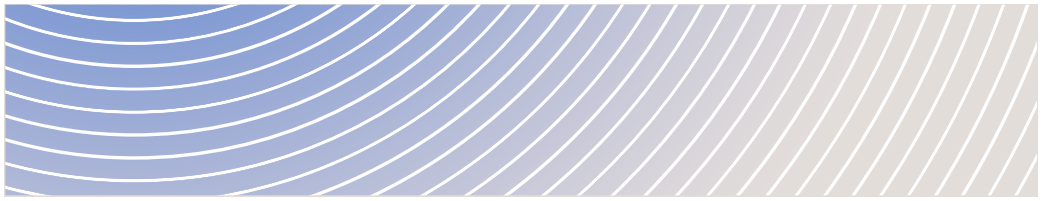
Draft Integrated Tailored Impact Statement Guidelines

NEW NUCLEAR AT WESLEYVILLE PROJECT



April 07, 2026

DRAFT VERSION

This is a draft document. Contents may change as a result of ongoing engagement and feedback received.

Impact Assessment Agency of Canada | Agence d'évaluation d'impact du Canada

Canada

Contents

Abbreviations and short forms

Term	Definition
Adverse federal effects	“Adverse effects within federal jurisdiction” and “direct or incidental adverse effects” as defined under the *Impact Assessment Act*
IAA	*Impact Assessment Act*
IAAC	Impact Assessment Agency of Canada
CNSC	Canadian Nuclear Safety Commission
COPC	Contaminant of Potential Concern
FPIC	Free, Prior, and Informed Consent
ECCC	Environment and Climate Change Canada
GBA Plus	Gender Based Analysis Plus
the Integrated Guidelines	Integrated Tailored Impact Statement Guidelines
GHG	Greenhouse gas
HHRA	Human Health Risk Assessment
IEPP	Indigenous Engagement and Partnership Plan
LSA	Local Study Area
LTPS	Licence to Prepare Site
MS-WTFN	Michi Saagiig Anishinaabeg Nations of the Williams Treaties First Nations which includes Alderville First Nation, Curve Lake First Nation, Hiawatha First Nation, Mississaugas of Scugog Island First Nations
Minister	Minister of Environment and Climate Change and Nature
NSCA	*Nuclear Safety and Control Act*
PA	Project Area
REGDOC	CNSC Regulatory Document in relation to NSCA requirements
RSA	Regional Study Area
SARA	*Species at Risk Act*
SACC	Strategic Assessment of Climate Change
the project	New Nuclear at Wesleyville Project
the Template	Tailored Impact Statement Guidelines Template
VC	Valued component

The Impact Assessment Agency of Canada's (IAAC) guidance on the practice of the application of the *Impact Assessment Act* (the IAA) [1] and its regulations is being updated, and the current versions of the guidance, referred to in this document, may not reflect IAAC's current practices. Ontario Power Generation (the proponent) remains responsible for following applicable legislation and regulations. The proponent is encouraged to engage with IAAC regarding up-to-date guidance. For more information, please contact Wesleyville@iaac-aeic.gc.ca.

A Compendium of references for the preparation of the Impact Statement (the Compendium) for the project has been provided as a separate document. The numbered in-text citations throughout these draft Integrated Tailored Impact Statement Guidelines (the Integrated Guidelines) correspond to a reference in the Compendium. In addition, table iii on page xix of the Initial Project Description includes preferred terminology chosen by MS-WTFNs, which is also used in this document.

1 Introduction

The federal impact assessment process is intended to prevent or mitigate significant adverse effects within federal jurisdiction and significant direct or incidental adverse effects - by anticipating, identifying and assessing the effects of designated projects in order to inform decision making under the IAA. These draft Integrated Guidelines for the New Nuclear at Wesleyville Project (the project) proposed by the proponent were tailored by IAAC during the Planning phase of the impact assessment process.

The draft Integrated Guidelines include information and studies necessary for the conduct of the impact assessment. These are based on adverse effects within federal jurisdiction, or direct or incidental adverse effects (collectively referred to hereafter as adverse federal effects). The scope of information and studies reflects what could potentially be significant as informed by the nature, complexity and context of the project, as well as by consultation and engagement with the proponent, First Nations and other Indigenous communities, the public, lifecycle regulators, jurisdictions, federal authorities and other interested parties.

Indigenous Knowledge provided by First Nations and other Indigenous communities also informs the scope of the information and studies included in the Integrated Guidelines.

Under the IAA, designated projects that include physical activities regulated by the Canadian Nuclear Safety Commission (CNSC) must be assessed by an integrated review panel (the review panel). The review panel will conduct an integrated assessment that addresses the requirements of an impact assessment (IA) under the IAA and the applicable requirements for an initial licence(s) under the *Nuclear Safety and Control Act* (NSCA) [2]. The review panel will use the proponent's Impact Statement along with other available information, including findings provided from Indigenous-led assessments, where available, to prepare an Impact Assessment Report.

In support of the Government of Canada's objective of "one project, one review", IAAC and the CNSC have collaborated to incorporate overlapping IAA requirements with those for the site evaluation for a Licence to Prepare a Site (LTPS) as outlined in Regulatory Document[1] (REGDOC) 1.1.1 [3] and other applicable

[1] REGDOCs are approved by the Commission following *public consultation.* REGDOCs are not subject to change based on comments received through the IA process.

regulations and guidance documents. Not all LTPS criteria are incorporated in the Integrated Guidelines. The proponent remains responsible for ensuring the Impact Statement addresses the requirements necessary to conduct the technical assessment under the NSCA for an LTPS. The proponent must refer to the requirements in REGDOC-1.1.1 [3] and other applicable regulatory and guidance documents to assist in preparing their submission.

The Integrated Guidelines use the word *must* to describe information requirements under the IAA or which form part of the licensing basis. In certain instances, the word *should*, instead of *must*, is used to advise the proponent to follow specific guidance or methods to meet the associated requirement. A concordance table, included in Appendix 1 identifies where these broadly overlapping information requirements are found.

The IAA requires the assessment of non-negligible adverse effects of a "federal work or undertaking." As the production of nuclear energy is declared to be to the general advantage of Canada in the *Nuclear Energy Act*, [4] this project is considered to be a federal work or undertaking as defined under the *Canadian Environmental Protection Act* (1999) [5]. Therefore, adverse federal effects within federal jurisdiction, as defined under the IAA also include changes to the environment or to health, social and economic conditions and the positive and negative consequences of those changes that are likely to be caused by the carrying out of the project.

It is the intention that the requirements in the final Integrated Guidelines will be focused on key issues anticipated to be material to decision-making. This draft version of the Integrated Guidelines reflects information requirements for all potential adverse federal effects, with tailored and focused requirements for key issues identified to date during the planning phase. These requirements may be further refined and focused during the remainder of the planning phase based on feedback received.

The Integrated Guidelines will be finalized following a comment period on these draft Integrated Guidelines, which will run from April 7, 2026 to May 7, 2026.

1.1 Scope of the impact assessment

In determining what information and studies are required in the proponent's Impact Statement, as set out in these Integrated Guidelines, IAAC took into account the factors listed in subsection 22(1) of the IAA, and focused on elements anticipated to be material to decision making under the IAA as described in section 1.3 Selection of Valued Components.

1.2 Site evaluation and site preparation for new nuclear reactor facilities

The CNSC's regulatory framework for nuclear reactors [6] requires a description of the site evaluation process to inform the application for a LTPS. Applicable requirements are from REGDOC-1.1.1 [3]. This

section provides an overview of site evaluation and site preparation, and how these intersect with the requirements of an IA conducted under the IAA.

1.2.1 Site evaluation

Site evaluation is the process of evaluating sites for new nuclear reactors. It is done before the proponent submits a licence application and continues throughout the lifecycle of the project, to ensure that the facility's design basis and safety case remains current with changing environmental conditions or modifications to the facility itself. Site evaluation information is also a key input into reactor facility design and subsequent lifecycle phases. The proponent should reject any unacceptable or inappropriate site before applying for a LTPS.

Site evaluation is not a licensed activity under the NSCA. Information gathered through the site evaluation process should be used during the integrated assessment process and will be reviewed by the CNSC during the assessment of the LTPS, and may be used to satisfy information needed for subsequent licensing phases. Many site evaluation requirements of REGDOC-1.1.1 Section 3 [3] have been consolidated into these Integrated Guidelines.

The site evaluation process overlaps substantially with the requirements of an IA conducted under the IAA. The site evaluation and IA determine, for the entire lifecycle of the project, whether:

- siting option choices were made to avoid or minimize environmental effects;
- the proposed facility and site infrastructure designs to be established are adequate (including the exclusion zone boundary, where appropriate);
- the proponent will ensure adequate provision for the protection of the environment, the health and safety of persons and maintaining national security; and
- the effects are likely to be, to some extent, significant, and the extent to which they are significant, taking into consideration mitigation measures.

The site evaluation process should satisfy the criteria contained in the following documents that apply to the facility being considered, including applicable federal environmental legislation and resources [3], [7], [8], and [9] in the Compendium. In accordance with the Canadian Standards Association (CSA) N288.6 [8], the site evaluation is periodically re-evaluated. The re-evaluation focuses on confirmation of the site characteristics and assessing the effects of the updated information. Design modifications, updates to operations, or both may be needed.

1.2.2 Site preparation

The proponent is applying for a LTPS for a Class IA nuclear facility under the NSCA. The proponent is required to hold an LTPS before any work is done on the site. The potential LTPS will be based on information gathered for the integrated assessment and thus should demonstrate that the proponent is taking into account future steps in the lifecycle of the proposed facility (construction, operation, decommissioning, and abandonment). The proponent should review REGDOC-1.1.1 Section 4 [3] and

other applicable documents and guidance to address the information criteria needed for an LTPS under the NSCA.

1.3 Selection of Valued Components

Valued Components (VCs) serve as the focal points for the impact assessment. The elements of the natural and human environments selected as VCs are those anticipated to be material for decision making under the IAA. The assessment of effects on VCs includes the assessment of the likely effect pathways that are cause-effect linkages between a project component or activity and the VC. The VCs must be assessed following the requirements presented in these Integrated Guidelines, as well as the generic assessment methodology in the Generic Requirements for Impact Statements which outlines the steps that must be applied to the assessment of each VC.

The Impact Statement must include, at minimum, the following VCs:

Category	Valued Component (VC) selected	Rationale for inclusion
	VCs for the assessment of adverse effects within federal jurisdiction, as defined under section 2 of the IAA	
Physical environment	Meteorological environment	Project-related activities may alter current climatic and physical properties at the site. Important for understanding impacts to other components of the environment.
	Geology and geochemistry, including shorelines, peninsulas, and islands	
	Soils and sediment	
	Radioactivity	Project-related activities may result in changes to air quality from fugitive dust, GHGs and the release of chemical and radiological contaminants. Ambient conditions may be impacted due to light, noise and vibrations from the project.
	Air quality	
	Noise levels	
	Visual environment	
	Surface water quantity	Project-related activities may result in adverse effects to the biological environment including thermal effects from cooling water discharge, release of contaminants.
	Surface water quality	
	Groundwater quantity	

	Groundwater quality	
Biological environment	Vegetation (aquatic, terrestrial, riparian and wetland environments)	Project-related activities such as site preparation and construction, blasting, in-water works, water intake, dewatering, effluent discharge, deposition of deleterious substances, sensory disturbances could result in adverse effects to the biological environment.
	Wildlife (insects, amphibians, reptiles, mammals) and their habitats	
	Fish and fish habitat	
	Birds, breeding birds, migratory birds, and their habitats	
	Species at risk and their habitats	
Human environment	Human health	Project-related activities may result in changes to water and air quality, which could affect human health via direct and indirect exposures. Changes to the local and regional economy, demand on healthcare and other local services, and an influx of temporary workers may alter the health, social and economic conditions of the region. There are also potential effects on the safety and well-being of people including minority and vulnerable subgroups (i.e., women; youth; individuals with disabilities, and individuals identifying within the LGBT2Q+ community).
	Community wellbeing	
	Services and infrastructure	
	Employment and economics	
Indigenous Peoples	Indigenous Peoples' physical and cultural heritage, and structures, sites or objects, including tangible and intangible items, features, places or elements[2], of historical, archeological,	Project-related activities may result in impacts to First Nations and other Indigenous communities.

