarding pollution prevention.

8.4.2. Acoustic environment

8.4.2.1. Baseline conditions

The Impact Statement must:

- provide current ambient noise levels at key receptor points, including the results of a baseline ambient noise survey and permissible noise levels for each receptor. The information on typical noise sources (natural and anthropogenic), their geographic extent and temporal variations must be included. At the

time of collecting baseline data for the study on ambient noise where there are human receptors, it is recommended that the following aspects be considered:

- natural sounds;
- soundscapes (see standard [ISO 12913-1:2014. Acoustics — Soundscape — Part 1: Definition and conceptual framework](#));
- expectations regarding quiet conditions in specific places or at specific times;
- usual sleeping hours (the default assumption is 10:00 p.m. to 7:00 a.m.); and
- degree of baseline annoyance attributable to existing noise sources (e.g. vehicle traffic, aircraft, other industrial noise);
- justify the selection of and provide information on all noise-sensitive receptors in the study area, including any foreseeable future receptors, and distances of receptors from the project; and
- describe engagement with Indigenous communities to identify receptor locations.

8.4.2.2. Changes to the acoustic environment

The Impact Statement must:

- describe changes in ambient sound levels resulting from the project;
- provide a list of all noise sources;
- quantify sound levels at appropriate distances from any project facilities and/or activities and describe for each sound source the timing, frequency, and duration of sound events and their characteristics, including the frequency spectrum, tonality and perceptibility;
- describe the locations and characteristics of the most sensitive receptors (e.g. species at risk and traditional land use sites);
- identify and justify the approach to characterize sound effects resulting from the project that may be adverse. Take into account:
 - the distribution of the reference nighttime sound events relative to the individual sound events expected at night at the location of each receptor; and
 - expectations of peace and quiet for receptors (e.g. in a quiet rural area or during land use by Indigenous peoples) and noise policies (e.g. processes for resolving and dealing with public complaints);
- describe consultation with regulators, stakeholders, community groups, landowners and Indigenous communities about potential effects to the acoustic environment;
- where there is public concern associated with an increase in sound levels during construction and operations, provide a vibration and sound impact assessment including an overview of concerns and an assessment of the change in percent highly annoyed; and
- describe any positive changes.

8.4.2.3. Mitigation and enhancement measures

The Impact Statement must:

- identify current and proposed noise mitigation measures and their effectiveness, including design, construction and operational factors referenced in AER's [Directive 038: Noise Control](#) (see also section 3.1 of Annex I);
- explain how a complaint-response protocol may be implemented and reported on to document any complaints and associated mitigation measures undertaken to resolve the complaints, including the nature of the noise produced (e.g. tonal, impulsive, highly impulsive, and the timing of the noise event); and
- explain how a community engagement plan may be implemented and reported on to proactively inform community members and Indigenous communities who may be affected by project-related noise, such as anticipated changes in noise levels (e.g. blasting).

8.4.3. Visual environment

8.4.3.1. Baseline conditions

The Impact Statement must:

- describe existing ambient night-time light levels at the project site and at any other areas where project activities could have an effect on light levels;
- describe night-time illumination levels during different weather conditions and seasons;
- describe the baseline visual environment, including existing structures and activities (e.g. flares, light, plumes) from key receptor points, including traditional land use locations; and
- describe landscapes of interest, visual screens and other components of the visual environment, and locate them on a map.

8.4.3.2. Changes to the visual environment

The Impact Statement must:

- describe any changes in night-time light levels as a result of the project;
- quantify light levels at appropriate distances from any project components and key receptor points within the defined zone(s) of influence, including the source, timing (e.g. night hours), frequency, duration, intensity, distribution and character of light emissions;
- describe the locations and characteristics of the most sensitive receptors, including species at risk, nearby communities, and areas favoured by Indigenous communities for the practice of traditional activities;
- describe consultations and, where appropriate, provide a record of engagement with regulators, stakeholders, community groups, landowners and Indigenous communities regarding potential effects on the visual environment;
- describe any changes to the visual environment that would consist of aesthetic disruptions to the cultural landscape (e.g. from deforestation, changes to topography, additional presence of humans). This assessment should focus on land users and people traveling along the Athabasca river;

- delineate the zone(s) of influence within which receptors (e.g. Indigenous communities, land users, and wildlife) may be impacted by changes in the visual environmental and night-time light levels, and identify the zone(s) of influence and receptor viewpoints on a map; and
- describe any positive changes.

8.4.3.3. Mitigation and enhancement measures

The Impact Statement must:

- describe existing and proposed mitigation measures for anticipated changes to the visual environment; and
- explain how measures considered the background environment and applied appropriate technical limits (e.g. illuminance value, Upward Light Ratio, etc.), where applicable.

8.5. Groundwater and surface water

The proponent should consult the additional guidance for requirements pertaining to groundwater and surface water provided in Appendix 1 – Additional guidance.

8.5.1. Baseline conditions

The Impact Statement must:

- describe and illustrate on one or more topographic maps, at appropriate scales, the drainage basins in relation to key project components. On the map(s), identify all waterbodies and watercourses, including intermittent streams, springs, wetlands, watershed and sub-watershed boundaries, and direction of flow;
- provide a list of all waterbodies and watercourses (permanent, intermittent, and ephemeral) that may be directly or indirectly affected by the project. Provide a table that groups waterbodies and watercourses by sub-watershed and provide the following information about each:
 - the type of waterbody or watercourse (e.g. lotic or lentic system, lake, river, pond, ephemeral, intermittent or permanent stream);
 - the size of the waterbodies and watercourses, as applicable (i.e. width at the ordinary high water mark (OHWM), linear length, area).
- provide flow hydrographs and corresponding water levels for nearby streams and rivers showing the full range of seasonal and inter-annual variations, as well as seasonal baseflow, including for the Athabasca River below Fort McMurray (i.e. station number 07DA001) and immediately upstream of the Peace-Athabasca Delta (PAD) (i.e. station number 07DD001), and for nearby streams similar to Poplar Creek and Beaver Creek.
 - Seasonal variability must cover the entire low flow season of late summer to early spring, particularly during river freeze-up and periods important for Indigenous navigation within the PAD (e.g. early spring and late summer/fall). The hydrographs may be based on data from nearby

gauging stations or from gauging stations on site. Information pertaining to the PAD must also be included;

- provide stage hydrographs for lakes expected to be affected by the project showing the full range of seasonal and inter-annual water level variations;
- for each waterbody and watercourse affected by the project, provide the timing of freeze-thaw cycles, ice cover, ice thickness, and ice conditions;
- provide for each waterbody affected by the project, bathymetry, maximum and mean depths, and sediment composition (e.g. particle size analysis, sediment quality, total organic carbon);
- for lakes directly affected by the project, provide physical limnology baseline data (e.g. lake vertical profile data, information on stratification and turnover, and ice cover);
- using traditional field and mapping techniques, provide a delineation and characterization of groundwater–surface water interactions, including an identification of groundwater-dependent ecosystems, wetlands, discharge and recharge areas that could potentially be impacted by the project. Use this information to calibrate and verify numerical flow modelling;
- if locally present, describe the influence of permafrost on groundwater-surface water interactions;
- present a quantitative surface water balance for watersheds potentially affected by the project, including for pore-water at existing mines, water storage reservoirs, tailings facilities, compensation lakes and evaporation from these surfaces;
- identify springs and other potable surface water resources within the local project area that are used as a drinking water source, or have Indigenous cultural importance. Describe traditional, historical, and current use of potable surface water resources in sufficient detail to identify whether there are alternate sources available should existing ones be affected by the project;
- describe the surface water, groundwater and sediment quality baseline characterization programs, including sampling site selection and locations, monitoring duration and frequency, sampling methodology, and analytical protocol, including quality assurance and quality control measures for each waterbody and watercourse potentially affected by the project. Explain how sites were selected to ensure ongoing and long-term data collection (e.g. monitoring requirements for all project phase). Baseline samples should be collected in the project area, the local study area, the regional study area and from reference locations that are unlikely to be impacted by the project;
- present the results of the surface water, groundwater and sediment quality baseline characterization in relation to applicable water and sediment quality guidelines, including:
 - sediment yield characterization (e.g. curves) for each watercourse;
 - erosion resistance capability for each watercourse;
 - erosion resistance capability and precipitation-runoff dynamics and response for each discrete landform type. Provide accuracy limits and, if modeled, supporting field data, calibration data, model validation and accuracy;
- provide baseline data for physicochemical parameters and relevant chemical constituents for surface water, groundwater and sediment quality.
 - Relevant physicochemical parameters should include: temperature, pH, electrical conductivity, dissolved oxygen, turbidity, total suspended solids, total hardness, and total dissolved solids.

- Relevant chemical constituents should include: major and minor ions, total and dissolved trace metals, radionuclides, total mercury, methylmercury, naphthenic acids, PACs (including PAHs, alkylated-PAHs, PAH transformation products, including nitro and oxy-PAHs and dibenzothiophenes), nutrients, organic and inorganic compounds, and other compounds of potential concern. For groundwater, this also includes radionuclides (uranium-238, radium, polonium, and thorium);
- when discussing naphthenic acids, refer to measured and measureable concentrations included in monitoring programs, rather than in terms of labile and refractory fractions;
- identify domestic, communal, or municipal water wells within the local and regional study areas, including available information on their depth, distance from the project, stratigraphy, screened hydrostratigraphic unit and piezometric level, and specific capacity. Describe their current use, potential for future use, and whether their consumption has any Indigenous cultural importance;
- identify groundwater-producing strata (coarse-grained sediments and permeable bedrock) that may be affected by the project. Where current domestic, communal, or municipal water wells access these strata, their distance from the project must also be marked and added to the map;
- provide a summary of key groundwater monitoring wells within the regional study area used to inform the conceptual model, and identify their location, groundwater quality information and monitoring frequency. Provide representative hydrographs showing the range of seasonal and inter-annual water level variations and indicate any spatial variation in the regional study area;
- describe the hydrostratigraphic units (aquifers, aquitards, aquicludes) of the affected hydrogeological environment, illustrated using geological cross-sections, and provide a piezometric map showing heads and the direction of groundwater flow;
- describe the structural geology of the affected hydrogeological environment, including any major faults, fracture density and orientation, and bedding orientation with respect to groundwater flow directions;
- describe the groundwater flow boundaries of the hydrogeological environment, including groundwater divides and boundaries with surface water;
- provide the hydraulic properties of the hydrostratigraphic units, including data on hydraulic conductivity, specific storage, transmissivity, storativity, saturated thickness, porosity, and specific yield, as applicable;
- provide hydrogeological maps and cross-sections of the study area showing water table elevations, potentiometric contours, interpreted groundwater flow directions, groundwater divides and areas of recharge and discharge;
- where community drinking water supply wells are present within RSA, provide the groundwater capture zones, and identify the potential for the groundwater to be under the direct influence of surface water;
- present a conceptual model of the hydrogeological environment, including a discussion of geomorphic, hydrostratigraphic, hydrologic, climatic, and anthropogenic controls on groundwater flow;
- present a 3-dimensional numerical groundwater flow model developed for the project area based on the conceptual model of the hydrogeological environment. The proponent must:
 - state limitations and assumptions in the modelling approach, including calibration methods, model validation and accuracy;

- calibrate the numerical model to baseline hydrogeological conditions using groundwater level and stream flow monitoring data, and provide metrics and graphs describing the quality of the calibration that was achieved, and discuss how spatial variability is considered in model calibration;
- analyse the sensitivity of key model outputs to hydraulic properties and climatic parameters such as recharge; and
- using the calibrated numerical model, provide a baseline groundwater budget including distributed surface recharge, groundwater discharge to wetlands, lakes streams and rivers, infiltration from surface water features to the groundwater flow system, and any anthropogenic withdrawals;
- present a conceptual model for the hydrological environment, as appropriate to describe baseline conditions for surface waters. The model should be developed to support the assessment of potential changes to water and sediment quantity and quality in rivers, streams, lakes, springs and wetlands, with input from regulators and Indigenous communities; and
- explain how baseline data were gathered, and modelling developed, at a scale and resolution that allows for the application of results about groundwater and surface water to the assessment of interrelated VCs, notably for fish, birds and other wildlife, their habitat and their health, as well as human health.

8.5.2. Changes to groundwater and surface water

The Impact Statement must:

- discuss changes to watersheds, including alignment and condition of all streams, waterbodies, and wetlands (permanent, intermittent, and ephemeral), including those created, removed or altered by the project, and potential alteration(s) to be made to Beaver Creek, Ruth Lake and Poplar Creek Reservoirs;
- quantify the extent of hydrological changes that will result from disturbances to aquifers and surface water features, taking into account climate change (see also sections 8.10 *Climate change* and 13.2 *Effects of the environment on the project*). This includes changes to the quantity or timing of surface flow, water levels, ice thickness or extent, sediment input, and channel regime in watercourses, and water levels in affected waterbodies of the LSA and of the RSA (including the PAD, Ruth Lake, Richardson Lake, the Athabasca Watershed, Slave River, and Old Fort River) during minimum, average and peak flows, including seasonal variability.
 - Seasonal variability must cover the entire low flow season of late summer to early spring, particularly during river freeze-up and periods important for Indigenous navigation within the PAD. Changes to water levels and flows in the PAD should be referenced to important thresholds such as those required for safe and reliable navigation through the PAD by Indigenous peoples;
- present an integrated site water balance model incorporating surface and groundwater fluxes to or from all major project components, for all project phases. Include estimates of surface water runoff rates for major project components (e.g. tailings management facilities);
- indicate the groundwater and surface water withdrawal requirements during all phases and specify:
 - the timing, quantity and quality of water withdrawn from the environment (flow rates and annual volumes);

- any treatment carried out on these waters (e.g. addition of a tracer); and
 - the conditions under which this water is released into the receiving environment;
- present comprehensive site water management plans for all project phases, including for water diversion and mine flooding strategies, water intake, and process water management. Include a description of potential discharges to account for changes to effluent discharge regulations that may come into force;
- present a 3-dimensional numerical groundwater flow model of the hydrogeological system that incorporates all major project features such as open pits, overburden disposal areas, tailings management facilities, dewatering wells, and water diversion ditches. The model should be based on the calibrated model used to represent baseline conditions, and use telescopically refined groundwater flow models in the vicinity of open pits and tailings management facilities. Using the numerical groundwater flow model:
 - estimate key project fluxes, including open pit inflow rates, dewatering rates, pit closure flooding rates, and seepage rates from project facilities during operations and the post-closure period;
 - estimate seasonal changes to surface water and groundwater regimes during operations and the post-closure period, including effects of depressurization of the basal aquifer and dewatering of surficial deposits, effects on baseflow in rivers and streams, effects on wetlands, effects on potable supplies, and effects on natural flow divides;
 - describe the contaminants associated with the project, their spatial and temporal locations and their potential flow paths (e.g. groundwater seepage pathways and how they relate to potential receptors). Characterize how they could affect surface and groundwater quality, including information on the source(s) of any contaminants, and their transport and fate in the hydraulic environment;
 - describe the downgradient flow of groundwater affected by the project, with the use of figures showing groundwater piezometric contours and particle tracking results, and
 - describe the contaminant attenuation capacity within the hydrogeological units in the project area. With this input, assess the potential for off-site groundwater and surface water contamination. Alternatively, the proponent may conservatively assume no attenuation capacity, but must still describe, in detail, potential degradation products (i.e. daughter materials) that may result from attenuation and other processes during groundwater flow;
- describe potential changes in surface water quality due to changes in surface water flows, erosion and sedimentation from the project, and explain how the alteration of the Beaver River and Poplar Creek watersheds may affect downstream water and sediment quality;
- quantitatively describe the range of predicted changes to surface water and groundwater quality from the removal of vegetation and changes to riparian, wetland, and terrestrial environments (see also section 3.6.2 of Annex I);
- quantitatively describe the range of predicted changes to water quantity and quality of domestic, communal, or municipal wells;
- present an integrated chemical mass balance model incorporating surface and groundwater chemical loads to or from all major project components, for all project phases, including:
 - a clear description and rationale for all input parameters and assumptions; and

- a base case estimate (i.e. most likely scenario – mean, median), worst-case scenario (e.g. 99.9 percentile), plus applicable sensitivity scenarios;
- using the model, describe predicted changes caused by project activities to surface water, groundwater and sediment quality in the receiving environment, including but not limited to those associated with watercourse and waterbody crossings, blasting, diversions, dewatering, water withdrawal, wastewater return, seepage from piles of material and tailings, overflows from excavation, and surface runoff. Include a description of changes to physicochemical parameters and chemical constituents;
- describe the quantity, quality, timing and duration of all effluent streams released from the site to the receiving environment, including seepage, overflow and surface runoff from tailings ponds and other project components during all phases of the project;
- describe potential effects to surface water as a result of acidifying emissions from the project and acid deposition, using the information provided to meet the requirements under the *Acid deposition* heading of section 8.4.1.2 *Changes to the atmospheric environment* making use of estimates generated per the acid deposition portion of section 8.4.1.2;
- describe potential effects to surface water quality due to aerial deposition of fugitive dust and particulate matter containing contaminants such as metals (including total mercury and methylmercury) and PACs;
- compare any changes to surface or groundwater quality to applicable guidelines, objectives or standards. Carry forward the assessment of potential adverse effects due to change in water quality to receptors in the receiving environment, as required in the following sections of these Guidelines;
- describe potential downstream effects to water quality including in Wood Buffalo National Park, Ruth Lake, Richardson Lake, the Athabasca watershed, Slave River, PAD and Old Fort River;
- describe tailings management strategies, including:
 - the solid and liquid composition and volume of specific waste streams (including mineralogy and total organic carbon content for solid streams), and dissolved inorganic carbon, organic carbon, isotopic composition of water, and potential tracers of groundwater contamination for liquid streams;
 - measures to minimize fine fluid tailings production;
 - measure to segregate and monitor streams with elevated solvents or radionuclides;
 - disposal sites, including their location on the post-closure landscape;
 - feasibility and effectiveness of different reclamation strategies (i.e. various wetland landscapes and dry landscapes);
 - measures and strategies for recycling, preventing pollution and minimizing waste throughout the life-cycle of the project, including information on the technologies that will be employed; and
 - identify the limits of proposed tailings treatment technologies at closure;
- describe the methods used to predict acidic drainage and metal leaching for mined materials, tailings and process waste;
- provide longer term kinetic testing to evaluate rates of acid generation and metal(loid) leaching, if applicable;

- provide estimates of the potential for mined materials, tailings and process waste to be sources of acid drainage or metal leaching, and estimates of the potential time to the onset of acidic drainage or metal leaching, if applicable;
- describe potential changes to groundwater and surface water quality associated with the inclusion of end pit lakes in the project, including predicted water quality within the pit lake through closure and post-closure. This should include:
 - a comprehensive water balance, complete with source assumptions for water filling and timeline to fill any pit lakes;
 - modelling of predicted closure water quality throughout the development of pit lakes until stability is achieved, including modelling of potential releases of contaminants into the water column, sediment resuspension, and potential stratification;
 - potential for mercury methylation, sulfide and methane generation;
 - closure water quality objectives; and
 - comparison of expected water quality to relevant surface water quality guidelines for the protection of aquatic life;
- provide proposed monitoring points to assess potential changes to surface water quality, including:
 - all points and diffuse sources of discharges;
 - the immediate receiving environment for any point or diffuse source of discharges from the project;
 - at the outer boundary of the mixing zone;
 - where the water quality from the immediate receiving environment begins to meet water quality guidelines, or background levels for that contaminant;
 - at the project boundary;
 - at the LSA boundary; and
 - at the RSA boundary; and
- analyze and describe changes to surface and groundwater at a scale and resolution that allows for the application of results to the assessment of interrelated VCs, notably for fish and fish habitat and human health.

8.5.3. Mitigation and enhancement measures

The Impact Statement must:

- describe mitigation measures for the possible effects on the quantity and quality of surface water, groundwater and sediment, including water supply wells, and provide a rationale with quantitative and qualitative evidence that explains the effectiveness of proposed measures;
- describe any applicable water quality treatment measures and provide evidence supporting the effectiveness of the proposed measures. Proposed unproven technology must be supported with contingent use of a viable existing treatment process;

- provide the details of mitigation measures comprised in water management plans proposed for waterbodies and watercourses likely to be affected during all phases of the project, including measures applicable to water use minimization;
- describe how the connectivity of surface water and groundwater within the project site in the regional landscape will be considered and maintained on the closure landscape;
- if flow supplementation is an anticipated mitigation measure, discuss the feasibility of long term supplementation and account for impacts of post-closure when supplementation would no longer be feasible; and
- describe methods for the prevention, management and control of acid rock drainage, metal leaching and salt leaching during all project phases and for a temporary or early closure scenario, if applicable.

8.6. Vegetation and riparian, wetland and terrestrial environments

The proponent should consult the additional guidance for requirements pertaining to wetlands provided in Appendix 1 – Additional guidance.

8.6.1. Baseline conditions

8.6.1.1. Vegetation and communities of importance

The Impact Statement must:

- describe vegetation biodiversity in the local and regional study area, and provide relative abundance and distribution at the species and community level, for species and communities of importance (e.g. ecologically, economically, and culturally important) (see also section 3.6.1 of Annex I). Species and communities should include:
 - rare plant communities and communities of limited distribution;
 - plant communities by type (i.e. ecosite and ecosite phases);
 - old growth forests;
 - species listed as at risk, may be at risk, and sensitive in the [General Status of Alberta Wild Species](#);
 - species listed in Schedule 1 of the *Species at Risk Act*;
 - species assessed by COSEWIC as extirpated, endangered, threatened or of special concern (refer to the most recent COSEWIC annual report for the list of assessed species); and
 - species of importance to Indigenous communities, including for traditional, medicinal, and cultural purposes;
- identify the biodiversity metrics, and biotic and abiotic indicators that are used to characterize the baseline vegetation biodiversity and discuss the rationale for their selection, which should take into consideration the [Lower Athabasca Regional Plan](#) for landscape-level indicators, as appropriate;

- provide maps, at an appropriate scale, of the vegetation species and communities, including those of importance within the local study area and, where available, extend mapping to describe vegetation species and communities of importance within the regional study area;
- discuss the potential of each ecosite phase within the study areas to support the species and communities listed above and their importance for local and regional habitat, sustained forest growth, rare plant habitat and the hydrologic regime (section also section 3.6.1 of Annex I);
- provide pre-project characterization of the shoreline, banks, current and future flood risk areas, and wetland catchment boundaries, including areas of ground instability;
- describe the natural disturbance regimes in the local and regional study areas, including context on how past projects and activities have affected those regimes (e.g. fire, floods, droughts, diseases, insects and other pests, etc.);
- describe and quantify the extent of any weed species, other invasive species, and introduced species of concern within the project study areas;
- describe the current levels of anthropogenic and natural disturbance affecting vegetation and other ecological communities, including a description and quantification of the current extent of habitat fragmentation, the extent of human access and use, and past and current fire suppression (see also section 3.6.1 of Annex I);
- identify ecosystems that are sensitive or vulnerable to disturbance, such as acidification resulting from the deposition of atmospheric contaminants or the generation of acid rock drainage (see also section 3.6.2 of Annex I), including ecosystems that are vulnerable to high salt concentration water, or saline sodic overburden or salts expressed from treated tailings deposit; and
- describe the current use of vegetation on the project site for construction materials, medicinal purposes, and as a source of country foods (traditional foods) and indicate whether its consumption has any Indigenous cultural importance. These include:
 - fruits and vegetables harvested from the wild (e.g. berries, seeds, leaves, roots, mushrooms and lichen), and
 - plant tissue (e.g. roots, bark, leaves, seeds and tubers) ingested for medicinal or other uses (e.g. teas).

8.6.1.2. Wetlands

The Impact Statement must:

- quantify, describe, and map wetlands potentially affected by the project (including muskeg, fens, marshes, peat lands, bogs, etc.) in the context of:
 - wetland class, ecological community type and conservation status (including the use of the [Alberta Wetland Classification System](#), as also required in section 3.6.1 of Annex I);
 - biodiversity;
 - abundance at local, regional and provincial scales;
 - distribution; and
 - current level of disturbance;

- provide a wetland functions assessment in accordance with the guiding principles of [Wetland Ecological Functions Assessment: An Overview of Approaches](#) or any subsequently approved guidelines by which to determine the most appropriate functions assessment methodology to use (see Appendix 1 – Additional guidance on the assessment of *Groundwater and surface water*); and
- determine whether the wetlands identified are within a geographic area of Canada where wetland loss or degradation has reached critical levels, and whether they are considered ecologically, socially, culturally, or economically important to a region.

8.6.2. Changes to vegetation and riparian, wetland, and terrestrial environments

The Impact Statement must:

- describe potential changes due to the project, for all its phases, to vegetation and to the riparian, wetland and terrestrial environments;
- include a description and rationale for the key indicators used to assess project effects and the sensitivity of vegetation communities, wetlands, and riparian and terrestrial environments to disturbance;
- provide an overall description of temporary and permanent changes related to landscape disturbance, including in terms of habitat fragmentation and alteration of riparian areas (including buffers and setbacks);
- describe potential effects on areas of ground instability (see also section 3.6.2 of Annex I);
- quantify the area of vegetation communities and riparian, wetland, and terrestrial environments, that may be cleared or otherwise disturbed during all project phases and from both temporary and permanent project components, including a description of the type of disturbance (see also section 3.6.2 of Annex I);
- describe, in a regional context, effects associated with changes to or loss of any ecosite phase (see also section 3.6.2 of Annex I);
- describe the potential effects of the project on rare plant species and plant species at risk (see also section 3.6.2 of Annex I);
- describe any hydrological or water flow changes, either permanent or temporary, that may alter moisture regimes or drainage conditions, and describe the effects on vegetation and wetland areas, including impacts on fish and fish habitat where applicable;
- describe any changes to or loss of wetland function as a result of the project, including consideration of the ecological (e.g. hydrological, water quality, biogeochemical cycling, habitat, and climate functions) and socio-economic functions of wetlands. Describe and justify the methodology used to assess the effects;
- explicitly describe potential effects to muskeg and related wetland functions, such as during construction and road building;
- discuss any changes to vegetation and riparian, wetland, and terrestrial environments, including changes to soil, sediment or water quality, in terms of how they compare to applicable guidelines,

objectives or standards, for all project phases. These should be obtained in consultation with federal and provincial authorities, as well as with Indigenous communities;

- identify the methods used for clearing and maintenance of project right-of-ways and other project components, where applicable, and describe how these activities may lead to potential effects, such as on the quality of drinking water sources, biodiversity and species of importance to Indigenous peoples;
- describe the amount, merchantability and location of any merchantable timber to be removed during project construction within the local study area, including timber productivity ratings (see also section 3.6.1 of Annex I);
- describe potential changes to riparian, wetland and terrestrial environments due to activities that may affect topography, soil erosion, compaction, and productivity, contamination, bank slopes and suspension of sediment. describe any contaminants of concern potentially associated with the project that may affect vegetation, soil, sediment or water;
- describe effects onto the biodiversity of riparian, wetland and terrestrial environments, including effects from fragmentation, and changes to regional biodiversity;
- describe potential effects from project emissions that may result in contamination and acidification of nearby land and waterbodies, including consideration of the sensitivity of vegetation communities, wetlands, and riparian and terrestrial environments to disturbance (see also section 3.6.2 of Annex I); and
- describe any positive changes (e.g. from offsets that result in re-vegetation, new wetlands, etc.).

8.6.3. Mitigation and enhancement measures

The Impact Statement must describe the mitigation measures for the potential effects of the project on riparian, wetland and terrestrial environments, including:

- describe any reclamation and revegetation procedures to be implemented as part of the project or as additional mitigation measures, including:
 - a description of the post-closure landscape and landform types, including techniques that will be used to ensure geotechnical stability of the closure landscape;
 - revegetation techniques and the locations where they would be implemented, including a description of species to be replanted and applicable criteria;
 - measures to mitigate potential dust deposition on reclamation materials and areas that may otherwise inhibit understory growth;
 - the selection of plant species to be maintained and planted to promote return to a natural ecosystem, including consideration for Indigenous use, during operation and upon reclamation, and integration of the reclaimed landscape with the regional landscape;
 - seed mixes to be used, application rates and location of application. Native and Indigenous species adapted to the local conditions should be used when the purpose of revegetation is to naturalize or regenerate the area;
 - fertilizers to be used, application rates and locations, and criteria for determining these specifications;

- the expected timelines, from an ecological perspective, for establishment and recovery of vegetation communities and the expected differences in community composition and structure. Identify the information sources on which the predictions rely, such as evidence from peer-reviewed scientific literature, or data from the oil sands region (see also section 3.6.2 of Annex I);
- how reclaimed areas and vegetation communities on the project site will integrate with local and regional vegetation communities and landscape features (see also section 3.6.2 of Annex I);
- any sources of uncertainty with respect to the anticipated effectiveness of reclamation. Explain how uncertainty was taken into account in the predictions; and
- reclamation standards to be used to evaluate ecological equivalency of post-operation reclaimed landscapes, in consultation with Indigenous communities;
- describe any positive changes (e.g. from offsets that result in re-vegetation, new wetlands, etc.);
- describe how mitigation measures consider resilience of wetlands and vegetation communities to climate change;
- concerning wetlands:
 - explain how avoidance of wetlands was considered, namely by considering other locations for project components and activities;
 - explain how the effects will be reduced and controlled when applying special mitigation or by modifying the activities and components that have the potential to affect wetlands during all phases of the project, including how the available procedures, practices and technologies that are standardized, proven, or experimental and wetland-specific were considered;
 - explain how mitigation measures consider the natural succession and the variability of the environment over time; and
 - describe proposed compensation measures, if applicable (see *Compensation and offset plans* in Appendix 1 – Additional guidance for relevant guidance);
- identify applicable measures to mitigate adverse effects to wetland functions (e.g. maintenance of muskeg functions potentially affected by road construction);
- describe and justify the proposed measures to mitigate bank erosion, including measures to eliminate the potential for erosion, such as bank stabilization using vegetation; and
- describe the vegetation standards and controls to be implemented during all project phases (see also section 3.6.2 of Annex I). Describe any integrated vegetation management programs, including:
 - the criteria and circumstances of application of chemical, biological or mechanical control methods, as well as relevant regulations and potential adverse effects associated with control methods; and
 - the methods to be used to identify invasive species or other undesirable introduced species, avoid their propagation and control them during all phases of the project, including the necessity of preconstruction surveys to identify any high density areas.

8.7. Fish and fish habitat

The proponent should consult the additional guidance for requirements pertaining to fish and fish habitat provided in Appendix 1 – Additional guidance.

8.7.1. Baseline conditions

The Impact Statement must:

- for each potentially affected waterbody or watercourse frequented by fish, provide a detailed assessment of physical and biological habitat characteristics. Include the use of satellite imagery overlaid with the pertinent information, tables, and text description to present the information, as appropriate. Relevant physical and biological habitat characteristics for fish habitat include:
 - surface and groundwater characteristics requested in section 8.5.1 *Baseline conditions*, and
 - substrate type, aquatic vegetation, riparian vegetation, bank stability, invertebrate population, food availability, light penetration, presence of woody debris, presence of beaver dams, stream segment type (riffle, run, pool), natural or anthropogenic barriers to fish passage, and geomorphological features and processes;
- for each potentially affected waterbody or watercourse frequented by fish, provide a detailed assessment of potentially affected fish as defined in subsection 2(1) of the *Fisheries Act* and other aquatic species (e.g. benthic invertebrates);
- where data is used to generate biodiversity metrics (e.g. abundance, richness, diversity, density), provide rationale on the choice of metrics based on their applicability for use in the effects assessment and associated follow-up, if applicable;
- provide a list of aquatic species at risk likely to be present and provide the location and a description of suitable or potential habitat for these species (residence and critical habitat) at or near the project area. Include species listed as *at risk*, *may be at risk* and *sensitive* in the [General Status of Alberta Wild Species](#), and species identified by the *Alberta Wildlife Act* as endangered, threatened, or species of special concern. There are no federal aquatic species at risk in the vicinity of the project;
- for each potentially affected waterbody or watercourse, provide an assessment of the use or suitability of the habitat to the relevant species' life history processes, including spawning, nursery, growth, foraging, migration, cover habitat, thermal and winter refuge, etc.;
- characterize ecological processes as relevant to the assessment of anticipated effects. For example, it may be necessary to establish a broader ecological baseline if the project affects a spawning area for a migratory species, but does not affect the larger area they depend on for life processes. Relevant ecological processes include: predator-prey interactions, population dynamics, migratory patterns, seasonal habitat use, or other relevant ecological processes that fish depend on to carry out their life history;
- use either a qualitative or a quantitative approach to characterize ecological processes, as appropriate to reflect anticipated effects and their likelihood, and include a rationale to support the selected approach;
- describe the use of fish and aquatic species as country foods or for other traditional purposes, including a description of the particular species of importance, and whether its consumption has cultural importance for Indigenous peoples, including medicinal uses. All sites used in the study area or historically important sites for the collection of country foods must be identified and mapped, such as important fishing sites; and
- provide baseline measurements of contaminants in aquatic species.