[2] At the request of the MS-WTFNs, the term "thing" in section 2(e) iii of the *Impact Assessment Act* has been modified in these Integrated Guidelines to "objects, including tangible and intangible items, features, places or elements".

	paleontological or architectural significance	
	Current use of lands, waters and Relatives[3] for traditional purposes by Indigenous Peoples	
	Health, social and economic conditions of Indigenous Peoples	
	Rights of Indigenous Peoples	
	Additional VCs for decision-making factors under section 63 of the IAA	
	Job creation and procurement opportunities. Education and training	Potential effects and benefits of changed demographics through increased employment, business, and procurement opportunities. Potential benefits including education and training opportunities.

The proponent may select additional VCs, based on engagement with First Nations and other Indigenous communities and public participants and in consideration of Indigenous Knowledge and community knowledge. The Impact Statement must provide a justification if a VC suggested by a First Nations or Indigenous community is excluded from the Impact Statement.

1.4 Preparing the Impact Statement

In preparing the Impact Statement, the proponent must adhere to ethical guidelines and cultural protocols governing research, data collection and confidentiality. The proponent must respect the obligation of protecting personal information, including for disaggregated data from small or unique populations, and adopt the established standards for the management of Indigenous data (e.g. the First Nations principles of Ownership, Control, Access and Possession (OCAP), the CARE Principles (Collective Benefit, Authority to Control, Responsibility, Ethics) of Indigenous Data Governance or standards adopted by a First Nation or Indigenous community), including obtaining permission from First Nations and other Indigenous communities before including information from or about them. The proponent may present the information in the Impact Statement in the manner it deems most appropriate. IAAC and the CNSC recommend the Impact Statement follow the structure of the Integrated Guidelines or provide a table of concordance that

[3] As shared by the Michi Saagiig Anishinaabeg Nations of the Williams Treaties First Nations.

indicates where in the Impact Statement the information set out in these Integrated Guidelines has been provided.

The Impact Statement must address requirements outlined in these Integrated Guidelines as well as in IAAC's Generic Requirements for Impact Statements, including the requirements on assessment methodology, general information, description of change to the project that may be caused by the environment, description of potential malfunctions and accidents that may occur in connection with the project, description of engagement with First Nations and other Indigenous communities, description of public participation, and Impact Statement Summary.

Where the proponent is of the opinion that certain information is not required or cannot be provided, it should contact IAAC and the CNSC prior to submitting the Impact Statement to confirm whether the proponent's rationale for excluding the information is appropriate. The rationale must also be provided in the Impact Statement. Additionally, if there are Indigenous specific requirements that a First Nation or other Indigenous community does not wish to pursue for the Impact Assessment process, please provide confirmation from the First Nation or other Indigenous community in their section of the Impact Assessment.

The proponent is expected to meet the requirements set out in these Integrated Guidelines; however, flexibility can be exercised in the methods and approaches used to achieve these requirements. Where the proponent considers that an alternative approach or methodology would achieve the same intent, they are encouraged to engage early with IAAC and the CNSC to discuss the proposed approach. IAAC, in consultation with the CNSC, may accept alternative methods where it is demonstrated that the requirement is met. The proponent should clearly describe and justify any proposed alternative approaches. Where the proponent considers that certain information or studies may be generated progressively over time, they should clearly demonstrate how the information available at the integrated assessment stage is sufficient to support sound conclusions and decision-making. This includes explaining how any remaining uncertainties will be understood and managed, and how subsequent information would be incorporated in a manner that maintains the integrity and objectives of the assessment.

As applicable, the proponent is also encouraged to refer to the requirements of other jurisdictions to assess effects, as well as to means of other jurisdictions to address effects of the project and to report in the Impact Statement how these were leveraged to assess effects. The proponent should also notify IAAC, the CNSC and potentially impacted First Nations and Indigenous communities of any changes made to the project relative to the Initial Project Description.

The Impact Statement must take into account, where relevant:

- any relevant regional or strategic assessment;
- any study or plan that is conducted or prepared by a jurisdiction—or an Indigenous governing body—in respect to the region related to the project and that is provided to the proponent 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 to the proponent with respect to the project;

- Indigenous Knowledge, community knowledge, as well comments received from First Nations and other Indigenous communities, the public, and any jurisdiction;
- Gender-Based Analysis Plus (GBA Plus) which, in the context of an impact assessment, is an analytical tool and process that examines how sex and gender intersect with other identity factors to assess who may be disproportionately impacted by a project and how they may experience impacts differently. It helps identify the diverse experiences and needs of various population groups and informs strategies to mitigate barriers and promote equitable access to project benefits; and
- other studies or assessments realized by the proponent or other proponents.

The proponent is encouraged to engage IAAC and the CNSC as early as possible to clarify the requirements in the Integrated Guidelines and to support early resolution of issues. To support this, IAAC and the CNSC may establish technical advisory groups, consisting of, as appropriate, First Nations and other Indigenous communities, federal authorities, provincial authorities or others. The proponent is also encouraged to submit draft documents for review by IAAC and the CNSC (e.g. proposed study plans, draft sections of the Impact Statement) prior to submitting the formal Impact Statement. The proponent is expected to provide IAAC and the CNSC a work plan for the Impact Statement phase of the integrated assessment, within 3 months of the Notice of Commencement.

As relevant, the proponent is also encouraged to refer to the policy frameworks and guidance available in IAAC's Practitioner's Guide to Federal Impact Assessments including the Technical Considerations and References for the preparation of an Impact Statement [10], and to keep apprised of updates.

1.5 Federal permitting coordination

IAAC will provide coordination of federal permits, licences or authorizations (collectively called permits) early and throughout the impact assessment process to provide:

- clarity on permitting requirements, timelines and processes through the development of detailed federal permitting plans; and
- transparency on the status and progress of permits through public reporting on the Canadian Impact Assessment Registry Internet site.

Under the IAA, federal authorities are prohibited from issuing permits before an impact assessment is completed. The proponent, however, is encouraged to develop federal permit applications concurrent with the impact assessment. In some cases, the same information and studies may be used to inform both the impact assessment and federal permits. Collecting and providing permitting information during the impact assessment process may expedite subsequent federal decisions, where applicable. Early engagement with the federal government, First Nations and other Indigenous communities and the public is essential to support a speedy review of federal permits.

2 Project description

2.1 The proponent

In addition to the requirements under General Information in the Generic Requirements for Impact Statements, the impact statement must include:

- proof of legal status by appending proof of incorporation, corporation number or charter;
- the corporation's legal name, corporation number, date of incorporation, registered office address (if different from head office address);
- if the mailing address is different from the head office address, the proponent should provide the mailing address. The proponent should notify IAAC and the CNSC within 15 days of any changes to this information;
- persons who have authority to act for them in their dealings with IAAC and the CNSC or the review panel. The proponent must notify IAAC and the CNSC within 15 days of any changes to this information;
- name, title and contact information of the individual who is signing the application as the proponent authority;
- name, position, contact information, mailing address of the person responsible for licence fee payments;
- organizational management structure insofar as it may bear on the proponent's compliance with the NSCA and the regulations made under it, including the internal allocation of functions, responsibilities and authority, and the roles and responsibilities of key personnel;
- names and position titles of the persons who are responsible for the management and control of the licenced activity and the nuclear substance, nuclear facility, prescribed equipment or prescribed information encompassed by the licence;
- evidence that the proponent is the owner of the site or has the authority from the owner of the site to carry on the activity to be licensed, including information, as it relates to the project, on the existing ownership and operational arrangements with the various owners/operators of the overall site;
- 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

In addition to the requirements under General Information in the Generic Requirements for Impact Statements, IAAC and CNSC expect the proponent to demonstrate scientific integrity in their preparation and delivery of the Impact Statement by:

- eliminating, controlling for, or appropriately managing potential biases; and
- characterizing potential sources and types of scientific uncertainty, including their magnitude and any differences in the interpretation of scientific results.

The proponent is expected to demonstrate adherence to these methods and processes within their Impact Statement.

2.3 Management system for site evaluation

As the CNSC's regulatory framework for nuclear reactors [6] requires a description of the management system to be applied to the site evaluation process, this section lists the information requirements for the management system. The management system may be graded in accordance with the importance to safety of the individual evaluation activity under consideration.

The Impact Statement must:

- describe the management system the proponent has established to govern the conduct of site evaluation activities;
  - the process of establishing site evaluation-related management system parameters should involve technical and engineering analyses, along with judgments that require extensive experience and knowledge. Evaluations should be reviewed and verified by individuals or groups that are independent of those who did the work;
- demonstrate that the management system will include:
  - procedures to control the effectiveness of assessments and engineering activities performed in the different stages of the site evaluation process;
  - appropriate organization, planning, work control, personnel qualification and training, and active verification and documentation, to ensure that the management system is carried out as effectively as possible;
  - records of all work carried out in the site evaluation process;
  - documentation of the results of studies (including models and simulations) and investigations in sufficient detail to permit independent review; and
  - a report that documents the results of all site evaluation work, laboratory tests, and geotechnical analyses and evaluations;
- describe the components of the management system. Content should include (but not be limited to):
  - data control, verification and validation;
  - data format;

- traceability of data;
- configuration control (including data, environmental, meteorological, geological, geophysical, survey, hydrological, biological);
- measuring and test equipment;
- use and control of computer modelling;
- field and laboratory work;
- calculations and analyses; and
- measures to ensure that the results of the site characterization are accurate, complete, reproducible, traceable and verifiable.

For additional guidance, refer to [11]; [12]; [13]; [14]; [15]; and [16] in the Compendium.

2.4 Evaluation against safety goals from a site perspective

The proponent must evaluate reactor facility designs against applicable safety goals, taking into account the characteristics of the site, the risks associated with external hazards (including any potential cliff-edge effects that may arise from small increases in the severity of external hazards), and the potential negative effect of the reactor facility on the environment. The evaluation must include the effects of multiple unit events and, where applicable, effects from events that may affect multiple units.

To support this evaluation, the proponent must provide a summary of the process by which the different nuclear reactor technologies being considered have been included in the site evaluation. Bounding approaches for site evaluation may be considered; however, bounding limits for a proposed facility must be based on credible information from designs being considered for that site.

For more information on safety goals related to quantitative and qualitative safety goals, see references [3] and [7] in the Compendium.

2.5 Project overview

The project subject to the impact assessment is the designated physical activity of the construction, operation and decommissioning of a nuclear facility and any incidental physical activity.

The physical activities and components listed in section 2.6 of the Initial Project Description are considered to be part of, or incidental to the designated physical activity and are subject to the impact assessment.

The Impact Statement must:

- describe the project, key project components and ancillary activities (both nuclear and non-nuclear), scheduling details, the timing of each phase of the project[4], the total lifespan of the project and other key features. If the project is part of a larger sequence of projects, the Impact Statement must outline the larger context;
- describe the purpose of the facility, such as for electrical power;
- provide the total facility's capacity in Megawatts thermal (MWth) and Megawatts electric (MWe);
- provide the total number of nuclear units and the projected in-service dates for each unit;
- state the estimated project budget, for each project activity, and the amount that is expected to be spent locally over the life of the project; and
- provide a summary of any changes made to the project as proposed in the Initial Project Description.

If site preparation activities involve construction of non-nuclear facility structures, systems and components (SSCs), the Impact Statement must demonstrate that the SSCs are appropriate for any reactor technology proposed for the site (refer to section 2.6.1 Plant Parameter Envelope Approach on proposed reactor technologies), such as water treatment plants, excavation (that is, earthen structures) and condenser cooling structures.

The proponent should clearly itemize all high-level activities proposed to be conducted under the LTPS. An application considering several technologies should clearly identify those site activities proposed to be undertaken under a LTPS that are, and are not, affected by the technology choice.

2.5.1 Decommissioning and Post-Closure Management

The Impact Statement must describe a preliminary decommissioning strategy consistent with applicable CNSC regulatory requirements (REGDOC-2.11.2) [17], including anticipated approaches to decontamination, dismantling, waste management, and site end-state objectives.

The Impact Statement must describe anticipated used nuclear fuel quantities, storage methods, duration of on-site storage, and reasonably foreseeable long-term management pathways (e.g., transfer to an authorized disposal facility or continued monitored storage), sufficient to support the assessment of potential adverse federal effects across the full project lifecycle.

The Impact Statement must assess potential long-term and post-closure effects on relevant valued components, including groundwater, surface water, the biological environment, and Indigenous Rights, and

[4] The *Information and Management of Time Limits Regulations* established under the IAA, list construction, operation, decommissioning and abandonment as project phases. The CNSC's regulatory framework includes site preparation as a distinct phase requiring a licence. For the purposes of the impact assessment, project phases for site preparation, construction and commissioning, operation, decommissioning, and abandonment are used in the Integrated Guidelines as defined in REGDOC-3.6 *Glossary of CNSC Terminology*

describe proposed monitoring, follow-up, and financial assurance mechanisms applicable to decommissioning and post-closure phases.

2.6 Project components and activities

The Impact Statement must:

- describe project components and activities to be carried out during each project phase, with a focus on components and activities with the greatest potential for adverse federal effects and impacts on First Nations and other Indigenous communities and their rights, including management options for used nuclear fuel:
    - at a minimum, include project components and activities (direct and incidental) listed in the Initial Project Description;
    - for each project activity, describe its location, method used to carry it out, schedule (expected start date, time of year, duration and frequency), magnitude and scale, identify activities that involve periods of increased disturbance related to adverse federal effects and impacts on First Nations and other Indigenous communities and their rights; and
    - identify likely effect pathways between project components and activities and VCs in sufficient detail to support the assessment of effects on VCs and their interactions;
- include maps of the project footprint and project components, major existing infrastructure, proponent lands, leased properties or lands and adjacent resource leases, land uses and federal lands.

2.6.1 Plant Parameter Envelope Approach

The proponent indicated that the Impact Statement will present potential reactor technologies as part of a bounding approach referred to as the “Plant Parameter Envelope (PPE)”. The PPE is a listing of values that supports (or informs) the bounding envelope that can be used in the Impact Statement to assist in predicting the potential safety and environmental effects of a nuclear reactor facility at a particular site.

The PPE must be informed from the outset by engagement with First Nations and other Indigenous communities, including Michi Saagiig Anishinaabeg Nations of the Williams Treaties First Nations which includes Alderville First Nation, Curve Lake First Nation, Hiawatha First Nation, Mississaugas of Scugog Island First Nations (MS-WTFN) defined impact pathways, where provided, and to report the results of this engagement in the Impact Statement. Where project activities may affect Indigenous Rights, lands, waters, or Relatives, the proponent must describe in the Impact Statement how Indigenous perspectives and Indigenous Knowledge informed the identification and mapping of PPE effect pathways and the selection of PPE parameters, indicators, and assumptions used to characterize those pathways.

PPE parameter selection must not be limited to biophysical or technical indicators alone. Where MS-WTFNs identify pathways related to access, harvesting, cultural continuity, stewardship responsibilities, governance responsibilities, or intergenerational wellbeing, the Impact Statement must explain how those pathways were reflected in the PPE framework and parameters, and areas of agreement and disagreement must be documented.

In applying a bounding envelope, the proponent's Impact Statement must provide:

- the derivation, analysis, and justification of the PPE parameters used with adequate level of detail to:
  - ensure that the bounding parameters encompass all technologies under consideration including all design information that is necessary to support the Impact Statement and the proposed site preparation activities under the LTPS (e.g. plant footprint excavation, and excavation of cooling water intake tunnels);
  - ensure a transparent and robust assessment of the effects of the project and development of appropriate mitigation measures, including:
    - the pathways of effects for each technology, including a clear description of the differences among them; and
    - a description of the manner in which reactor technologies could differ in their impact on the environment throughout the project life cycle (i.e., site preparation, construction, operation, decommissioning, and abandonment);
- a description of key sources of uncertainty, including long-term, cumulative, and intergenerational uncertainties identified through engagement with First Nations and other Indigenous communities; and
- a description of clear measures for the management of uncertainty. Where uncertainty relates to potential impacts on Indigenous Rights, health, safety, cultural continuity, or stewardship responsibilities, the proponent must apply conservative assumptions where appropriate and describe adaptive management and follow-up measures designed to reduce uncertainty over time.

Furthermore, to the extent possible:

- the proponent is encouraged to narrow the envelope to the most plausible choices of technology to reduce the quantity and complexity of information that will need to be reviewed; and
- the proponent is encouraged to engage with the public on the use of the bounding approach during their outreach, and to report the results of this engagement in the Impact Statement.

To facilitate meaningful engagement with First Nations and other Indigenous communities and the public on the use of the bounding approach, a clear understanding of the PPE and its role, the bounding parameters, and the pathways of effects for each technology and potential site location, is required. The proponent must submit a plain language summary of this information to IAAC no later than six months in advance of the submission of the Impact Statement for IAAC and the CNSC to provide the occasion for review by First Nations and other Indigenous communities and participants.

2.7 Receiving environment

The Impact Statement must describe the project's location, including the geographical setting, meteorological conditions and socio-ecological context required to understand the effects of the project on VCs including and, where appropriate, located on map(s):

- description of the site of the activity to be licensed, including the location of exclusion zone and any structures within that zone;
    - plans showing the location, perimeter, areas, structures and systems of the nuclear facility;
    - satellite or aerial photographs of the site and surrounding region, with a resolution scale of 1:1,440 or better, including the proposed exclusion zone and site boundary; and
    - topographical map(s) for each site layout in 1:50,000 to no smaller than 1:250,000 scale for all structures and associated infrastructure (all drawings are to scale and include a legend).
- proposed layouts of labelled structures, including:
    - reactor building;
    - power block;
    - auxiliary power buildings (for example, diesel generators) and related fuel storage;
    - switchyard;
    - cooling system infrastructure, water intakes and outlets; and
    - large structures (for example, machine shops or storage buildings for parts inventory) in the immediate vicinity to the proposed nuclear facility;
- proposed conventional and radiological waste transfer and storage areas;
- layouts of all site roads and proposed transmission corridors;
- services and infrastructure in the area, including:
    - roads;
    - municipalities and administrative regions;
    - resource development projects and activities;
    - local businesses and industries; and
    - any other relevant uses of land and water;
- local and regional climate, including historical records of weather variation;
- summary data, with data sources, including unique weather station identifiers for:
    - monthly mean, maximum and minimum temperatures as well as precipitation;
    - typical wind speed and direction; and
    - evaporation (e.g. using the Penman, Morton or Meyer Methods) or of evapotranspiration;
- primary, secondary and tertiary watersheds;
- waterbodies and watercourses, including intermittent and ephemeral, and their location;
- drainage basins in relation to key project components, flood risk areas, wetlands, and watersheds, as well as direction of flow on topographic map(s), at appropriate scales;
- riparian areas and wetlands (e.g. fens, marshes, peat lands, bogs) affected by the project, including:
    - wetland class, ecological community type and conservation status;
    - wetland habitat that provides important functions for species at risk, migratory birds and species of importance to First Nations and other Indigenous communities; and

  - distribution, disturbance level and abundance, at local, regional and provincial scales;
- navigable waterways. In support of federal permitting coordination, if the project includes works that may interfere with navigation and which may require approval(s) or exemption(s) by Transport Canada's under the *Canadian Navigable Waters Act*, the proponent is encouraged to coordinate the navigability assessment (baseline conditions) during the development of the Impact Statement in consultation with Transport Canada and users, including First Nations and other Indigenous communities, to allow Transport Canada to consider whether an approval or exemption under the *Canadian Navigable Waters Act* is required and to expedite any subsequent regulatory process, and to include a table listing:
  - waterbody or watercourse impacted;
  - type of work proposed;
  - physical characteristics of waterbody or water course;
  - known or suspected past, current or future use of the waterway;
  - potentially affected waterway users and concerns regarding waterway use and access; and
  - physical impacts from proposed work upstream and downstream;
- landcover in the area, including important vegetation species or communities;
- ecozones, ecoregions, and ecodistricts as per the province's or Canada's Ecological Landscape Classification (see Introduction to the Ecological Land Classification (ELC) 2017);
- environmentally sensitive areas, such as national parks, Indigenous Protected and Conserved Areas, UNESCO World Heritage Sites, ecological reserves, marine protected areas, and habitats of federally listed species at risk;
- lands subject to conservation agreements;
- potable drinking water sources (i.e. municipal or private);
- description of the terrain, soils and sediments affected by the project, including sediment stratigraphy. Provide surficial geology maps and cross-sections of appropriate scale;
- landforms associated with important wildlife habitat features [including elevated land forms, eskers, ridges, cliffs, rock outcrops, and exposed bedrock;
- geomorphology, topography and geotechnical characteristics of areas proposed for construction of major project components;
- geology of the surface, bedrock and unconsolidated sediments for the project, including a table of geological descriptions, geological maps and cross-sections at appropriate scale(s);
- for bedrock blasting: areas of bedrock outcrops that will require blasting identified on geological maps;
- distance to the international (e.g. the United States) and provincial borders;
- Indigenous traditional territories and/or consultation areas, Treaty and/or Title lands, Reserve lands, Indigenous harvesting regions (with permission of First Nations and other Indigenous communities), Métis settlements;
- federal lands; and

- culturally important features of the landscape.

2.8 Project purpose, need and alternatives considered

The proponent must identify the purpose of and need for the project, as well as alternatives to the project and alternative means of carrying it out.

2.8.1 Purpose of the project

The Impact Statement must outline what is to be achieved by carrying out the project from the proponent's perspective, broadly classify the project type (e.g. electricity supply), indicate the target market (e.g. international, domestic, local), and consider the perspectives of First Nations and other Indigenous communities, the public and other participants.

2.8.2 Need for the project

The Impact Statement must describe the underlying opportunity or issue that the project intends to seize or solve from the perspective of the proponent, such as demand for a resource or support for a federal or provincial government objective, provide a rationale that the project is a warranted response, and consider the perspectives of First Nations and other Indigenous communities, the public and other participants.

2.8.3 Alternatives to the project

IAAC will rely on the proponent's Initial Project Description demonstrating that there are no alternatives to the project that are technically and economically feasible to meet the need for the project and achieve its purpose. The selection of electricity generation technologies and the broader energy supply mix in Ontario are matters determined through provincial energy planning and policy processes, including Ontario's Integrated Energy Plan.