8.7.2. Effects to fish and fish habitat

The Impact Statement must describe the potential effects on fish and fish habitat as defined in subsection 2(1) of the *Fisheries Act*, and other aquatic species (see also section 3.5 of Annex I). Consider any effects whether they are adverse or positive, direct or indirect, and temporary or permanent, for all phases of the project, including from the release of effluent or the deposit of a deleterious substance to water frequented by fish, for all developmental stages of fish, and other aquatic species. Refer to section 8.5 *Groundwater and surface water* for related water quality requirements to inform the assessment of effects to fish and fish habitat.

For each waterbody and watercourse potentially affected by the project, the following must be documented and considered in the determination of effects:

- the geomorphological changes and their effects on hydrodynamic conditions and aquatic habitat (e.g. change of substrates, longitudinal and cross-sectional change, long term bank stability, silting of spawning beds, sediment load), including potential direct and indirect effects from aquatic habitat fragmentation (see also sections 3.5.1 and 3.5.2 of Annex I);
- the modifications of hydrological and hydrometric conditions on aquatic habitat and fish species' life cycle activities (e.g. reproduction, rearing, feeding and growth, movement and migration, winter refuge);
- potential effects to riparian areas that could affect aquatic biological resources and productivity, taking into account any anticipated modification to aquatic habitat (e.g. structure, cover, temperature) (see also section 3.5.1 of Annex I);
- potential fish mortality associated with entrapment or entrainment at intakes during water pumping or withdrawal activities (e.g. hydrostatic testing) (see also section 3.5.2 of Annex I), or by fish rescue activities;
- the potential for introduction of deleterious substances (e.g. sediment, project-related contaminants) and aquatic invasive species into the aquatic environment;
- changes to water quality and quantity, such as in flow, temperature, acidification, eutrophication, as applicable, including at discharge point(s) and in the receiving environment;
- changes in access to fishing grounds (see also section 3.5.2 of Annex I);
- contaminant levels in aquatic species, including harvested species and their prey; and
- any other changes resulting from the project that may affect fish and other aquatic species, and their habitat.

The Impact Statement must:

- utilize a [Pathways of Effects](#) approach to determine all potential effects to fish and fish habitat;
- clearly delineate anticipated habitat alteration, disruption, or destruction (temporary or permanent) in terms of area and habitat type;
- assess the effects to fish, other aquatic species, and their habitat based on specific life history processes, population status, resilience in the face of change, dependence on specific habitat features, or limiting ecological processes or variables. Take into account and include an examination of the

correlation between construction periods and sensitive periods for fish (e.g. reproduction), and any potential effects due to overlapping periods;

- describe potential effects to fish and aquatic resources from contaminants, including from bioaccumulation downstream of the project. Include a comparison of predicted water quality for all project phases at all key locations in the receiving environment to applicable water quality guidelines, site-specific objectives or benchmarks, and relevant toxicity test results (either site-specific or published), or other applicable methods. Describe potential effects from contamination on fish and other aquatic species' behaviour, distribution, abundance, and migration patterns;
- describe how the project's effects on aquatic biodiversity may contribute to changes in regional biodiversity and effects on local and regional ecosystems (see also section 3.8.2 of Annex I);
- provide an assessment of potential effects to fish populations in the Athabasca River, PAD and the Slave River;
- take into account the tolerance thresholds for potential adverse effects that the Indigenous peoples have identified; and
- provide a quantification of any positive effects to fish, other aquatic species, and their habitat, if applicable, such as area of habitat creation and number of fish in re-stocking activities.

8.7.3. Mitigation and enhancement measures

The Impact Statement must describe the proposed mitigation measures for fish, fish habitat and aquatic resources applicable for each phase of the project (see also section 3.5.2 of Annex I), including:

- all standard measures, policies, and commitments regarding mitigation that constitute technical and economically feasible proven mitigation measures and that will be applied in common practice, regardless of the location, as well as any new or innovative mitigation measure proposed;
- measures to mitigate effects from harmful, destructive or disruptive activities during sensitive periods and in sensitive locations (e.g. spawning and migration areas) for fish and other aquatic species;
- measures applicable to all water crossings, intakes, and outflows including how they would be maintained following construction of the project;
- measures proposed to restore aquatic environments, including the criteria used to assess successful restoration;
- measures to avoid fish mortality as a result of the use of explosives in or near the aquatic environment, by fish entrainment during pumping and water withdrawal operations (e.g. during construction of temporary structures and hydrostatic tests), or by fish rescue activities;
- measures to prevent the deposit of deleterious substances in the aquatic environment; and
- measures to prevent the introduction and intrusion of invasive aquatic species during work in or near the aquatic environment.

The Impact Statement must also:

- describe measures and plans to offset any loss in productivity of fish populations and fish habitat as a result of the project, including potential effects downstream of the project; and

- describe how measures included in environmental protection plans will address any applicable federal and provincial policies with respect to fish habitat (see also section 3.5.2 of Annex I).

The proponent must refer to Fisheries and Oceans Canada guidance and explain how it was applied to the assessment, including the references provided Appendix 1 – Additional guidance under *Compensation and offset plans* and *Fish and fish habitat*.

8.8. Birds, migratory birds and their habitat

The proponent should consult the additional guidance for requirements pertaining to birds provided in Appendix 1 – Additional guidance.

8.8.1. Baseline conditions

The Impact Statement must:

- identify any applicable Bird Conservation Regions (BCRs) and [BCR strategies](#) applicable to the local and regional study areas;
- describe the biodiversity of bird species and their types of associated habitat that are found or are likely to be found in the study areas, noting all avian species at risk and species of Indigenous importance or use;
- identify the biodiversity measures (i.e. biotic and abiotic indicators) used to characterize the baseline avifauna biodiversity conditions and discuss the rationale for their selection;
- provide estimates of the abundance and distribution, and information on the life history of migratory and non-migratory birds (e.g. waterfowl, raptors, shorebirds, forest birds, fen/bog/marsh birds, and other land birds) in the study areas;
- provide maps showing areas of highest concentrations of species and identify areas of concentration of migratory birds, including sites used for migration, staging, breeding, feeding and resting. Maps must comply with requirements set out in Appendix 1 – Additional guidance under *Documentation*;
- describe food webs and trophic linkages to summarize biotic interactions. Ensure described food webs or interactions are relevant to the study areas since these can vary geographically and by ecosystem;
- provide a characterization of potential habitat and habitat features found in the project area that are associated with the presence of those bird species that are likely to be affected, based on the best available existing information (e.g. land cover types, vegetation, aquatic elements, fragmentation, disturbance). Provide maps showing the location of identified habitat and habitat features associated with the presence of those bird species that are likely to be affected. This information can refer to the habitat description required in section 8.6 *Vegetation and riparian, wetland and terrestrial environments*;
- provide estimates of year-round bird use of the area (e.g. winter, spring migration, breeding season, fall migration), based on data from existing sources and surveys to provide current field data if required to generate reliable estimates. In each portion of the year, survey effort must account for differences in species movements, including winter usage of highly habitat reliant species and highly mobile species that will accurately characterize the use of a site;

- identify all federal species at risk, critical habitat and any potentially affected residences in the study areas; sites that are likely to be sensitive locations and habitat for birds; and environmentally significant areas. These include National Parks, Areas of Natural or Scientific Interest, Migratory Bird Sanctuaries, Important Bird Areas or other priority areas or sanctuaries for birds, National Wildlife Areas, World Biosphere Reserves and provincially or territorially designated areas, such as Wildlife Areas. This information can supplement the requirements in section 3.2 *Project location*; and
- describe the use (magnitude, timing) of migratory and non-migratory birds as a source of country foods (traditional foods) and where use has Indigenous cultural importance.

8.8.1.1. Whooping Crane

In relation to Whooping Crane, in addition to the information required above, the Impact Statement must:

- quantify Whooping Crane use of the study areas with surveys focused on landings and stopover use of habitat during migration to complement existing data on relative use of different habitats and features in the project area and support the evaluation of project and project component siting decisions or impact predictions;
- provide the best available information from the relevant jurisdiction concerning baseline range population size and trend, and consider Indigenous knowledge and community knowledge; and
- document and demonstrate how the information was developed, including how the proponent consulted:
 - experts of the relevant jurisdiction on appropriate survey methodologies;
 - regional and site-specific bird monitoring programs of oil sands mine operators; and
 - relevant published studies, such as any describing use of different habitat types by Whooping Crane during stopovers relative to overall habitat availability in the northeastern Alberta Oil Sands Region and mineable oil sands area.

8.8.2. Effects to birds, migratory birds, and their habitat

The Impact Statement must:

- describe the interactions between the project and birds, migratory birds, and their habitat, due to project components and activities, for all phases, including from:
 - site preparation and vegetation removal;
 - deposit of harmful substances in waters frequented by migratory birds;
 - construction and operation of tailings disposal facilities (i.e. tailings ponds), wastewater ponds, or other ponds containing process liquids or substances harmful to birds;
 - construction and operation of aerial structures, including transmission and distribution lines;
 - changes to the aquatic flow regime and sediment load;
 - changes to the atmospheric, acoustic, and visual environments (e.g. from noise, vibration, lighting, air emissions and dust);
 - site reclamation activities and landscape features; and

- any other project activity or component that may occur during critical periods or restricted activity periods for birds;
- describe and quantify, where possible, potential effects of the project on migratory and non-migratory birds, their eggs and nests – including on species at risk, priority BCR species, and those noted as important to Indigenous and local communities – from changes to:
 - habitats important for nesting, foraging, staging, overwintering, rearing and moulting;
 - movement corridors between habitat, and on habitat loss, fragmentation and structural change. Provide maps showing important habitats that were considered, including forests, riparian zones, wetlands and other similar geological formations, and open waters. If there is displacement of breeding birds, the baseline data must be provided as evidence that there is a significant number of equivalent habitats in which the birds can move and that the vegetation removed is not unique to the project area;
 - food sources in terms of types, quality, quantity, availability, distribution and function, including short term and long term changes;
 - bird-habitat relationships, including avoidance of habitat, and any change in diversity, abundance, and density, including at the population-level, for birds that utilise the various habitat types or ecosystems. Particular attention must be paid to the change in detection before and after the project is carried out;
 - mortality risk, including as a result of collision with any project infrastructure and vehicles, and as a result of indirect effects such as an increase in the ease of movement of predators in the prediction of mortality effects;
 - relative abundance, distribution, and daily or seasonal movement patterns, due to increased disturbance (e.g. sound, artificial light, presence of workers), considering the critical periods for birds (e.g. breeding, nesting, staging, stopover, migration and overwintering). If a temporary relocation hypothesis is applied to the operational phases of the project, support the hypothesis with scientific evidence; and
 - contaminants and bioaccumulation of contaminants, including those that may be consumed by Indigenous communities;
- provide an assessment of the availability of species for traditional use sufficiently detailed to carry results into the assessment of effects to Indigenous peoples (see section 12 *Indigenous peoples*); and
- should the project be expected to result in or contribute to downstream effects to water quality in the Athabasca River system, including the PAD, describe potential effects for birds that may be present in or utilize that area.

8.8.2.1. Whooping Crane

In relation to Whooping Crane, the Impact Statement must describe effects in consideration of Whooping Crane use data collected, in accordance with regional and site-specific bird monitoring programs of oil sands mine operators to report Whooping Crane sightings on mine leases, including:

- crane proximity to mine infrastructure (e.g. transmission lines or process-affected water);
- number and type of bird deterrents active in the area;

- levels of human activity;
- habitat attributes and proportions of habitat types at landing sites; and
- local weather conditions at the time of occurrences.

8.8.3. Mitigation and enhancement measures

The Impact Statement must:

- describe measures that will be implemented to mitigate adverse effects identified above to migratory birds and non-migratory birds, including species at risk, their eggs and nests, or through effects to their habitats. Include a description of measures applied during sensitive periods and in sensitive locations, such as avoiding logging activities during roosting season, avoiding lights at night during key migration peaks and avoiding excessive loud noises, vibration or blasting during breeding season;
- describe the deterrent systems that will be used to mitigate impacts on migratory and non-migratory birds due to for instance, attraction to tailings ponds, wastewater ponds, or other areas with open water on the project site (see also section 3.7.2 of Annex I);
- describe the anticipated effectiveness of the measures proposed to mitigate effects on birds, including deterrents;
- describe measures to mitigate sensory disturbance and the functional habitat loss it may cause;
- describe technologies and approaches to minimize the impacts of tailing ponds on migratory birds that maybe come into contact with process affected waters;
- describe measures for preventing the deposit of substances harmful to migratory birds in areas frequented by migratory birds; and
- demonstrate how the proponent will consider the timing of vegetation removal and construction to be outside the main breeding season or other critical periods for birds.

8.9. Wildlife and wildlife habitat

The proponent should consult the additional guidance for requirements pertaining to wildlife provided in Appendix 1 – Additional guidance.

8.9.1. Baseline conditions

The Impact Statement must:

- describe and map the wildlife resources (amphibians, reptiles, mammals) within the study area that are likely to be directly or indirectly affected by the project, including:
 - species listed in Schedule 1 of the federal *Species at Risk Act* (SARA). A preliminary list of species at risk likely to use the project area is provided in Appendix 1 – Additional guidance under *Species at Risk*. Each of these species must be discussed separately;
 - species listed as at risk, may be at risk and sensitive in the [General Status of Alberta Wild Species](#) or under any other applicable provincial legislation;

- species assessed by COSEWIC as extirpated, endangered, threatened or of special concern. It is recommended to refer to the most recent COSEWIC annual report for the list of assessed wildlife species posted on its website;
- species of importance to Indigenous peoples, notably pertaining to the practice of rights, considering traditional knowledge; and
- species of other ecological, economic or human importance;
- for these species, describe and map as appropriate (see also section 3.7.1 of Annex I):
 - species composition, abundance (including relative abundance in each habitat type), population status, distribution (including across survey sites), general life history;
 - the location and quantity of habitat, including residences, seasonal movements and ranges, movement and migration corridors, habitat features, requirements, key habitat areas, species use and potential use of habitats;
 - their regional importance, including ecological, economic, and human importance (e.g. traditional use, wetlands, old growth, etc.);
 - sensitive periods (e.g. seasonal, diurnal and nocturnal) and sensitive locations, including critical timing windows (e.g. denning, rutting, spawning, calving, breeding, roosting), setback distances from sensitive areas, or other restrictions related to wildlife species and species at risk;
 - a map showing the highest concentrations or areas of use by species, sensitive locations, and key wildlife and biodiversity zones; and
 - locations of identified or proposed critical habitat and/or recovery habitat, residences and ranges for species at risk, with information and locations differentiated between federal and non-federal lands. For sensitive locations, include key wildlife and biodiversity zones;
- identify the metrics and biotic and abiotic indicators that are used to characterize the baseline conditions (e.g. population size, recruitment rates, etc.) and discuss the rationale for their selection;
- describe the use of all wildlife species as a source of country foods (traditional foods) and whether its consumption and use has Indigenous cultural importance, including for medicinal purposes;
- describe the use and harvesting of fur-bearing species and whether its harvesting has Indigenous cultural or economic importance;
- take into account the species identified as being of importance or sensitive from an ecological, economic or human point of view, which may include, among others, insects and arthropods (e.g. the reference conditions of certain insect larvae in aquatic environments can serve as relevant indicators for the subsequent development of a biodiversity monitoring program);
- describe and quantify wildlife habitat, including function, location, suitability, structure; diversity, relative use, natural inter-annual and seasonal variability, and abundance (see also sections 3.7.1 and 3.8.1 of Annex I);
- describe and demonstrate the validation of any habitat model used to map wildlife resources;
- list, and depict on a map, wildlife management areas and established or proposed sanctuaries; and
- provide the information required in section 3.8.1 of the provincial terms of reference (Annex I) for terrestrial and aquatic biodiversity to inform characterization of the existing ecosystem, impacts, and

assessment of the proposed reclaimed landscape. Identify biodiversity metrics used to characterize the baseline biodiversity for terrestrial wildlife and discuss the rationale for their selection.

The proponent should consult the [Species at Risk Public Registry](#) to obtain information on the list of species at risk and their protection status, as well as available recovery documents. Information on species and habitat attributes, threats, population and distribution objectives, critical habitat, and residences must be considered and incorporated in the Impact Statement. The Impact Statement must specify the references and dates consulted. The proponent is responsible for ensuring that the most up-to-date documents have been used and that the status of the species is current.

8.9.1.1. Caribou

The Impact Statement must provide the best information available from the Government of Alberta regarding population size and trends for herds within the RSA. The proponent should consult Alberta provincial experts on appropriate survey methods for caribou and provide justification for the methodology used.

The Impact Statement must:

- describe the use of the study areas by boreal caribou (e.g. distribution, movement, timing) over time using survey data to supplement existing data if it is not sufficient;
- evaluate, where telemetry data are available, movements of collared individuals using quantitative methods (e.g. step analysis) to determine existing movement corridors and use, particularly within the project area or areas of potential for sensory disturbance or increased predator access;
- include maps showing the proximity of caribou range in relation to the proposed project area;
- evaluate whether caribou have potential to interact with the project during sensitive periods associated with caribou life stages, such as calving, overwintering, and any seasonal movements;
- take into account sensitive periods associated with caribou life stages such as calving, overwintering, movements, and specific sensitive time periods established by Alberta for caribou that are used to identify, delineate and take into account habitat features;
- describe the type and spatial extent of biophysical attributes present in the study areas and defined in the [Amended Recovery Strategy for the Woodland Caribou \(*Rangifer tarandus caribou*\), Boreal Population, in Canada 2020](#); and
- present total habitat disturbance for boreal caribou at the range scale, and also in a manner that clearly indicates critical habitat disturbance within federal lands.

8.9.1.2. Bats

In relation to Little Brown Myotis and Northern Myotis, in addition to the information required above, the Impact Statement must:

- include the best information available from the Government of Alberta. The proponent should consult Alberta provincial experts on appropriate survey methods for bats and provide justification for the methodology used;

- describe the use of the study areas by bat species over time using site-specific surveys to provide an overview of the species (present/undetected) to supplement existing data if it is not sufficient;
- describe the type and spatial extent of biophysical attributes present in the study area and defined in the [Recovery Strategy for the Little Brown Myotis \(*Myotis lucifugus*\), the Northern Myotis \(*Myotis septentrionalis*\), and the Tri-colored Bat \(*Perimyotis subflavus*\) in Canada](#);
- identify potential regional migration corridors and identify site-specific travel corridors and movement patterns;
- quantify bat baseline activity (e.g. using acoustic detection to calculate a bat activity index) to assess the relative use of different habitats or features in the project area in order to evaluate and justify decisions regarding project location and anticipated impacts. In addition, locate and confirm the use of high-value features such as nurseries and resting sites (such as hollow trees and buildings), feeding areas and hibernacula;
- locate and assess potential hibernation sites for bat use, taking into account the inter-annual and seasonal variability of use;
- include the following types of surveys:
 - acoustic surveys; ensure study design is statistically valid; and
 - continuous acoustic monitoring throughout the night (at least from sunset to sunrise: 30 minutes before sunset to 30 minutes after sunrise is recommended), active season (spring dispersal/migration, summer breeding/fall migration and swarming [fall staging]), as well as appropriate surveys of hibernation sites;
- clearly describe the methods used for acoustic identification, including validation procedures, species classification criteria and software used, if applicable (including versions and parameters);
- clearly describe how a bat “passage” is defined, consistent with the definition used for any control group, and justify the choice of modality;
- include, in data or reports, information on the acoustic detection methods used, including: detector make and model; microphone model used; location of detectors; height of microphones; orientation of microphones; special housing that may affect microphone; sensitivity (e.g. wind screen, cones, weatherproofing); mounting method (e.g. meteorological tower, pole); device-specific settings (e.g. gain/sensitivity, etc.); recording mode (i.e. full spectrum or zero crossing); and a summary of any equipment failure issues and a description of procedures used to ensure equipment was functional during deployment (including ensuring microphone sensitivity remains within an acceptable range); and
- take into account that when results are compared from year to year, the survey schedule, the equipment and the installation protocols must remain consistent from year to year.

8.9.2. Effects to wildlife and wildlife habitat

The Impact Statement must:

- describe the potential effects of the project to wildlife and species at risk and their habitat, residences and critical habitat (including its extent, availability and presence of biophysical attributes) during all phases, including:

- population level effects, including relative abundance, distribution, and mortality rates (see also section 3.7.2 of Annex I) that could be caused by project effects, particularly in the vicinity of wetland, lake and riparian habitats and on migratory corridors;
- regional or local sub-populations effects, especially for wildlife that frequent areas which are preferred harvesting areas for Indigenous peoples, considering that effects in preferred harvesting areas may not equate to population level-high effects, but could be important for Indigenous harvesting and rights;
- effects to migration, movement, habitat usage patterns, wildlife behaviour, including potential displacement of wildlife species and species at risk;
- the potential destruction of residences of species of risk;
- the surface area, biophysical attributes, and location of habitat, including residences and critical habitat that may be affected;
- effects associated with habitat and vegetation removal such as loss and fragmentation of forest cover and other habitat types, including effects to habitat quantity, diversity, spatial and temporal habitat availability, and habitat effectiveness (i.e. types, quality, and distribution) considering edge effects, particularly mixedwood and old-growth forest habitat, riparian areas, wetland (fen, bog, swamp, and marsh) areas, and sensitive habitat locations (see also section 3.7.2 of Annex I);
- effects to species should project activities occur during critical timing windows or during other sensitive periods; and
- effects that may result from:
 - introduction and intrusion of invasive species;
 - altered predator-prey relationships, such as increased wildlife predation;
 - increased access by hunters to the project area due to new roads and access corridors, including poaching;
 - increased access and use by off-highway vehicles, including environmental degradation and vandalism; and
 - noise, artificial light, and vibrations;
- provide an evaluation of the effects of the project, including any new road access, pipeline, powerline, water supply line or other rights of way, on wildlife and species at risk mortality risk and movement patterns;
- describe the potential for an increase in the spread and prevalence of disease as a result of project activities, including for species at risk;
- describe and quantify, where possible, the potential effects to wildlife and species at risk, including acute and chronic effects to wildlife health, of changes to air and water quality (e.g. from contaminants, effluents, atmospheric emissions, dust deposition, and bioaccumulation). Include wildlife species that may be consumed by Indigenous peoples (see also section 3.7.2 of Annex I);
- describe potential effects of the project on species noted as important to Indigenous communities and local communities, such as effects resulting from changes to important habitat areas, including moose, beaver, lynx, marten, river otter and fishers, and their habitat that are not currently listed under the *Species at Risk Act* or provincial statutes. This must include a discussion of the availability of species

for traditional use, considering potential habitat loss, habitat avoidance, increased wildlife mortality (e.g. due to vehicle collisions, increased non-Indigenous hunting pressure), and other project-related effects (see also section 3.7.2 of Annex I);

- take into account the tolerance thresholds for potential adverse effects that Indigenous peoples have identified;
- describe and assess the resilience and recovery capabilities of wildlife populations and habitats to disturbance, including the anticipated potential for the project area to be returned to its existing state with respect to wildlife populations and their habitat following operations (see also section 3.7.2 of Annex I);
- identify provincial, territorial or federal permits or authorizations that may be required in relation to species at risk and describe discussions with the appropriate authority regarding these permits or authorizations;
- describe effects to wildlife biodiversity, considering biodiversity metrics and the biotic and abiotic indicators selected, including changes to regional biodiversity and local and regional ecosystems (see also section 3.8.2 of Annex I); and
- describe changes to important habitat for species important for the current use of lands and resources for traditional purposes by Indigenous peoples.

Resources from the Alberta provincial government should be considered as a source of information on appropriate methodologies for predicting effects on wildlife and vegetation (see Appendix 1 – Additional guidance under *Sources of baseline information*).

8.9.2.1. Caribou

With respect to the description of effects on caribou, the Impact Statement must:

- provide an assessment of potential adverse effects on boreal caribou habitat;
- describe any sensory disturbance (e.g. noise, vibration, light) that could affect caribou and assess if this could lead to abandonment or reduced use of habitat;
- determine whether the project is expected to result in a reduction of connectivity within or between the ranges and provide a rationale for the conclusion;
- evaluate effects to habitat and habitat connectivity at the local, regional and range scales using quantitative methods (e.g. habitat quality analysis);
- Evaluate potential effects to existing movement corridors or use from project development;
- determine whether the project is expected to result in an increase of predator and/or prey access to undisturbed areas and provide a rationale for the conclusion; and
- evaluate the effects on population status at the range scale by providing:
 - the best available information regarding population size and trend;
 - an assessment of the potential adverse effects of the project on population status (size and trend) at the federal range scale; and
 - an assessment of the potential adverse effects on boreal caribou (e.g. sensory disturbance, mortality, pollution), including legal harvesting by Indigenous peoples.

8.9.2.2. Bats

Concerning the description of the effects on bats, the Impact Statement must also:

- identify potential resting areas, maternity roosts, hibernacula, foraging habitat and movement corridors in the local area, as well as the project's potential impacts on these habitats or on their particular functions for bats; and
- describe and consider all effects on overwintering habitat (hibernacula, such as caves, abandoned mines and wells), summering habitat (roosting and foraging habitats, including maternity roosts), swarming habitat (used in late summer and early fall for mating and socializing), and movement corridors in an assessment of effects on local and regional populations.

8.9.3. Mitigation and enhancement measures

The Impact Statement must describe the measures for mitigating potential effects on wildlife and species at risk and their habitat, including:

- describe all feasible measures to avoid or lessen potential adverse effects to wildlife and species at risk and their habitat, including residences and critical habitat. Include a description of the measures in terms of the effectiveness of each measure in avoiding negative effects;
- justify how the project and mitigation measures are consistent with any applicable recovery strategies, action plans, or management plans for species at risk based on scientific data;
- provide the best technically and economically feasible approaches for mitigating effects on habitat, aligned with the hierarchy of mitigation measures, and justify moving from one mitigation option to another;
- include measures to address sensory disturbance and the resulting functional loss of wildlife habitat;
- take into account species of interest to Indigenous peoples in the identification of mitigation measures for potential effects on species and ecological communities;
- describe the deterrent systems that will be used to mitigate impacts to wildlife and species at risk due to, for instance, attraction to the project site and/or components and activities associated with the project (see also section 3.7.2 of Annex I);
- describe and explain when and how temporary construction areas will be restored or maintained following construction, and explain the mitigation measures considered including possible revegetation, obstruction of the sightline, restoration of wildlife and species at risk corridors and habitat connectivity, reduction of fragmentation and reduction of long-term cumulative effects;
- describe and explain the measures to control the use of the project area and new access roads to access areas that were previously difficult to reach, including by wildlife and species at risk predators, hunters, off-roading recreationalists, and other users;
- describe measures to prevent the release of harmful substances into waters or areas frequented or occupied by wildlife or species at risk;
- provide details of any compensation or offsetting plans proposed following guidance in Appendix 1 – Additional guidance under *Compensation and offset plans* and available guidance documents, if effects cannot be otherwise avoided or mitigated; and

- describe mitigation measures applicable to wildlife habitat and other biodiversity metrics that will be implemented through reclamation, including timelines and targets that will be used to assess effectiveness.

8.9.3.1. Caribou

With respect to caribou:

- demonstrate that measures to avoid and minimize effects will be applied for boreal woodland caribou and its critical habitat, including potential use of the project area that supports population connectivity between ranges;
- describe all reasonable alternative means of carrying out the project that would avoid the adverse effects of the project on boreal woodland caribou;
- describe how these alternative means have been considered, and provide a rationale to confirm that the best solution has been adopted to mitigate adverse effects on boreal woodland caribou;
- describe all feasible measures that will be taken to minimize the adverse effects of the project on boreal woodland caribou and its critical habitat, such as:
 - minimize the footprint of the development and consider locations where the habitat is already disturbed;
 - restore the habitat to provide availability of undisturbed habitat over time;
 - minimize noise, light, smell and vibrations;
 - develop a management plan;
 - use techniques to prevent increased predator access or density; and
- report on how the project and mitigation measures are consistent with any applicable recovery strategy, action plan or management plan for the boreal woodland caribou, including provincial range plans.

8.9.3.2. Bats

With respect to Northern Myotis and Little Brown Myotis:

- describe all feasible measures that will be taken to minimize the adverse effects of the project on SARA-listed bats, and their critical habitat and residences;
- describe all reasonable alternative means of carrying out the project that would avoid the adverse effects of the project on SARA-listed bats;
- describe how these alternative means have been considered, and provide a rationale to confirm that the best solution has been adopted to mitigate adverse effects on SARA-listed bats; and
- report on how the project and mitigation measures are consistent with the [*Recovery Strategy for the Little Brown Myotis \(Myotis lucifugus\), the Northern Myotis \(Myotis septentrionalis\), and the Tri-colored Bat \(Perimyotis subflavus\) in Canada*](#).

8.10. Climate change

8.10.1. Baseline

Refer to the requirements provided under *Baseline conditions* in sections 8.1 *Meteorological environment* and 8.4 *Atmospheric, acoustic, and visual environment*.

8.10.2. Effects to climate change

The following requirements are based on the [Strategic Assessment of Climate Change](#) (SACC) document developed by ECCC. The SACC provides guidance on climate change information requirements throughout the impact assessment process. More details will be provided in the *Technical Guide Related to the Strategic Assessment of Climate Change: Guidance on quantification of net GHG emissions and impacts on carbon sinks, mitigation measures, and net-zero plan* (hereafter 'the technical guide') when published in its draft form in spring 2021.

The Impact Statement must:

- provide annual estimates of net GHG emissions for each phase of the project based on the project's maximum capacity (nominally 225 thousand barrels per day) (refer to section 3.1.1 of the SACC).
 - Include a description of each of the project's main GHG emission sources and their estimated annual GHG emissions over the lifetime of the project;
- provide each term of Equation 1⁵ per year for each phase of the project (refer to section 3.1.1 of the SACC);
- provide methodology, data, emission factors and assumptions used to quantify each element of the project's net GHG emissions (refer to section 3.1.1 of the SACC);
- provide emission intensity (Equation 2⁶) for each year of the operation phase of the project (refer to section 3.1.2 of the SACC);
- provide the quantity and a description of the "units produced" (in barrels of bitumen) used in Equation 2 for each year of the operation phase of the project (refer to section 3.1.2 of the SACC);
- provide a discussion on the development of emissions estimates and uncertainty assessment (refer to section 3.3 of the SACC);
- describe large sources of GHG emissions that may be the consequence of accidents or malfunctions;
- provide a qualitative and quantitative description of the project's positive or negative impact on carbon sinks (refer to section 5.1.2 of the SACC). This information must include:

⁵ Equation 1: Net GHG emissions = Direct GHG emissions + Acquired energy GHG emissions - CO₂ captured and stored - Avoided domestic GHG emissions - Offset credits

⁶ Equation 2: Emission intensity = Net GHG emissions / Units produced

- a description of project activities in relation to significant landscape features such as topography, hydrology and regionally dominant ecosystems;
- land areas directly impacted by the project, by ecosystem type (forests, cropland, grassland, wetlands, water bodies, built-up land) over the course of the project lifetime. This includes the areas of restored or reclaimed ecosystem(s);
- initial carbon stocks in living biomass, dead biomass and soils (by ecosystem type) directly impacted by the project over the course of the project lifetime;
- fate of carbon stocks on directly impacted land, by ecosystem type: immediate emissions, delayed emissions (timeframe), and storage (e.g. in wood products, wetland biomass); and
- anticipated land cover on the impacted land areas after the project is in place.