The federal impact assessment will focus on the potential effects of the designated project and the proponent's rationale for the selected technology and site. It will not reassess provincial energy policy or determine the appropriate electricity generation mix for the province. On this basis, the information provided in the Initial Project Description is considered sufficient to address alternatives to the project for the purposes of these Integrated Guidelines, and no additional information is required.

2.8.4 Alternative means of carrying out the project

The Impact Statement must:

- determine the preferred means of carrying out the project, and justify the exclusion of alternative means, considering:

- technical and economic feasibility of alternative means, including use of best available technologies;
- potential for adverse environmental, health, social and economic effects and impacts on First Nations and other Indigenous communities and their rights, as identified by First Nations and other Indigenous communities;
- potential for malfunctions or accidents;
- consideration of effects to species at risk listed under Schedule 1 of SARA, including any critical habitat, and how these effects may be avoided through alternative means of carrying out the project;
- application of GBA Plus to the analysis of alternative means of carrying out the project to inform how effects may vary for diverse population groups; and
- information provided by First Nations and other Indigenous communities, the public and other participants.

- describe all reasonable alternatives considered that would avoid impacts on current use of lands, waters and Relatives for traditional purposes considered during project development; and
- address key project elements in its alternative means analysis, including, but not limited to, the following:
  - route or corridor and means options for transportation (e.g. marine shipping, moving fuel or waste);
  - management options for used nuclear fuel;
  - route or corridor and means options for linear components (e.g. transmission lines, roads, railways);
  - width of the right-of-way;
  - project site and/or component locations;
  - timing options for components and phases of the project;
  - access to the project site;
  - facility design;
  - switchyard design;
  - energy sources to power the project site and other stationary sources to provide heat or steam to the project;
  - water and wastewater management elements:
    - location of effluent discharge points; and
    - treatment technologies and techniques to control effluent quality;
  - waste management;
  - construction alternatives;
  - location, construction and crossing methods for waterbodies, watercourses, wetlands and other obstacles;

- management of excavated materials, including those that are acid generating or leachable; and
- suspension, abandonment or decommissioning options.

3 Description of Engagement with First Nations and other Indigenous Communities

The proponent must meet the standard requirements related to Indigenous engagement as outlined in the *Generic Requirements for the Preparation of an Impact Statement*. The proponent must align with IAAC's guidance documents Indigenous Knowledge under the *Impact Assessment Act*: Procedures for Working with Indigenous Communities and Frequently asked questions on Indigenous Knowledge in federal impact assessments, except where doing so would contravene the terms of any applicable agreement or arrangement with a First Nation or other Indigenous community. The proponent must also comply with REGDOC-3.2.2. The proponent is encouraged to consult the applicable guidance and resources found in the *Technical Considerations and References for the Preparation of an Impact Statement*.

The terms "First Nations and other Indigenous communities" and "Indigenous Peoples" are used throughout this document. "First Nations and other Indigenous communities" refers specifically to those Nations or communities listed in the Indigenous Engagement and Partnership Plan (IEPP). The term "Indigenous Peoples" is used to reflect the broader legal and policy obligations and can include individuals and collectives whose rights may be affected.

Additionally, project-specific requirements have been identified during consultation and engagement activities carried out to date. In addition to the standard requirements, the Impact Statement must:

- describe how the proponent engaged with First Nations and other Indigenous communities early and throughout the impact assessment process to understand potential impacts of the project on Indigenous Peoples and their rights and to incorporate Indigenous Knowledge. Engagement must be carried out in good faith in a manner that is attentive to the concerns of First Nations and other Indigenous communities, committed to producing mutually beneficial outcomes and recognizing the wide diversity of Indigenous Peoples. The project should be designed to avoid, minimize, offset or otherwise accommodate potential adverse impacts and to maximize positive impacts on First Nations and other Indigenous communities and their rights on;
- indicate where and how First Nations and other Indigenous communities' knowledge, perspectives and values were considered and how these shaped project plans and mitigations and contributed to decisions regarding the project, including but not limited to:
  - collect and convey Indigenous Knowledge in a culturally appropriate manner that follows Indigenous methodologies, respects its holistic nature, and considers it on equitable footing with scientific and

technical information, while ensuring First Nations and other Indigenous communities retain ownership of their Indigenous Knowledge; and

- document the record of engagement and inclusion of Indigenous Knowledge in the Impact Statement, including how the proponent sought to build consensus and obtained agreement from First Nations and other Indigenous communities regarding information presented in the Impact Statement that pertains to them, and referencing any related agreements or working groups with First Nations and other Indigenous communities;

- indicate where Indigenous Knowledge that was provided was not included in the assessment and provide a rationale. Where findings differ between Indigenous Knowledge and scientific or technical studies, the proponent should clearly present how both were considered in the Impact Statement;
- describe the proponent's approach to seek and support First Nations and other Indigenous communities' respective decisions about their free, prior, and informed consent (FPIC)[5] for the project and how the proponent intends to continue discussions as the project progresses through the impact assessment process;
- describe how the proponent demonstrated best efforts to collaborate with First Nations and other Indigenous communities in a manner that considers their preferred timelines and internal governance and addresses their capacity;
- include a description of any proponent plans and commitments to continue to work with, and seek the knowledge and expertise of, First Nations and other Indigenous communities throughout the lifecycle of the project, should the project proceed, including how the proponent will report to the CNSC on engagement efforts; and
- clearly outline the proposed waste management plan for the project and demonstrate efforts to engage with First Nations and other Indigenous communities with rights and interests may be affected in relation to potential locations in Canada under consideration for waste management activities in relation to the project.

Where applicable, the Impact Statement should include:

[5] Note: It is ultimately the responsibility of the Crown, not proponents, to aim to secure FPIC where appropriate for Crown decisions. These Integrated Guidelines are instructions for the proponent on what is required in the Impact Statement. Other documents including the Indigenous Engagement and Partnership Plan, community-specific consultation plans and/or Nation-specific agreements can be co-developed between the Crown and First Nations and other Indigenous communities on how they will work together throughout the impact assessment, including working together to seek to secure FPIC. For the purpose of the impact assessment, this includes the IA and the initial licensing decisions. In addition, there will be future decision-points that require a consultation process and where the Crown may need to aim to secure the FPIC of impacted First Nations and other Indigenous communities throughout the project's lifecycle. See the Government of Canada's website on Implementation of the United Nations Declaration: Implementing the United Nations Declaration on the Rights of Indigenous Peoples.

- a description of how Indigenous-led studies or assessments were taken into account, or how ongoing studies or assessments will be taken into account, with the First Nation or other Indigenous community's permission to have this information included in the Impact Statement.

4 Assessment Methodology

The proponent must meet the standard requirements related to assessment methodology as outlined in the Generic Requirements for the Preparation of an Impact Statement, including providing an overview of how these areas were incorporated throughout the Impact Statement. The proponent is encouraged to consult the applicable guidance and resources found in the Technical Considerations and References for the Preparation of an Impact Statement.

The Generic Requirements address methodological areas of the IA related to: spatial and temporal boundaries, baseline conditions, effects assessment, mitigation measures, residual effects assessment, cumulative effects assessment, extent of significance, follow-up program, and uncertainty and bias.

In addition to the standard requirements, the Impact Statement must also:

- assess the projects likely cumulative effects in relation to the ability of Indigenous Peoples to exercise their rights. The proponent should work with First Nations and other Indigenous communities to determine which section within the Impact Statement this assessment is best suited to be included in;
- consider the methodology and outcomes of any relevant, and where available, Indigenous-led assessment processes and provide explanations for how these were incorporated. Where elements of these assessments were not incorporated, provide a rationale;
- consider defining mitigation measures, particularly for long-term, irreversible, or intergenerational impacts over a reliance on adaptive management, where possible;
- demonstrate efforts to collaborate on data collection and analysis with First Nations and other Indigenous communities;
- consider temporal boundaries explicitly accounting for nuclear lifecycle effects, including interim, on-site waste management, decommissioning, post-closure monitoring, and intergenerational impacts;
- where provided, consider pre-colonial baseline conditions for First Nations' and other Indigenous communities' impacts, include community descriptions of current barriers to exercising rights and responsibilities, existing disturbances that constrain access, and areas valued for restoration, reconnection, and care of Relatives, to support cumulative effects and future-scenario analysis;
- where the VC includes a species or Relative of specific interest or concern to First Nations and other Indigenous communities that is likely to be affected by the project:
    - provide the common and scientific name of the species, its status on Schedule 1 of SARA, and availability of a recovery strategy, action plan or management plan;
    - provide information and/or mapping at an appropriate scale for species presence and critical areas such as residences, movement corridors, areas of highest concentration,

identified or proposed critical habitat and/or recovery habitat. If applicable, differentiate between federal and non-federal lands;
    - identify critical periods (e.g. denning, rutting, spawning, calving, breeding, roosting); and
    - describe applicable threats and conservation goals outlined in the recovery strategy.
- include First Nation and other Indigenous communities-identified pathways of impact to rights, responsibilities to lands and Relatives, cultural continuity, wellbeing, safety, and sense of place, and use these pathways inform scoping, modelling, and interpretation;
- include criteria and benchmarks for significance determinations, when describing perspectives and tolerance levels of First Nations and other Indigenous communities, co-developed with interested communities, to reflect community thresholds and interpretations of impact severity, duration and consequence, including considerations of cultural continuity, wellbeing and intergenerational effects.. Incorporating defined thresholds and interpretations of non-negligible impacts as defined by First Nations and other Indigenous communities, and include explicit documentation of how First Nations and other Indigenous communities input influenced conclusions;
- include mitigation measures developed in collaboration with First Nations and other Indigenous communities in considering which measures are required to mitigate effects, particularly to culturally important Relatives and landscapes. The proponent must consider an avoidance-first approach where First Nations and other Indigenous communities identify Relatives of specific interest or concern to them or places. First Nations and other Indigenous communities should be involved in defining required mitigation, adequacy, and thresholds where mitigation is considered insufficient;
- describe alternative or additional mitigation measures, where these are identified by First Nations or other Indigenous communities, and explain how those measures were considered; and
- integrate First Nation and other Indigenous community-led cumulative effects work (as available), including defined scenarios, stressors, and future-without-project conditions. Consider First Nation and other Indigenous community interpretations of existing cumulative impacts and acceptability related to the effects of the project.

The proponent should also:

- Define and apply criteria and relevant benchmarks with First Nations and other Indigenous communities, including but not limited to the description of effects on Indigenous Peoples. Criteria may include those identified in Guidance: Assessment of Potential Impacts on the Rights of Indigenous Peoples and other relevant criteria proposed by a First Nation or other Indigenous community. These criteria should be applied to determine the extent to which adverse effects on Indigenous Peoples are significant.

5 Biophysical Environment

5.1 Meteorological environment

The Impact Statement must:

- describe the local and regional climate, in sufficient detail to highlight weather variations and characteristics of the regions affected by project activities and components, including historical records of relevant meteorological information;
- provide summary data and the reference to underlying data source, including unique weather station identifiers for:
  - monthly mean, maximum and minimum temperatures;
  - monthly mean, maximum and minimum precipitation;
  - typical wind speed and direction;
  - standard and reliable meteorological measurement to provide estimates of evaporation (e.g. using the Penman, Morton or Meyer Methods) or of evapotranspiration; and
  - the locations of all meteorological and air quality data collection stations should be identified on an appropriately sized topographical map, and include a justification of their locations;
- describe the influence of climate change on the local and regional climate and on the risks of extreme weather events.