The proponent can refer to the upcoming draft technical guide for information on quantifying impacts on carbon sinks.

With regard to federal emissions reduction efforts and on global GHG emissions, the Impact Statement must provide:

- an explanation of how the project may impact Canada's efforts to reduce GHG emissions, if applicable, including how the project could result in GHG emission reductions in Canada (e.g. by replacing higher emitting activities) (refer to section 5.1.3 of the SACC);
- a discussion on how the project could impact global GHG emissions, if applicable (refer to section 5.1.3 of the SACC). This could include, for example:
 - if there is a risk of carbon leakage if the project is not built in Canada, the Impact Statement could include an explanation of the likelihood and possible magnitude of carbon leakage if the project is not approved; and
 - if the project may displace emissions internationally, the Impact Statement could describe how the project is likely to result in global emission reductions. For example, a project that enables the displacement of high-emitting energy abroad with lower emitting energy produced in Canada could be considered as having a positive impact; and
- should the potential exist for the project to result in increased forest fires in the region, a description of the impacts of increased forest fires on climate change.

8.10.3. Mitigation and enhancement measures

The Impact Statement must include a credible plan that describes the mitigation measures (refer to section 5.1.4 of the SACC) that will be taken to minimize GHG emissions throughout all phases of the project and achieve net-zero emissions by 2050 (refer to section 5.3 of the SACC). Additional guidance can also be found in the upcoming technical guide. The plan must demonstrate how the net GHG emission equation (refer to Equation 1 in the SACC) will equal 0 kt CO₂ eq/year by 2050 and thereafter for the remainder of the lifetime of the project. Emphasis should be placed on minimizing net GHG emissions as early as possible. The credible plan must include at a minimum the following information:

- the conclusions of the Best Available Technologies and Best Environmental Practices (BAT/BEP) Determination process to identify and select the technically and economically feasible technologies,

techniques, or practices, including emerging technologies, to minimize GHG emissions throughout all phases of the project. This must include at a minimum:

- the list of selected technologies and practices and rationale that would support the conclusions of the BAT/BEP determination process;
- the potential reduction in GHG emissions associated with each selected technologies/practices over the project's lifetime;
- the emerging technologies with their respective technology readiness level (TRL) that could be considered for future implementation to further reduce GHG emissions, as well as the planning process, timing and circumstances for that consideration. This could include a discussion on technical challenges, risks, infrastructure requirements and any other relevant considerations, and how the proponent could overcome them;
- include a description of measures taken to mitigate the project's impact on carbon sinks, including measures to restore disturbed carbon sinks; and
- subject to the public availability of information, include a comparison of the project's projected GHG emission intensity to the emission intensity of similar high-performing, energy-efficient project types in Canada and internationally. If applicable, the comparison should explain why the emission intensity of the project is different;
- any additional mitigation measures and offset credits that will be taken to mitigate remaining GHG emissions and achieve net-zero by 2050. This can include an explanation of the impact of the actions the company will take to achieve net-zero emissions on Canada's net-zero goal, and related avoided emissions assigned to the project. This explanation can refer to the proponent's corporate net-zero emission plan, if applicable;
- the implementation schedule of the mitigation measures identified, describing when the technologies/practices and other mitigation measures will be implemented and considering equipment replacement. It does not need to describe every technology or practice the project will implement over time to achieve net-zero emissions. Proponents can describe the process they will follow in order to make the decisions and investment needed to achieve net-zero emission by 2050;
- the emission reductions at specified intervals determined by the proponent, up to 2050. Explain how net GHG emission reductions are maximized in the earlier years of the project's lifespan. ECCC recommends intervals to be every five (5) years or as appropriate for the project; and
- any other relevant information such as supportive actions that the proponent would need in order to be able to achieve net-zero emissions.

9. Human health conditions

9.1. Baseline conditions

The Impact Statement must:

- provide baseline information on existing human health conditions to prepare community health profiles. This information must include the current state of physical, mental and social well-being and incorporate a determinants of health approach to move beyond biophysical health considerations;
- provide information that is sufficiently detailed to describe the pathways by which the project's influence on the determinants of health may affect health outcomes. This will help understand how these determinants have been taken into account and why certain indicators or information are presented when analyzing expected effects;
- provide a comparison of data at the provincial, regional or national level, if possible, to better interpret baseline health and social conditions; and
- identify the social area of influence of the project.

To understand the context and to develop the baseline health profiles of local and Indigenous communities, the proponent must:

- develop community health profiles that reflect the overall health of each community, including birth rates; death rates; sexually transmitted infections, injuries, and chronic disease rates; mental health status and other community-relevant health information. Profiles must:
 - describe baseline health conditions and existing health inequalities using disaggregated data and include information on health VCs corresponding to health behaviours and human biology for diverse groups and subgroups and their differential access to resources, opportunities and services within the community to support GBA+; and
 - use, where known, secondary information sources (e.g. Public Health Agency of Canada, Statistics Canada, provincial health authorities);
- describe any context-specific definitions of physical, mental and social health and well-being that are specific to the context of communities, including community and spiritual well-being, including from the perspective of the relevant Indigenous cultures and local communities;
- describe relevant community and Indigenous history or context, including historical impacts on health and intergenerational trauma;
- describe the determinants of health selected specifically for Indigenous communities, including for subgroups within them;
- document and describe the relevant protection factors that contribute to community well-being and resilience (e.g. sense of belonging, cultural continuity, language, family supports);
- provide the approximate location on a map and distance of likely human receptors, including foreseeable future receptors, which could be affected by changes in air, water, country food quality, and noise and light levels. Include communities' gathering, hunting, trapping and fishing areas, including for Indigenous peoples, permanent residences, temporary residences (e.g. Indigenous cottages and camps identified in collaboration with Indigenous peoples) and sensitive receptors (e.g. schools, hospitals, community centres, retirement complexes, health care centres) near the project;
- describe drinking water sources, both surface or groundwater (permanent, seasonal, periodic or temporary), including approximate catchment areas at wellheads and their distance from project activities (see also the section on groundwater and surface water);

- provide baseline concentrations of contaminants in ambient air, drinking water, soil, and tissues of traditional foods consumed by Indigenous peoples and local communities. For collection of samples, such as game and plants, the proponent should work with local Indigenous peoples to collect tissue samples where appropriate;
- describe the consumption of traditional foods as a health-related behaviour, including what species are used, quantities, frequency, harvesting locations and how the data were collected (e.g. site-specific consumption surveys, community-led assessments on impacts to treaty and harvesting rights);
- describe the level of food security and food sovereignty within local and Indigenous communities. Refer to the [Public Health Agency of Canada's website on food security](#) for more information;
- ensure that the data are representative of site conditions. If surrogate data from reference sites are used rather than project site-specific measurements, demonstrate how the data are representative of site conditions;
- provide a summary of identified data and explain the selection of methods for statistical analysis of available data, including identifying uncertainties and limitations of proposed methods and available data; and
- identify and describe the baseline information for social determinants of health that may be relevant to the project, including social and economic conditions as outlines in sections 10 and 11 respectively.

Where possible, identify increase or decreased prevalence, incidence and trends for physical, mental and social well-being determinants, including for Indigenous peoples, considering pre-development conditions in the RSA.

The proponent should consult additional guidance provided in Appendix 1 – Additional guidance under *Human health baseline*. The proponent must justify any omission or deviation from the recommended baseline characterization approaches and methods, including the Health Canada guidelines.

9.2. Effects to human health

The proponent must assess the potential effects of the project on human health. Interconnections between human health determinants (e.g. between behavioural factors such as healthy eating, and biological factors such as chronic stress or exposure to contaminants) and other VCs must be described, as well as the interactions between effects, especially when the proponent foresees a potential indirect effect.

Applying a determinants of health approach in the assessment of human health effects is recommended to support the identification of linkages and effect pathways between VCs as well as of disproportionate effects across subgroups, including how gender will impact outcomes across subgroups.

A dedicated Health Impact Assessment, supported by a Human Health Risk Assessment (HHRA), should show an understanding of the project's health and social impacts on Indigenous peoples and will play a role in understanding the project's impacts on rights and culture.

The Impact Statement must:

- clearly describe the selected indicators of physical, mental and social health;

- describe any potential project-related effects on the community health profile (e.g. changes in existing community activities) and the availability of health-related resources; and
- indicate the potential health effects, short-term or long-term, resulting from changes on biophysical and social determinants of health during the construction phase, and determine whether those effects would change again during the operation phase, at closure and during reclamation.

Should the proponent use a different approach for the health impact assessment, a rationale must be provided, including how input from local and Indigenous communities was considered in the development of the approach.

9.2.1. Biophysical determinants of health

With regard to the biophysical determinants of health, the Impact Statement must:

- provide an assessment of adverse and positive effects on human health taking into consideration, but not limited to, potential changes in:
 - air quality;
 - noise exposure and effects of vibration;
 - access to health services (i.e. increased demands on community services due to an influx of workers, if applicable);
 - light levels;
 - current and future availability and access to (including contamination/quality) country foods (traditional foods); and
 - current and future availability and access to (including contamination/quality) water for drinking, recreational and cultural uses, applying the strictest guideline values for the [Guidelines for Canadian Drinking Water Quality](#);
- describe how contaminants related to the project could be released to the water, air or soil and be absorbed in country foods (i.e. foods that are trapped, fished, hunted, harvested or grown for subsistence, cultural or medicinal purposes);
- identify all potential routes of exposure to contaminants into inhabited areas during blasting activities;
- identify the potential routes of exposure to silica in the crystalline form (i.e. quartz, cristobalite, tridymite) from project sources, and assess the associated potential to cause effects to human health. Provide a rationale for the guidelines and health endpoints used. Although there are no Canada- or Alberta-specific ambient air quality objective for silica, guidelines from other jurisdictions like the [Ontario Ministry of the Environment](#) and the [Texas Commission on Environmental Quality](#) should be considered;
- provide a detailed justification for every contaminant of potential concern (COPC) or exposure route that would be excluded and/or eliminated from the assessment of the human health risks;
- provide a description of potential increase threat of communicable, sexually transmitted infections and others diseases;
- apply a Human Health Impact Assessment approach, including consideration of Indigenous determinants of health;

- conduct a Human Health Risk Assessment using best practices (see Health Canada’s [Guidance for Assessing Human Health Impacts in Environmental Assessments: Human Health Risk Assessment](#)).
 - Include consideration of additive effects of various COPCs, if relevant, and all exposure pathways for COPC to adequately characterize potential biophysical risks to human health.
 - A multimedia HHRA may need to be considered and conducted for any COPC with an identified risk and multiple pathways.
 - If it is established that the sum of the modelled concentrations and the background concentrations is below the guidelines, standards or criteria — based on health protection — for the affected area, the statement of the problem stage of the risk assessment may conclude that it is unnecessary to treat this chemical substance as a COPC in a quantitative risk assessment;
- describe and quantify, if possible, the specific thresholds used for the health effects assessment and indicate if different thresholds have been considered for vulnerable population subgroups, including thresholds based on sex and age. Provide a justification if any applicable threshold was not used;
- document and take into account tolerance thresholds for potential adverse effects on health identified by Indigenous peoples;
- in situations where project-related air, water, noise or light emissions meet local, provincial, territorial or federal guidelines, and yet public concerns were raised regarding human health effects, provide a description of the public concerns and how they were or are to be addressed;
- provide an assessment of the carcinogenicity of diesel exhaust gases when diesel engines are a source of air pollutant emissions for the project. In characterizing the carcinogenic risk of project-related diesel exhaust gases, the proponent has two options:
 - carry out a quantitative risk assessment using the associated unit risk value published by the *Environmental Protection Agency* of California that, despite not being expressly recognized in Canada, can provide an overview of the potential impacts that a particular project may have on the risks associated with diesel emissions; or
 - provide a qualitative risk assessment of the carcinogenic risk of diesel exhaust gases related to the project, which includes three different elements to ensure transparency:
 - identification of the main sources of diesel emissions for the project and acknowledgement of the relative importance of diesel emissions as a source of air pollution for the project;
 - acknowledgement that diesel emissions have been labelled a human carcinogen by international authorities such as Health Canada, WHO’s International Agency for Research on Cancer, the U.S. Environmental Protection Agency and the California Environmental Protection Agency; and
 - why a quantitative assessment of the carcinogenic risk of diesel emissions for the project is not being done;
- describe changes in terms of availability, use, consumption and quality of country foods (traditional foods), and the potential effects related to these changes on physical and mental health of communities, including for Indigenous peoples;
- identify possibilities of avoidance of certain country food sources or drinking or recreational water sources by the Indigenous peoples due to the perception of contamination;

- describe any project-related changes that could result in a positive health effect (e.g. remediation projects); and
- assess any resultant effects of air quality changes or deposition of air contaminants on land or waterbodies to human health.

9.2.2. Social determinants of health

With respect to the determinants of health other than biophysical ones, the Impact Statement must:

- identify any vulnerable groups or susceptible populations in the local and regional study areas, based on results of the baseline health condition assessment and describe how this affected assessment methods and results;
- provide a summary of social determinants of health identified by local and Indigenous communities, identify relevant indicators for the social determinants of health selected to assess effects on health. In cases where identified social determinants were not assessed, provide supporting rationale for the exclusion;
- explain how the factors and indicators were selected to allow for a holistic interpretation of health, considering the complex interrelationships between components the environment and health, social and economic conditions, such as in the following examples:
 - effects on health care services;
 - effects on income, socio-economic status and employment;
 - effects on municipal revenues and local industries;
 - migration and re-settlement;
 - effects on social and community health, including effects on culture and way of life;
 - effects on services (e.g. education, social support networks, etc.);
 - effects on psychological well-being (e.g. stress, anxiety, nuisance, discomfort);
- identify and describe the effects to social determinants of health that may be relevant to the project;
- apply GBA+ to all health effects, including access to and use of health services and examine how the potential effects or the changes to human health conditions could be different for diverse groups and subgroups including the Indigenous and other relevant community subgroups; and
- ensure that the differentiated needs including those with specific health needs are addressed.

The proponent should refer to *Chapter 5: Aboriginal Health and Traditional Knowledge* of the [Canadian Handbook on Health Impact Assessment](#).

9.3. Mitigation and enhancement measures

The Impact Statement must:

- describe proposed mitigation and enhancement measures for any potential effects on human health;

- describe the mitigation and enhancement measures proposed separately for non-Indigenous and Indigenous peoples and for each Indigenous community;
- if the level of emissions from a particular project or effluent discharge is below or at the applicable limits, identify if additional mitigation measures will still be considered. However, if the change may be substantial (even within established limits) as a result of local or regional circumstances or the extent of the change, the proponent must provide additional mitigation measures to minimize pollution and risks to human health;
- when potential effects on human health exist due to exposure to a threshold or non-threshold contaminant (e.g. certain air pollutants such as fine particulate matter and nitrogen dioxide, as well as arsenic and lead in drinking water), describe mitigation measures aimed at reducing residual effects to as low a level as reasonably possible;
- when potential effects on social determinants of health are identified (e.g. avoidance of traditional foods, displacement, loss of culture), describe measures aimed at minimizing the effects;
- describe any project-related change that could lead to positive health effects (e.g. resulting from improved economic opportunities or increased access to services);
- describe how the GBA+ results on disproportionate effects have been used to inform mitigation and enhancement measures;
- propose differentiated mitigation measures, if applicable, so that adverse effects do not fall disproportionately on Indigenous peoples and vulnerable subgroups, and they are not disadvantaged in sharing any positive effect resulting from the project. These mitigation measures should be developed in collaboration with the potentially affected communities and subgroups; and
- identify mitigation and enhancement measures presented in other sections that are also applicable to health and well-being effects.

The proponent is encouraged to refer to the National Collaborating Centre for Healthy Public Policy's publication entitled [*Tools and approaches for assessing and supporting public health action on the social determinants of health and health equity*](#).

10. Social conditions

Baseline information is required on existing social conditions and must include social well-being and social activities for individual communities and Indigenous peoples. The scope and content of the social baseline conditions should be tailored to the specific project context, take into account community and Indigenous input, and should include indicators and information that are useful and meaningful for the effects analysis.

In preparing a baseline for the social context, the proponent must identify the social area of influence of the project and prepare a community profile.

The information provided must:

- describe the demographic information for the region, including descriptive statistics (age, ethnicity, sex and gender, language);

- provide a comparison of data at the provincial, regional or national level, if possible, to better interpret baseline health and social conditions; and
- use disaggregated data to understand different access to resources, opportunities and services for diverse groups and subgroups within the community to support GBA+.

Within the context of the predicted changes to the biophysical environment, health and economic conditions resulting from the project, the proponent must assess the adverse and positive effects of the project on social conditions. Interconnections between social VCs and other VCs and interactions between effects must be described. The degree of confidence must be discussed in the analyses.

In consideration of effects, the impact statement must document and take into account tolerance thresholds for potential adverse effects identified by Indigenous peoples.

10.1. Services and infrastructure

10.1.1. Baseline conditions

The Impact Statement must describe the existing local and regional services in the study area, including:

- capacity (currently available or planned) of institutions to deliver public services and infrastructure;
- water supplies and water lots, as well as water sources and intakes for agricultural operations, industries, residents and municipalities;
- accommodation and lodging (e.g. affordability, availability, suitability, home ownership), including camping facilities and remote workforce accommodation facilities;
- educational services, facilities and daycare;
- elder care and services;
- existing health services and programs, including health providers' capacity;
- road and other transport infrastructures and associated services;
- emergency and social services, including information relevant to understand the baseline conditions for communities on the capacity and ability to meet current needs, if available; and all other potentially affected services.

10.1.2. Effects to services and infrastructure

The Impact Statement must:

- describe potential effects to local and regional infrastructure, facilities and services, including access to these infrastructure and services:
 - accommodation/lodging (e.g. affordability, availability, appropriateness, home value and home ownership), including camping facilities and remote workforce accommodation facilities;
 - access to green space, recreation and parks;
 - road infrastructure and traffic safety;

- emergency, health and social services, including the increased use of health services and related social services in the relevant communities;
- educational services, facilities and day care; and
- utilities; and
- describe any need for government and/or proponent expenditures for new or expanded services, facilities or infrastructure, arising out of project-related effects.

10.2. Land and resource use

10.2.1. Baseline conditions

The information provided must describe baseline conditions for land and resource use, including:

- describe the general patterns of human occupancy and resource use based on the spatial and temporal boundaries selected (include maps where available), including seasonal cabins;
- describe sites, access routes or areas that are used by local populations and Indigenous peoples either for permanent residences or on a seasonal/temporary basis and the number of people who use each site or area identified (include a map(s), where possible), including any potentially impacted transportation routes;
- identify and take into account relevant local, regional, or provincial land use or resource development plans (e.g. the [Lower Athabasca Regional Plan](#));
- provide general information about local populations and diverse subgroups and their roles and responsibilities in the communities; and
- identify parks and recreational use areas, including fishing.

10.2.2. Effects to land and resource use

The Impact Statement must:

- describe the potential interactions of the project with local and regional land use and resource activities (see also section 3.6.2 of Annex I), including potential effects to:
 - residential land use;
 - water supplies and water lots, as well as water sources and intakes for agricultural operations, industries, residents, reserve lands, and municipalities; and
 - other land uses;
- describe potential effects to recreation (e.g. hunting, fishing, hiking, wildlife viewing, plant gathering, aesthetic enjoyment) by the community and Indigenous communities (see also section 3.6.2 of Annex I), including effects to:
 - access to, and quality and quantity of resources, including terrestrial, riparian, and wetland areas; and

- overall experience when undertaking recreational activities, including effects of noise, viewscales and artificial light;
- describe the land use losses associated with the security buffer zones applicable to the project;
- describe how potential avoidance of land near project components by Indigenous peoples due to perceived changes in environmental quality and tranquillity, personal and community safety, and access (gates, firearm restrictions, changes to roads and trails) was considered in assessing potential effects to Indigenous peoples (including on diet, health and well-being, community cohesiveness, and knowledge transfer);
- describe how changes to or loss of wetlands and other waterbodies may affect land use, including use by Indigenous peoples (see also section 3.6.2 of Annex I); and
- identify potential effects of the project on the quality and quantity of surface water and implications for Indigenous and recreational uses, including travel on ice.

10.3. Navigation

Refer to section 8.5 *Groundwater and surface water* requirements as they related to baseline conditions and effects on navigation.

10.3.1. Baseline conditions

The Impact Statement must describe baseline conditions for navigation, including:

- identify and describe existing navigable waterways, including the Athabasca River, PAD, and those identified by Indigenous communities, and all their uses;
- provide a list of all potentially affected waterway users and existing concerns regarding waterway use and access; and
- provide information on existing water intake infrastructure to be used including, but not limited to, location, construction date, project methodology, Navigation Protection Program/Transport Canada file number.

10.3.2. Effects to navigation

The Impact Statement must:

- describe ancillary project components that will be constructed in, on, under, over, through or across navigable waterways to support the project;
- describe how all potentially affected waterway users have been consulted regarding navigational use and the issues that were raised, and how they were addressed;
- describe project effects to navigation and navigation safety, including potential effects from changes to water levels and flows in the PAD;
- consider changes in water depth at critical pinch points in both the PAD and along the lower Athabasca River and tributaries as defined by Indigenous groups;

- consider the timing of change of water availability and consequent changes in water depth.

The proponent should:

- refer to Indigenous flow requirements which have been previously published by Indigenous communities or other sources, such as standards provided in the context of the [Lower Athabasca Regional Plan](#);
- consult the [Athabasca River Navigational Study](#) and the [Transport Canada Navigational Study of the Lower Athabasca River – Outcomes and Technical Review](#) report;
- consider available Indigenous navigational indices or thresholds for affected waterways; and
- refer to any other relevant materials.

10.4. Community well-being

10.4.1. Baseline conditions

To understand the context for potentially impacted communities, the Impact Statement must describe:

- influences on community well-being (e.g. disposable income, cost of living, lifestyle; language; rates of alcohol and substance abuse, and of illegal activities and violence; rates of sexually transmitted infections and ethnicity- and gender-based violence; etc.), including indicators proposed by Indigenous communities;
- access, ownership and use of resources (e.g. land tenure, food, water, social infrastructure);
- food security, access to country foods (traditional foods) and baseline perceived quality;
- community cohesion, including factors such as community or neighbourhood engagement, support, and social networks and other social activities;
- the psychosocial environment and its influence on community well-being;
- factors supporting mental health and community well-being (such as perceived stress, feelings of isolation, of remoteness, of concern for future generations);
- the socio-cultural environment, identifying Indigenous peoples and predominant cultural communities;
- demographic characteristics and major socio-cultural concerns of the population;
- safety of Indigenous and non-Indigenous women and girls, identified LGBTQ+ and two-spirited people;
- relevant historical community background; and
- community leadership and governance structure.

10.4.2. Effects on community well-being

The Impact Statement must:

- assess potential effects, at the community level, of changes to social conditions such as those considered for the analysis in section 9.2.2 *Social determinants of health*;

- describe the effects of in- and out-migration and the influx of transient workers or temporary work camps, including:
 - changes in social and cultural make-up of affected communities,
 - changes in populations, and
 - the potential for increased risks to local communities (e.g. greater spread of sexually transmitted infections, prostitution, drugs, alcohol, crimes, racism, and ethnicity- and gender-based violence) and vulnerable groups who may be disproportionately affected by these risks;
- describe, at the community level, the expected interactions between the project's construction, operation and maintenance workforce and local communities, businesses and residents;
- describe the potential effects on community well-being associated with moving from rural and subsistence-based economy to a wage or cashbased economy as a result;
- identify whether socio-economic divisions might be intensified as a result of the project;
- evaluate potential social effects associated with increased disposable income, including potential cost-of-living effects, effects on housing, adverse and positive lifestyle changes, distribution of benefits among affected people, and how will the project change people's place in relation to poverty line;
- describe impacts to mental health and community well-being (including perceived stress, feelings of isolation, of remoteness, of concern for future generations, powerlessness associated with industrial and resource development, and other factors that have been identified in the wake of youth suicide in rural and remote communities);
- describe any food safety concerns from Indigenous communities resulting from potential exposure to contaminants;
- describe any changes to safety of Indigenous and non-Indigenous women and girls, identified LGBTQ+ and two-spirited people;
- describe effects on food security and access to country foods (traditional foods), including perceived observed, and documented quality;
- describe any anticipated effects to language;
- describe any emotional or stress factor that may result from the project including disturbance of normal daily activities (e.g. changes to viewscapes, noise, traffic) and concerns regarding public safety;
- consider the potential for stresses on community, family and household cohesion, alcohol and substance abuse, or illegal or other potentially disruptive activities;
- describe potential effects related to greater propagation of sexually transmitted infections and gender-based violence (e.g. harassment or human trafficking);
- describe potential effects of vandalism on traditional lands;
- identify and consider the barriers that impede taking advantage of the positive effects on social conditions and how they are accentuated across diverse subgroups; and
- identify any changes to, or interaction with, community leadership and governance structure.

The proponent must apply GBA+ within the information related to community well-being and document how potential effects are different across diverse subgroups, including among Indigenous peoples and other relevant community subgroups. Ethical guidelines and relevant cultural protocols governing research,

data collection and confidentiality must be adhered to. This is particularly important in the case of information gathered and studies conducted with vulnerable subgroups (e.g. analysis of gender-based violence).

10.5. Mitigation and enhancement measures

The Impact Statement must describe the mitigation and enhancement measures that will be implemented for all potential effects on social conditions, including:

- explore and discuss opportunities by which benefits to local communities can be enhanced, such as improving infrastructure;
- describe the goals of local or regional land use plans, or local or regional development plans, where applicable mitigation or enhancement measures are proposed and the extent to which the project is aligned with such plans to avoid or enhance social effects;
- any measures to mitigate effects on transportation infrastructure, such as alteration or removal of road access during construction;
- describe mitigation measures considered for heritage and structures, sites, and things of significance, as well as contingency plans and communications plans in the event of such discoveries during construction;
- describe the measures that will be implemented if important thresholds for water levels and flows in the PAD are exceeded, such as those required for safe navigation by Indigenous peoples;
- propose differentiated mitigation measures, if applicable, so that adverse effects do not fall disproportionately on Indigenous peoples and vulnerable subgroups, and they are not disadvantaged in sharing any positive effect resulting from the project. These mitigation measures should be developed in collaboration with the potentially affected communities and subgroups;
- describe how tolerance thresholds for potential adverse effects identified by Indigenous peoples were considered;
- describe how the GBA+ results on disproportionate effects have been used to inform mitigation and enhancement measures, including measures to prevent sexual harassment and gender-based violence;
- describe measures to address potential effects on community well-being, including policies and programs related to drug and alcohol consumption and for crime prevention;
- identify measures that will be implemented to prevent abuse, sexual harassment and violence in the workplace, such as programs to support the safety and security of people and codes of conduct; and
- a description of any plans for cultural sensitivity or awareness training for non-Indigenous employees to promote a safe work environment that supports the well-being of Indigenous employees.

11. Economic conditions

11.1. Baseline conditions

The Impact Statement must:

- describe the main economic activities in the local and regional study areas that could potentially be affected by the project, including: outfitters, registered or recognized hunting, trapping or guiding areas, lodging and accommodations facilities, agriculture, commercial fisheries, forestry and forest management areas, and any other relevant activities from industrial or commercial sectors;
- describe the workforce in the local and regional study areas, as relevant to the project, including workforce employed at existing operations.
 - This description must include information on relevant conditions, such as the availability of skilled and unskilled workers, education level, wages and average salary range, full-time and part-time employment, and gaps in wages and qualification for skilled trades in gender and for Indigenous versus non-Indigenous peoples.
 - If the project's workforce is anticipated to draw beyond the regional labour force, describe the same information for areas (regions or provinces) with potential labour supply;
- describe the baseline conditions for Indigenous employment at existing operations, and identify existing constraints affecting the employability of local Indigenous peoples that could be relevant for the project;
- describe traditional economies that have the potential to be affected by the project in the local and regional study areas, and associate employment;
- provide an overview of the availability of businesses that may provide supplies and services required for the project;
- provide an overview of the availability and access to education and training of relevance to the project;
- describe how community and Indigenous knowledge from affected populations, including input from diverse subgroups, such as Indigenous women, was used in establishing baseline conditions; and
- describe baseline economic conditions for diverse subgroups within the community to support GBA+.

11.2. Effects to economic conditions

The Impact Statement must:

- describe potential effects as a result of workforce requirements that are part of the project, as outlined in section 3.5 *Workforce requirements*, including:
 - discuss the availability of the local workforce and the potential for labour shortages in certain sectors within communities affected by the project;
 - identify potential direct or indirect effects related to the displacement of workers across sectors or regions;

- if applicable, and hiring from in and out-of-province will not suffice, provide a description of the plans and the justification for hiring of temporary foreign workers to make up for the shortage of labour and skills;
- describe the potential effects in terms of long term careers and quality employment (e.g. full time versus precarious part time, temporary or permanent, skilled or unskilled) for the life of the project;
- provide an estimate of direct, indirect or induced income or wages resulting from the project and for all phases;
- provide analysis of the potential for increasing employment, wages and income for underrepresented subgroups, and for local workers and economies more generally;
- provide an estimate of the anticipated levels of local and regional economic participation in the project in comparison to the total project requirements (e.g. number of workers, wages and income, total dollar value of contracts), including a specific consideration for Indigenous peoples;
- describe, if applicable, the training requirements related to the project, and identify associated economic effects, such as increased access to employment opportunities;
- describe the products and services that would be required for the all phases of the project, and provide anticipated procurement and contract values;
- discuss how contracts and procurement values are anticipated to be attributed, including for local and Indigenous businesses;
- provide the estimated total project cost and indicate the percentage of expenditures expected to occur in the region, Alberta, outside of Alberta, Canada, and outside of Canada;
- include an estimate and description of direct, indirect and induced economic effects of the project in the short and long term;
- take into consideration the temporal scale of all project phases, and discuss the potential for, and avoidance of, boom-and-bust cycles potentially associated with the project;
- describe any new technology, process or other intellectual property that will be developed as part of this project, and their potential economic benefits;
- document the sources and methodologies used for developing multipliers and estimates and, where a generic multiplier may not accurately reflect the specific situation of the project, provide evidence of specific economic activity that would result if the project is allowed to proceed;
- describe the potential effects to economic conditions of affected communities, including Indigenous communities, for example:
 - effects related to changes in forestry and logging operations, including the recovery of wood cut during the construction phase;
 - economic burdens of travelling further to hunting, fishing, trapping, and gathering sites;
 - loss or displacement of hunting, fishing, trapping, and gathering opportunities; and
 - loss or displacement of commercial outfitters, recreation and tourism opportunities;
- provide an estimation of the potential effects of the project on the traditional economy, including the potential for related loss of subsistence (e.g. food, clothing, shelter) and the potential loss of related jobs;

- consider the indirect effects on the economy resulting from changes in land use (e.g. potentially increased use of recreational vehicles, removal of roads, and restrictions related to the presence of the project);
- describe the potential effects of the project on the availability and quality of land and the short-term and long-term disturbance of the related sectors of activity;
- describe the potential effects of the project on the quality and quantity of groundwater or surface water used for commercial purposes, including water lots, if applicable;
- discuss how the project would affect the gross domestic product at the federal and provincial levels;
- evaluate the net economic benefits to the Canadian economy as a whole, which requires a detailed forecast of annual cash flows for the life of the project, including a sensitivity analysis showing the impact of changes in the discount rate, prices, capital and operating costs, or other significant parameters;
- provide estimates of government revenues, including royalties and federal and provincial tax payments;
- discuss the potential effects related to inflation, if predicted, on local economic conditions; and
- provide an analysis of potential changes to property values and to the cost of living as a result of the project.