The baseline information should address the criteria contained in the following documents in the Compendium: [18] and [19].

5.2 Geology, geochemistry and geological hazards

5.2.1 Baseline conditions

The Impact Statement must:

- describe the geomorphology, topography and geology of areas proposed for the project;
- describe the geology of the surface, bedrock and unconsolidated sediments for the project, including a table of geological descriptions, geological maps and cross-sections at appropriate local and/or regional scale(s);
- describe the geological history of the site, local, and regional study areas including information on bedrock lithology and stratigraphy;
- describe the physical and mechanical properties of the rocks and overburden, including shear strength and liquefaction potential;
- describe underground instability (rock falls and underground collapses) and groundwater inflow using site-specific geotechnical and hydrogeological data to assess the potential risks;
- describe any potential site instability, such as collapse, subsidence, surface uplift, and liquefaction of the subsurface materials and the backfill materials;

- present a 3-dimensional geological model developed for the site, local, and regional study areas based on the conceptual model of the geological environment and site investigation data;
  - include cross sections through the 3-dimensional models showing the geological units and their elevations, structural information, and groundwater level; and
  - state limitations and assumptions in the modelling approach, including calibration methods, model validation and accuracy, and a description of how uncertainty is quantified;
- identify and describe any geological hazards that exist in the areas planned for the project facilities and infrastructure;
- for structures such as faults, lineaments and arches, assess their seismogenic potential and their potential to constitute preferential groundwater flow paths, with a description of their tectonic setting;
- describe the seismotectonics for the region, using geophysical data and information on geotechnical hazards;
- prepare a site-specific seismic hazard assessment, including a paleoseismic investigation and probabilistic seismic hazard analysis to develop ground motion response spectra, for the final selected site to be referenced in the LTPS application;
- conduct the assessment in accordance with CSA N289.2 [20];
- identify on geological maps the location of areas of bedrock outcrops that will require blasting;
- map both active and inactive structural geological features using both measured and publicly available information;
  - include data from in-situ investigations, including maps of borehole locations and their positions relative to the project; and
- provide a characterization of the geochemical composition of materials to be excavated.

The baseline information should address the criteria contained in the following documents in the Compendium: sections 3.5.5 and 3.5.6 and appendices C.3.4 and C.3.5 in REGDOC-1.1.1 [3]; section B.4.1 in REGDOC-2.9.1 [16]; Appendix A to Part 100 in NRC Regulations (10 CFR) [21]; CSA N289.2 [20]; CSA N289.3 [22]; International Atomic Energy Agency NS-G-3.6 [23]; and International Atomic Energy Agency NS-R-3 (Rev1) [24].

5.2.2 Effects on geology, geochemistry and geological hazards

The Impact Statement must:

- describe the effects of the project on geology, geochemistry and geological hazards;
- assess settlements (magnitude and rate) of foundations and/or foundation soils caused by large surface loadings and/or underground water drainage, using project-specific data; and
- analyze differential settlement and soil distortion as required to assess their potential effects on the nuclear facility.

5.3 Topography, soil and sediment

5.3.1 Baseline conditions

The Impact Statement must:

- describe the terrain, soils and sediments within the LSAs and RSAs, including sediment soil types and stratigraphy. Provide surficial geology maps and cross-sections of appropriate scale;
- provide dynamic properties (such as shear wave velocities, damping ratio, shear modulus) to be used in soil response and soil-structure interaction analyses;
- describe and map landforms including elevated land forms, eskers, ridges, cliffs, rock outcrops, exposed bedrock, talus and other karst topography caves;
- provide a description and location of any erosion-sensitive soils, predicted rates of erosion, and areas of ground instability;
- provide estimates of the rate(s) of erosion of shores or riverbanks on or near the site;
- provide maps depicting soil depth by horizon and soil order within the PA to support soil salvage and reclamation efforts, and to outline potential for soil erosion;
- describe the suitability of topsoil and overburden for use in the reclamation of disturbed areas including an assessment of the acid generating potential of overburden to be used;
- describe the historical land use and the potential for contamination of soils and sediments;
- describe any known or suspected soil or sediment contamination with the study areas that could be re-suspended, released or otherwise disturbed as a result of the project;
- identify areas or ecosystems that are sensitive or vulnerable to acidification resulting from the deposition of atmospheric contaminants, including radionuclides.

The baseline information should address appropriate federal and provincial guidelines and the criteria contained in the following documents in the Compendium: [25]; [26]; and [27].

5.3.2 Effects to topography, soil and sediment

The Impact Statement must describe all effects of the project on topography, soil and sediment including:

- potential and likelihood of problematic erosion from movement or redistribution of soil and overburden, vegetation clearing, and watercourse diversions;
- potential and likelihood of re-suspended, releasing or otherwise disturbing known or suspected soil or sediment contamination;
- potential and likelihood of new soil contamination (e.g., by radiological sources and others, such as potential sources of polyfluoroalkyl substances (PFAS), etc.);
- changes to the quantity and quality of soil, as well as its suitability for reclamation; and
- effects of the project on coastal erosion.

5.4 Ambient radioactivity

5.4.1 Baseline conditions

The Impact Statement must:

- describe the ambient radiological conditions at the project site and within the LSA and RSA by providing information on existing conditions including an inventory of sources, activity levels and origin for all environmental components including air, soil, food, water, aquatic sediments, plant and animal tissue (see section 4 Assessment Methodology);
- describe human and non-human biota exposed to ambient radioactivity, including information on radiation levels to which workers and members of the public are exposed; and
- describe current radiological monitoring, management programs and any special studies, including detailed results from these programs.

5.4.2 Changes to radiological conditions

For all phases of the project and all applicable VCs the Impact Statement must:

- describe changes to radiation and radioactivity present in the terrestrial, aquatic, and atmospheric environments; and
- document plans and strategies for characterizing effects of the project related to radiological impacts on humans and wildlife and to the release of radionuclides to the environment, including:
  - details pertaining to sampling media and/or indicator species, measured parameters, sampling methodologies, locations, and frequencies; and
  - the use of detailed maps to present this information with sampling locations.

Additional guidance that should be referenced to support the effects assessment and associated follow up are presented in the Compendium, including: [28].

The proponent should refer to the relevant Health Canada's Guidance for Evaluating Human Health Impacts in Impact Assessments: Radiological Impacts [29] to ensure that it provides the information and analysis considered necessary to assess the project's impacts on human health. The proponent should complete the checklists provided in these guides (Appendix A) to assist participants in verifying that the main elements have been completed and in identifying the location of this information in the Impact Statement.

5.5 Electromagnetism and corona discharge

The Impact Statement must:

- describe ozone concentrations;
- describe predicted electromagnetic field levels;
- identify the potential for electromagnetic interference with radio, television or other telecommunication signals and reception at maximum loading and describe the area potentially affected, the frequency and duration of occurrence and any applicable standards;
- describe potential induction effects to other infrastructure operators, and where applicable, describe any authorizations required and consultations with potentially affected infrastructure operators; and
- evaluate electromagnetic emitters in the region during operations, with respect to their potential to affect the safe operation of the reactor facility.

5.6 Atmospheric, acoustic and visual environment

5.6.1 Baseline conditions

The Impact Statement must:

- characterize the ambient air quality in the PA, LSAs and RSAs and identify existing emissions and contaminant sources;
- provide baseline ambient air concentrations for contaminants, in particular near key receptors (e.g. communities, traditional land users, wildlife) and quantify emission sources for the following:
  - total particulate matter;
  - particulate matter less than 2.5 microns ($PM_{2.5}$);
  - particulate matter less than 10 microns (PM_{10});
  - carbon monoxide (CO);
  - sulphur dioxide (SO_2);
  - nitrogen dioxide (NO_2) and nitrogen oxides (NOx);
  - ozone (O_3);
  - volatile organic compounds (VOCs), individual or an appropriate subset;
  - polycyclic aromatic compounds, including polycyclic aromatic hydrocarbons (PAHs), alkylated PAHs, PAH transformation products, including nitro and oxy-PAHs, and dibenzothiophenes;
  - metals;
  - diesel particulate matter;
  - nuclear emissions including tritium oxide and tritium gas, carbon 14, noble gases, iodine-131, and particulates;
  - hydrazine;
  - morpholine;

- PFAS;
- ammonia; and
- any other relevant air pollutants from mobile, stationary, or fugitive sources;

- compare ambient air quality results with applicable regional, provincial and federal standards, and apply the most conservative criteria/standard. For air pollutants with standards, the comparison must use the same averaging period and statistical format associated with each numerical value;
  - standards include: *Canadian Ambient Air Quality Standards* [30] and relevant provincial standards. The proponent must refer to the new *Canadian Ambient Air Quality Standards* [30] established by the Canadian Council of Ministers of the Environment (CCME) for $PM_{2.5}$, O_3, SO_2 and NO_2 for 2020 and 2025; and
  - for complete hazardous substance analysis, VOCs are compared to ozone; to particulate matter related to total suspended particulates (TSP); to PM_{10}; and to $PM_{2.5}$. SO_2, NO_x and CO are included in the analysis;
- describe dust and acid deposition through either existing long-term or new monitoring data for a duration of a minimum of one year;
- describe the data collection methods and data source(s), including data validation and quality control methods;
- identify and address issues related 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 and geographic scope;
- if modelling is undertaken to understand baseline ambient air quality, then describe and provide an inventory of direct and indirect sources of baseline air emissions, including mobile, stationary and fugitive;
- provide current ambient noise and vibration levels at key receptor points (e.g. communities, traditional land users, sensitive human receptors and wildlife), including the results of a baseline ambient noise and vibration survey and permissible noise levels for each receptor. The information on usual noise and vibration sources (natural or anthropogenic), their geographic extent and temporal variations must be included. At the time of collecting baseline data for the study on ambient noise and vibrations where there are human receptors, it is recommended that the following aspects be considered:
  - natural sounds;
  - soundscapes (see [31]);
  - expectations regarding quiet conditions in specific places or at specific times;
  - usual sleeping hours (the default assumption is 10 p.m. to 7 a.m.); and
  - degree of baseline annoyance attributable to existing noise and vibration sources (e.g. vehicle traffic, aircraft, other industrial noise);
- justify the selection of and provide information on all noise and vibration sensitive receptors in the study areas, including any foreseeable potential receptor and the distance between the receptors and the project;

- provide current underwater soundscape and vibration sources within the study areas and at the project site, based on acoustic measurements. Provide information on vibration and sound sources, geographic extent and spatial and temporal variations within the water column and at the lakebed;
- 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; and
- describe landscapes of interest, visual screens and other components of the visual environment, and locate them on maps.

For additional guidance, see the Compendium.

5.6.2 Effects on the atmospheric, acoustic, and visual environment

The Impact Statement must describe the effects of the project on the atmospheric, acoustic and visual environment, and:

- provide a detailed description, including quantification of emission sources of air pollutants from the project listed under section 5.6.1 Baseline conditions for all phases of the project;
- provide detailed methodology and assumptions used to estimate emissions of air pollutants released, including:
  - provide and reference all relevant emission factors;
  - for all applicable emission sources, include the assumed tier of emission standard for each emission factor applied; and
  - provide details of the achievement of emission standards for all mobile and stationary engines used in the project;
- use atmospheric dispersion modelling to predict the fate of emissions resulting from project-related sources and provide appropriately scaled contour map(s) plotting the predicted emissions):
  - determine whether the formation of secondary pollutants (pollutants which are not directly emitted but form when other primary pollutants react in the atmosphere) resulting from the project under assessment has the potential to raise concentrations above baseline levels. If so, identify and characterize these pollutants;
- provide the rationale for the choice of air quality model(s), including the type and magnitude of emissions, the complexity of sources, terrain and meteorology, or for why modelling is not being used to predict fate of air emissions;
- provide justification for all control efficiencies used to reduce emission rates of sources within the model, including details of all assumptions associated with the related mitigation, and their achievability;
- 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 modeled predictions may vary spatially and temporally; and
  - uncertainty in baseline concentration estimates, in the estimates of meteorological inputs, and in estimates of source emissions (from sources attributable to the project, and externally);
- 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 all pollutants that exceed 10% of the relevant guidance or standard value. Emission sources should be grouped into appropriate categories;
- assess effects to receiving environment through:
  - comparison with ambient standards, including the *Canadian Ambient Air Quality Standards* [30]. The assessment should be based on the principles of "keeping clean areas clean" and continuous improvement, and in the context of air sheds and air zones with the Air Quality Management System;
  - comparison with critical thresholds (consider current, historical loadings, buffering capacity, including Acid Deposition Critical Loads);
  - comparison with sensitive ecological receptors or VCs in the aquatic and terrestrial environment (consider effects thresholds of species in question); and
  - comparison to other appropriate existing guidelines, objectives or standards, where relevant. This includes regional and community-based air quality guidelines;
- describe changes in ambient vibration and sound levels, including frequency and timing, resulting from the project at potential receptor locations, including changes in the perception of non-anthropogenic sounds and the predicted area of influence of project acoustic effects, including from:
  - blasting;
  - increased road traffic;
  - operation of various engines, motors, and/or equipment, if applicable;
- provide a vibration and sound impact assessment for the construction phase, including an overview of the expressed concerns;
- for project activities that result or may result in an increase in sound emissions during any phase of the project:
  - quantify sound levels at appropriate distances from any project facility and/or activities and describe the timing, frequency, duration and characteristics of sound;
  - provide the hourly distribution of baseline night-time sound events compared to the individual nighttime sound events expected at each receptor location;
  - describe the locations and characteristics of sensitive receptors, including species at risk and Relatives of specific interest and concern to First Nations and other Indigenous communities;
  - describe consultation with the public, federal authorities, and interested parties including landowners about potential effects to the acoustic environment; and

- identify and justify the approach to determine the extent to which sound effects resulting from the project are adverse;

- provide a description of any changes in nighttime light levels resulting from the project:
  - quantify light levels at appropriate distances from any project facilities, including the timing (e.g. night hours), frequency, duration, distribution and character of light emissions;
  - describe the locations and characteristics of the most sensitive receptors, including species at risk, Relatives of specific interest and concern to First Nations and other Indigenous communities, and areas favoured by or identified as ideal by First Nations and other Indigenous communities for the practice of traditional activities; and
  - describe engagement activities and, where appropriate, provide a record of engagement with the public, federal authorities, and interested parties including landowners regarding potential effects on the visual environment; and
- describe any positive changes.

The proponent should refer to the relevant Health Canada's Guidance for Evaluating Human Health Impacts in Impact Assessments: Noise [32] and Guidance for Evaluating Human Health Impacts in Impact Assessments: Air Quality [33] 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 the sound environment and air quality. The proponent should complete the checklists provided in these guides (Appendix B in the noise guide and Appendix A in the air quality guide) to assist participants in verifying that the main elements of a noise or 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.

The proponent should consult with the Ontario Ministry of the Environment, Conservation, and Parks where an Environmental Compliance Approval under the *Environment Protection Act* [34] may be necessary for activities with emissions related to air, noise and/or vibration. If such an authorization is required, the proponent should identify and describe the thresholds that would need to be met to obtain the Environmental Compliance Approval.

The proponent should refer to the Ontario Ministry of the Environment, Conservation, and Parks' Environmental Noise Guideline – Stationary and Transportation Sources [35] for additional guidance on the proper control of sources of noise emissions to the environment.

5.7 Groundwater and surface water

5.7.1 Baseline conditions

The Impact Statement must:

- describe the hydrographic and hydro-climatic context of the project site (e.g. climate patterns);

- identify the hydrologic network, including but not limited to the watershed delineation, stream courses identification and mapping;
- provide a characterization of groundwater resources potentially affected by the project;
- describe the local monitoring program and hydrologic data collection;
- quantify the existing surface water conditions, including the full range of seasonal and inter-annual variations, (including variations in inflows, outflows, water surface elevations, net loss, including evaporation and seepage. and storage volumes and retention time), ice cover and snow regime. This may be based on data from on-site gauging stations or from reference regional gauging stations;
- identify and describe the waterbodies, and water resources potentially affected by the project;
    - a list of major streams and the criteria used to determine what constitutes a major stream should be provided (e.g. flow rate, drainage area, etc.);
    - for Lake Ontario, the description should include the size, location, and elevation of outlets, and elevation-area-capacity curves; and
    - a summary description of lake operating rules (for example, motorboat capacity) should be documented;
- annual yield and dependability;
- identify surface-water bodies that could affect the project's water supply and effluent;
- describe the adequacy of water supply to the site, include consideration of:
    - surface and groundwater resources;
    - quantity and quality of water supply;
    - reliability and availability of supply; and
    - the characterization of potential effects of:
        - effects of debris and fouling;
        - additional water requirements for emergency cooling or process needs;
        - effects on contaminant transportation;
        - effects of fluctuations in water temperature that could affect heatsinks; and
        - effects on firefighting capability;
- for each water body used as a heat sink or process water source, information about maximum, average maximum, average, average minimum, and minimum monthly temperature and monthly flow of the water bodies;
- characterize and describe upwelling and downwelling, including an analysis of duration, frequency, intensity-thermal/spatial and seasonality of these events, in the LSA within Lake Ontario. See Environmental Effects Assessment of Freshwater Thermal Discharge, 2019 [36] for more guidance;
- describe the design-basis flood (DBF) elevation, derivation, and discharge, if applicable;
- screen baseline surface water and groundwater quality data against recognized water quality guidelines, such as the Canadian Environmental Quality Guidelines (CEQG) [37];

- screening criteria should be derived using site specific conditions/concentrations of environmental modifying factors for guidelines that may vary between sites;
- contaminants associated with historical, current, or proposed site activities should form the basis for the baseline monitoring program; and
- if federal or provincial standards or guidelines are not available or where natural background as documented in an appropriate baseline study demonstrates the water quality standards or guidelines are not applicable, benchmarks from the peer-reviewed scientific literature may be used with appropriate rationale. Site-specific water quality objectives may be developed with the support of the scientific literature and the application of the procedures for deriving numerical water quality objectives as documented in the CEQG [37];

- provide complete hydrometeorological information (temperature, precipitation, evapotranspiration), based on data from nearby weather stations or from a weather station on site;
- 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, flood risk areas, wetlands, watershed and sub-watershed boundaries, and direction of flow;
  - show types of land use in drainage areas; and
  - indicate the intended locations of water crossing and watercourse diversions;
- provide a list of all waterbodies and watercourses (permanent, intermittent and ephemeral), including wetlands and headwater drainage features, that may be directly or indirectly affected by the project. Provide a table that groups waterbodies and watercourses by sub-watershed and provides the following information about each:
  - type of watercourse impacted (e.g. lotic or lentic system, lake, river, pond, temporary or permanent stream), and
  - size of the waterbodies and watercourses, as applicable (e.g. width at the ordinary high water mark, length or 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:
  - hydrographs may be based on data from nearby gauging stations or from gauging stations on site;
  - approach used should take into account the need to provide information for use in fish habitat characterization and effects assessment as guided by the Canadian Science Advisory Secretariat's Framework for Assessing the Ecological Flow Requirements to Support Fisheries in Canada [38]; and
  - approach used should take into account the need to provide information for use in aquatic dispersion modelling for both groundwater and surface water;
- describe where lake level can affect the safe operation of the facility, the design basis maximum and minimum lake levels, including how those levels were derived;
- provide stage hydrographs for lakes expected to be affected by the project showing the full range of seasonal and inter-annual water level variations;

- describe waves (statistics of wave heights, run-up, and so on), including:
  - information about historic seiche activity; if applicable and
  - where waves can affect the safe operation of the facility, information about the design basis wave conditions (including how those conditions were derived);
- provide information about current patterns:
  - including frequency distributions of current speed, direction, and persistence;
  - including sediment movement, quantity, and size range;
  - at the local and regional spatial scale; and
  - at the whole-water body spatial scale within a reasonable distance from the site;
- include modelling, such as hydrodynamic modelling, to characterize coastal processes, including a quantitative sediment movement and size spectrum through littoral transport, flow directionality, velocity, and shear stress. Modelling should also examine shoreline recession rates and sediment inputs;
- for each waterbody and watercourse potentially affected by the project, provide a description of ice cover, thickness and conditions and the timing of freeze-thaw cycles;
- for each waterbody potentially affected by the project, provide bathymetry, maximum and mean depths, vertical profile information, information on stratification and turnover, and sediment composition (e.g. particle size analysis and sediment quality);
- 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 are potentially affected by the project;
  - use this information to calibrate and verify numerical flow modelling;
- develop a quantitative surface water balance for watersheds potentially affected by the project, for all phases of the project detailing water intake and outfall to the environment, including upstream and downstream of the zones of influence;
- describe the surface water, ground water and sediment quality baseline characterization program, including sampling site selection and locations, upstream, within the zone of influence of the project, and downstream monitoring duration and frequency, sampling methodology, and analytical protocol, including quality assurance and quality control measures;
  - describe the incorporation of any applicable historical data or existing information; and
  - characterization program should include sampling locations within the PA, the LSAs and RSAs, and should include reference locations that are unlikely to be impacted by the project. Provide a detailed map that indicate the sampling locations;
- provide baseline data for relevant physicochemical parameters and chemical constituents for surface water, groundwater and sediment quality that are expected to change throughout the project lifecycle including temporal trends and groundwater–surface water interactions, representative of seasonal and inter-annual variability and spatial representation relevant to the project components, the LSA and the

RSA. The data should be presented in a compiled, tabulated, and graphed form using appropriately sensitive detection limits, and include estimates relevant to the project activities and components:

- physicochemical parameters may include temperature, pH, electrical conductivity, dissolved oxygen, turbidity, total suspended solids, total hardness, total dissolved solids, biological oxygen demand, carbonate equilibrium and chemical constituents may include major and minor ions, total and dissolved trace metals/metalloids, radionuclides including radionuclide plumes, total mercury, methylmercury, polycyclic aromatic compounds, persistent organic pollutants, nutrients, organic and inorganic compounds, or other compounds of potential concern in comparison to the relevant environmental quality guidelines;
- water sample collection and analysis should use appropriately sensitive detection limits and the data should illustrate the seasonal and inter-annual variability in baseline surface water quality with sufficient years of baseline data to fully characterize natural variability, including possible variabilities due to groundwater–surface water interactions;
- physical and chemical parameters may include particle size, moisture content metals/metalloids, total sulphur, total organic carbon, polycyclic aromatic compounds, persistent organic pollutants. Sediment samples should target silt-clay range (<63um) and include appropriate replication to describe site heterogeneity.
- screen baseline sediment quality data against applicable guidelines, including from CCME [39], CEQG [39], and Ontario [40];
    - if an appropriate baseline study demonstrates that natural background exceeds the available standards or guidelines (or that none exist for the contaminants of potential concern (COPC[6]) of interest), sediment quality benchmarks from the peer-reviewed scientific literature should be used with appropriate rationale;

- identify springs and any other potable surface water resources within the local and regional study areas and describe their current use and potential for future use;
- identify domestic, communal or municipal water wells within the local and regional areas, and provide information on their depth, distance from the project, stratigraphy, screened hydrostratigraphic unit and piezometric level and capacity, and describe their current use and potential for future use;
- 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 RSA used to inform the conceptual model, and identify their location, groundwater quality information and monitoring frequency. Provide

[6] COPC: Any chemical substance, radiological or non-radiological contaminant for which the concentration in an environmental medium is likely to be high due to the project's activities may first be considered as a COPC. However, if it is established that the sum of the modeled 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.

representative hydrographs showing the range of seasonal and inter-annual water level variations and indicate any spatial variation in the RSA.