11.3. Mitigation and enhancement measures

The Impact Statement must:

- identify opportunities for enhancing positive effects, such as creation of local employment and Indigenous employment, including:
 - describe education, training and hiring practices that encourage employment of local people;
 - describe actions taken to increase access to education and training opportunities for different groups (e.g. provision of transportation, flexible hours);
 - provide a summary of commitments made with respect to employment, training and trade, including any economic benefit plans or specific cooperation agreements with Indigenous communities and peoples;
 - describe plans to encourage the recruitment, development, retention and advancement of women, Indigenous and local workers more generally (i.e. establish employment targets for specific subgroups, such as setting targets for the number of women in management positions and on boards of directors);
 - describe the training, education, and scholarship programs that the proponent plans to support in order to improve employment opportunities, including participation in and contribution to local training networks. Specify the types of employment targeted by these programs, as well as the targeted clientele, such as local residents, Indigenous peoples, and various relevant subgroups (e.g. Indigenous women);
 - describe cultural competency training plans for non-Indigenous employees to ensure a respectful working relationship with Indigenous employees, businesses and contractors;

- describe all cultural awareness training plans for non-Indigenous employees to promote a safe work environment that fosters the well-being of Indigenous employees and contractors; and
- describe, if applicable, the co-development processes of plans pertaining to training and employment with Indigenous peoples to ensure common development and management of programs for Indigenous employment;
- describe plans, programs and policies to encourage contracting and procurement opportunities for local and regional businesses. Identify specific considerations for Indigenous-based or Indigenous owned businesses in the area, and for workers from Indigenous communities, including underrepresented subgroups. Describe:
 - supplier network development initiatives, including the identification of potential local suppliers, and plans to provide them with information on technical, commercial and other requirements, and to debrief unsuccessful bidders; and
 - technology transfer and research and development programs that will facilitate the use of local suppliers of goods and services and local employees, and that will develop new capabilities related to project requirements;
- summarize business commitments made, if the proponent has prepared an economic benefits plan or has entered into specific cooperation agreements with communities, including with Indigenous communities;
- provide details regarding financial liability, responsibility, and compensation, as required by regulation or through the proponent's commitments for closure and reclamation. Explain how mitigation measures, risk of failure and potential correctives actions were accounted for, such as rehabilitation of water infrastructures at end of life and maintenance of fish offset features;
- describe compensation plans for mitigating potential effects on local, regional and Indigenous businesses and land and resources users, including other industrial and commercial sectors;
- propose differentiated mitigation measures, if applicable, so that adverse effects do not fall disproportionately on Indigenous peoples and vulnerable subgroups (including vulnerable subgroups within Indigenous communities), and they are not disadvantaged and have an adequate sharing of any positive effect resulting from the project. These mitigation measures should be developed in collaboration with the potentially affected communities and subgroups.

12. Indigenous peoples

The Impact Statement must provide information on how the project may affect Indigenous peoples, as informed by the Indigenous community(ies) involved in the assessment. The proponent should apply Agency guidance on engaging with Indigenous communities and appropriate methodologies for assessing potential effects and impacts on Indigenous peoples and their rights.

The assessment of potential effects must include both adverse and positive effects to the current use of lands and resources for traditional purposes, to physical and cultural heritage, to structures, sites or things of historical, archaeological, paleontological or architectural significance, and to environmental, health, social, cultural and economic conditions of Indigenous peoples affected by the project.

The proponent must:

- engage with Indigenous communities in developing baseline conditions, identification and understanding of the potential impacts of the project on Indigenous peoples, and to work collaboratively to identify preferred means to mitigate impacts;
- incorporate Indigenous knowledge into the impact assessment and view this knowledge as complementary and influential alongside western science;
- provide a reasonable opportunity for Indigenous communities to review the information prior to submission of the Impact Statement, including in cases where information was obtained from public sources;
- take into account the capacity of Indigenous peoples to collect information on all aspects identified in relation to the current use of lands and resources for traditional purposes;
- support the participation of Indigenous peoples in the completion of the Impact Statement, which could include funding studies and assessments conducted by potentially affected Indigenous peoples who demonstrate interest in this regard;
- indicate where input from Indigenous communities has been incorporated. To the extent possible, information should be specific to the individual Indigenous communities involved in the assessment and describe contextual information about the members within each Indigenous community (e.g. women, men, elders and youth).

The baseline conditions should be validated by Indigenous peoples. Where not publicly available, the proponent should obtain the approval of Indigenous communities to integrate current use baseline information into the Impact Statement or explain, as applicable, why the information was not validated or approved.

The proponent is also encouraged to work with Indigenous communities who demonstrate an interest in drafting sections of the Impact Statement that concern them, including sections describing Indigenous knowledge, on the subject of current use of lands and resources for traditional purposes, on potential impacts to the rights of Indigenous peoples, and for the identification of mitigation or enhancement measures. Where applicable, sections of the Impact Statement prepared by Indigenous peoples must be clearly identified. All perspectives and the rationale for different conclusions should be documented in the assessment report.

12.1. Indigenous physical and cultural heritage and structures, sites or things of significance

12.1.1. Baseline conditions

The Impact Statement must include a description of the baseline conditions associated with physical and cultural heritage and structures, sites or things of significance for Indigenous peoples. This description should give consideration to understanding the historical (pre-development) baseline conditions associated with ability to transmit culture, including through language, ceremonies, harvesting, teaching of sacred laws, traditional laws, stewardship laws, and traditional knowledge.



The requirements in Suncor's proposed Terms of Reference that relate to historic resources captured under the provincial *Historical Resources Act* are detailed in section 4 of Annex I and may be referenced to inform baseline conditions.

The Impact Statement must:

- describe the interconnections and impact pathways between heritage and cultural structures, sites, places, and things and the current use of lands, health, social, and economic components, Indigenous knowledge, and Indigenous rights for each potentially-impacted Indigenous community, including intergenerational impacts over the lifetime of the project;
- provide the location of physical and cultural heritage features on maps, and access routes to those features including overland and water-based options including entry and exit / landing sites for watercraft, camp locations and water sources for potable uses, if it has been shared by an Indigenous community with the proponent and if the Indigenous community has authorized its release;
- describe how historical and current cumulative effects to environmental and socio-cultural conditions, including changes to those conditions, have already impacted physical and cultural heritage;
- describe how input from potentially impacted Indigenous communities was sought and considered in the identification of these locations and features, including opportunities provided to participate in or lead historic resources studies (including field studies);
- describe best practices that will be employed for field studies, such as the use of 6 mm mesh size for screening;
- describe the outcomes of engagement and consultation activities with Indigenous communities with concerns about heritage resources in the Local and Regional Study Areas and indicate the participation of the members of these communities in the related studies, if applicable; and
- include components of the environment identified by Indigenous communities as having heritage value, to reflect that natural and cultural heritage is a multidimensional concept which is not limited to particular sites or objects.

Information on heritage and structures, sites, and things of significance for Indigenous communities can include:

- burial sites;
- spiritual sites, including rivers and watercourses;
- oral histories;
- cultural landscapes
- teaching areas used to transfer knowledge between generations;
- cultural values and experiences of being on the land;
- Indigenous governance systems and Indigenous laws associated with the landscape;
- sacred, ceremonial or culturally important places and landscapes, plants, animals, objects, beings or things;
- the toponymy, language and other components that make up a culture;

- wagon roads, trails, trail markers, rivers and waterways important for navigation, ancestral village and camp sites, and places of historic significance;
- sites with archaeological potential and/or known artifact sites; and
- sites occupied historically.

The proponent should consult the [Technical Guidance for Assessing Physical and Cultural Heritage or any Structure, Site or Thing](#) on the Agency's Website.

12.1.2. Effects to Indigenous physical and cultural heritage

The Impact Statement must:

- assess potential effects to physical and cultural heritage and to structures, sites or things of historical, archaeological, paleontological or architectural significance for Indigenous communities, including:
 - the potential for loss or destruction of physical and cultural heritage;
 - changes to access to the site(s) of physical and cultural heritage;
 - changes to the cultural value, spirituality or importance attached to the physical and cultural heritage;
 - changes to sacred, ceremonial or culturally important places, objects or things, use of place names, including languages, stories and traditions; and
 - changes to visual, auditory and olfactory aesthetics over the life of the project and after reclamation, abandonment or decommissioning of the project;
- take into account potential effects on physical and cultural heritage when assessing the effects on social and economic conditions;
- describe how Indigenous communities will be notified of findings of historical resources;
- present contingency plans and field interventions that will be applied should heritage resources be discovered during construction and operation;
- include a description of any cultural heritage training programs for workers;
- explain the interconnections with and potential impacts to physical and cultural heritage from changes to pre-development and current baseline environmental, social, and economic conditions; and
- in the event that project activities disturb the soil (surface or underground) on provincial Crown lands, conduct an archaeological potential study for the Crown territory affected. Based on the recommendations of this study, field work (visual inspection without snow cover, archaeological inventory, or other) could be necessary. Depending on the findings, this expertise could lead to mitigation measures related to the findings obtained, which can take the form, for example, of intensive digs at a given site or a proposal for modification of the anticipated route.

12.2. Current use of lands and resources for traditional purposes

12.2.1. Baseline conditions

The Impact Statement must include information on the current use of lands and resources for traditional purposes. The proponent must refer to the [Technical Guidance for Assessing the Current Use of Lands and Resources for Traditional Purposes under CEAA, 2012](#), on the Agency's website.

The information requirements of section 5 of Annex I, Traditional Ecological Knowledge and Land Use (Annex I), may be referenced as appropriate to address the information requirements below.

The Impact Statement must identify and describe:

- Indigenous governance systems and Indigenous laws associated with the current land and resource use for traditional purposes;
- traditional activities presently or historically practiced (e.g. hunting, fishing, trapping, gathering of plants or medicines, wood or other resources);
- location of traditional use areas such as hunting, trapping, and fishing camps, cabins and gathering or teaching areas;
- resources important for traditional and cultural purposes such as fish, wildlife, birds, plants or other natural resources and describe places where these resources are harvested. Identify those being species at risk and describe their traditional and cultural significance;
- country foods (traditional foods);
- quality and quantity of resources (e.g. preferred species and perception of quality);
- rotational harvesting practices and how they vary in time, such as berry and tea harvesting, bait harvesting and fishing, big game hunting and trapping of fur-bearing animals;
- access and travel routes for conducting traditional practices (e.g. physical access to harvest specific species, culturally important harvesting locations, timing, seasonality, distance from community);
- all uses of banks, waterways and water bodies navigable by Indigenous communities, such as for travel and recreation (e.g. canoe route and portage trails), including entry and exit/landing sites for watercraft;
- Waterways, water bodies, springs, wetlands, and shallow groundwater used as drinking water sources and aesthetic properties (taste, colour, clarity, temperature, odour) of those waters;
- the current use of lands and water bodies in the study area, including for harvesting, hunting, gathering, and fishing, as well as social and ceremonial purposes, including as defined by Aboriginal and Treaty rights;
- the frequency, duration or timing of traditional practices;
- efforts by Indigenous communities to restore traditional practices, where applicable;
- the use of cabins, camp sites and staging areas;

- important features for the experience of the practice (e.g. connection to the landscape without artificial noise and sensory disturbances, privacy, safety, air quality, visual landscape, perceived or real contamination, etc.); and
- other current uses recognized by Indigenous communities.

12.2.2. Effects to current use of lands and resources for traditional purposes

The Impact statement must:

- assess the potential effects on current use of lands and resources for traditional purposes, within the context of historical and current cumulative effects, including to:
 - describe and assess the interconnections and impact pathways between the current use of lands and resources and health, social, and economic components, Indigenous knowledge, and Indigenous rights for each Indigenous community, including potential intergenerational impacts over the lifetime of the project;
 - current and future availability, distribution, and quality of country foods (traditional foods);
 - quality, quantity, and distribution of resources available for harvesting, (e.g. species of cultural importance, traditional and medicinal plants);
 - experiences of being on the land (e.g. the changes in air quality, noise exposure, effects of vibrations from blasting or other activities, increase in artificial light at permanent and temporary sites, fragmentation of traditional territory, visual aesthetics);
 - the use of travel routes including ice-related travel, navigable waterways and water bodies;
 - sites of interest to communities including for non-commercial fishing, hunting, trapping and gathering sites, as well as on cultural and ceremonial activities and practices that could be taking place on those sites;
 - access to culturally important harvesting areas, resources of importance, traditional territory and to and from the community and reserves;
 - location of springs (mapped) and potable water sources in Local and Regional Study Area.
 - assessment of navigation that includes changes in water depth at critical pinch points in the Athabasca River, pinch points, and PAD;
 - economic burdens of, and increased time for, travelling further to hunting, fishing, trapping, and gathering opportunities; and
 - impacts of changes in the sensory experience of being on the land, due to noise and change in soundscape, changes in the visual landscape, and odor, and any corollary wellness impacts as a result of these sensory changes;
- describe potential effects on the transmission of traditional knowledge, language, community tradition of sharing and community cohesion linked to activities potentially affected by the project;
- take into account expectations pertaining to the preservation of landscapes, including nighttime landscapes and, if applicable, regulatory requirements and best practices in place concerning light

pollution (the proponent needs to work with communities to ensure that any standards that are applied are protective of traditional uses and purposes and human health);

- describe the methods used to collect information on traditional use of lands and resources by Indigenous communities;
- describe how the traditions, perspectives, values and knowledge of Indigenous communities have been considered in determining the severity of the project's contribution to current cumulative effects to environmental and socio-cultural conditions affecting Indigenous land and resource use.
- describe how information about impacts to land and resource use is integrated into section 12.1.2. Specifically, how:
 - changes to the access, cabins, travelways and harvesting and traditional land and resource use areas affects cultural values, spirituality or importance attached to physical and cultural heritage sites;
 - changes to traditional use of cultural landscapes including important travelways, waterways and harvesting areas associated with sacred, ceremonial or culturally important places, objects or things, use of placenames, languages, stories and traditions;
 - changes to visual, auditory or olfactory aesthetics over the life of the project and after reclamation, abandonment or decommissioning of the project affects traditional use; and
 - impacts to harvesting and traditional use affects teaching and knowledge transfer between generations;
- describe how traditional land and resource use and cultural values informed the biophysical assessment and impact rating criteria;
- describe how the results of the biophysical assessment were integrated in the traditional land and resource use assessment and considered in the determining residual effects and the severity of impacts; and
- provide a detailed explanation of how comments from Indigenous communities and Indigenous knowledge informed the assessment of potential effects to current use of lands and resources for traditional purposes (see section 6.3 *Indigenous knowledge considerations* for requirements pertaining to respectful protocols and procedures on the integration and verification of Indigenous knowledge into the assessment).

12.3. Health, social and economic conditions of Indigenous peoples

12.3.1. Baseline conditions

The Impact Statement must meet the requirements set out in sections above with regard to the baseline for health, social and economic conditions, which must take into account Indigenous peoples and GBA+ specific to Indigenous peoples.

The baseline conditions established for Indigenous communities must take into account Indigenous governance regimes and Indigenous laws associated with health and socio-economic conditions. The baseline conditions should provide community-specific health and socio-economic conditions on a disaggregated basis (without identifying individuals), where possible.

12.3.2. Effects on Indigenous health, social and economic conditions

The Impact Statement must meet the requirements set out in sections above with regard to the effects on health, social and economic conditions, which must take into account Indigenous peoples and GBA+ specific to Indigenous peoples. Some of the above-described requirements from sections 9, 10, and 11 pertain to effects on Indigenous peoples, some are reiterated here with an Indigenous focus.

The assessment of these effects on Indigenous peoples must describe and take into account interactions with the effects on physical and cultural heritage, on structures, sites or things of significance, and on the current use of lands and resources for traditional purposes. For example, an effect on a traditional food may have consequences for the practice of traditional activities, and could lead to an effect on the cost of living, food security, and mental health at the community level or on vulnerable subgroups.

The Impact Statement must:

- describe the potential health, social and economic effects that the project may have on Indigenous peoples;
- consideration of how economic boom and bust cycles (including into the reclamation and closure phases) in remote communities impact economic, social and cultural wellbeing;
- include a Health Impact Assessment including Indigenous determinants of health and Human Health Risk Assessment (see also section 9 *Human health conditions*);
- describe potential long-term health effects to Indigenous peoples due to project activities;
- describe and quantify potential effects to mental and social well-being of Indigenous peoples (e.g. stress, depression, anxiety, sense of safety);
- describe and quantify specific thresholds and document if different thresholds were considered for vulnerable Indigenous peoples, including by sex and age; provide rationale and justification if specific thresholds are not used;
- identify predicted effects of the project on the quality and quantity of ground or surface water used by Indigenous peoples;
- describe effects to the availability, quality, use and consumption of country foods (traditional foods) and potential health impacts of any changes to availability, use, security and consumption patterns. Consider the bio-cultural parameters and Indigenous knowledge relating to resource availability;
- provide a rationale if a determination is made that an assessment of the potential for contamination of country foods (or other exposure pathways, such as inhalation) is not required or if some contaminants are excluded from the assessment;
- describe how community and Indigenous knowledge was used in assessing potential effects to Indigenous health, social and economic conditions;

- apply GBA+ across potential health, social and economic effects and document how these effects could be different for diverse subgroups, including relevant community subgroups;
- describe effects on reserve lands and peoples on reserve (e.g. visual, light, dust, noise, air quality, odours, water sources and accidents/malfunctions);
- describe the effects specific to lands within an Indigenous community or hamlet, Indigenous-community owned or held lands (e.g. leased lands), Indigenous-held Registered Fur Management Area and community-identified traditional territory within the regional study area; and
- describe how the results of the traditional land and resource use assessment and the cultural heritage assessment were integrated in the Indigenous health assessment and considered in determining the residual effects, specifically, linkages between:
 - cultural heritage and traditional land and resource use;
 - country foods and clean water; and
 - mental and social well-being of Indigenous peoples (e.g. stress, depression, anxiety, sense of safety).

12.4. Rights of Indigenous peoples

12.4.1. Baseline conditions

The Impact Statement must:

- identify and describe the Treaty and Aboriginal rights of Indigenous peoples potentially affected by the project, including historic, regional, and community context, the geographic extent of traditional territory, the purpose and importance of the rights to the rights-bearing communities (e.g. the practices, customs, beliefs, worldviews and livelihoods), and information on how rights have already been affected. The description should include maps, when available and permitted by the respective Indigenous communities, to illustrate the location of treaties, traditional territories and Métis harvesting zones;
- document the nature and extent of the exercise of these rights by the Indigenous communities who are potentially impacted by the project, as identified by the Indigenous community(ies). Indigenous communities may also provide their perspective through consultations with the Agency or directly to the review panel. Indigenous communities should be involved in the choice for the scoping and assessment of the nature and extent of the exercise of rights of Indigenous peoples; and
- describe how Indigenous rights have influenced the selection of indicators and values considered in each section of the Project Assessment and the final impact ratings;
- consider how the information requirements related to physical and cultural heritage, current use, Indigenous health, social, and economic conditions are applicable to the nature and extent of the exercise of rights.

Further information related to rights may include:

- landscape, social, and cultural conditions that support the Indigenous community's exercise of rights (e.g. large, intact and diverse landscapes; areas of solitude; connection to landscape; sense of place; language; Indigenous knowledge; clean water, biodiversity, abundance, distribution and quality of wildlife and vegetation);
- the Indigenous governance systems and Indigenous laws associated with the exercise of rights;
- information about members within an Indigenous community, and their role in the exercise of rights (e.g. women, men, elders, youth, people with disabilities);
- how the Indigenous community's cultural traditions, laws and governance systems, social values, access and patterns of occupation and preferences inform the manner in which they exercise the rights (the who, what, when, how, where and why);
- where they exist, identification of thresholds identified by the community that, if exceeded, may impair the ability to meaningfully exercise of rights;
- maps and relevant data sets (e.g. overlaying the project footprint, places of cultural and spiritual significance, traditional territories, fish catch numbers); and
- pre-existing impacts and cumulative effects that are already interfering with the ability to exercise rights or to transmit Indigenous cultures and cultural practices (e.g. language, ceremonies, Indigenous knowledge), particularly in the oil sands region.

12.4.2. Impacts on rights of Indigenous peoples

The Impact Statement must describe the level of engagement with Indigenous communities regarding potential impacts of the project on the exercise of rights, and where possible, the project's potential interference with the exercise of rights. It is preferable that Indigenous communities have all the information about the project and its potential effects on hand to be able to assess the potential impacts of the project on their rights. The proponent is therefore encouraged to share studies with Indigenous communities prior to assessing the impact on their rights. In the absence of this information, the proponent must document the approach taken to support Indigenous communities in order to identify the potential impacts of the project on their rights and interests, including the hypotheses put forward on the potential effects. Indigenous governments and communities should be provided the opportunity to review the assessment of the impacts on their rights conducted by the proponent and approve all use of Indigenous knowledge by the proponent prior to submission to the Regulator.

Where an Indigenous community has not provided this information to the proponent, or both parties agree that it is better to provide information related to the impact on the exercise of rights directly to the Agency or the review panel, the proponent must provide a rationale for the approach taken. The proponent should discuss with Indigenous communities their views on how best to reflect the assessment of impacts on rights in the Impact Statement. Impacts on rights may be assessed using a methodology identified by Indigenous communities, including community-led assessments⁷, and agreed upon between the

⁷ See for example the [Methodology for Assessing Potential Impacts on the exercise of Aboriginal and Treaty Rights of the Proposed Frontier Oil Sands Mine Project](#) (CEAA and MCFN, 2018). CEAR #394 on the Registry for the Frontier Oil Sands Mine Project.



Indigenous community and the Agency. This may include supporting Indigenous-led studies and assessments to inform the assessment of effects to Indigenous peoples including on their ability to practice their rights and the resources necessary to support those rights (e.g. for VCs, spatial and temporal boundaries, community health, social conditions and community well-being) that are to be provided publicly and to the Government of Canada.

The proponent must work together with Indigenous communities to find mutually agreeable solutions to concerns raised about the project, especially for those concerns raised by Indigenous peoples about impacts on the exercise of their rights.

The Impact Statement must:

- document the project's potential impacts on the exercise or practice of the rights of Indigenous peoples or the rights arising from treaties in the project area, as expressed by potentially impacted Indigenous peoples;
- describe the project impact pathways on the rights of Indigenous peoples, taking into account the linkages between resources, access and experience;
- document the views of potentially affected Indigenous peoples regarding the severity of impact that the project could have on their rights and interests; and
- describe how the results of the traditional land and resource use assessment, the cultural heritage assessment, health and socio-economic assessment of Indigenous peoples were integrated in the Indigenous Rights assessment and considered in the determining residual effects and the severity of impacts.

The proponent must consult the following Agency guidance documents on this topic: [Policy Context: Assessment of Potential Impacts on the Rights of Indigenous Peoples](#) and the [Guidance: Assessment of Potential Impacts on the Rights of Indigenous Peoples](#).

The proponent and Indigenous communities must, when information is available, consider the following:

- how the project may contribute cumulatively to any existing impacts on the exercise of rights, as identified by the Indigenous community(ies);
- effects of the project on the quality and quantity of resources available for the exercise of rights;
- how the project may affect the ability of Indigenous communities to travel freely in their territory;
- effects of the project on access to areas important for the exercise of rights;
- effects of the project on the experience associated with the exercise of rights including the ability of Indigenous communities to exercise their rights in a peaceful manner (e.g. without changes in connection to land, well-being, knowledge of the landscape, air quality, noise exposure, effects of vibrations, artificial light, fragmentation, visual aesthetics, safety);
- effects the project on Indigenous traditions, laws and governance;
- how the project will affect the planning, management or stewardship of traditional lands and resources by Indigenous peoples;
- how the project will affect the ability of Indigenous communities to derive future economic benefits from the land or water or to maintain an ongoing relationship with the land or water;

- the way that the project is aligned with the values, political direction and/or objectives of Indigenous communities in the fight against climate change;
- the manner in which the project and its impacts weaken or strengthen the authority of Indigenous communities on their territory;
- how the project affects all other components of significance identified by Indigenous communities; and
- the severity of the impacts on the exercise of rights, as identified by the Indigenous communities.

12.5. Mitigation and enhancement measures

The Impact Statement must:

- describe the proposed mitigation and enhancement measures for all potential effects on Indigenous communities, as well as on potential impacts to the rights of Indigenous peoples, and identify if these are measures for which the proponent or other parties would be responsible;
- identify the mitigation and enhancement measures proposed for potential effects as described in the previous sections that will also apply to effects on Indigenous communities and impacts on their rights, and elaborate on how these measures may vary for each Indigenous community and community;
- describe if and how proposed mitigation measures will be integrated into the project design, if applicable;
- include perspectives of the potentially impacted Indigenous communities on the effectiveness of particular mitigation measures on such impacts;
- describe collaboration with Indigenous peoples to identify preferred mitigation measures for potential adverse impacts on Indigenous communities or their rights, as well as to optimize the project's benefits for their communities;
- demonstrate how the timing of Indigenous activities on the land was considered when establishing the schedule for project activities;
- describe proposed measures to provide opportunity for Indigenous communities to harvest forest or vegetation resources prior to and during construction;
- provide intervention and communications plans, as applicable, pertaining to heritage resources and structures, sites, and things of historical, archaeological, paleontological, or architectural significance to Indigenous communities, if there is a possibility of discovery during construction or development activities. This plan must include, at a minimum, the person to be contacted, intervention measures and the conditions that would lead to a shutdown and resumption of work;
- describe the mitigation measures that will be implemented by the proponent for the potential impacts of the project on the exercise of rights, including how the measures directly address the possible impacts of the project on the exercise of rights and the scope of the measures;
- describe the measures that would enhance or support the exercise or practice of rights in the project area;
- describe how the proponent has addressed the suggestions and recommendations made by potentially affected Indigenous communities;

- propose differentiated mitigation measures, if applicable, so that adverse effects do not fall disproportionately on Indigenous communities and vulnerable subgroups, and they are not disadvantaged in sharing any positive effect resulting from the project. These mitigation measures should be developed in collaboration with the potentially affected communities and subgroups;
- describe how the GBA+ results on disproportionate effects have been used to inform mitigation and enhancement measures;
- describe predicted climate change considerations for VCs and incorporate climate change adaptation into reclamation planning;
- describe accommodation, mitigation and complementary measures for impacts to previously known heritage and structures, sites, and things of significance, or those identified in the course of impact assessment and other field studies; and
- provide available evidence of the effectiveness for all mitigation measures related to potential effects on Indigenous communities. Where no evidence exists, describe plans to monitor the effectiveness of mitigation measures. The proponent is encouraged to share results with Indigenous communities and to monitor the effectiveness of mitigation measures in cooperation with Indigenous communities.

Where no mitigation measures are proposed or mitigation is not possible, the Impact Statement must describe the potential adverse impacts on the rights of Indigenous peoples, as identified by the Indigenous communities. In addition, the Impact Statement must include perspectives of the potentially impacted Indigenous groups on the effectiveness of particular mitigation measures on such impacts.

13. Other effects

13.1. Potential accidents or malfunctions

The failure of certain works caused by malfunctions, human error or malicious act, or natural events (e.g. flooding, earthquake, landslide, forest fire) could cause major effects. If certain events are expected to occur (e.g. minor spills, road accidents), they should be included as expected effects in the previous sections.

13.1.1. Risk Assessment

The Impact Statement must:

- identify hazards for each project phase that could lead to events of accidents and malfunctions and provide an explanation of how these events were identified (e.g. information sources, recognised risk assessment methodology, professional expertise, similar project, participants' input, etc.);
- take into account the lifespan and design basis of different project components;
- conduct an analysis of the risk of each hazard and adverse event (including likelihood and consequences), including potential fire and explosion events, accidental leaks or failure of pipelines, failures and breach of tailings management facilities and tailings disposal areas, minor and major fuel spills, releases of hazardous materials, and loss of containment of dangerous goods;

- describe the plausible worst-case scenarios, including;
 - the magnitude and extent of effects, including a description of the quantity, mechanism, rate, form and characteristics of contaminants, greenhouse gases and other materials likely to be released or discharged into the environment;
 - consideration of the influence of local and regional particularities of the terrain, in particular in terms of topography (e.g. difficult access for interventions) and weather conditions such as snow and ice cover;
 - consideration of the proximity to highway 63 and the Athabasca River in the likelihood of events and the characterization of their consequences;
 - modelling for any contaminants spilled into water and those indirectly released;
 - potential environmental, health, social and economic effects, including effects on Indigenous peoples. With respect to human health specifically, consideration should be given to potential pathways of effects associated with surface water, air, country foods, and other relevant media, including short-term and long-term risks to human health;
 - relative locations of sensitive receptors (e.g. humans, fish and/or wildlife and their habitat, waterways, private drinking water wells);
 - consideration of timing related to sensitive receptors (e.g. hunting season, tourist season, migration or nesting period); and
 - any critical infrastructure, such as local drinking water treatment plants or facilities that can treat water sources affected by the project, as well as the ability and capacity of the drinking water treatment plants or facilities to treat water sources affected by accidental releases from the project during all project phases;
- justify spatial and temporal boundaries for the assessment of effects associated with accidents and malfunctions. The spatial boundaries established for the effects resulting from possible accidents and malfunctions will generally be larger than the boundaries for effects of the project alone; and
- describe incidents that have occurred at the existing Base Mine site, lessons learned and how they have been integrated into preventing future accidents or malfunctions for the proposed project.

13.1.2. Mitigation Measures

The Impact Statement must:

- describe the mitigation measures and safeguards that would be in place to avoid and prevent accidents and malfunctions, including project design choices and operational considerations, including engineering, safety and risk reduction standards, criteria and approaches to be used (e.g. spacing, fire protection, prevention of leaks of toxic chemicals, active fire suppression and explosion/overpressure minimization);
- describe the proposed security measures to reduce the potential for vandalism or other malicious acts that could lead to accidents or malfunctions;
- describe the mitigation measures applicable for the potential adverse environmental, health, social and economic effects, including effects on Indigenous peoples, in the event of an accident or malfunction, such as emergency response and repair procedures that would be put in place;

- describe long-term monitoring and recovery measures that would be implemented to manage effects to the environment and health, social and environmental conditions, including effects on Indigenous peoples, from accidents and malfunctions, including those to remediate affected lands and waters;
- provide details of financial liability and compensation measures in place pursuant to regulations or the proponent's commitment in case of potential accidents or malfunctions associated with the project; and
- describe mutual aid arrangements in the event that the incident exceeds proponent resources and how to access these resources.

13.1.3. Emergency Management

An emergency response plan is required in section 6.2 of Annex I. In addition to, or as a part of this plan, the Impact Statement must:

- identify emergency planning and emergency response zones (section 7.5.1 *Mitigation and enhancement measures*);
- present preliminary emergency measures to respond to such events, including identifying associated response systems and capabilities;
- take into account evacuation areas in the planning of emergency measures as well as the particularities linked to these areas (e.g. number of residents varying with the seasons, possible high number of individuals unfamiliar with the region, limited communication means in remote areas and with temporary residents);
- describe emergency response training and exercise programs, including a description of the participation and training agreements with Indigenous communities that could be impacted by accidents or malfunctions;
- document spill response strategies for each type of spill scenario, including strategic locations of spill response equipment relative to likely accident and malfunction sites and/or likely pathways to sensitive environmental receptors;
- describe emergency communication plans that would provide emergency instructions to surrounding communities, including Indigenous peoples, and how these will be informed by the public and Indigenous communities. The proponent should consider including:
 - immediate urgent actions, such as notifying the public of security and safety concerns, instructions for on-site shelter or shelter-in-place, procedures and evacuation routes; and
 - longer-term actions, such as a general website and telephone helplines, updates on the status of incidents, injured animal reports, etc.;
- describe liaison and continuous education plans linked to emergency preparedness for surrounding communities that may be affected by the consequences of a significant incident, including for Indigenous communities; and
- explain how the proponent has made and will continue to make an outreach effort to ensure public and Indigenous communities' understanding of the risks associated with this type of project (e.g. providing non-technical information, providing information in local languages if requested).

13.2. Effects of the environment on the project

The Impact Statement must consider and describe how environmental conditions, including natural hazards such as severe and/or extreme weather conditions and external events (e.g. earthquakes, flooding, drought, ice jams, landslides, erosion, subsidence, fire), could adversely affect the project and how this in turn could result in effects to the environment, health, social and economic conditions. These events are to be considered in different probability patterns (e.g. 5-year flood versus 100-year flood) with considerations of how they may change under a range of potential future climate change scenarios. The focus should be on credible external events that have a reasonable probability of occurrence and for which the resulting environmental effects could be significant without careful management.

The Impact Statement must:

- provide details of planning, design and construction strategies intended to minimize the potential adverse effects of the environment on the project. This includes details related to any planning for upgrades or BAT/BEP improvements to existing infrastructure or equipment;
- provide information in accordance with section 5.1.5 of the [Strategic Assessment on Climate Change](#) (Revised, October 2020) and the upcoming technical guide on climate change resilience about how the project is resilient to, and at risk from, the current and future impacts of a changing climate. This information will include descriptions of:
 - the scope and timescale of the climate change resilience assessment and of the methods used to identify, evaluate and manage the climate risks that could affect the project itself and thereby the surrounding environment; and
 - the project's vulnerabilities to climate change both in mean and extremes conditions over the full project lifetime from project construction to decommissioning. This could include the impacts of extreme weather events on project infrastructure, impacts to water quality and availability, etc.; and
- describe measures to mitigate adverse environmental, health, social and economic effects resulting from effects of the environment on the project and enhance positive effects.

The climate change resilience assessment should consider projections for multiple possible future emission scenarios, as outlined by the [Intergovernmental Panel on Climate Change](#), and should discuss the assumptions and data sources used and the confidence or uncertainty in the results. Where in-house models or forecasts are developed to support a specific assessment, the modeling methodology, assumptions, statistical certainty and data sources should be provided.

14. Residual effects

After considering the consequences of technically and economically feasible mitigation measures, the Impact Statement must describe any residual environmental, health, social or economic effects.

The Impact Statement must:

- characterize the residual effects using criteria and language most appropriate for the effect;
- consider using the following criteria for residual effects, as appropriate:

- magnitude;
- geographic extent;
- timing;
- duration;
- frequency;
- reversibility; and
- the ecological, health, social and economic context within which potential effects may occur. Context should be described and applied as part of the key criteria above, for example:
 - the sensitivity and importance of affected aquatic and terrestrial species, including species at risk and species of importance for Indigenous peoples;
 - the sensitivity and importance of affected habitats and their functions for wildlife;
 - the linkages between VCs, such as the importance of a resource to the practice of rights, and the importance of wetland functions to the health and socio-economic conditions of Indigenous communities for example;
 - vulnerability of a VC to climate change;
 - the potential for disproportionate residual effects for diverse subgroups as per the GBA+; and
 - the existence of standards, guidelines, tolerance levels and other sources of information to assess effects;
- describe the extent to which the adverse effects within federal jurisdiction and the adverse direct or incidental effects are significant;
- justify the choice of criteria used to determine the extent to which these effects are significant. The information provided must be clear and sufficient to allow the Agency, the review panel, regulatory bodies, Indigenous peoples and other participants to review the effects analysis;
- identify and explain relevant sources of information that were used to characterize the extent to which those effects were significant, including views of the public, Indigenous communities, jurisdictions, federal authorities and other participants; and
- where applicable, specify the likelihood of, or potential for, residual effects occurring, and describe the level of scientific uncertainty associated with the data and methods used in this analysis.

If an Indigenous community identifies that there are residual effects from the project that impact rights, those effects should be characterized as outlined above and carried forward to a cumulative effects assessment.

The Agency prepared a technical guidance document for [Determining whether a designated project is likely to cause significant adverse effects under the Canadian Environmental Assessment Act, 2012](#). The best practices described in this document also apply to the assessment of effects under the Act.

Other sources of best practices may complement the technical guidance from the Agency and be used by the proponent as reference. For example, regarding species at risk and their habitat, the report [NatureServe Conservation Status Assessments: Factors for Evaluating Species and Ecosystem Risk](#) is a reference to evaluate criteria against applicable thresholds.

15. Cumulative effects assessment

The proponent must assess the project's cumulative effects using the approach described in the Agency's guidance documents related to cumulative effects. The proponent should consult the Agency's technical guidance on [Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012](#) to complete its analysis. The best practices described in this document also apply to the assessment of cumulative effects under the Act.

Cumulative effects are defined as changes to the environment, health, social and economic conditions, after consideration of mitigation measures (residual effects), combined with the effects of past, existing and reasonably foreseeable projects and physical activities. Cumulative effects may result if:

- the implementation of the project may cause direct residual adverse effects to the VC, taking into account the application of technically and economically feasible mitigation measures; and
- the same VC may be affected by other past, present and future physical activities.

A cumulative effect on an environmental, health, social or economic component may be important even if the project's effects to this component by themselves are minor. Activities from the project itself that generate multiple emissions and discharges (e.g. simultaneous operations) may also need to be considered in the cumulative effects analysis to understand synergistic, compensatory, masking or additive effects.

The Impact Statement must:

- identify the VCs that will be subject to the cumulative effects assessment;
 - VCs for which the proponent anticipates residual effects from the project must be considered in the cumulative effects assessment;
 - the proponent can refine its analysis by taking into account selected VCs that are most likely to be affected by the project in combination with other past, existing or future projects and physical activities, as well as those identified as being of particular concern in the context of cumulative effects by the public and by Indigenous communities; and
 - finalize of the selection of appropriate VCs and boundaries for cumulative effects assessment should be informed by consultations with the public, Indigenous communities, other jurisdictions, federal authorities and other participants;
- include a rationale if VCs are excluded from the cumulative effects assessment;
- identify and justify the spatial and temporal boundaries of the cumulative effects assessment for each selected VC. Take into account that:
 - the boundaries of cumulative effects assessments may differ for each selected VC and should not be limited by administrative boundaries;
 - spatial and temporal boundaries for cumulative effects will generally be larger than boundaries for the effects of the project alone and may extend beyond the jurisdictional boundaries of Canada;
 - temporal boundaries must be based on appropriate baseline conditions and should account for all potential effects over the life cycle of the project, including closure and reclamation (see requirements in section 7.3.1 *Temporal Boundaries*); and

- spatial and temporal boundaries for VCs related to effects and impacts on Indigenous peoples must be defined in collaboration with the Indigenous peoples concerned;
- identify sources of potential cumulative effects. Specify which other projects or activities that have been or will be carried out that could have resulted or could result in effects on the selected VCs within the defined boundaries and whether those effects could interact with the residual effects of the project. Clearly explain and justify the rationale for selecting other past, existing or future projects or activities to include in the cumulative effects assessment. Projects to be considered include but are not limited to:
 - past, existing and future oil sands mine projects;
 - past, existing and future infrastructure projects, including the expansion of the town of Fort McMurray; and
 - past, existing and future projects and physical activities contributing to the fragmentation of the territory;
- take into account the results of any relevant regional studies;
- assess the cumulative effects for each VC, taking into account the following:
 - the analysis must include the effects of past and future projects and physical activities in combination with the residual effects of the project, including how the effects may interact (additive, synergistic, compensatory, and masking effects);
 - the analysis of the effects of future projects and physical activities may include a comparison of possible future scenarios with and without the project, but must reflect the full range of cumulative effects and not just the project's contribution;
 - the effects of past and existing projects and physical activities can be used to put the current state of the VC into context, but must be included in the cumulative effects analysis;
 - cumulative effects for the same VC may need to be assessed using a hierarchy (e.g. effects on local populations of certain species and on the larger populations); and
 - cumulative effects to Indigenous peoples, the resources they rely upon, both locally and regionally;
- describe technically and economically feasible mitigation measures proposed for cumulative effects on the environment, health, social and economic conditions, as well as those that could mitigate potential impacts on the rights of Indigenous peoples, including:
 - describe and assess the effectiveness of the measures applied to mitigate cumulative effects;
 - in cases where the mitigation measures for these effects are beyond the proponent's control, identify all parties with the power to act on these measures. In such cases, the Impact Statement shall summarize the commitments of the other parties in relation to implementing the necessary measures and any related communication plan;
- assess the regional implications of applying project-specific mitigation and enhancement measures, taking into account any reasonably foreseeable development in the area;
- describe, where appropriate, the extent to which the adverse cumulative effects are significant, taking into account applicable tolerance and threshold levels, including those identified by Indigenous communities and other participants; and

- develop a follow-up program to verify the accuracy of the assessment and the effectiveness of mitigation measures for applicable cumulative effects, in accordance with the requirements and guidance outlined in section 16 *Follow-up programs*.

The cumulative effects assessment must include consideration of cumulative effects to the rights of Indigenous peoples and their cultures. Both the content and means of presenting this information is to be developed in consultation with each Indigenous group potentially impacted by the project. Proponents are encouraged to collaborate with Indigenous communities in the cumulative effects assessment. The Impact Statement must demonstrate how Indigenous groups were involved in the cumulative effects assessment and in the design of appropriate mitigation measures and follow-up programs.

If Indigenous communities do not wish to participate in the cumulative effects assessment with the proponent, the proponent must share a preliminary draft of the cumulative effects assessment on the Indigenous communities' rights and culture with them in order to receive feedback prior to submitting the Impact Statement to the Agency.

The proponent must demonstrate how the following types of cumulative effects, which were raised as concerns during the Planning phase, were considered in the assessment:

- effects from changes in atmospheric conditions, including but not limited to noise, odours, and air quality, notably:
 - local and transboundary effects to wildlife habitat due to acid deposition, and
 - effects on nearby harvesting and access areas for Indigenous land use;
- effects from GHG emissions, including:
 - contribution to effects of climate change on biodiversity and ecosystems, and
 - effects due to the increase of duration of emissions from existing operations, should the project be approved;
- effects related to fragmentation, including direct and indirect effects:
 - from habitat disturbance and loss,
 - from barriers or changes to movement on migratory routes for wildlife species, and
 - mortality of wildlife species (e.g. moose, caribou, birds, furbearers important to Indigenous peoples, and fish at the watershed level);
- effects on species of interest or concern and species at risk, including, among others:
 - migratory birds and their habitats, including Whooping Crane;
 - fish and fish habitat;
- effects on birds and other wildlife species from increased exposure to tailings ponds as a result of project disturbance;
- effects on the boreal forest, wetlands and their functions, notably as they relate to continued and future use by Indigenous communities;
- transformation of the regional landscape;

- effects to water quantity and quality, including for the lower Athabasca River and tributaries, and Wood Buffalo National Park and the PAD. The origin and estimates for the loss of water for water withdrawals that are additive downstream should be identified by source;
- effects on navigation from the project in conjunction with surrounding works;
- effects on the Athabasca River, as a transportation route, as a site for traditional use, as a site for the transmission of Indigenous knowledge across generations, and as a key cultural landscape;
- effects on the current use of lands and resources for traditional purposes by Indigenous peoples (e.g. medicinal plants, wild berries, and other non-timber forest products), including:
 - effects of increased access to the area of the project; and
 - effects from management and closure of tailings facilities;
- effects on the socio-economic conditions and culture of Indigenous peoples, considering community-level effects and exacerbated effects for vulnerable subgroups, including:
 - effects from moving from a subsistence lifestyle to a wage-based economy and population growth;
 - effects from the inequality between Indigenous and non-Indigenous populations;
 - effects on heritage and structures, sites, and things of significance at the sub-regional and regional scales; and
 - effects on the transmission of culture and historical knowledge;
- effects on the health and well-being of Indigenous communities, including:
 - effects related to ecological grief;
 - effects on Indigenous country foods due to bioaccumulation of contaminants in the food chain;
- effects on the sustainable development of the area of the project; and
- any other effect that could impact the rights of Indigenous peoples, as well as the loss of opportunities to exercise rights including, for example, the loss of trails, waterways and cultural landscapes supporting the exercise of hunting, trapping and fishing rights.

16. Follow-up programs

A follow-up program verifies the accuracy of the effects assessment and evaluates the effectiveness of mitigation measures. The information obtained through the follow-up program may be used to determine whether additional actions are needed to address unanticipated outcomes. Should the project be allowed to proceed, the proponent will be required to develop a follow-up program in consultation with relevant authorities and Indigenous communities. Follow-up programs are an opportunity to continue engaging with impacted Indigenous communities. If undertaken collaboratively, they can support solution-oriented approaches to managing adaptively through the early identification of issues in follow-up programs and appropriate solutions incorporating Indigenous knowledge.

If the follow-up program indicates that mitigation measures are not working effectively, additional measures may be required and implemented. If, through a follow-up program, it is identified that the predictions of the impact assessment were not accurate, corrective action or additional measures may be required to be put in place by the proponent.

The factors to be considered in developing a follow-up program include:

- methods to assess the accuracy of the predictions;
- an assessment of the effectiveness of mitigation measures;
- the level of uncertainty regarding the potential for adverse residual effects and the extent of their significance, and the effectiveness of proposed mitigation measures;
- the efficiency of new or unproven techniques and technologies;
- the nature of concerns raised by participants, including Indigenous peoples, about the project;
- adopting a collaborative approach with Indigenous and local communities on the design of and participation in follow-up and monitoring programs. Should collaboration not be feasible or practical, suggestions from communities should be factored into the program design;
- the integration of Indigenous and community knowledge, if available;
- disproportionate effects highlighted by the GBA+;
- the nature of cumulative effects;
- the nature, extent and complexity of the program;
- any technically and economically feasible measures to manage the effects if the mitigation measures applied do not work as intended;
- whether scientific knowledge pertaining to effects is limited, or emerging;
- where data gaps were identified;
- the parties that will be involved in implementing the follow-up program and reviewing its results;
- existing programs, procedures, and plans that provide relevant standardised or established follow-up and monitoring methods, such as from municipal, provincial, federal, or other appropriate centres of expertise;
- the duration of follow-up program activities, which may vary depending on the VCs assessed;
- any existing follow-up programs relevant to the project, and lessons that can be learned from their results;
- the commitments made by the proponent when the project was reviewed;
- any compensation programs proposed to offset residual effects;
- how the results of the follow-up program will be communicated to interested parties; and
- triggers for corrective actions or the development of additional measures.

16.1. Follow-up program framework

The duration of the follow-up program must be as long as necessary to verify the accuracy of environmental, health, social and economic effects predicted during the impact assessment and to evaluate the effectiveness of the mitigation measures.

The Impact Statement must present a follow-up program that includes:

- how the need for corrective action will be detected and the anticipated effectiveness of that detection;

- the range of potential corrective actions that could be applied and the general circumstances under which each such action would be applied, and the expected success of each such action based on previous experience;
- how Indigenous communities will be involved in decision-making processes and activities related to the project throughout the lifecycle of the project;
- the objectives of the follow-up program and the VCs targeted by the program;
- the list of elements requiring follow-up;
- the main characteristics of each of the recommended follow-up elements, including, but not limited to:
 - the objectives to be achieved (general and specific);
 - a list of the parameters to be measured, including the recommended methodology for each parameter; and
 - the proposed timelines, including the time period(s) involved (e.g. spring flood period, fish migration period), frequency and overall time frame;
- how potentially affected Indigenous communities have been, and will continue to be, consulted regarding follow-up programs that may affect them, including on the development of the plans and participation in follow-up measures, such as monitoring and data gathering throughout the project life;
- the intervention mechanisms, and potentially applicable thresholds, that could be used in the event that the effects to the environment or impacts on rights of Indigenous peoples and cultures attributed to the project are not as predicted;
- the mechanism for disseminating the results of the follow-ups (deliverables) to relevant stakeholders and, per section 1 of Annex I, plans to maintain the public and Indigenous community engagement to ensure that the public and Indigenous communities will have an appropriate forum for expressing their views on the ongoing development, operation, closure and reclamation of the project;
- the accessibility and sharing of data, taking into consideration that accessibility needs may vary among Indigenous communities and other participants, such as regulatory authorities and the general public; and
- in cases where concerns exist about knowledge or information gaps, identify follow-up measures to address the sources of uncertainty (e.g. additional research initiatives, participation in monitoring programs, conducting field studies), whether specific to the project or as part of larger initiatives relevant to the project.

Describe the flexibility built into the project to accommodate future modifications required as a result of:

- any change in environmental standards, limits and guidelines (Including approach to future potential effluent release plans should regulations come into force); and
- findings from project-specific regional monitoring programs.

To accompany the description of the follow-up programs, it is recommended that a table be presented showing the main characteristics for each of the recommended follow-up programs (effects of concern, objectives, parameters, timelines, and targets). It is recommended that an overall schedule be presented in the form of a table compiling all of the stages of achievement for each of the follow-ups, including all

deliverables (e.g. baseline status pre-construction, post-construction follow-up, follow-up protocol, work and follow-up reports, etc.).

16.2. Follow-up program monitoring

Monitoring is an essential component of effective follow-up programs. Monitoring can determine the potential for environmental, health, social or economic degradation at any phase of the project development. Monitoring can also assist in developing clearly defined action plans and emergency response procedures to address the protection of the environment, health, socio-economic conditions and human safety.

The Impact Statement must provide an overview of the preliminary environmental, health, social and economic monitoring program, which includes:

- information on the participation of Indigenous communities in existing monitoring activities with respect to project planning, or for projects adjacent to the proposed project (where available);
- a description of engagement with potentially affected Indigenous communities in the development of monitoring plans;
- the identification of monitoring activities that pose risks to the environment, health, social and economic conditions or VCs, and the measures and means to protect these conditions;
- the identification of regulatory instruments that include a monitoring requirement for VCs;
- the definition of positions responsible for monitoring and compliance, including for inspections, and confirmation that they are independent of the contractor;
- inspection procedures, where applicable, as well as the accountability and reporting structure for inspectors. Describe the minimum qualifications and experience required for these roles, including training requirements for individuals who will be undertaking inspection and monitoring responsibilities;
- a description of the follow-up methodology and documentation for tracking environmental, health, social and economic issues (including Indigenous health, social and economic issues);
- a description of the methodology and mechanisms for monitoring the effectiveness of mitigation measures, including how Indigenous communities will be notified and engaged in monitoring;
- information on guidelines and methodologies used to establish reference conditions and benchmarks to demonstrate the effectiveness of mitigation measures.
 - Where information is not yet available to describe reference conditions and benchmarks for monitoring, provide a timeline and a process by which such information will be provided and used in the development of follow-up and monitoring plans.
 - Where quantitative or qualitative benchmarks are proposed, justify their adequacy to assess mitigation effectiveness;
- a description of the characteristics of monitoring (e.g. location of interventions, planned protocols, list of measured parameters, analytical methods employed, schedule, human and financial resources required);

- description of the proponent's intervention mechanisms in the event of the observation of non-compliance with the legal and environmental requirements or with the obligations imposed on contractors by the provisions of their contracts, including a description of the quantitative thresholds that will trigger the need for corrective action;
- procedures for the production of monitoring reports (number, content, frequency, date, format, duration, geographical scope) to be transmitted to the authorities and Indigenous peoples involved;
- plans, including funding options, to engage Indigenous peoples and local communities in monitoring, where appropriate; and
- quality assurance and quality control measures to be applied to monitoring and reclamation programs.

For those VC that do not have established thresholds (e.g. air emissions and related health effects), the Impact Statement must include a description of how monitoring results will be used to trigger response mechanisms (e.g. using CAAQS for common air pollutants such as fine particles and NO₂, and following Health Canada's recommendation that concentrations of arsenic and lead in drinking water be as low as is reasonably possible).

With respect to groundwater and surface water monitoring programs, the Impact Statement must include the selection and location of sampling points, the parameters that will be measured, the duration and frequency of monitoring, the sampling and analysis protocols, and the quality assurance and control measures. Where applicable, the parameters measured should include a comparison with the criteria in the [Canadian Council of Ministers of the Environment's Canadian Environmental Quality Guidelines](#) as well as any other applicable regulatory or Indigenous criteria or guidance. The Impact Statement must also describe any specific monitoring program planned during construction, including assessment of effects before and after construction activities, in order to optimize or adapt mitigation measures at the time of their application.

For existing or proposed monitoring programs, the Impact Statement should note where provincial and federal monitoring programs may provide components of the project's follow-up monitoring program, and describe the requirements for proponent's participation and initiatives, such as for the National Pollutant Release Inventory and the Oil Sands Monitoring Program. For existing programs, identify how the project's follow-up monitoring would contribute to address any potential limitations.

17. Canada's ability to meet its environmental obligations and its climate change commitments

The Government of Canada, through the Act, recognizes that impact assessments contribute to Canada's understanding and ability to meet, first, its environmental obligations, and second, its commitments in respect of climate change.

In accordance with paragraph 22(1)(i) of the Act, the Impact Statement should describe the effects of the project in the context of environmental obligations and commitments in respect of climate change, with a focus on Government of Canada's obligations and commitments relevant to decision-making.

Federal environmental obligations relevant to this project include the following:

- the Convention on Biological Diversity and Canada's supporting national framework (e.g. the Canadian Biodiversity Strategy, Canada's Biodiversity Outcomes Framework and the current biodiversity goals and objectives in Canada) and legislation that supports the implementation of Canada's biodiversity commitments, including SARA and the *Canada Wildlife Act (1985)*, as well as supporting policies and guidance documents. For further information, the proponent is encouraged to consult the publications and resources available on the [biodivcanada](http://biodivcanada.ca) website;
- recovery strategies and action plans developed under SARA for all species at risk potentially affected by the project;
- the [*Convention on Wetlands of International Importance Especially as Waterfowl Habitat \(Ramsar\)*](#), as implemented in part under the [*Federal Policy on Wetland Conservation*](#) and supporting guidance documents such as the [*North American Waterfowl Management Plan*](#); and
- the [*Convention for the Protection of Migratory Birds in the United States and Canada*](#), as implemented in part under the *Migratory Birds Convention Act (1994)*, and supporting guidance documents on conservation objectives derived from bird conservation regions and strategies.

The Government of Canada through a collaborative effort with the Government of Alberta, the Government of British Columbia, the Government of the Northwest Territories, and Indigenous partners have developed an [Action Plan](#) to ensure the ongoing protection and maintenance of the Wood Buffalo National Park World Heritage Site. The proponent should ensure the project will not hinder achievement of the Wood Buffalo National Park World Heritage Site Action Plan goals and any associated monitoring or management actions implemented by the Federal-Provincial-Territorial-Indigenous Action Plan Committee.

The Impact Statement must:

- describe the extent to which the effects of the project could contribute to or hinder Canada's ability to meet its environmental obligations;
- describe where the project may enable Canada to meet its environmental obligations, and the proponent's plans and commitments to ensure that positive contributions are respected; and
- describe where the project may adversely affect Canada's ability to meet its environmental obligations, and the mitigation measures and follow-up programs related to those effects.

The Impact Statement must also indicate how community and Indigenous knowledge have been incorporated into the assessment with respect to the potential effects of the project on Canada's ability to meet its environmental obligations.

The proponent should refer to the Agency's guidance documents on this topic, including the document [*Policy Context: Considering Environmental Obligations and Commitments in Respect of Climate Change under the Impact Assessment Act*](#).

With respect to climate change commitments, section 8.10 *Climate change* outlines the information required as part of the Impact Statement. As outlined in section 6 of the [*Strategic Assessment of Climate Change*](#), the Government of Canada will provide a supplementary analysis on the project's GHG emissions provided in the Impact Statement, in the context of Canada's emission targets and forecasts, including Canada's commitments under the Paris Agreement, the goal for Canada to achieve net-zero emissions by

2050 and Canada's 2030 emission targets. Although it is not required, the proponent may, in the Impact Statement, provide its views on the extent to which the effects of the project would hinder or contribute to the Government of Canada's ability to meet its commitments in respect of climate change in order to inform the impact assessment.

18. Description of the project's contributions to sustainability

The Impact Statement must characterize the project's contribution to sustainability, as defined in section 2 of the Act. The Impact Statement should describe the context of the project, including the issues of importance to participants, the diversity of views expressed and the selection of VCs.

The Impact Statement must also describe the project's contribution to sustainability as defined by Indigenous communities.

Once the analysis on potential effects of the project is conducted, the sustainability principles should be applied:

- consider the interconnectedness and interdependence of human-ecological systems;
- consider the well-being of present and future generations;
- maximize overall positive benefits and minimize adverse effects of the designated project; and
- apply the precautionary principle by considering uncertainty and risk of irreversible harm.

The Impact Statement must describe how sustainability principles were applied and identify conclusions drawn from this analysis. This summary should be qualitative in nature, but may draw on quantitative data as necessary.

In addition, the Impact Statement must:

- indicate how the planning and design of the project, in all phases, consider the sustainability principles;
- describe the process in selecting the preferred alternative means and alternatives to the project and how the sustainability principles were considered;
- indicate how monitoring, management and reporting systems consider the sustainability principles and attempt to ensure continuous progress towards sustainability;
- describe the ecological, health, social and economic benefits of the project to local communities within the study area, potentially affected Indigenous communities, regional, provincial, territorial and/or federal governments; and
- describe engagement with potentially affected Indigenous communities and describe measures and commitments to ensuring the sustainability of Indigenous livelihood, traditional use, culture and well-being.

The proponent should refer to Agency guidance on this topic: the [Guidance: Considering the Extent to which a Project Contributes to Sustainability](#) and the [Framework: Implementation of the Sustainability Guidance](#).



19. Assessment summary

The proponent must prepare a stand-alone plain language summary of the Impact Statement in both of Canada's official languages (French and English) and should make available a copy in the language most prominently spoken by Indigenous peoples residing within the proposed project area (if requested by a community). The summary must contain sufficient details for the reader to understand the project, any potential environmental, health, social and economic effects, potential adverse impacts on Indigenous peoples, proposed mitigation measures, residual effects and any required follow-up programs.

The Assessment Summary provides an opportunity for the proponent to demonstrate correspondence between issues raised during the Planning phase and issues addressed in the assessment. The summary should be presented by VC, which allows the proponent to demonstrate the completeness of the assessment and provide the results of the analysis. The summary must include key maps or figures illustrating the project location and key project components.

The Impact Statement should also include a series of tables, as outlined under Appendix 1 – Additional guidance under *Summary Tables*.



Appendix 1 – Additional guidance

This appendix contains guidance on how to address the requirements outlined in the main body of the Guidelines. Guidance has been placed in appendix for ease of reading. The proponent is expected to demonstrate how relevant guidance or technical recommendations were used. Alternatively, a rationale must be provided as to why it is not applicable, feasible, or why different approaches were found more adequate.

1. List of project activities

The list of project activities, as required in section 3.4 *Project components and activities*, should focus on activities with the greatest potential to have environmental, health, social and economic effects, or impacts on Indigenous peoples and their rights, as determined by Indigenous communities. Sufficient information must be included to adequately predict adverse and positive effects, the interaction between those effects and any disproportionate effects for diverse subgroups within communities.

Project activities should include the following elements:

Preparation and clearing

- construction staging, including surveying of work areas;
- excavation and salvage of topsoil, soil and, where present, bedrock, including potentially acid-generating and metal-leaching materials;
- clearing, grubbing, and grading of site, including tree and vegetation removal and timber salvage; and
- clearing of transmission corridor for powerlines.

Use of Explosives

- blasting; and
- manufacture, storage, transportation and management of explosives.

Construction

- new construction or changes to existing infrastructure including pipelines, powerlines, and access and haul roads;
- installation of site fencing;
- construction of temporary and permanent facilities, including administrative buildings, maintenance facilities, and other ancillary facilities;
- construction of Ore Preparation Plant and Primary Extraction Plant;
- construction of temporary and permanent areas for stockpiling and storing materials, including topsoil; and
- construction of facilities for managing and disposing of tailings materials.

**Transportation**

- operation of light duty, heavy-duty and mobile off-road equipment (type, quantity);
- transportation and management of borrow material (source and quantity);
- transportation of construction materials, equipment and related infrastructure
- transportation of employees;
- acquisition and deployment on site of various mobile equipment; and
- use and maintenance of access and haul roads.

Activities related to water management or effects

- construction of water management infrastructure to divert, control, collect and discharge surface drainage and groundwater to the receiving environment (e.g. collector ditches, groundwater interception wells, sedimentation ponds, sumps, and pump and pipeline systems);
- work related to waterbody or watercourse crossings, temporary or permanent (bridge or culvert);
- water management activities, including information on their location, methods, and timing, such as:
 - water diversions, dewatering or deposition activities;
 - site drainage and runoff management;
 - sediment and erosion control;
 - water recycling and effluent treatment, including information on quantity, treatment requirements, and release point(s);
 - wastewater treatment; and
 - water use requirements (e.g. drinking water, water intakes and mining processes, water tanks); and
- any other activity, including temporary structures, that may affect the terrestrial, riparian and aquatic environment, including those carried out in intermittent streams and flood prone areas.

Emergency Services

- general maintenance and emergency services.

Hazardous Materials and Waste Management

- storage, handling, recycling and disposal of fuel, hazardous materials and residual materials, including information on relevant types, methods, quantity;
- waste management, other than for mine waste (disposal, recycling);
- removal of contamination from facilities and equipment, and management of residual contamination (e.g. contaminated soil remediation); and
- transfer of fuel, hazardous materials and waste to off-site locations upon closure.

Operation

- excavation and disposal of overburden materials;
- bitumen extraction, transportation, and processing;
- drilling, including infill drilling;

- extraction, transportation, and use of aggregate resources;
- mine waste management, including tailings, waste rock, ore, overburden and topsoil;
- storage, handling and transport of materials;
- maintenance and, where appropriate, upgrading of aboveground infrastructure and buildings housing them;
- environmental monitoring; and
- workforce management, including transportation, work schedules and lodging.

Reclamation and Closure

- site restoration (works, stockpiling, storage and other affected areas during construction), including, where appropriate, reconnection of drainage systems impacted by construction work;
- activities associated with progressive reclamation, including salvage, stockpiling, and placement of reclamation material, development of surface drainage channels, and revegetation;
- development, monitoring and maintenance of closure landforms;
- the inclusion and configuration of pit lakes on the post-closure landscape, including overall pit lake water management and whether pit lakes will support aquatic ecosystems. This should include information on the:
 - connectivity to surface and ground waters;
 - presence/absence of tailings;
 - presence/absence of lean oil sands; and
 - fill source (freshwater versus process-affected water) and timing to fill;
- the ownership, transfer and control of the different project components;
- final site reclamation and/or restoration plan, describing specific reclamation and restoration activities;
- ongoing management of fluid tailings, including transportation, treatment, and disposal;
- dismantling and removal of equipment and systems;
- removal of buildings, plants, linear infrastructure, water management systems and ancillary structures; and
- long term care, monitoring and maintaining the integrity of the site (including site drainage and water management) and any remaining structures, including emergency services.