  - graphs illustrating historical analytical data for COPCs for selected wells should be provided. Trends in concentration should be interpreted and described;

- describe the hydrostratigraphic units (aquifers, aquitards, aquicludes) of the hydrogeological environment in both bedrock and overburden and provide a piezometric map showing heads and the direction of groundwater flow;
  - provide piezometric maps for each hydrostratisgraphic unit; and
  - include the thickness and area extent of each unit through appropriate tools such as isopach maps;
- describe the structural geology of the hydrogeological environment, including major faults, fracture density and 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 method used and the hydraulic properties of the hydrostratigraphic units graphically, on maps, and in cross-sections in conjunction with water level and gradient information, including data on hydraulic conductivity, specific storage, transmissivity, storativity, saturated thickness, porosity, estimated rates and directions of groundwater flow, the capture zones of wells and specific yield, as applicable;
- provide hydrogeological maps and cross-sections, using the same scales and able to show important site features, of the study areas showing water table elevations, potentiometric contours, interpreted groundwater flow directions, groundwater divides and areas of recharge and discharge;
  - lithological logs, cone penetrometer logs, borehole geophysical logs, surface geological mapping, surface geophysical surveys, and trench logs for hydrogeological cross-sections should be provided;
    - cross-sections should depict the interpretation of hydrostratigraphy and rationale for the interpretation must be provided. As additional monitoring or geological data are developed, cross-section interpretations should be updated, and the results of the data must be reported if they result in significant changes to conceptual models. Final drawings should be included with draft and ongoing remedial investigation reports;
- provide site-specific structure contour maps that use the same scale(s) as groundwater. Contour intervals should be selected commensurate with the density and precision of the data;
- 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 geological model developed for the site, local, and regional study areas based on the conceptual model of the geological environment;
  - include cross sections through the 3-dimensional models showing the geological units, unit thicknesses, and structural information;
  - state limitations and assumptions in the modelling approach, including calibration methods, model validation and accuracy and a description of how uncertainty is quantified;

  - calibrate the numerical model to baseline geological 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; and
  - analyse the sensitivity of key model outputs to hydraulic properties and climatic parameters such as recharge;
- amend maps (and include the amendment date) as additional monitoring or geological data are developed;
- 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;
  - chemical or isotopic tracer data that provide constraints on fluid direction, flow velocity or mixing should be included;
- 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, human health as well as the current use of land and resources for traditional purposes; and
- where applicable, present reporting in accordance with CSA N288.6 [8].

5.7.2 Effects on groundwater and surface water

The Impact Statement must:

- describe the effects of the project on surface and groundwater, including effects related to:
  - project use of surface water or groundwater resources;
  - changes to water flow or watercourse diversions; and
  - discharge of water, effluent, wastewaters or other substances to the environment, including those from waste storage areas, such as irradiated fuel bays;
- describe how the effects of climate change are taken into account in the evaluation of the project effects;
- discuss changes to watersheds, including alignment and condition of waterbodies and watercourses (permanent, intermittent and ephemeral), including those created, removed or altered by the project;
- quantify the extent of hydrological changes that will result from disturbances to aquifers and surface water features, taking into account climate change. 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;
- 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;

- 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 key flow rates for all project components and water management structures, including inflow, outflow or surface run off from storage piles, dredge materials, and contaminated material storage;
- present a comprehensive site water management plan for the project's lifecycle, including for:
  - water inflows and outflows from project site;
  - water diversion;
  - process water management;
  - stormwater management; and
  - water management within the project site;
- describe the contaminants associated with the project, including radionuclides, their spatial and temporal locations and their potential flow paths (e.g. groundwater seepage pathways and how they relate to potential receptors such as drinking water sources). 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;
- demonstrate contaminant attenuation capacity empirically with field data and/or a numerical model (i.e., aquatic dispersion modelling). This model should also include a description of expected physical and geochemical reactions and transport mechanisms along flow paths (i.e., aqueous complexation, redox reactions, adsorption, ion exchange, colloidal transport, precipitation of solid phases, radioactive decay and ingrowth, advection, dispersion, diffusion) and how these were quantified or accounted for in the model;
  - If used, models for dispersion and pathways analyses must include site-specific, local, and regional topographic features and characteristics of the reactor facility, and take into account natural and human-induced events that may influence contaminant behaviour;
- describe the downgradient flow of groundwater affected by the project, with the use of figures showing groundwater piezometric contours, drawdown contours and particle tracking results;
- describe the contaminant attenuation capacity within the hydrogeological units in the PA. 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 that may result from attenuation and other processes during groundwater flow;
- describe the potential changes to surface water, groundwater, or sediment quality related to the project including:
  - potential changes to surface water quality due to surface erosion and sedimentation, from the removal of vegetation and changes to riparian, wetland and terrestrial environments;

- potential changes to surface water quality due to the generation and deposition of dust and particulate matter and any contaminants they contain (such as metals, mercury, methylmercury);
- changes to surface water, groundwater and sediment quality due to all discharges and effluents from the project, including changes to physicochemical parameters (temperature, pH, salinity, dissolved oxygen), and relevant chemical constituents (major and minor ions, trace metals, radionuclides, nutrients, organic compounds); and
- changes to surface water from thermal plumes associated with nuclear power generating activities, including:
  - areas of influence (temperature, discharge jet) relative to intakes and known/suspected areas of VC-focused habitat use (spawning, rearing, nursery, feeding, wintering areas) and features (substrates, bathymetry, wetlands, aquatic plants);
  - descriptions of models (physical, mathematical, conceptual) used to predict temperature effects and thermal discharge jet effects, and to account for long-term effects of climate warming relative to incremental effects of the project;
  - descriptions of zones of influence of thermal plume temperature effect (greater than 1 ºC above ambient) and physical discharge jet effect with maps and plots;
  - descriptions of how alongshore currents are changed by discharge plumes, including direction, speed and sediment transport (deflection, distance and entrainment time for passively drifting biota, such as eggs, larvae);
  - temperature predictions (mean, median, maximum and minimum) during critical life stage periods for potential VCs and plots of hourly maxima showing duration at peak temperatures;
  - assessment of whether the ambient temperature maximum would be exceeded; and
  - contaminants released in the thermal discharge;
- comparison of any changes to surface or groundwater quality to applicable guidelines, objectives or standards;

- describe the quantity and quality of all effluent streams released from the site to the receiving environment, including effluent from treatment facilities, dewatering activities, seepage and surface run off from project components:
  - compare the quality of all effluent streams to applicable guidelines, objectives or standards to better identify possible adverse effects on the receiving environment;
- using the integrated chemical mass balance model, describe predicted worst, base and sensitivity case changes caused by project activities to surface water, groundwater and sediment quality in the receiving environment, for both physicochemical parameters and chemical constituents, including but not limited to:
  - watercourse and waterbody crossings, blasting, diversions, dewatering, water withdrawal, wastewater return, overflows from excavation, and surface runoff volumes and quality;
- compare the predicted worst, base and sensitivity case scenario changes to groundwater, surface and sediment quality to baseline and applicable guidelines, objectives or standards;

- provide an assessment for off-site migration pathways for impacted groundwater, and an analysis of contaminant attenuation capacities within the hydrogeological units of the project study area;
- describe locations at which potential changes to water or sediment quality will be assessed, including:
  - all point and diffuse sources of discharges;
  - immediate receiving environment for any point of diffuse sources of discharges from the project;
  - at outer boundary of mixing zone;
  - where the water quality from the immediate receiving environment begins to meet Water Quality Guidelines, or background levels for that contaminant; and
  - at PA, LSA, and RSA boundaries; 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. Carry forward the assessment of potential changes in water quality, as required in the following sections of the Integrated Guidelines.

The proponent should refer to Health Canada's Guidance for Evaluating Human Health Impacts in Impact Assessments: Drinking and Recreational Water Quality [41] to ensure that it provides the information and analysis considered necessary to assess the project's effects on human health in relation to changes to water quality. The proponent should complete the checklist provided in this guide (Appendix A) to assist participants in verifying that the main elements of a water quality impact assessment have been completed and in identifying the location of this information in the Impact Statement. This checklist will facilitate the review of the Impact Statement and will be particularly useful if analyses on this aspect are found in several sections of the Impact Statement.

The proponent should consult with the Ontario Ministry of the Environment, Conservation, and Parks where an Environmental Compliance Approval under the *Environmental Protection Act* [34] and a Permit to Take Water under the *Ontario Water Resources Act* [42] may be necessary for sewage works and water taking and describe how and to what extent this process could address adverse effects.

5.8 Terrestrial, riparian and wetland environments

5.8.1 Baseline conditions

The Impact Statement must:

- provide a description of the biodiversity[7], relative abundance and distribution of vegetation species and communities of ecological importance and of importance for human uses (e.g. recreational and economic uses), within the LSAs and RSAs of the project, including:

[7] Biodiversity can include the species or communities found, abundance, density, species richness and evenness, species distribution within the study areas; their ecological role, trophic level, their ecological or

  - the geographical settings, as described in section 2.7 Receiving Environment, along with the presence of endangered ecosystems, rare, limited and/or significant habitat (e.g. federal, provincial or Indigenous protected areas, wildlife sensitivity maps, RAMSAR sites, identified or proposed critical habitat in recovery strategies or action plans);
  - rare plant communities and communities of limited distribution;
  - species at risk, including those listed in Schedule 1 of the SARA, provincially listed or assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) [43] to be 'at risk,' including species of concern;
  - critical habitat as described in final or draft recovery strategies or action plans for species at risk;
  - habitat of special interest to MS-WTFN; and
  - species for which harvest level records are maintained by provincial or local conservation agencies or organizations;
- describe the biodiversity metrics, biotic and abiotic indicators that are used to characterize the baseline vegetation biodiversity and discuss the rationale for their selection such as cover and standing biomass for aquatic plants as a basis to predict and detect changes;
- provide maps, at an appropriate scale, of the vegetation species and communities of importance within the LSA, and where available, the RSA;
- describe the current level of both anthropogenic and natural (e.g. fire, flood, drought) disturbance associated with vegetation, including a description of level of habitat fragmentation and loss, historical and current disturbance, any proximate activities that have resulted in changes to fire regimes (e.g. fire suppression, flooding, insect infestations);
  - describe any weed species, other invasive species and introduced species of concern; and
  - describe past site clearing and shoreline development, if applicable (this information determines the succession trajectory of the site habitat);
- describe the use of local vegetation for medicinal purposes, or as a source of country foods;
- describe the shoreline, banks, current and future flood risk areas, and wetland catchment boundaries;
- quantify, describe and map riparian areas within the LSA and RSA potentially affected by the project;
- quantify, describe and map wetlands (e.g. fens, swamps, marshes, peat lands, bogs), including ephemeral wetlands, within the LSA and RSA potentially affected by the project, in the context of:
  - wetland class based on the Canadian Wetland Classification System (CNWI schema), ecological community type and conservation status;
  - biodiversity;
  - wetland habitat that provides important functions for species at risk, migratory birds, and Indigenous medicines;
  - abundance at local, regional and provincial scales;

population health (e.g. breeding status, population trends, movement, habitat availability or connectivity, reproductive status or health, food availability or limitations).