2. Sources of baseline information

Information sources and data collection methods used for describing the baseline environmental, health, social and economic setting may consist of the following, which does not constitute an exhaustive list:

- the federal government, including the departments and agencies with relevant expertise for the impact assessment;
- resources from the government of Alberta (i.e. Alberta Energy Regulator, Alberta Environment and Parks, Alberta Consultation Office, Alberta Health, etc.), for example:

- [Alberta species at risk guides and resources](#),
- [Alberta historic resources guides and resources](#), and
- [Alberta Natural Heritage Information Centre](#);
- resources from other provincial or territorial governments such as the Government of Northwest Territories;
- [Bird Conservation Region plans \(BCR\) and strategies](#);
- universities;
- field studies, including site-specific survey methods;
- database searches, including federal, provincial, territorial, municipal, local and Indigenous data banks and geospatial resources.
 - [the Atlas of Breeding Birds of Alberta](#) (2007);
 - other monitoring program databases such as, [eBird](#), [Breeding Bird Survey](#), [Christmas bird count](#), [Birds Canada's Canadian Migration Monitoring Network](#), [NatureCounts](#), and [iNaturalist](#);
 - [Birds Canada's Nesting Calendar Query Tool](#);
 - [Boreal Avian Modelling Project](#);
 - [Environment Canada's Cause-Effect Monitoring, Oil Sands Region](#);
 - [Species at risk public registry](#);
 - the [Fish and Wildlife Internet Mapping Tool](#);
 - the [Canadian Protected and Conserved Areas Database \(CPCAD\)](#);
 - Alberta geospatial data layers, databases and tools such as on [geological formations](#), [hydrology](#), [biophysical data](#), [wildlife sensitivity](#), and [land disturbance](#));
 - [Fisheries and Wildlife Management Information System](#);
 - [Alberta Biodiversity Monitoring Institute](#) data;
 - information available for [Surface water quality data](#);
 - [Athabasca Chipewyan First Nation – Community-Based Monitoring Program](#);
 - [Mikisew Cree First Nation – Community-Based Monitoring Program](#);
 - [Peace - Athabasca River Basin Long-term Water Quality Monitoring Data](#);
 - [Regional Aquatics Monitoring Program](#) database;
 - [Health inequalities data tool](#) (Public Health Agency of Canada);
 - [Interactive Health Data Application](#) (Alberta Health);
 - [Social determinants of health for the off-reserve First Nations population, 15 years of age and older](#) (Statistics Canada);
 - information available under [Community and Health System Characteristics](#) (Canadian Institute for Health Information);
 - [Alberta Health database](#);
 - [Administrative Health Data](#) dataset and resources;

- [Cancer Community Prevention & Screening Dashboard](#), and
- [Alberta Environmental Public Health Information Network](#);
- health resources, studies and reports provided from reliable local, regional, provincial, and federal and Indigenous sources, such as:
 - [First Nations Regional Health Survey reports and associated online data](#) (First Nations Information Governance),
 - [Primary Care Network profiles](#),
 - [Alberta Congenital Anomaly Surveillance Report](#), and
 - [Community Profile: Wood Buffalo excluding Fort McMurray - Health Data and Summary](#);
- field measurements or studies acquired through existing Base Plant operations;
- regional studies conducted through Wood Buffalo Environmental Association (WBEA);
- data or studied generated through the Oil Sands Monitoring Program (OSMP) – [federal OSMP](#) and [provincial OSMP](#) sources;
- water quantity and quality data and information held by Indigenous communities in the lower Athabasca River, PAD, and Lake Athabasca regions;
- protected areas, watershed, or national or provincial park management plans;
- assessments and studies that may be made available through work undertaken to advance the achievement of the Action Plan for Wood Buffalo National Park;
- natural resource management plans;
- species recovery and restoration plans;
- field measurements to gather data on ambient or background levels for air, water, soil and sediment quality, light levels or acoustic environment (soundscape);
- land cover data including terrestrial ecosystem mapping products, forest cover maps, and remote sensing information;
- published literature, including specialized publications, with preference given to literature that has been peer-reviewed and published in scientific journals;
- environmental assessment documentation, including monitoring reports, from prior projects in the area and similar projects outside the area;
- regional studies, project assessments and strategic assessments;
- renewable harvest data;
- Indigenous knowledge, including from oral histories and Indigenous Knowledge and Use Studies;
- Indigenous-led studies;
- expert, community, public and Indigenous engagement and consultation activities, including workshops, meetings, open houses, and surveys;
- participant comments submitted during the Planning phase (posted on the Registry) that may be used to identify specific areas and existing conditions of concern to be considered in the Impact Statement;
- qualitative information gathered from interviews, focus groups or observation;

- census data;
- human health risk assessments (HHRA);
- human health impact assessments (HHIA);
- studies on community well-being and other social and economic studies;
- community and regional economic profiles; and
- statistical surveys, as applicable.

Baseline data should be collated in a way that makes analyses, extrapolations and reliable predictions possible.

The proponent should consult with federal, provincial or local government authorities to determine whether additional data sources and survey methods may be appropriate.

3. Documentation

Geospatial data

Where information is required in a map format, the proponent must also provide the Agency with the corresponding electronic geospatial data file(s). The Agency will make the geospatial data files available to the public under the terms of the [Open Government License – Canada](#).

Metadata included in geospatial files must be compliant with the ISO 19115 standard and, at a minimum, provide:

- title;
- abstract or summary of what is contained in the data file;
- source of the data;
- date of creation for the data;
- the point of contact and originator; and
- must confirm there are no restrictions or limitations on sharing the data.

The proponent should review the Agency's [Guidance on submitting geospatial data](#) for more information.

Data and analyses

The proponent should curate all data collected and analyses performed in such a way that it may be made available to participants or the Agency upon request. It is recommended that the proponent be prepared to provide:

- all biological survey data in a well-documented data file which provides information on the site, site visits and individual observations or measurements (georeferenced where possible);
- individual results of all laboratory analysis, including methods, standards or references followed, detection limits, controls, and quality assurance and control procedures;
- input and output data from modeling; and

- documentation and results of analysis that allow for a clear understanding of analytical methods and for replication of results.

These recommendations are made in support of the Government of Canada's commitment to Open Science and Data and would facilitate the sharing of information with the public through the Canadian Impact Assessment Registry and the Government of Canada's Open Science and Data Platform.

Reference documents

The impact assessment must be based on information that is publicly accessible. Therefore, the proponent must provide a summary for the documents that served as key references in the Impact Statement that are not otherwise publicly accessible, or consider appending them to the Impact Statement. The Impact Statement must include a bibliography of all documents and sources of information consulted.

4. Use of an ecosystem approach

In describing the biophysical environment, the Impact Statement must take an ecosystem approach that considers how the project may affect the structure and functioning of biotic and abiotic components with the ecosystem using scientific, community and Indigenous knowledge regarding ecosystem health and integrity, as applicable. The Impact Statement must provide a description of the indicators and measures used to determine ecosystem health and integrity, as reflected in the Guidelines. The Impact Statement description of the biophysical baseline conditions should include in the presence of endangered ecosystems, and rare, limited and/or significant habitat potentially affected by the project (e.g. [federal](#), provincial, or Indigenous protected areas, [wildlife sensitivity maps](#), [RAMSAR sites](#), and identified or proposed critical habitat in recovery strategies or action plans).

The baseline conditions must consider the resilience of relevant species populations, communities and associated habitats to the effects of the project. Ecological processes should be evaluated for potential susceptibility to adverse effects from the project. Considerations include: configurations and connectivity of habitat patches; continuation of key natural disturbance regimes; structural complexity; hydrogeological patterns; nutrient cycling; interactions of biotic components with each other and with abiotic components; population dynamics and genetic diversity, and Indigenous knowledge relevant for the conservation and sustainable use of relevant species populations, communities and associated habitats.

5. Application of GBA+

GBA+ must be incorporated into all baseline data collection and presentation, and in effects assessment methodologies to understand potential effects to diverse subgroups within the community.

To support GBA+, the information provided in the Impact Statement must:

- be sufficiently disaggregated to support the analysis of disproportionate effects as per the GBA+. As much as possible, the data must be disaggregated by sex, gender identity, age and ethnicity and presented distinctly for each Indigenous community and all subgroups forming their communities.

- be sufficient to provide a comprehensive understanding of the current state of health, social and economic conditions, including trends relevant to GBA+;
- describe how community and Indigenous knowledge from affected populations, including input from diverse subgroups, was used in establishing baseline conditions and informing effects assessments for these subgroups;
- consider that subgroups have different access to resources, opportunities and services;
- consider how the potential effects could particularly affect different subgroups, and how they may respond differently; and
- take into account the circumstances in which diverse subgroups could, due to their special situation, suffer more severe adverse effects of the project than others, or not benefit from future economic benefits.

In the preparation of the Impact Statement, the proponent must adhere to relevant ethical guidelines and cultural protocols governing research, data collection and confidentiality. This is particularly important in the case of information gathered and studies conducted with vulnerable subgroups. Namely, the proponent must respect the obligation of protecting personal information and adopt the established standards for the management of Indigenous data (e.g. the [First Nations principles of Ownership, Control, Access and Possession](#) (OCAP), or standards adopted by an Indigenous people).

The application of GBA+ should not be limited to simple descriptions of differences but should include an explanation of the underlying causes of these inequalities. Quantitative information, including gender sensitive data, should also be complemented by qualitative insights from studies or consultations, and other sources. Characterization of effects should be based on both data collected and the level of concern expressed through engaging with the affected Indigenous communities and their members. The proponent is encouraged to refer to the Agency's guidance document [Gender-Based Analysis Plus in Impact Assessment](#).

6. Establishing spatial boundaries

The following guidance is supplement to the requirements in 7.3.2 *Spatial Boundaries*.

The proponent should consider the following areas in assigning appropriate spatial boundaries:

- areas potentially impacted by changes to water quality and quantity or changes in flow in the watershed and hydrologically connected waters, including any interprovincial or territorial borders that that require a transboundary assessment;
- areas potentially impacted by airborne emissions or odours, including any interprovincial or territorial borders that that require a transboundary assessment;
- air zone(s) that are affected – based on consideration of CAAQS, AQMS/Airshed management system;
 - air zone CAAQS achievement status, as well as the associated management levels as outlined in the [Guidance Document on Air Zone Management](#) (following removal of transboundary flows and exceptional events per the [Guidance Document on Transboundary Flows and Exceptional Events](#);

- existing local major emissions;
- areas within the range of vision, light and sound;
- the locations and characteristics of the key and most sensitive receptors;
- terrestrial and aquatic species habitat areas likely to be affected directly or indirectly, usage timing and species migratory patterns;
- emergency planning and emergency response zones;
- the geographic extent of local and regional services;
- any affected communities;
- areas of importance to people, such as recreational areas;
- all potentially affected Indigenous peoples;
- areas of known current use of Indigenous land, cultural, spiritual and resource use; and
- existing affected infrastructure.

The proponent's terminology to refer to the project area, LSA and RSA can vary depending on the context of the project. For example, using a *development area* during project development, referring to a *study areas* or *modelling areas* to explain the assessment methods, and to *assessment areas* for the effects assessment.

For VCs that are defined on the basis of habitat, the proponent should conduct a land cover analysis to determine appropriate ecological boundaries and buffer distances around the project area.

The spatial boundaries for the biophysical VCs should allow the following objectives to be met:

- the diversity of land cover types included in the LSA and RSA is representative of the land cover types found within the LSA and RSA;
- the spatial pattern of land cover types is even or well distributed within the RSA boundary. Spatial boundaries of the RSA should be changed if one or more land cover types are concentrated in a sub-area and are uncommon in other parts of the region; and
- the land cover patterns within the RSA boundary being drawn show a low to moderate rate of change with increasing distance from the project area.

7. Human health baseline

Baseline information is required on existing human health conditions to prepare the community health profiles. This information must include the current state of physical, mental and social well-being and incorporate a determinants of health approach to move beyond biophysical health considerations. In line with the World Health Organization's (WHO) expanded definition of health in the context of the social determinants of health, a determinants of health approach recognizes that health is more than the absence of disease but rather a state of general well-being, which is influenced by a variety of factors (i.e. determinants). The structural and inequality factors of the socio-economic context would influence the conditions in which people are born, develop, live, work and age. Acting as intermediary factors, these same conditions would in turn influence individual factors (called behavioural and biological factors), which

directly affect physical and mental health. This approach recognizes the interdependence of environmental, health, social and economic VCs. The selection of determinants can be guided by the following references:

- the [Social determinants of health and health inequalities](#) recognized by the Public Health Agency of Canada;
- resources from the [National Collaborating Centre for Determinants of Health](#), such as the fact sheet [What are the social determinants of health?](#);
- resources from the [National Collaborating Centre for Healthy Public Policy](#);
- resources from the [National Collaborating Centre for Indigenous Health](#), such as the report [Health inequalities and the social determinants of Aboriginal peoples' health](#);
- resources from the National Collaborating Centre for Environmental Health on [Health Impact Assessments](#);
- [resources from the International Association for Impact Assessment](#); and
- the [Positive Mental Health Surveillance Indicator Framework](#).

The following references contain best practices for health impact assessment methods, which the proponent is encouraged to consult:

- [Minimum Elements and Practice Standards for Health Impact Assessment, Version 3](#);
- resources from the [National Collaborating Centre for Healthy Public Policy](#);
- [Guidance on human health risk assessment for environmental impact assessment in Alberta](#);
- the [Health Equity Impact Assessment \(HEIA\) Tool](#) by the Ministry of Health of Ontario; and
- [Health impact assessment. A guide for the oil and gas industry](#) by the International Association of Oil and Gas Producers.

8. Mitigation hierarchy

Mitigation measures are technically and economically feasible measures to eliminate, reduce, control or offset the adverse effects of a designated project, and include restitution for any damage caused by those effects through replacement, restoration or compensation. The "hierarchy of mitigation measures" means the descending sequence of the following three options:

- **Eliminate:** refers to the elimination of effects, such as by changing the location or design of the project. It can also be referred to as "avoidance" of effects.
- **Reduce and control:** aims to reduce effects to the extent possible, for example, by modifying the most adversely impactful project activities or components or by taking measures specific to the potential effects. There may still be residual effects where measures are not sufficient to eliminate the effects, or where their absolute effectiveness is uncertain. Effects may also be "minimized" when it is not possible to "avoid" them.
- **Offset:** aimed at offsetting residual effects following consideration of elimination and reduction measures, through measures referred to as "compensation" or "restitution". For example, where an effect on fish habitat persists, it may be possible to offset through the creation of new habitat

(replacement) or to propose measures to restore degraded habitat conditions. These include measures referred to as replacement, restoration or (financial) compensation.

As a first step, the proponent is encouraged to use an approach based on the avoidance and reduction of the adverse effects at the source, namely consider modifying the design or changing the location of certain project components.

9. Compensation and offset plans

In general, these plans should address the following elements, or refer to locations in the Impact Statement where this information is presented:

- describe the baseline conditions of the fish and fish habitat, species at risk, critical habitat, and wetland functions potentially impacted by the project;
- explain and justify the hierarchy of mitigation measures considered;
- identify and describe residual effects that are the subject of the compensatory measures;
- identify a compensation ratio with rationale, including how any policies or guidance provided by federal and provincial authorities and Indigenous peoples have been considered;
- where feasible, identify the location and timing of implementation of compensation projects;
- identify and describe the success criteria;
- identify and describe in detail non-habitat related compensation measures (e.g. predator control);
- describe how the proposed measures align with published provincial and federal recovery management or action plans and strategies for species at risk, or for fish and fish habitat;
- describe how the proposed measures align with published provincial and federal recovery management or action plans and strategies for wetlands;
- identify, if possible, the parties responsible for implementation of the compensatory measures, including monitoring and review;
- identify indicator species for setting compensation objectives. The choice of indicator species should be based on baseline data. Species at risk should not be used as indicator species, since compensation efforts must be specifically directed to these species;
- describe the selection process for proposed compensation sites and associated baseline conditions;
- provide a description of the monitoring schedule and activities to be completed to verify the success of compensation activities; and
- if offsets are required to address residual effects, refer to the [Operational Framework for Use of Conservation Allowances](#).

The proponent must explain how Indigenous communities were involved in the development of the compensation and offsetting plans. The proponent must demonstrate how the information received from Indigenous communities has been taken into account, including the choice of compensation ratios, if applicable. The proponent must also elaborate on how Indigenous communities will be involved in the implementation of the compensation measures and the evaluation of the success of these measures.

For compensation plans targeting **species at risk**, the proponent can refer to Template 2 in the [Species at Risk Act Permitting Policy](#).

With respect to **wetlands**, compensation plans should:

- clearly indicate the location and total area of each type of wetland, as well as their respective locations, for which the residual effects should be mitigated by compensation measures;
- favour the restoration of drained or altered natural wetlands of the same type and function as those affected by the project. Wetland restoration is preferable to wetland enhancement, both of which are preferable to the development of existing wetlands or the creation of new wetlands;
- demonstrate that wetland functions can be replaced by the proposed compensation activities;
- indicate where it is not possible to compensate for the loss of functions in cases where wetlands are unique, perform habitat functions that ensure the survival of a large proportion of migratory birds, or provide habitat for species at risk; and take this information into consideration when developing compensation measures;
- use a minimum ratio of 2:1 for the area of wetlands to be restored or created, versus the original area of wetlands affected. A higher compensation ratio is recommended for wetland types where compensation is more difficult or where there is uncertainty about the success of the compensation measures. The choice of ratio for wetland compensation needs to be justified;
- prioritize compensating for locally affected wetland functions. If this is not possible, the preference is to compensate within the same watershed, and then within the same ecosystem as the one where functions are affected;
- minimize the delay between the time the adverse effects occur and the time habitat and functions are restored; and
- explain how vegetation removals, as well as soil and peat excavation activities will be managed for reclamation of disturbed wetlands (e.g. methods, conditions and timing of stockpiling).

With regard to offsetting plans for **fish and fish habitat**, each offsetting plan should include:

- baseline information, including a description of the environment (biological, hydrological, physical, chemical, etc.), an estimation of the quality of the environment in question and a description of the issue to address. Ideally, the description of the environment should be accompanied by georeferenced and dated photographs;
- a description of the proposed measures (nature, extent, method, timetable, etc.);
- exact locations for the proposed offsetting measures (latitude and longitude, lot number, municipality, regional municipality county, etc.) and property rights;
- the fish species affected by the proposed measures, including the resulting fish habitat functions (feeding, reproduction, rearing, shelter, growth, migration);
- an assessment of the benefits to fish and fish habitat resulting from the offsetting measures in terms of the significance, magnitude and adequacy of the gains to be achieved with respect to the current situation and relative to the impacted habitat; and
- a follow-up program to measure the success of offsetting objectives, including the details of its implementation. Offsetting objectives as well as the methods and criteria used to evaluate success

(parameters, frequency, duration, etc.) must be clearly identified and described. Deliverables must be identified (e.g. baseline information, follow-up protocol, plans and specifications, work report, follow-up report, etc.), along with contingency measures in case success criteria are not met. The offsetting objectives and the timelines of the follow-up program (including deliverables) should be compiled in one or more tables.

Offsetting plans and monitoring programs for fish and fish habitat should be developed using standard Fisheries and Oceans Canada (DFO) guidance:

- [A review of functional monitoring methods to assess mitigation, restoration, and offsetting activities in Canada;](#)
- [Assessing the Effectiveness of Habitat Offset Activities in Canada: Monitoring Design and Metrics;](#)
- [Equivalency metrics for the determination of offset requirements for the Fisheries Protection Program;](#) and
- [Policy for applying measures to offset adverse effects on fish and fish habitat under the Fisheries Act;](#)

10. Guidance for biophysical components

Atmospheric, acoustic and visual environment

The following guidance should be consulted in conjunction with section 8.4 *Atmospheric, acoustic, and visual environment*.

- project sources of air pollutant emissions should include the following types of sources:
 - point sources: include but are not limited to power generation equipment (i.e. gensets), fire pump stacks, turbines, compressor engines, incinerators, exhaust vents and stacks from processing facilities, ventilation vents, boilers and other heating equipment, flares, idling transport vehicles, fugitive emissions from storage tanks and leaks from gas pipes and other equipment. Where applicable, emissions from start-up and shut-down should be taken into account;
 - area sources: include material handling and transport, wind erosion of material piles, fugitive emissions from exposed mine faces, fugitive emissions from process areas and tailings management areas; and
 - mobile and road sources: include tailpipe emissions and fugitive dust emissions. Fugitive dust emission factors (e.g. road dust) and assumed mitigation (control efficiency) should be described and should be justifiable based on what is practicable. Tailpipe emission factors should be estimated using established methods. Include all off-road and on-road fleet vehicles used in the project;
- when providing detailed methodology and assumptions used to estimate emissions, all relevant emissions factors should be provided and referenced. For all applicable emission sources, include the assumed Tier of emission standard for each emission factor applied.
 - For the mine fleet: include the vehicle descriptions for all mine fleet and assumptions with activity data.

- For the mine face (fugitive emissions): provide the location of the mine face areas and the surface of each area.
- for requirements pertaining to the use of atmospheric dispersion modelling, the proponent should:
 - conduct modelling for a 5-year period, to account for variability in meteorology and baseline conditions, and use the most recent meteorological and emissions data available (i.e. 2015-2019);
 - conduct modelling for all relevant temporal scenarios (see section 7.3.1 *Temporal Boundaries*), including: the pre-development scenario, the base case (i.e. all existing emission sources plus projects already approved and under construction), a project-alone scenario (recommended in order to represent emissions from the project only), the application case, and the planned development case; and
 - ensure appropriate domain boundaries. At a minimum, the modelling domain should enclose concentrations that are 10% of relevant air quality criteria;
- SMOKE-ready emissions input files used for regional air-quality base case and scenario simulations should be provided in order to conduct an adequate cumulative effects assessment and for baseline studies;
- photochemical modelling may be necessary to model long range transport, as well as transformation processes that are beyond the capabilities of standard models, particularly for SOA and acid deposition;
- the assessment of the project's emissions of acidifying pollutants, and potential to adversely affect ecosystems in the region, should include Northern Alberta, Northern Saskatchewan, the southern NWT, and NE British Columbia (boundary corners approximately at: 53N and 122W, 53N and 100W, 62N and 100W, and 62N and 122W);
- for requirements pertaining to the use of modelling for acidifying deposition, the proponent should consider the following technical requirements:
 - model simulations should be for a minimum of 1 year using the most recent meteorological and emissions year available in the 2015-2019 timeframe, and should be conducted at minimum for the base case and the application case;
 - the regional air quality model's horizontal resolution should comprise a horizontal grid cell size equal to or less than 12 kilometres within the region modelled;
 - the model chosen should be capable of a rigorous representation of gas and particle chemistry and physics and long range transport, to provide an estimate of acidifying deposition, and must include the explicit treatment of the following key processes:
 - chemical mechanism similar in complexity to the following mechanisms: Carbon-Bond4, Carbon-Bond5, SAPRC07, SAPRC11, RACM2, ADOXI,
 - gas dry deposition,
 - size-resolved particle dry deposition,
 - cloud (aqueous) chemistry, particle uptake into and formation from clouds and rain drops,
 - wet deposition from clouds to the surface,
 - size-resolved particle microphysics (particle nucleation, condensation, coagulation as a function of particle size),

- inorganic particle heterogeneous chemistry, and
- SOA formation; and
- key chemical species the model must include are: size resolved chemically speciated particles (particle sulphate, nitrate, ammonium, base cations, water soluble iron and manganese, primary organics, secondary organics, sea-salt, black carbon, crustal material), gases (including, but not limited to NO, NO₂, SO₂, H₂O₂, speciated volatile organic compounds, ozone, NH₃, HNO₃, PAN, HONO, HNO₄, one or more organic nitrates, N₂O₅), and ions within precipitation (SO₄²⁻, HSO₃⁻, NH₄⁺, base cations). The model must include the dry (gases, particles) and wet (ions in solution) deposition fluxes of these species.

The proponent should engage with experts at Environment and Climate Change Canada (ECCC) to inform the choice of program to conduct regional air quality modeling of acidifying deposition rates.

The proponent should also refer to Health Canada's Guidance for [Guidance for Evaluating Human Health Impacts in Environmental Assessment: Air Quality](#) and to [Evaluating Human Health Impacts in Environmental Assessment: Noise](#) to ensure that it provides the information and analysis considered necessary to assess the project's impacts on human health in relation to changes to air quality and to the sound environment. It is requested that the proponent complete the checklists provided in this guide (Appendix A in the air quality guide, Appendix B in the noise guide) to assist participants in verifying that the main elements of a air quality impact assessment have been completed and in identifying the location of this information in the Impact Statement. These checklists will facilitate the review of the Impact Statement and will be particularly useful if analyses on these aspects are found in several sections of the Impact Statement.

Other relevant guidance and resources to consult for the assessment of the atmospheric, acoustic and visual environment include:

- [Guidance for Odour Impact Assessments and Odour Management for Proposed Oil Sands Projects on Fort McKay's Traditional Territories](#);
- [Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities](#) for dust suppression and fugitive dust minimization during mining operations, as well as for emission reduction measures associated with vehicle and equipment engines;
- [Good Practices Guide for Odour Management in Alberta](#);
- the [Ecological Risk Assessment Guidance Document](#); and
- Commission Internationale de l'Éclairage's [Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations](#).

Groundwater and surface water

The following guidance should be consulted in conjunction with section 8.5 *Groundwater and surface water*.

With regards to the establishment of baseline condition for surface water, groundwater and sediment quality, the proponent should take into account the following guidance:

- Sample collection and analysis should use appropriately sensitive detection limits.

- Include additional data, as appropriate, to illustrate the seasonal and inter-annual variability in baseline water quality, with sufficient years of baseline data to fully characterize natural variability, including possible changes due to groundwater–surface water interactions.
- Baseline groundwater quality characterization should include data from multilevel monitoring wells that appropriately covers the spatial extent of the project (i.e. major project features, all sides of the site, up-gradient and down-gradient of the project, etc.).
- Zones in multilevel wells should correlate to hydrostratigraphic units with a hydraulic conductivity of greater than 10^{-6} m/s, and be completed to the depth of groundwater protection (e.g. the lowest zone should be below depth of groundwater protection).

The proponent should refer to the Health Canada guide [Guidance for Evaluating Human Health Impacts in Environmental Assessment: Water Quality](#) to ensure that all necessary information and analyses are provided to assess the project's impacts on human health in relation to changes in water quality. The proponent should complete the checklist in this guide (Appendix A) to assist participants in verifying that the main components of a water quality impact assessment have been completed and to identify the location of this information in the Impact Statement. The checklist will make it easier to review the Impact Statement, and it will be particularly helpful if analyses on this aspect are found in multiple sections of the Impact Statement.

The proponent should also refer to the Health Canada guide [Federal Contaminated Site Risk Assessment in Canada, Supplemental Guidance on Human Health Risk Assessment of Contaminated Sediments: Direct Contact Pathway](#) to ensure that all necessary information and analyses are provided to assess the project's impacts on human health in relation to changes in sediment quality.

Wetlands

The following guidance should be consulted in conjunction with section 8.6 *Vegetation and riparian, wetland and terrestrial environments*.

With regards to the wetlands functions assessment, the proponent should:

- complete the assessment for a representative selection of wetlands that the project would directly impact and for a representative selection of wetland(s) that are hydrologically connected. In conducting this assessment, the proponent should ensure that wetlands are considered in the context of:
 - the larger watersheds of which they are a part;
 - adjacent land use with a focus on hydrological and other functions;
 - landscape and/or watershed considering topography, soil types and hydrological linkages; and
 - the global significance of peatlands across the RSA;
- collect data from representative wetlands in a manner that enables reliable extrapolations in space (i.e. at minimum to the project area, LSA and RSA) and in time (i.e. across years), including:
 - design surveys so that they represent the spatial and temporal targets of modeling and extrapolations, and to produce scientifically defensible predictions of effects and estimates of mitigation effectiveness. Survey designs should be sensitive enough to detect and quantify the effects at the appropriate spatial and temporal scales, any departures from predictions, and the

- effectiveness of mitigations. Justify the selection of modeling techniques based on current and recent scientific literature;
- plan survey protocol for representative wetlands to include modeling and simulations to estimate sampling requirements, and analysis to evaluate resulting design options. Sample size must be planned to support evaluation of the project study area within the context of the LSA and RSA. Appropriate design of surveys will need to consider multiple survey locations in order to represent the wetland heterogeneity of the RSA, and to yield multiple survey locations per wetland type, without requiring aggregation of habitat classes post-hoc;
 - incorporate the value of wetlands from an Indigenous perspective and existing disturbance when making proposals for wetland offsets;
 - provide this assessment in a quantitative form and include the collection of site-specific baseline information on wetland functions, including:
 - surveys to assess for the presence, abundance, density, and distribution of migratory birds and federally listed species at risk, provincially listed species at risk, and species assessed by COSEWIC as at-risk in relation to potentially affected wetlands and associated riparian areas. Surveys should meet appropriate standards, be species or bird group specific as appropriate, and be conducted during the appropriate times of the year;
 - surveys for species at risk should assess species individually where possible (typically an indicator approach is not appropriate for species at risk). Surveys should not be limited to species or groups of species that are wetland-obligate, but rather should include any species known to use wetland habitats as part of its lifecycle. Data should be sufficiently robust to identify which wetland classes are important to which species (and for how many);
 - the location and a description of the biological characteristics of each potentially affected wetland and the ecological services and functions (hydrology, biochemical cycling, habitat, climate) they provide. The functions assessment should be as specific as possible to the biological characteristics of the wetland and to the ecological services and functions it provides; and
 - a supporting rationale and detailed description of the methods used in completing the wetland functions assessment, including sampling design;
 - consider submitting complete data sets from any survey sites, including GIS files; and
 - contact the relevant provincial and local government authorities to determine if other wetland conservation policies, regulations or wetland compensation guidelines apply. See also resources available from [The Wetland Network](#).

Fish and fish habitat

The following guidance should be consulted in conjunction with section 8.7 *Fish and fish habitat*, as relevant to the establishment of baseline conditions.

For potentially affected fish habitat, the proponent should consider that:

- Intermittent and ephemeral streams or wetlands (marshes, bogs, ponds, etc.) are potential fish habitat, and may contribute indirectly to fish habitat. Also, the absence of fish or water at the time of the survey

does not irrefutably indicate an absence of fish and/or fish habitat (e.g. migratory corridor), and beaver dams and accumulations of woody debris are not considered impassable barriers to fish.

- Baseline data collected for each waterbody or watercourse is expected to vary depending on the predicted effects, as relevant to support the ability to validate predictions (see section 7.1 *Baseline methodology*).
- Baseline measurements of contaminants should be provided for the complete fish food web (including water, invertebrates, prey fish), and include carbon and nitrogen stable isotope measurements in fish and the complete fish food web. These measurements should then be used to inform the assessment of effects from contaminants, including bioaccumulation of contaminants, in fish downstream of the project.

For potentially affected fish, the proponent should:

- First, use existing information (e.g. the Fish and Wildlife Internet Mapping Tool, accessible regional reports, primary literature, fisheries management objectives, information from consultation and engagement activities, traditional knowledge of Indigenous peoples affected by the project, etc.). Existing information should be supplemented using field data collection as necessary to support the assessment, and as relevant to validate predictions and mitigation success in the future.
- Perform field data collection programs in a representative number of locations (including reference locations where applicable), using sampling methods appropriate to the aquatic system, and should be performed in multiple seasons.
- Identify data sources, including information on the surveys carried out (description of gear and catch methods, location sampling occurred, date of data collection, effort, etc.).
- Where field data is collected, consider providing raw data.

With respect to the assessment of effects on fish and fish habitat, the proponent should:

- present potential habitat alteration, disruption and destruction on maps at appropriate scales, as well as in the form of tables;
- include changes to surface water conditions resulting from changes to groundwater quantity and discharge location. The [Framework for Assessing Ecological Flow Requirements to Support Fisheries in Canada](#) should be used to guide this aspect of the effects assessment;
- refer to standard metrics for changes in habitat quality and quantity to choose an analysis that is appropriate to the type and scale of effects (see [A framework for assessing fisheries productivity for the Fisheries Protection Program](#)). For example, broader, ecosystem-wide effects may require a modelling approach. It is recommended that the information be collected in the form of a map at appropriate scales, as well as in the form of a table; and
- consider that the effects of chronic and acute disturbances to fish populations are often dependent on the state of the fish population. If the fish population is already quite depleted, the effect of an acute disturbance may have a disproportionate effect on the population.

The proponent should also consult:

- recommendations in the protocols: [Standard for sampling of small streams in Alberta](#) and [Standard for sampling of small-bodied fish in Alberta](#); and

- [*A Science-Based Framework for Assessing the Response of Fisheries Productivity to State of Species or Habitats.*](#)

Birds and their habitat

The following guidance should be consulted in conjunction with section 8.8 *Birds, migratory birds and their habitat*:

- the proponent should consider and assess the following groups of migratory and non-migratory birds separately: waterfowl, water birds (other than waterfowl), songbirds, shorebirds, each bird species at risk and their habitat;
- in order to establish adequate baseline conditions for birds, the proponent should take into account the following technical recommendations:
 - collect bird data to adequately represent the following temporal sources of variation: among years, within and among seasons (e.g. spring migration, breeding, fall migration, overwintering), and within the 24-hour daily cycle.
 - collect and include explanatory data (i.e. covariates) necessary for modeling in such a way as to adequately represent the following sources of variation: land cover composition, soil type, geomorphology, hydrological processes, and variation in climatic conditions inter- and intra-annually.
 - collect data in a manner that enables reliable extrapolations in space (i.e. at minimum to the project area, LSA and RSA) and in time (i.e. across years).
 - design surveys so that they represent the spatial and temporal targets of modeling and extrapolations, and to produce scientifically defensible predictions of impacts and estimates of the effectiveness of mitigation measures. Survey designs should be sensitive enough to detect and quantify: the impacts at the spatial and temporal scales identified above (i.e. project area, LSA, RSA), any departures from predictions, and the effectiveness of mitigation measures. Justify the selection of modeling techniques based on current and recent scientific literature.
 - survey protocol planning should include modeling and simulations to estimate sampling requirements and analysis to evaluate resulting survey options. It is recommended to:
 - collect field data over at least two years. The goal of collecting data over multiple years is to improve the understanding of natural variability in populations. Two years of sampling is suggested as a minimum. As the number of sampling years increases so does the understanding of natural variability;
 - plan sample size to support evaluation of the project study area within the context of the local study area and regional study area. Appropriate design of surveys will need to consider multiple survey locations in order to represent the habitat heterogeneity of the RSA, and to yield multiple survey locations per land cover or habitat class, without requiring aggregation of habitat classes post-hoc;
 - design sampling effort per unit area - field survey effort to be most intensive within the project study area. The level of effort per unit area may be similar or somewhat less within the remainder of the LSA, but should be scaled to the likelihood that project effects will effect birds within that zone. Efforts outside the project study area should be carefully designed to ensure

that estimates comparing within and across the project area, LSA, and RSA are unbiased and as precise as possible; and

- use simulation modelling to assess bias and precision between project area, LSA, and RSA to ensure the estimates are useful for comparison;
- if data collection methods prior to the issuance of these Guidelines differs from the guidance above, the proponent should explain the differences and potential implications;
- when selecting metrics to characterize avifauna biodiversity, it is recommended that:
 - biodiversity metrics should include the following: distribution in space, frequency of occurrence, occurrence and abundance trends in time, abundance and density, as well as the types of associated habitats and the strength of the associations; and
 - species communities should not be grouped together by diversity indicator and should not be limited to the indicator species. The identification of species, distribution, abundance and, when possible, estimates of species' breeding status should be the main quantification objectives;
- when estimating for the abundance and distribution of migratory and non-migratory birds, the proponent should:
 - base estimates on existing information, or additional surveys, as appropriate, to provide current data sufficient for reliable estimates. At minimum, the combined information from existing data and field surveys needs to be detailed enough to describe the distribution and abundance of all bird species in relation to the study areas;
 - generate measures of abundance and distribution using spatially balanced, randomly selected sample locations. Sampling should include edges and transitions between habitat types and should not be focused exclusively within homogeneous patches of a given habitat type.
 - Use simulation modelling prior to sampling to ensure coverage is broad enough to estimate and account for detection error as well as provide unbiased estimates of abundance and distributions.
 - Sampling within temporal boundaries should be spatially and temporally balanced so that all spatial areas receive comparable temporal coverage;
 - provide estimates of confidence or error for all estimates of abundance and distribution. Define estimates by providing, for example, mean across years, mean across sites, and modeled prediction. If appropriate, define confidence or other intervals such as 95% confidence intervals or other credible intervals. The use of hypothesis testing p-values is generally not appropriate in this context and their use should be justified;
 - whenever estimating densities for species, consider observer-induced detection error for comparisons among counts to be valid (e.g. between, before and after surveys, or between affected and unaffected sites). When accounting for detection error the method used should account for variable detection between land cover types, observers, weather, time of year, species, as well as random variation between visits. Simulation methods can help determine if a specific method is appropriate for a given survey design and analysis. Care should be taken to avoid affecting the reliability of abundance estimates (see [On the reliability of N-mixture models for count data](#));
 - use a spatially dispersed stratified random sampling approach to maximize efficiency. Sample sites should be selected with a randomization procedure that accounts for the project design footprint. To

- select specific sampling sites, care should be taken to ensure sites are spatially distributed across the area of interest and coverage is obtained across habitat types. Site locations should be randomly selected using an approach that avoids implicit bias in site selection;
- provide a justification on the approach chosen and include all criteria used to choose plot locations. If necessary to constrain or adjust site selection based on access limitations, simulation modelling should provide evidence that this sampling strategy has not resulted in the introduction of bias; and
 - survey vegetation features of concern in a manner that is not disproportionate to other types. Avoid bias in estimates of abundance and impair extrapolation and statistical inference;
 - the following must be considered when identifying areas of concentration of migratory birds:
 - migratory bird concentrations can vary within a year and between years. It is therefore important to survey across the project study area, LSA and RSA both temporally and spatially; and
 - migratory bird counts are dependent on length of stay as well as presence. Attempt to estimate abundances across a migratory period should incorporate an estimate of inter and intra-annual trends and estimates of lengths of stay. Irruptive species may act in ways similar to migrants in terms of abundance. They may be absent from an area until conditions change (such as a mast event), during which time the habitat becomes vital to these species;
 - to quantify trophic linkages in the project area and the LSA, the proponent should consider using Structural Equation Models;
 - in the baseline description for bird habitats, the proponent should include at a minimum, characterization of biophysical conditions with regard to ecoregion and BCR, and include local aerial and on-site photos. Habitat surveys need to be detailed enough within the LSA and RSA to provide context for local and regional habitat availability and quality.
 - For example, mixedwood and old-growth forest land cover and other upland vegetation types may be particularly important for many forest associated birds, supporting birds during migration, breeding and through the winter. Peatlands and wetlands including fens and bogs are ecologically important elements of the landscape. River riparian corridors with adjacent mixed wood forest are another relatively uncommon feature.
 - Should there be anticipated displacement of nesting birds, baseline data should provide evidence that there is enough equivalent habitat for birds to be displaced to and that the habitat being removed is not unique to the project area or region. This information may serve to inform reclamation planning; and
 - the proponent should curate survey data and analyses in such a way that it may be made available to participants for review upon request. It is recommended that the proponent be prepared to:
 - provide raw survey data and analysis results for 1) all birds, 2) each VC, and 3) BCR priority species showing the species ranked according to: frequency of occurrence⁸, abundance, abundance in each habitat type;

⁸ Frequency of occurrence: % frequency for Species A = (# sampling locations in which Species A detected / total # sampling locations) * 100

- data sets from all survey sites should be in the form of complete and quality assured relational databases, with precisely georeferenced site information, precise observation/visit information and with observations and measurements in un-summarized form;
- provide documentation and digital files for all results of analyses that allow for a clear understanding of the methods and a replication of the results (raw scripts or workflows are preferred in place of descriptive documentation); and
- the analysis of predicted effects on birds should:
 - include separate analyses for each activity, component and project phase;
 - distinguish between migratory and non-migratory birds;
 - consider sources of error for all analyses to ensure that the final effects predictions indicate the best estimate of precision;
 - explore, wherever possible, non-linear, indirect and synergistic responses to the project; and
 - justify any assumptions regarding relocation or temporary displacement during construction and operation of the project by using scientific references.

The proponent should consult:

- the [Framework for the Scientific Assessment of Potential Project Impacts on Birds](#) for examples of project types and recommended techniques for assessing effects on migratory birds;
- the Government of Canada's guidance [Avoiding harm to migratory birds](#) to characterize effects on birds in terms of amount, duration, frequency, and timing of disturbances;
- the [Guidelines to reduce risk to migratory birds](#) and to ECCC's website on [General nesting periods for migratory birds](#) to inform the development and application of mitigation measures.
 - Note that although the nesting period dates on ECCC's website cover the main nesting periods of migratory birds, in order to reduce the risk of taking nests or eggs, it does not authorize the disruption, destruction or taking of a migratory bird, its nest or its eggs outside these periods.

Wildlife

The following guidance should be consulted in conjunction with section 8.9 *Wildlife and wildlife habitat*. For wildlife surveys, the proponent should:

- in order to establish adequate baseline conditions for wildlife, take into account the following technical recommendations:
 - collect data to represent the sources of time variation between years, during and between seasons (e.g. spring migration, breeding, fall migration, wintering), and in the daily 24-hour cycle;
 - consider that rare species require more survey effort to detect than common species, and this needs to be accounted for in survey design by increasing the number and duration of surveys;
 - survey protocol planning should include modeling and simulations to estimate sampling requirements and analysis to evaluate resulting survey options. It is recommended to:
 - collect field data over at least two years. The goal of collecting data over multiple years is to improve the understanding of natural variability in populations. Two years of sampling is

suggested as a minimum. As the number of sampling years increases so does the understanding of natural variability;

- plan sample size to support evaluation of the project study area within the context of the local study area and regional study area. Appropriate design of surveys will need to consider multiple survey locations in order to represent the habitat heterogeneity of the RSA, and to yield multiple survey locations per land cover or habitat class, without requiring aggregation of habitat classes post-hoc;
- design sampling effort per unit area - field survey effort to be most intensive within the project study area. The level of effort per unit area may be similar or somewhat less within the remainder of the LSA, but should be scaled to the likelihood that project effects will effect birds within that zone. Efforts outside the project study area should be carefully designed to ensure that estimates comparing within and across the project area, LSA, and RSA are unbiased and as precise as possible; and
- use simulation modelling to assess bias and precision between project area, LSA, and RSA to ensure the estimates are useful for comparison;
- It is recommended that the proponent be prepared to:
 - submit complete data sets from all survey sites. These should be in the form of complete and quality assured relational databases, with precisely georeferenced site information, precise observation/visit information and with observations and measurements in un-summarized form; and
 - provide documentation and digital files for all results of analyses that allow for a clear understanding of the methods and a replication of the results (raw scripts or workflows are preferred in place of descriptive documentation).

Species at Risk

The preliminary list of species at risk that may use the project study area and local study area is as follows:

- Plants
 - None identified based on available project information to February, 2021.
- Insects:
 - Gypsy Cuckoo Bumble Bee (*Bombus bohemicus*)
 - Nine-spotted Lady Beetle (*Coccinella novemnotata*) – designated Endangered by COSEWIC and is not on SARA Schedule 1 but is under consideration for status change.
 - Transverse Lady Beetle (*Coccinella transversoguttata*) – designated Special Concern and is not on SARA Schedule 1 but is under consideration for status change.
- Amphibians
 - Western Toad (*Anaxyrus boreas*);
- Birds
 - Bank Swallow (*Riparia riparia*);
 - Barn Swallow (*Hirundo rustica*);
 - Canada Warbler (*Cardellina canadensis*);

- Common Nighthawk (*Chordeiles minor*);
- Evening Grosbeak (*Coccothraustes vespertinus*);
- Horned Grebe (*Podiceps auritus*);
- Olive-sided Flycatcher (*Contopus cooperi*);
- Peregrine Falcon (*Falco peregrinus*);
- Rusty Blackbird (*Euphagus carolinus*);
- Short-eared Owl (*Asio flammeus*);
- Western Grebe (*Aechmophorus occidentalis*);
- Whooping Crane (*Grus americana*);
- Yellow Rail (*Coturnicops noveboracensis*);
- Mammals
 - Little Brown Myotis (*Myotis lucifugus*);
 - Northern Myotis (*Myotis septentrionalis*);
 - Caribou (*Rangifer tarandus*; including West Side Athabasca range);
 - Grizzly Bear (*Ursus arctos*); and
 - Wolverine (*Gulo gulo*);

This list is preliminary, and not intended to be authoritative. It will be revised depending on the final spatial boundaries selected in the Impact Statement. The proponent is advised to review the Species at Risk Public Registry and contact the Agency for relevant updates.

The following guidance should be consulted in conjunction with sections 8.8 *Birds, migratory birds and their habitat* and 8.9 *Wildlife and wildlife habitat*

- The proponent should consult the Species at Risk Public Registry to obtain information on the list of species at risk and their protection status, as well as available recovery documents. Information on species and habitat attributes, threats, population and distribution objectives, critical habitat, and residences must be considered and incorporated in the Impact Statement. The proponent is responsible for ensuring that the most up-to-date documents have been used and that the status of the species is up to date.
- For surveys of species at risk, the proponent should:
 - take into account that the detection of species at risk will require more survey effort, since they are generally less abundant, which needs to be considered in the survey design by increasing the number and duration of surveys;
 - collect data in order to represent sources of time variation between years, during and between seasons (e.g. spring dispersal and migration, breeding, fall migration, wintering), and in the daily 24-hour cycle;
 - collect field data to account for natural variability in populations. To achieve this, a minimum of two years of inventory is normally required. However, if existing data are available for the study area, it can be used to complement the data collected in the field (minimum one year). The available data

must be sufficiently robust to assess the variability of populations between years and a demonstration must be presented for that purpose;

- plan the sample size to ensure sufficient assessment of the project area in the context of the LSAs and RSAs. Survey design will need to consider multiple number of survey locations in order to represent the habitat heterogeneity of the regional study area, and to plan the number of survey locations per land cover or habitat class so that aggregation of habitat classes post-hoc is not required. In terms of sampling effort per unit area, focus primarily on field surveys within the project area. The level of effort per unit area may be similar or slightly lower in the remainder of the LSAs, but should be proportional to the likelihood that project effects will affect species at risk in that area. Actions undertaken outside the project area must be carefully designed to ensure that comparative estimates between the project area, LSAs and RSAs are unbiased and sufficiently accurate;
 - preferably use stratified random sampling of habitat. Sample sites must be selected using a random procedure such as a GIS grid overlay;
 - plan to include several sampling stations and several visits to each station to support all required assessment analyses;
 - inventories and analyses should be conducted by qualified experts; and
 - consult recovery plans for which a survey schedule would have been created to identify information gaps for these species, including for the designation of critical habitat.
- For the analysis of effects on species at risk, it is recommended to provide a separate analysis for each species at risk, including separate analyses for each activity, component and phase of the project. To fully understand the effects or benefits of one alternative over another, all parameters relevant to species at risk should be considered.

Habitat features

In the baseline and effects descriptions concerning habitats for wildlife, including bird and species at risk, the proponent should identify and consider the following habitats features and important landscape characteristics:

- waterbodies, wetlands, marshes, wet meadows, shrubby swamps, fens, and watercourses,
- riparian habitat, stream or river banks or other eroded habitats,
- artificial water sources,
- forests, trees patches, solitary trees, decaying trees, snags,
- forest edges and rows of trees,
- ridges, caves, mines,
- talus,
- karst topography,
- buildings, bridges and other anthropogenic features, including linear features (e.g. roads, electrical transmission lines),
- sources of artificial lighting attracting insects,
- critical habitat and residences of species at risk, and

- any other habitat feature known to be important.

11. Summary Tables

The Impact Statement must include a series of tables summarizing the following information:

- potential environmental, health, social and economic effects and the potential impacts on Indigenous peoples;
- potential mitigation and enhancement measures in relation to potential effects and impacts;
- a characterization of the residual effects of the project according to the selected criteria;
- cumulative effects and proposed mitigation measures to address them;
- any other commitments made by the proponent or recommendations made by the proponent to other parties; and
- effects falling within an area of federal jurisdiction as well as direct or incidental effects and the extent to which they are significant. According to the Act, effects that fall under federal jurisdiction are as follows:
 - change to the following components of the environment that are within the legislative authority of Parliament:
 - fish and fish habitat, as defined in subsection 2(1) of the *Fisheries Act*;
 - aquatic species, as defined in subsection 2(1) of the *Species at Risk Act*; and
 - migratory birds, as defined in subsection 2(1) of the *Migratory Birds Convention Act, 1994*;
 - a change to the environment that would occur:
 - on federal lands,
 - in a province other than the one where the physical activity or the designated project is being carried out, or
 - outside Canada;
 - with respect to the Indigenous peoples of Canada, an impact — occurring in Canada and resulting from any change to the environment — on:
 - physical and cultural heritage,
 - the current use of lands and resources for traditional purposes, or
 - any structure, site or thing that is of historical, archaeological, paleontological or architectural significance; and
 - any change occurring in Canada to the health, social or economic conditions of the Indigenous peoples of Canada.

Appendix 2 – Reference documents

Atmospheric, acoustic and visual environment

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Note: Key Agency guidance documents are provided from the [*Practitioner's Guide to Federal Impact Assessments under the Impact Assessment Act*](#)

Annex I – Draft Terms of Reference for the provincial environmental assessment

[English only]

Also available at: <https://open.alberta.ca/dataset/environmental-assessment-suncor-bmx>

**PROPOSED TERMS OF REFERENCE
ENVIRONMENTAL IMPACT ASSESSMENT REPORT**

**FOR SUNCOR ENERGY INC.'S PROPOSED
BASE MINE EXTENSION PROJECT**

Approximately 3 km North of Fort McMurray, Alberta

ISSUED BY: Suncor Energy Inc.

DATE: February 26, 2021

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PURPOSE OF THE TERMS OF REFERENCE

The purpose of this document is to identify for Suncor Energy Inc. (Suncor), Aboriginal communities and appropriate stakeholders, the information required by government agencies for an Environmental Impact Assessment (EIA) report prepared under the *Environmental Protection and Enhancement Act* (EPEA) for the Base Mine Extension Project (the Project).

The Project, located on the west side of the Athabasca River near the existing Oil Sands Base Plant facilities (Base Plant), will consist of an oil sand mine and associated activities as an extension of the Base Plant operation near Fort McMurray, Alberta. The Project includes an open pit mining operation supplying oil sands to new bitumen froth production facilities (primary extraction). Bitumen froth will be delivered by pipeline to Base Plant where further processing occurs, including secondary extraction and upgrading into various product blends for market. Further integration between the Project and Base Plant includes utilities and water systems.

There will be external and in-pit tailings areas on the Project footprint. These facilities will be constructed with a combination of overburden and coarse tailings deposits. These areas, which provide off-stream storage of water that is recycled, are the final location for coarse tailings deposits and treated fluid tailings deposits.

The Project is expected to produce up to 80 million barrels per year (nominally 225,000 barrels per day) of bitumen froth during its estimated 25-year operational life.

The anticipated schedule for the Project is to undertake and complete the regulatory process between 2019 and 2026. Construction of the Project is planned for 2026 to 2030, with operations scheduled for 2030 to 2055. Decommissioning of the Project is expected to start in 2055.

SCOPE OF THE EIA REPORT

The Proponent shall prepare and submit an EIA report that examines the environmental and socio-economic effects of the Project.

The EIA report shall be prepared considering all applicable provincial and federal legislation, codes of practice, guidelines, standards, policies and directives.

The EIA report shall be prepared in accordance with these Terms of Reference and the environmental information requirements prescribed under EPEA and associated regulations, and the *Canadian Environmental Assessment Act*, if applicable. The EIA report will form part of the Proponent's application to the Alberta Energy Regulator (AER). An EIA report summary will also be included as part of the AER Application.

The Proponent shall refer to the *Guide to Preparing Environmental Impact Assessment Reports in Alberta* published by Alberta Environment and Sustainable Resource Development (the Guide) and these Terms of Reference when preparing the Environmental Impact Assessment report. In any case where there is a difference in requirements between the Guide and these Terms of Reference, the Terms of Reference shall take precedence.

CONTENT OF THE EIA REPORT

1 PUBLIC ENGAGEMENT

[A] Describe the concerns and issues expressed by the public and Indigenous communities and the actions taken to address those concerns and issues, including how public and

Indigenous community input was incorporated into the Project development, impact mitigation, monitoring and reclamation.

- [B] Describe plans to maintain the public and Indigenous community engagement following completion of the EIA report to ensure that the public and Indigenous communities will have an appropriate forum for expressing their views on the ongoing development, operation and reclamation of the Project.

2 PROJECT DESCRIPTION

2.1 Overview

- [A] Provide a brief project description in sufficient detail to provide context for the EIA, including:
- a) proponent information;
 - b) proposed extraction and bitumen processing technology;
 - c) amount and source of energy required for the Project;
 - d) water supply and disposal requirements, including process water and potable water requirements;
 - e) proposed method to transport product to markets; and
 - f) development plan and schedule.
- [B] Provide maps and/or drawings of the Project components and activities including:
- a) existing infrastructure, leases and clearings, including exploration clearings;
 - b) proposed mining excavation(s);
 - c) proposed bitumen processing facilities;
 - d) other buildings and infrastructure (e.g., pipelines and utilities);
 - e) temporary structures;
 - f) transportation and access routes;
 - g) on-site hydrocarbon storage;
 - h) containment structures such as tailings ponds, retention ponds and storage ponds (e.g., stormwater runoff);
 - i) water wells/intakes, pipelines, and storage structures;
 - j) sources of aggregate resources, borrow material and other construction material and locations of any stockpiles that will be developed; and
 - k) waste storage area and disposal sites.
- [C] Provide a development plan that includes:
- a) the phases of development;
 - b) the extent of mine excavation and dump areas in each stage of the Project;
 - c) bitumen recovery facilities;
 - d) tailings management;
 - e) overburden storage areas;
 - f) dewatering and water control facilities;
 - g) processing facilities;
 - h) infrastructure (pipelines, access roads and, power lines);
 - i) other buildings and structures;
 - j) field maintenance operations; and
 - k) activities associated with each stage of the Project.

- [D] Describe the proposed method to transport product to markets.
- [E] Provide a list of chemical products to be manufactured, processed or otherwise used for the Project and describe, in general terms, how these products will be stored and managed. Identify products containing substances that are:
 - a) listed in the Canadian Environmental Protection Act, Schedule 1, List of Toxic Substances;
 - b) listed on the National Pollutant Release Inventory;
 - c) dangerous goods as defined by the federal Transportation of Dangerous Goods Act; and
 - d) on the Domestic Substances List and categorized as requiring further assessment under Canada's Chemicals Management Plan.
- [F] Describe the nature and amount of on-site hydrocarbon storage. Discuss containment and other environmental protection measures.
- [G] Discuss the implications of a delay in proceeding with the Project, or any phase of the Project, or not going ahead with the Project. Discuss the key factors controlling the schedule, including restrictions for certain development activities.
- [H] Describe the benefits of the Project, including jobs created, local training, employment and business opportunities, and royalties and taxes generated that accrue to:
 - a) Suncor;
 - b) local and regional communities, including Indigenous communities;
 - c) the local authority;
 - d) Alberta, and Canada.
- [I] Provide the adaptive management approach that will be implemented throughout the life of the Project. Include how monitoring, mitigation and evaluation were incorporated.

2.2 Constraints

- [A] Discuss the process and criteria used to identify constraints to development, and how the Project has been designed to accommodate those constraints. Include the following:
 - a) any applicable *Alberta Land Stewardship Act* Regional Plan;
 - b) how this Project aligns with the *Comprehensive Regional Infrastructure Sustainability Plan for the Athabasca Oil Sands Area*;
 - c) land use policies and resource management initiatives that pertain to the Project;
 - d) Indigenous traditional land and water use;
 - e) all known traplines;
 - f) the environmental setting;
 - g) cumulative environmental impacts in the region;
 - h) cumulative social impacts in the region;
 - i) results of project-specific and regional monitoring;
 - j) potential for new or additional technology to increase resource recovery at later times; and
 - k) potential for changes in the regulatory regime.
- [B] Discuss the selection criteria used, options considered, and rationale for selecting:
 - a) location of facilities and infrastructure (including linear infrastructure); and
 - b) thermal energy and electric power required for the Project.

- [C] Provide a list of facilities for which locations will be determined later. Discuss the selection criteria that will be used to determine the specific location of these facilities.

2.3 Regional and Cooperative Efforts

- [A] Discuss the Suncor's involvement in regional and cooperative efforts to address environmental and socio-economic issues associated with regional development, including:
 - a) potential cooperative ventures that the proponent has initiated, could initiate or could develop with other oil sands operators and other resource users; and
 - b) how the proponent would design and implement research programs.
- [B] Describe opportunities for sharing infrastructure (e.g., access roads, utility corridors, water infrastructure) with other resource development stakeholders. Provide rationale where these opportunities will not be implemented.
- [C] Discuss opportunities to coordinate reclamation plans with adjacent operators. Identify environmental implications of lease boundary agreements with adjacent operators and indicate plans to address any lease boundary issues that may arise.

2.4 Process and Infrastructure Alternatives

- [A] Discuss the route or site selection criteria for any linear or other infrastructure development or modification and provide the rationale for selecting the proposed alignment and design.
- [B] Discuss the bitumen extraction and tailings management options considered for the Project and the environmental implications of each. Compare and contrast the selected options against other options in terms of fluid fines tailings volumes production, containment, abandonment and progressive reclamation and, tailings water treatment and recycling. Quantify the resource sterilization for each option (including under tailings ponds).
- [C] Discuss the potential for new or additional technology to increase resource recovery at later times in the development.
- [D] Discuss options and technologies considered for tailings water treatment and recycling, including water quality effects on the bitumen extraction and processing operations and environmental considerations for selecting the preferred options in the context of best management practices and best available technologies.
- [E] Discuss the effects of technology selection on tailings characteristics including, but not limited to, quantity, quality, physical characteristics, generation and storage requirements, air and water discharges, toxicity, water and energy requirements, chemical and hydrocarbon waste streams, bitumen recovery and effects on reclamation programs.

2.5 Project Processes and Facilities

- [A] Describe the primary resource recovery process, any proposed follow-up recovery process and other related processes and process facilities of the Project.
- [B] Discuss the amount and source of energy required for the Project.
- [C] Describe the proposed method to transport product to markets.

2.6 Transportation Infrastructure

- [A] Prepare a Traffic Impact Assessment as per Alberta Transportation's *Traffic Impact Assessment Guideline* (<http://www.transportation.alberta.ca/613.htm>).
- a) Describe background traffic and consider the cumulative effects of traffic impacts due to other existing and planned developments using the same highways and accesses.
 - b) Discuss anticipated changes to highway traffic (e.g., type, volume) due to the Project.
 - c) Assess potential traffic impacts for all stages of the Project (e.g., construction, operation, maintenance, expansion, shutdown).
 - d) Determine any necessary improvements and methods to mitigate traffic impacts.
- [B] Describe and map the locations of any new road or intersection construction, or any improvements to existing roads or intersections, related to the development of the Project, from the boundary of the Project Area up to and including the highway access points, and:
- a) discuss the alternatives and the rationale for selection for the preferred alternative;
 - b) discuss compatibility of the preferred alternative to Alberta Transportation's immediate and future plans;
 - c) describe the impacts to local communities of the changes in transportation and infrastructure; and
 - d) provide a proposed schedule for the work.
- [C] Describe any infrastructure or activity that could have a potential impact on existing roads (e.g., pipelines or utilities crossing provincial highways, any facilities in close proximity of the highways, any smoke, dust, noise, light or precipitation generated by the Project that could impact the highway and road users).
- [D] Provide a summary of any discussions with Alberta Transportation in regards to the Project and its traffic impacts.

2.7 Air Emissions Management

- [A] Discuss the selection criteria used, options considered, and rationale for selecting control technologies to minimize air emission and ensure air quality management.
- [B] Provide emission profiles (type, rate and source) for the Project's operating and construction emissions including point and non-point sources and fugitive emissions. Consider both normal and upset conditions. Discuss:
- a) odorous and visible emissions from the proposed facilities;
 - b) annual and total greenhouse gas emissions during all stages of the Project. Identify the primary sources and provide detailed calculations;
 - c) the intensity of greenhouse gas emissions per unit of bitumen produced;
 - d) the Project's contribution to total provincial and national greenhouse gas emissions on an annual basis;
 - e) Suncor's overall greenhouse gas management plans;
 - f) Suncor's plans to manage emissions from the mining fleet, including the types of equipment;
 - g) Suncor's overall fugitive emissions management plans;
 - h) amount and nature of Criteria Air Contaminants emissions;

- i) the amount and nature of acidifying emissions, probable deposition patterns and rates;
- j) control technologies used to reduce emissions;
- k) emergency flaring scenarios (e.g., frequency and duration) and proposed measures to ensure flaring events are minimized;
- l) upset condition scenarios (e.g., frequency and duration) and proposed measures to ensure upset conditions are minimized;
- m) gas collection and conservation, and the applicability of vapour recovery technology;
- n) applicability of sulphur recovery, acid gas re-injection, or flue gas desulphurization to reduce sulphur emissions; and
- o) fugitive emissions control technology to detect, measure and control emissions and odours from equipment leaks.

2.8 Water Management

- [A] Discuss potential cooperation with other parties regarding water related infrastructure and management including, but not limited to, water intakes, pipelines, water storage and withdrawals, flow monitoring and reporting and ecological monitoring.

2.8.1 Water Supply

- [A] Describe the water supply requirements for the Project, including:
- a) the criteria used, options considered and rationale for selection of water supply;
 - b) the expected water balance during all stages of the Project. Discuss assumptions made or methods chosen to arrive at the water balances;
 - c) the process water, potable water, and non-potable water requirements and sources for construction (including, but not limited to, road construction, winter road construction, lease construction, and dust suppression), camp(s) and plant site, start-up, normal and emergency operating situations, decommissioning and reclamation. Identify the volume of water to be withdrawn from each source, considering plans for wastewater reuse;
 - d) the location of sources/intakes and associated infrastructure (e.g., pipelines for water supply);
 - e) the variability in the amount of water required on an annual and seasonal basis as the Project is implemented;
 - f) the expected cumulative effects on water losses/gains resulting from the Project operations;
 - g) contingency plans in the event of restrictions on the Project's water supply source (e.g., due to license conditions, source volume limitations, climate change or cumulative impact water deficits);
 - h) potable water treatment systems for all stages of the Project;
 - i) type and quantity of potable water treatment chemicals used; and
 - j) measures for ensuring efficient use of water including alternatives to reduce the consumption of non-saline water such as water use minimization, recycling, conservation, and technological improvements.

2.8.2 Surface Water

- [A] Describe the surface water management strategy for all stages of the Project, including:

- a) design factors considered, such as:
 - i) site drainage,
 - ii) run-on management,
 - iii) road and plant run-off,
 - iv) erosion/sediment control,
 - v) geotechnical stability concerns,
 - vi) groundwater and surface water protection,
 - vii) wetland and waterbody dewatering,
 - viii) mine pit dewatering,
 - ix) groundwater seepage,
 - x) produced water management, and
 - xi) flood protection;
 - b) permanent or temporary alterations or realignments of watercourses, wetlands and other waterbodies;
 - c) the pre and post-disturbance alignment and condition of all ephemeral and permanent streams, wetlands and waterbodies including those created by the Project; and
 - d) factors used in the design through decommissioning of water management facilities with respect to the *Water (Ministerial) Regulation* and where relevant, the *Alberta Dam and Canal Safety Directive*, including consequence classification and expected failure related flood and flood protection.
- [B] Describe and map all roadway, pipeline, powerline and any other utility crossings of watercourses or waterbodies.
- [C] Describe discharges to the surrounding watershed from existing, reclaimed or planned sites and the management strategy for handling such releases.
- [D] Describe how the *Alberta Wetland Policy* was considered in the assessment of impacts, including but not limited to:
- a) avoidance, minimization, reclamation or replacement of wetlands in accordance with the *Alberta Wetland Mitigation Directive*;
 - b) temporary and permanent alterations (direct and indirect) to wetlands classified under the *Alberta Wetland Classification System*;
 - c) any expected changes in wetland class and cause for this change; and
 - d) consideration of cumulative effects in the watershed to wetlands.

2.8.3 Wastewater Management

- [A] Describe the wastewater management strategy, including:
- a) the criteria used, options considered and rationale for the selection wastewater treatment and wastewater disposal and a discussion of why other options not chosen;
 - b) the source, quantity and composition of each wastewater stream from each component of the proposed operation (e.g., oil sands mining, bitumen extraction and associated facilities) for all project conditions, including normal, start-up, worst-case and upset conditions;
 - c) the proposed disposal locations and methods for each wastewater stream;
 - d) geologic formations for the disposal of wastewaters;
 - e) design of facilities that will collect, treat, store and release wastewater streams;

- f) the type and quantity of chemicals used in wastewater treatment, including measures taken in the design to prevent or minimize potential impacts to the environment;
- g) quantity and composition of residual products resulting from proposed wastewater treatment and proposed handling of these materials;
- h) sewage treatment and disposal;
- i) the options for the disposal of wastewater in the context of best management practices and best available technologies, including the rationale for choosing the preferred option and the measures taken to prevent impacts on potable groundwater, aquatic ecosystems and vegetation;
- j) how make-up water requirements and disposal volumes will be minimized; a monitoring plan for wastewater releases, including the rationale used to determine the frequency of sampling and the parameters to be measured;
- k) planned life-mine discharges to the surrounding watershed from existing and future sites including reclaimed sites, tailings management areas and end pit lakes and the management strategy for handling such releases; and
- l) the potable water and sewage treatment systems for both the construction and operation stages. Discuss the sewage treatment system options considered including the rationale for the option selected.

2.9 Waste Management

- [A] Discuss the selection criteria used, options considered, and rationale for waste disposal. Include:
 - a) the location, availability of on-site waste disposal; and
 - b) site suitability from a water quality protection perspective, geotechnical perspective and with regard to existing and potential human activities.
- [B] Characterize and quantify the anticipated dangerous goods, and hazardous, non-hazardous, and recyclable wastes generated by the Project, and describe:
 - a) the composition and volume of specific waste streams and discuss how each stream will be managed;
 - b) the management plan for exploratory drilling wastes, produced tailings, overburden and other mining wastes, as well as any by-products. Include evaluations to minimize fine fluid tailings production, considering mining methods and the proposed extraction process;
 - c) how disposal sites and sumps will be constructed; and
 - d) plans for pollution prevention, waste minimization, recycling, and management to reduce waste quantities for all stages of the Project.
- [C] Describe the nature and amount of on-site hydrocarbon storage. Discuss containment and other environmental protection measures.

2.10 Conservation and Reclamation

- [A] Provide a conceptual conservation and reclamation plan for the Project considering. Describe and map as applicable:
 - a) any existing Conservation and Reclamation Plan;
 - b) current land use and capability, vegetation, commercial forest land base by commercialism class, forest productivity, recreation, wildlife, aquatic resources, aesthetics, traditional land uses and land use resources;

- c) integration of operations, decommissioning, reclamation planning and reclamation activities;
 - d) anticipated timeframes for completion of reclamation stages and release of lands back to the Crown including an outline of the key milestone dates for reclamation and how progress to achieve these targets will be measured;
 - e) constraints to reclamation such as timing of activities, availability of reclamation materials and influence of natural processes and cycles including natural disturbance regimes;
 - f) post-development land capability with respect to:
 - i) self-sustaining topography, drainage and surface watercourses representative of the surrounding area,
 - ii) existing traditional use with consideration for traditional vegetation and wildlife species in the reclaimed landscape,
 - iii) end pit lakes,
 - iv) wetlands,
 - v) self-sustaining vegetation communities representative of the surrounding area capable of ecological succession, and
 - vi) reforestation and forest productivity;
 - g) water supply capability of post-mine landscape;
 - h) reclamation material salvage, storage areas and handling procedures;
 - i) reclamation material replacement indicating depth, volume and type;
 - j) management of suitable overburden;
 - k) existing and final reclaimed site drainage plans;
 - l) integration of surface and near-surface drainage within the Project Area; and
 - m) promotion of biodiversity.
- [B] Provide a conceptual revegetation plan for the disturbed terrestrial, riparian and wetland areas. Consider factors such as biological capability and diversity, natural disturbance regimes and end land use objectives.
- [C] Provide a map of the predicted ecosites for the post reclamation landscape considering potential land uses, including traditional uses and how the landscape and soils have been designed to accommodate future land use.
- [D] Provide a conceptual plan to monitor reclamation performance and success (including soils, vegetation, wildlife and aquatic resources).
- [E] Describe how the Suncor considered the use of progressive reclamation in project design and reclamation planning.
- [F] Provide a discussion of issues related to the design of a self-sustaining and productive aquatic ecosystem for a range of users and uses, including implications of the selected tailings technology. Explain processes and activities Suncor will undertake to address issues of uncertainty surrounding the long-term ecological viability of end pit lakes.
- [G] Provide a discussion of any off-site mitigation that is being considered for habitat types that cannot be reclaimed.
- [H] Discuss uncertainties related to the conceptual reclamation plan.

2.11 Environmental Management Systems

- [A] Summarize key elements of Suncor's existing or proposed environment, health and safety management system.
- [B] Describe adaptive management plans that minimize the impact of the Project. Describe the flexibility built into the Project to accommodate future modifications required as a result of:
 - a) any change in environmental standards, limits and guidelines; and
 - b) findings from project-specific regional monitoring programs.
- [C] Describe the Suncor's current and proposed monitoring programs with respect to:
 - a) air emissions, including fugitive emissions;
 - b) wastewater treatment and release; and
 - c) hazardous and non-hazardous waste treatment and storage.
- [D] Describe the emergency response system that will be used to minimize adverse environmental effects while protecting the safety of personnel.

3 ENVIRONMENTAL ASSESSMENT

3.1 Air Quality, Climate and Noise

3.1.1 Baseline Information

- [A] Discuss the baseline climatic and air quality conditions including:
 - a) seasonal variation in temperature and precipitation;
 - b) extreme precipitation statistics;
 - c) projected changes due to climate change in temperature and precipitation, including extreme precipitation statistics, over the life of the Project;
 - d) the type and frequency of meteorological conditions that may result in poor air quality; and
 - e) appropriate ambient air quality parameters.

3.1.2 Impact Assessment

- [A] Identify components of the Project that will affect air quality, and:
 - a) describe the potential for reduced air quality (including odours and visibility) resulting from the Project and discuss any implications of the expected air quality for environmental protection and public health;
 - b) estimate ground-level concentrations of appropriate air quality parameters;
 - c) discuss any expected changes to particulate deposition, nitrogen deposition or acidic deposition patterns;
 - d) identify areas that are predicted to exceed Potential Acid Input critical loading criteria;
 - e) discuss interactive effects that may occur resulting from co-exposure of a receptor to all emissions; and
 - f) describe air quality impacts resulting from the Project, and their implications for other environmental resources, including habitat diversity and quantity, soil resources, vegetation resources and water quality.

- [B] Identify stages or elements of the Project that are sensitive to changes or variability in climate parameters, including frequency and severity of extreme weather events and discuss the potential impacts over the life of the Project.
- [C] Summarize the results of the noise assessment conducted for the Project, and:
 - a) identify the receptors used in the assessment;
 - b) discuss the design, construction and operational factors to be incorporated into the Project to comply with the AER's *Directive 38: Noise Control*; and
 - c) identify components of the Project that have the potential to increase noise levels and discuss the implications, including:
 - i) potentially affected people and wildlife;
 - ii) an estimate of the potential for increased noise resulting from the development, and
 - iii) strategies to monitor and mitigate any increased noise levels.

3.2 Hydrogeology

3.2.1 Baseline Information

- [A] Provide an overview of the existing geologic and hydrogeologic setting from the ground surface down to, and including, the oil producing zones and disposal zones, and if applicable, to the base of any deeper strata that would be potentially impacted by mining. Document any new hydrogeological investigations, including methodology and results, undertaken as part of the EIA, and:
 - a) present regional and Project Area geology to illustrate depth, thickness and spatial extent of lithology, stratigraphic units and structural features; and
 - b) present regional and Project Area hydrogeology describing:
 - i) the major aquifers, aquitards and aquicludes (Quaternary and bedrock), their spatial distribution, properties, hydraulic connections between aquifers, hydraulic heads, gradients, groundwater flow directions and velocities. Include maps and cross sections,
 - ii) the chemistry of groundwater aquifers including baseline concentrations of major ions, metals and hydrocarbon indicators,
 - iii) the potential discharge zones, potential recharge zones and sources, areas of groundwater-surface water interaction and areas of Quaternary aquifer-bedrock groundwater interaction,
 - iv) water well development and groundwater use, including an inventory of groundwater users,
 - v) the recharge potential for Quaternary aquifers,
 - vi) potential hydraulic connection between bitumen production zones, deep disposal formations and other aquifers resulting from project operations,
 - vii) the characterization of formations chosen for deep well disposal, including chemical compatibility and containment potential, injection capacity, hydrodynamic flow regime, and water quality assessments, and
 - viii) the locations of major facilities associated with the Project including facilities for waste storage, treatment and disposal (e.g., deep well disposal) and describe site-specific aquifer and shallow groundwater conditions beneath these proposed facilities. Provide supporting geological information.

3.2.2 Impact Assessment

- [A] Describe project components and activities that have the potential to affect groundwater resource quantity and quality at all stages of the Project.
- [B] Describe the nature and significance of the potential project impacts on groundwater with respect to:
 - a) inter-relationship between groundwater and surface water in terms of both groundwater and surface water quantity and quality;
 - b) implications for terrestrial or riparian vegetation, wildlife and aquatic resources including wetlands;
 - c) changes in groundwater quality, quantity and flow;
 - d) conflicts with other groundwater users, and proposed resolutions to these conflicts;
 - e) potential implications of seasonal variations; and
 - f) groundwater withdrawal for project operations, including any expected alterations in the groundwater flow regime during and following project operations.
- [C] Describe the nature and significance of the potential project impacts on groundwater with respect to:
 - a) the early detection of potential contamination
 - b) groundwater remediation options in the event that adverse effects are detected
 - c) monitoring groundwater levels and associated changes due to production or dewatering impacts.

3.3 Hydrology

3.3.1 Baseline Information

- [A] Describe and map the surface hydrology in the Project Area.
- [B] Identify any surface water users who have existing approvals, permits or licenses.
- [C] Provide surface flow baseline data, including:
 - a) seasonal variation, low, average and peak flows for watercourses; and
 - b) surface water catchment areas.

3.3.2 Impact Assessment

- [A] Discuss changes to watersheds, including surface and near-surface drainage conditions, potential flow impediment, and potential changes in open-water surface areas caused by the Project.
- [B] Describe the extent of hydrological changes that will result from disturbances, including licensed water diversions, to groundwater and surface water movement, and:
 - a) include changes to the quantity of surface flow, water levels and channel regime in watercourses (during minimum, average and peak flows) and water levels in waterbodies;
 - b) assess the potential impact of any alterations in flow on the hydrology and identify all temporary and permanent alterations, channel realignments, disturbances or surface water withdrawals;

- c) discuss the effect of these changes on hydrology (e.g., timing, volume, peak and minimum flow rates, river regime and lake levels), including the significance of effects for downstream watercourses; and
 - d) identify any potential erosion problems in watercourses resulting from the Project.
- [C] Describe impacts on other surface water users resulting from the Project. Identify any potential water use conflicts.
- [D] Discuss changes in sedimentation patterns in receiving waters.
- [E] Discuss the impact of low flow conditions and in-stream flow needs on water supply and water and wastewater management strategies.

3.4 Surface Water Quality

3.4.1 Baseline Information

- [A] Describe the baseline water quality of watercourses and waterbodies. Discuss the effects of seasonal (temporal), spatial, flow and other factors on water quality. Consider appropriate water quality parameters, including those with established guidelines for the protection of aquatic life or known to be influenced or impacted by the proposed Project.

3.4.2 Impact Assessment

- [A] Identify project components that may influence or impact water quality.
- [B] Describe the potential impacts of the Project on surface water quality, including:
- a) changes in water quality that may exceed the *Environmental Quality Guidelines for Alberta Surface Waters* or the *Canadian Water Quality Guidelines for the Protection of Aquatic Life* (where relevant Alberta guidelines do not exist);
 - b) implications of the tailings deposits, including the amount and quality of water or leachates released, their permeability and groundwater characteristics;
 - c) changes in water quality parameters determined to be altered by the Project for which provincial or federal guidelines do not exist;
 - d) seasonal and spatial variation;
 - e) project-related and cumulative impacts of acidifying and other air emissions; and
 - f) changes in surface runoff or groundwater discharge.
- [C] Describe water and sediment quality conditions and suitability for aquatic biota in constructed waterbodies.

3.5 Aquatic Ecology

3.5.1 Baseline Information

- [A] Describe and map the fish, fish habitat and aquatic resources (e.g., aquatic and benthic invertebrates) of the lakes, rivers, ephemeral water bodies and other waters. Describe the species composition, distribution, relative abundance, movements and general life history parameters of fish resources including their use and potential use of habitats. Provide the methods used and rationale for the baseline data collection.
- [B] Describe any species that are:
- a) listed as “at Risk, May be at Risk and Sensitive” in the *General Status of Alberta Wild Species* (Alberta Environment and Parks);

- b) identified by the *Alberta Wildlife Act* as ‘Endangered’, ‘Threatened’, or ‘Species of Special Concern’;
 - c) listed in Schedule 1 of the federal *Species at Risk Act*;
 - d) listed as “at risk” by COSEWIC; and
 - e) traditionally used species.
- [C] Describe and map aquatic habitat including critical or sensitive areas as well as habitat disturbances that are related to proposed, existing and approved projects overlain on surface hydrology.
- [D] Describe the current and potential use of the fish resources by Indigenous, or recreational fisheries.
- [E] Describe and quantify the extent of current aquatic habitat fragmentation.

3.5.2 Impact Assessment

- [A] Describe and assess the potential impacts of the Project to fish, fish habitat, aquatic and benthic invertebrates and key indicators, including but not limited to::
- a) fish tainting, survival of eggs and fry, chronic or acute health effects, and increased stress on fish populations from release of contaminants, sedimentation, flow alterations, and/or changes in temperature;
 - b) habitat loss and alteration;
 - c) potential water quality and quantity changes;
 - d) potential impacts on riparian areas that could affect aquatic resources and productivity;
 - e) changes to benthic invertebrate communities;
 - f) increased fishing pressures in the region that could arise from the increased human activity and improved access from the Project;
 - g) increased habitat fragmentation;
 - h) acidification and/or eutrophication;
 - i) groundwater-surface water interactions; and
 - j) entrapment and entrainment of fish at water intakes.
- [B] Identify the key aquatic indicators that the Proponent used to assess project impacts. Discuss the rationale for the selection of key indicators.
- [C] Discuss the design, construction and operational factors to be incorporated into the Project to minimize effects to fish and fish habitat and protect aquatic resources.
- [D] Identify plans proposed to offset any loss in the productivity as a result of the Project. Indicate how environmental protection plans address applicable provincial and federal policies on fish habitat.

3.6 Vegetation

3.6.1 Baseline Information

- [A] Describe and map the vegetation communities, wetlands (using the Alberta Wetland Classification System), rare plant communities, old growth forests, and communities of limited distribution. Identify the occurrence, relative abundance and distribution of each vegetation community and identify any species that are:

- a) listed as “at Risk, May be at Risk and Sensitive” in the *General Status of Alberta Wild Species* (Alberta Environment and Parks);
 - b) listed in Schedule 1 of the federal *Species at Risk Act*;
 - c) listed as “at risk” by COSEWIC; and
 - d) traditionally and currently used species.
- [B] Describe and quantify the current extent of habitat fragmentation.
- [C] Discuss the potential of each ecosite phase to support rare plant species, plants for traditional, medicinal and cultural purposes, old growth forests and communities of limited distribution. Consider their importance for local and regional habitat, sustained forest growth, rare plant habitat and the hydrologic regime.
- [D] Describe regional relevance of landscape units that are identified as rare.
- [E] Provide timber productivity ratings for both the Project Area and the Local Study Area including identification of productive forested, non-productive forested and non-forested lands.

3.6.2 Impact Assessment

- [A] Identify the amount of vegetation and wetlands to be disturbed during the life of the Project.
- [B] Describe and assess the potential impacts of the Project on vegetation communities.
- [C] Describe the potential impacts of the Project on rare or endangered plant species.
- [D] Identify key vegetation indicators used to assess the Project impacts. Discuss the rationale for the indicator’s selection.
- [E] Discuss temporary (include timeframe) and permanent changes to vegetation and wetland communities and comment on:
- a) the impacts on recreation, Indigenous and other uses;
 - b) the sensitivity to disturbance (including acid deposition) as well as techniques used to estimate sensitivity to disturbance and reclamation of each vegetation community; and
 - c) impacts on other environmental resources (habitat diversity and quantity, water quality and quantity, erosion potential).
- [F] Describe the regional impact of any ecosite phase to be removed.
- [G] Discuss, from an ecological perspective, the expected timelines for establishment and recovery of vegetative communities and the expected differences in the resulting vegetative community structures.
- [H] Provide a map of the predicted ecosites that shows the reclaimed vegetation. Comment on the importance of the size, distribution and variety of the reclaimed landscape units from both a local and regional perspective.
- [I] Discuss the impacts of any loss of wetlands, including how the loss will affect the land use.
- [J] Identify key vegetation indicators used to assess the Project impacts. Discuss the rationale for the indicator’s selection.

- [K] Discuss weeds and non-native invasive species and describe how these species will be assessed and controlled in all stages of the Project.
- [L] Discuss the potential changes to upland, riparian and wetland habitats increased fragmentation.

3.7 Wildlife

3.7.1 Baseline Information

- [A] Describe and map the wildlife resources (amphibians, reptiles, birds, and terrestrial and aquatic mammals). Describe species composition, relative abundance, distribution, seasonal movements, movement corridors, habitat requirements, key habitat areas, general life history and their use and potential use of habitats. Also identify any species that are:
 - a) listed as “at Risk, May be at Risk and Sensitive” in the *General Status of Alberta Wild Species* (Alberta Environment and Parks);
 - b) listed in Schedule 1 of the federal *Species at Risk Act*;
 - c) listed as “at risk” by COSEWIC; and
 - d) species of traditional and current use and cultural keystone species.
- [B] Describe and map existing wildlife habitat and habitat disturbance including exploration activities. Identify habitat disturbances that are related to existing and approved projects.

3.7.2 Impact Assessment

- [A] Describe and assess the potential impacts of the Project to wildlife populations and wildlife habitats, considering:
 - a) how the Project will affect wildlife relative abundance, habitat availability, mortality, movement patterns, and distribution for all stages of the Project;
 - b) how improved or altered access may affect wildlife, including potential obstruction of movements, increased vehicle collisions, and increased hunting pressure;
 - c) how increased habitat fragmentation may affect wildlife. Consider edge effects, the availability of core habitat and the influence of linear features and infrastructure on wildlife movements and predator-prey relationships;
 - d) the use of setbacks;
 - e) potential effects on wildlife resulting from changes to air and water quality, including both acute and chronic effects to animal health;
 - f) the spatial and temporal changes to habitat availability and habitat effectiveness (types, quality, quantity, diversity and distribution);
 - g) the resilience and recovery capabilities of wildlife populations and habitats to disturbance;
 - h) the potential for the Project to be returned to its existing state with respect to wildlife populations and their habitats;
 - i) i) the predicted and/or anticipated changes to wildlife and wildlife habitat cumulative effects resulting from the Project’s anticipated changes; and
 - j) potential effects on wildlife from the Proponent’s proposed and planned exploration, seismic and core hole activities, including monitoring/4D seismic.
- [B] Identify the key wildlife and habitat indicators used to assess project impacts. Discuss the rationale for their selection.

- [C] Comment on the availability of species for traditional use, considering habitat loss, habitat avoidance, vehicle-wildlife collisions, increased non-Indigenous hunting pressure and other Project related impacts on wildlife populations.
- [D] Describe the deterrent systems that will be incorporated into the Project to reduce the impacts on birds and other wildlife attracted to open ponds or wastewater ponds.

3.8 Biodiversity

3.8.1 Baseline Information

- [A] Describe the terrestrial and aquatic biodiversity metrics that will be used to characterize the existing ecosystem and potential impacts of the Project, and
 - a) describe the process and rationale used to select biotic and abiotic indicators for biodiversity within the selected taxonomic groups;
 - b) determine the relative abundance of species in each ecosite phase;
 - c) provide locations and lists of species, as well as summaries of observed and estimated species richness and evenness for each ecosite phase;
 - d) provide a measure of biodiversity on baseline sites that are representative of the proposed reclamation ecosites;
 - e) rank each ecological unit for biodiversity potential. Describe techniques used in the ranking process; and
 - f) describe the current level of habitat fragmentation.

3.8.2 Impact Assessment

- [A] Describe the metrics used to assess the potential impacts of the Project. Discuss the contribution of the Project to any anticipated changes in regional biodiversity and the potential impact to local and regional ecosystems.
- [B] Describe and assess the potential impacts of the Project to biodiversity at relevant scales (site-specific to landscape level), considering:
 - a) the biodiversity metrics, biotic and abiotic indicators selected;
 - b) the effects of fragmentation on biodiversity potential;
 - c) the contribution of the Project to any anticipated changes in regional biodiversity and the potential impact to local and regional ecosystems; and
 - d) effects during construction, operations and post-reclamation and the significance of these changes in a local and regional context.

3.9 Terrain and Soils

3.9.1 Baseline Information

- [A] Describe and map the terrain and soils conditions, including:
 - a) surficial geology and topography, overburden geology and mineralogy;
 - b) the soil types and their distribution. Provide an ecological context for the soils by supplying a soil survey report and maps to Survey Intensity Level 2 for the Project Area;
 - c) suitability and availability of reclamation material (soils, suitable overburden) within the Project Area for reclamation;
 - d) soils that could be affected by the Project, with emphasis on potential acidification (by soil type); and

- e) descriptions and locations of erosion-sensitive soils.
- [B] Describe and map soil types in the areas that are predicted to exceed Potential Acid Input critical loading criteria.

3.9.2 Impact Assessment

- [A] Describe project activities and other related issues that could affect soil quality (e.g., compaction, contaminants) and:
 - a) indicate the amount (ha) of surface disturbance from plant, mine, overburden disposal, reclamation material stockpiles, infrastructure (e.g., pipelines, power lines, access roads), aggregate and borrow sites, camps, waste disposal and other construction and operation activities;
 - b) provide an inventory of the pre- and post-disturbance land capability classes for soils in both the Project Area and the Local Study Area and describe the impacts to land capability resulting from the Project. Indicate the size and location of soil types and land capability classes that will be disturbed;
 - c) discuss the relevance of any changes for the local and regional landscapes, biodiversity, productivity, ecological integrity, aesthetics and future use resulting from disturbance during the life of the Project;
 - d) identify the potential acidification impact on soils and discuss the significance of predicted impacts by acidifying emissions;
 - e) discuss the potential for soil erosion during the life of the Project;
 - f) describe the impact of the Project on soil types and reclamation suitability and the approximate volume of soil materials for reclamation. Discuss any constraints or limitations to achieving vegetation/habitat reclamation based on anticipated soil conditions (e.g., compaction, contaminants, salinity, soil moisture, nutrient depletion, erosion, etc.); and
 - g) describe potential sources of soil contamination.
- [B] Discuss:
 - a) the environmental effects of proposed drilling methods on the landscape and surficial and bedrock geology; and
 - b) the potential impacts caused by the mulching and storage of woody debris considering, but not limited to, vulnerability to fire, degradation of soil quality, increased footprint.

3.10 Land Use and Management

3.10.1 Baseline Information

- [A] Describe and map the current land uses in the Project Area, including all Crown land dispositions and Crown Reservations (Holding Reservation, Protective Notation, Consultative Notation).
- [B] Describe the existing land and resource uses and potential conflicts that exist, considering oil and gas development, agriculture, forestry, tourism and outdoor recreational activities.
- [C] Indicate where Crown land dispositions may be needed for roads or other infrastructure for the Project.

- [D] Identify and map unique sites or special features such as Parks and Protected Areas, Heritage Rivers, Historic Sites, Environmentally Significant Areas, culturally significant sites and other designations (e.g., World Heritage Sites, Ramsar Sites, Internationally Important Bird Areas).
- [E] Identify any land use policies and resource management initiatives that pertain to the Project and discuss how the Project will be consistent with the intent of these initiatives.
- [F] Describe and map land clearing activities, showing the timing of the activities.
- [G] Describe the status of timber harvesting arrangements, including species and timing.
- [H] Describe existing access control measures.

3.10.2 Impact Assessment

- [A] Identify the potential impacts of the Project on land uses, including:
 - a) unique sites or special features;
 - b) changes in public access arising from linear development, including secondary effects related to increased hunter, angler and other recreational access and facilitated predator movement;
 - c) aggregate reserves that may be located on land under the Suncor's control and reserves in the region;
 - d) development and reclamation on commercial forest harvesting and fire management in the Project Area;
 - e) the amount of commercial and non-commercial forest land base that will be disturbed by the Project, including the Timber Productivity Ratings for the Project Area. Compare the baseline and reclaimed percentages and distribution of all forested communities in the Project Area;
 - f) how the Project impacts Annual Allowable Cuts and quotas within the Forest Management Agreement area;
 - g) anticipated changes (type and extent) to the topography, elevation and drainage patterns within the Project Area; and
 - h) access control for public, regional recreational activities, Indigenous land use and other land uses during and after development activities.
- [B] Describe how Integrated Land Management has been used (e.g., sharing of infrastructure, access requirements).
- [C] Provide a fire control plan highlighting:
 - a) measures taken to ensure continued access for firefighters to adjacent wildland areas;
 - b) forest fire prevention, detection, reporting, and suppression measures, including proposed fire equipment;
 - c) measures for determining the clearing width of power line rights-of-way; and
 - d) required mitigative measures for areas adjacent to the Project Area based on the *FireSmart Field Guide for the Upstream Oil and Gas Industry*.

4 HISTORIC RESOURCES

4.1 Baseline Information

- [A] Provide a brief overview of the regional historical resources setting including a discussion of the relevant archaeological, historic and palaeontological records.

- [B] Describe and map known historic resources sites in the Project Area, considering:
 - a) site type and assigned Historic Resources Values; and
 - b) existing site specific *Historical Resources Act* requirements.
- [C] Provide an outline of the program and schedule of field investigations that Alberta Culture, Multiculturalism and Status of Women may require Suncor to undertake to further assess and mitigate the impacts of the Project on historic resources.
- [D] Document any historic resources raised during consultation on the Project.
- [E] Provide an overview of previous Historical Resources Impact Assessments that have been conducted within the Project Area, including:
 - a) a description of the spatial extent of previous assessment relative to the Project Area, noting any assessment gap areas; and
 - b) a summary of *Historical Resources Act* requirements and/or clearances that have been issued for the Project to date.
- [F] Identify locations within the Project Area that are likely to contain previously unrecorded historic resources. Describe the methods used to identify these areas.

4.2 Impact Assessment

- [A] Describe project components and activities that have the potential to affect historic resources at all stages of the Project.
- [B] Describe the nature and magnitude of the potential project impacts on historical resources, considering:
 - a) effects on historic resources site integrity; and
 - b) implications for the interpretation of the archaeological, historic and palaeontological records.

5 TRADITIONAL ECOLOGICAL KNOWLEDGE AND LAND USE

- [A] Provide:
 - a) a map and description of traditional land use areas including fishing, hunting, trapping, water use (e.g., for drinking, cooking and navigation) and nutritional, medicinal or cultural plant harvesting by affected Indigenous peoples (if the Indigenous community or group is willing to have these locations disclosed);
 - b) a map of cabin sites, spiritual sites, cultural sites, graves and other traditional use sites considered historic resources under the *Historical Resources Act* (if the Indigenous community or group is willing to have these locations disclosed), as well as traditional trails and resource activity patterns; and
 - c) a discussion of:
 - i) the availability of vegetation, fish and wildlife species for food, traditional, medicinal and cultural purposes in the identified traditional land use areas considering all project related impacts,
 - ii) access to traditional lands in the Project Area during all stages of the Project, and
 - iii) Indigenous views on land reclamation.

- [B] Describe how Traditional Ecological Knowledge and Traditional Land Use information was incorporated into the Project, EIA development, the conservation and reclamation plan, monitoring and mitigation.
- d) Determine the impacts of the Project on traditional, medicinal and cultural purposes and identify possible mitigation strategies.

6 PUBLIC HEALTH AND SAFETY

6.1 Public Health

- [A] Describe aspects of the Project that may have implications for public health or the delivery of regional health services. Determine quantitatively whether there may be implications for public health arising from the Project.
- [B] Document any health concerns raised by stakeholders during consultation on the Project.
- [C] Document any health concerns identified by Indigenous communities or groups resulting from impacts of existing development and of the Project specifically on their traditional lifestyle. Include an Indigenous receptor type in the assessment.
- [D] Describe the potential health impacts resulting from higher regional traffic volumes and the increased risk of accidental leaks and spills.

6.2 Public Safety

- [A] Describe aspects of the Project that may have implications for public safety. Specifically:
- a) describe the emergency response plan including public notification protocol and safety procedures to ensure public safety and minimize adverse environmental effects, including emergency reporting procedures for spill containment and management;
 - b) document any safety concerns raised by stakeholders during consultation on the Project and the actions taken to address those concerns;
 - c) describe how local residents will be contacted during an emergency and the type of information that will be communicated to them;
 - d) describe the existing agreements with area municipalities or industry groups such as safety cooperatives, emergency response associations, regional mutual aid programs and municipal emergency response agencies or other industry partner emergency response/spill response agreements; and
 - e) describe the potential safety impacts resulting from higher regional traffic volumes.

7 SOCIO-ECONOMIC ASSESSMENT

7.1 Baseline Information

- [A] Describe the existing socio-economic conditions in the region and in the communities in the region.
- [B] Describe factors that may affect existing socio-economic conditions including:
- a) population changes;
 - b) workforce requirements for all stages of the Project, including a description of when peak activity periods will occur;
 - c) planned accommodations for the workforce for all stages of the Project. Discuss the rationale for their selection;

- d) Suncor's policies and programs regarding the use of local, regional and Alberta goods and services;
- e) the project schedule; and
- f) the overall engineering and contracting plan for the Project.

7.2 Impact Assessment

- [A] Describe the effects of construction and operation of the Project on:
 - a) housing;
 - b) availability and quality of health care services;
 - c) local and regional infrastructure and community services;
 - d) recreational activities;
 - e) hunting, fishing, trapping and gathering; and
 - f) First Nations and Métis (e.g., traditional land use and social and cultural implications); and
 - g) local training, employment and business opportunities.
- [B] Describe the socio-economic effects of any new or existing camp(s) required for the Project and identify:
 - a) its location;
 - b) the number of workers it is intended to house;
 - c) whether the camp will service the Project only or other clients;
 - d) the length of time the camp will be in service;
 - e) describe the services that will be provided in the camp (e.g., security, recreation and leisure, medical services), including a description of the impacts on Municipal or other external services; and
 - f) outline the emergency services and evacuation plan that will be in place.
- [C] Describe the need for additional Crown land.
- [D] Discuss opportunities to work with First Nation and Métis communities and groups, other local residents and businesses regarding employment, training needs and other economic development opportunities arising from the Project.
- [E] Provide the estimated total project cost, including a breakdown for engineering and project management, equipment and materials, and labour for both construction and operation stages. Indicate the percentage of expenditures expected to occur in the region, Alberta, Canada outside of Alberta, and outside of Canada.

8 MITIGATION MEASURES

- [A] Discuss mitigation measures planned to avoid, minimize or eliminate the potential impacts for all stages of the Project.
- [B] Identify the mitigation objectives for each associated impact and describe those mitigation measures that will be implemented. Provide rationale for their selection, including a discussion on the effectiveness of the proposed mitigation.

9 RESIDUAL IMPACTS

- [A] Describe the residual impacts of the Project following implementation of Suncor's mitigation measures and the Suncor's plans to manage those residual impacts.

10 MONITORING

- [A] Describe Suncor's current and proposed monitoring programs, including:
- a) how the monitoring programs will assess any project impacts and measure the effectiveness of mitigation plans. Discuss how Suncor will address any project impacts identified through the monitoring program;
 - b) how Suncor will contribute to current and proposed regional monitoring programs;
 - c) monitoring performed in conjunction with other stakeholders, including Indigenous communities and groups;
 - d) new monitoring initiatives that may be required as a result of the Project;
 - e) regional monitoring that will be undertaken to assist in managing environmental effects and improve environmental protection strategies;
 - f) how monitoring data will be disseminated to the public, Indigenous communities or other interested parties; and
 - g) how the results of monitoring programs and publicly available monitoring information will be integrated with Suncor's environmental management system.