  - distribution; and
  - current level of disturbance;
- determine whether these wetlands are within a geographic area of Canada where wetland loss or degradation has reached critical levels due to cumulative effects;
- determine whether these wetlands are considered ecologically, socially or economically important to a region;
- identify and describe wetland capacities to perform hydrological and water quality functions, provide for wildlife and wildlife habitat or other ecological functions;
- provide a wetland functions assessment in accordance with the guiding principles of Wetland Ecological Functions Assessment: An Overview of Approaches [44] or any subsequent approved guidelines by which to determine the most appropriate functions assessment methodology to use;
  - provide a rationale for the wetland functions assessment method chosen and submit complete data sets from any survey sites, including geospatial data files;
- determine if other wetland conservation policies, regulations or wetland compensation guidelines apply (contact provincial and/or local government authorities); and
- identify an RSA of sufficient size to capture effects to wetlands within the larger drainage area and include wetlands located outside of the LSA that may be affected by hydrological changes as a result of cumulative effects.

5.8.2 Effects on terrestrial, riparian and wetland environments

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

- describe all potential effects due to the project, for all phases, on terrestrial, riparian, and wetland environments;
- describe the key indicators used to assess project effects and the sensitivity of vegetation communities, terrestrial, riparian, and wetland environments to disturbance;
- describe changes related to landscape disturbance, including loss and fragmentation of habitats, alteration of riparian areas, including buffers or setbacks (the proponent should consider consulting with, and potentially co-developing buffers with First Nations and other Indigenous communities) and project effects on areas of soil or ground instability;
- quantify the area of vegetation communities, riparian, wetland, aquatic and terrestrial environments, that may be cleared or otherwise disturbed within the study areas during all phases of the project, including a description of the disturbance and changes to:
  - habitat ratios between the interior and periphery;
  - availability of rare habitat; and
  - function within the remaining vegetation or wetland complex;

- describe effects on the biodiversity of terrestrial, riparian and wetland environments, including effects from fragmentation and changes to regional biodiversity;
- describe effects related to potential introduction of weed species or invasive species or due to the increase in the spread and prevalence of diseases or pests;
- describe any hydrological or water flow changes, either permanent or temporary, that could alter moisture regimes or drainage conditions, and describe the effects on vegetation and wetlands;
- describe any changes to or loss of wetland function, including consideration of ecological (e.g. hydrological, biogeochemical cycling, habitat and climate functions) and socioeconomic functions of wetlands. Describe and justify the methodology used to assess the effects;
- 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, terrestrial, riparian, and wetlands environments to disturbance;
- describe potential changes to terrestrial, riparian, and wetland environments due to activities that may affect topography, soil erosion, compaction and productivity, contamination, bank slopes and suspension of sediment, or due to any contaminants of concern potentially associated with the project that may affect vegetation, soil, sediment or water;
- describe potential changes to terrestrial, riparian and wetland environments as a result of any new, known or suspected soil contamination within the study areas that could be re-suspended, released or otherwise disturbed as a result of the project;
- present the explicit calculation of radiation doses to vegetation with recognized approaches and software tools (example of acceptable approach in CSA N288.6 [8]):
  - provide a high-level discussion of the relative merits of alternative approaches to put the presented approach in a current national and international context;
  - document details of transfer parameters and their validation for site conditions. Site-specific data, and/or authoritative data sources, should support model structure and parameter choices;
  - note the choice of food chain transfer factors for VCs, which can vary by orders of magnitude in different environments for different species; and
  - if approach different from CSA N288.6 [8] is used, describe the model structure and implementation. Regardless of the approach taken, document a few representative samples of dose calculations starting with media and/or food concentrations;
- quantify and interpret doses for the effects of controlled releases on life history parameters (morbidity, mortality, reproduction);
- if numerical benchmarks for chronic radiation effects are exceeded, interpret effects at multiple levels of organization in an ecological context relative to the potential for effects on individual biota, populations, communities and ecosystems; and
- describe any positive changes.

5.9 Terrestrial wildlife and wildlife habitat

The proponent should consult the additional guidance for requirements pertaining to wildlife provided in the Compendium. The proponent must work with First Nations and other Indigenous communities to determine how Relatives of specific interest or concern will be considered in the Impact Statement.

5.9.1 Baseline conditions

The Impact Statement must:

- describe and map the biodiversity of terrestrial wildlife species (e.g., amphibians, reptiles, mammals, insects) and wildlife habitats that are found or are likely to be found in the study areas;
- identify wildlife species of ecological importance and of importance for human uses (e.g. recreational and economic uses), other than birds, that are likely to be directly or indirectly affected in the study areas. Species with harvest level records maintained by provincial, local conservation agencies or organizations should be included. For each species:
  - describe their distribution and location, abundance and population status, lifecycle, known residences, seasonal ranges, migration and movements, wildlife corridors and physical barriers to movement, habitat requirements, and sensitive periods (e.g. seasonal, diurnal and nocturnal), and
  - provide a map showing the highest concentrations or areas of use by species, differentiating between federal and non-federal lands;
- identify the metrics and biotic and abiotic indicators that are used to characterize the baseline conditions (e.g. population size, recruitment rates, spatial distribution, density) and provide a rationale for their selection, including how the selection of indicators for baseline conditions will support adequate population monitoring;
- describe the use of wildlife as a source of country foods, including current, historical, and anticipated future use;
- describe the use and harvesting of fur-bearing species, including current, historical, and anticipated future use;
- describe any locations within the study areas that might constitute sensitive areas for terrestrial wildlife, and show on maps, such as:
  - protected areas or sensitive habitats as described in sections 2.7 Receiving Environment and 5.10 Species at risk and their habitat;
  - travel corridors and alternate routes for travel corridors that could potentially be affected by the project;
- identify and describe any invasive species, introduced species of concern; and other species that may be considered as “weed species” in the project’s context;
- describe the levels of disturbance currently affecting wildlife and wildlife habitat, such as habitat fragmentation and the extent of human access and use;

- describe the natural disturbance regimes and their sources (e.g. fire, floods, droughts, diseases, insects and other pests);
- describe and provide the location of any recent or currently in progress ecological or biological studies of the site or the surrounding area; and
- describe the source of the baseline data, data collection methods (including details of spatial and temporal coverage), and provide a rationale for any modelling approaches chosen, and describe how community and Indigenous Knowledge was incorporated.

5.9.2 Effects on terrestrial wildlife and their habitat

The Impact Statement must:

- describe the potential effects of the project on wildlife and wildlife habitat, including population level, regional or local sub-population effects, including, but not limited to:
  - site preparation, vegetation removal, particularly of habitats important for breeding, overwintering or that act as movement corridors;
  - noise, light and sensory disturbances;
  - water and air emissions or dust;
  - bioaccumulation of contaminants in wildlife;
  - habitat loss and fragmentation;
  - introduction of invasive species, including the rapid growth of pathogens such as those in the ultimate heat sink or other elements of the cooling system, and other biohazards;
  - altered predator-prey relations, such as increased wildlife predation; and
  - increase in the spread and prevalence of diseases and other health concerns;
- provide an evaluation of the effect of the project, including any traffic, new road access, if applicable, switchyard, transmission line or other rights of way, on wildlife mortality risk and movement patterns;
- 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;
- describe and quantify, where possible, the potential effects to wildlife, including acute and chronic effects to wildlife health, of changes to air and water quality (e.g. from radiation exposure, contaminants, effluents, atmospheric emissions, dust deposition, and bioaccumulation);
- describe how predicted effects to wildlife compare to the expected reference conditions for unexposed wildlife on a biological population basis, taking into account natural variation;
- present the explicit calculation of radiation doses to terrestrial wildlife with recognized approaches and software tools (example of acceptable approach in CSA N288.6 [8]);
  - provide a high-level discussion of the relative merits of alternative approaches to put the presented approach in a current national and international context;

  - document details of transfer parameters and their validation for site conditions. Site-specific data, and/or authoritative data sources, should support model structure and parameter choices;
  - note the choice of food chain transfer factors for VCs, which can vary by orders of magnitude in different environments for different species; and
  - if an approach different from CSA N288.6 [8] is used, describe the model structure and implementation. Regardless of the approach taken, document a few representative samples of dose calculations starting with media and/or food concentrations;
- quantify and interpret doses for the effects of controlled releases on life history parameters (morbidity, mortality, reproduction);
  - if numerical benchmarks for chronic radiation effects are exceeded, interpret effects at multiple levels of organization in an ecological context relative to the potential for effects on individual biota, populations, communities and ecosystems;
- describe and assess the resilience and recovery capabilities of wildlife populations and habitats to disturbance, including the anticipated potential for the PA to be returned to its existing state with respect to wildlife populations and their habitat following operations; and
- describe the potential adverse effects of the project on species noted as important to local communities, Relatives of specific interest or concern to First Nations and other Indigenous communities and their habitat.

Appropriate methodologies to predict effects to wildlife should be used.

The assessment of effects on the terrestrial environment must be consistent with CSA N288.6 [8].

The Ontario government should be considered a source of information on appropriate methodologies to predict impacts to wildlife.

5.10 Species at risk and their habitat

The proponent should consult the additional guidance for requirements pertaining to species at risk provided in the Compendium. With respect to effects on bird species at risk, the information required is presented in section 5.12 Birds and their habitat.

5.10.1 Baseline conditions

The Impact Statement must:

- provide a list of all species at risk that are likely to be in the PA, including:
  - species listed in Schedule 1 of SARA; and
  - 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;

- for each species at risk identified in the list above:
  - describe abundance (including relative abundance in each habitat type), population status, and distribution;
  - provide a map showing survey sites, species sighting records, the areas of highest concentration or areas of use;
  - provide information and/or mapping at an appropriate scale for residences, seasonal movements, movement corridors, habitat requirements, key habitat areas, identified or proposed Critical Habitat and/or recovery habitat (where applicable);
  - describe the general life history (e.g., breeding, foraging) that may occur in the PA, or be affected by the project; and
  - identify critical periods (e.g., denning, rutting, spawning, calving, breeding, roosting), setback distances, or other restrictions related to these species; where appropriate, the proponent should consider consulting with First Nations and other Indigenous communities to identify critical periods and co-develop measures related to these species.
- provide any published studies that describe the regional importance (including economic), abundance and distribution of species at risk, including recovery strategies or plans; and
- describe the source of the Species at Risk data, including survey design, sampling protocols and data handling:
  - when using recognized standards, provide details of any modifications to the recommended methods and rationale for these modifications; and
  - indicate who was consulted in the development of the baseline surveys (e.g., federal/provincial wildlife experts, specialists) and describe how community knowledge and Indigenous Knowledge was incorporated.

The proponent should contact provincial or local government authorities to determine additional data sources and survey methods.

5.10.2 Effects on species at risk and their habitat

The Impact Statement must:

- describe the potential effects of the project on species at risk listed under Schedule 1 of SARA as listed under section 1.3 Selection of Valued Components and their critical habitats (including its extent, availability and presence of biophysical attributes). The analysis of potential effects should be provided separately for each species at risk, including separate analyses for each activity, component and phase of the project;
- present the explicit calculation of radiation doses to species at risk assessed by COSEWIC with recognized approaches and software tools (example of acceptable approach in CSA N288.6-22 [8] clause 7.3.4 Dose calculation methods, and clause 7.3.7 Models);
  - provide a high-level discussion of the relative merits of alternative approaches to put the presented approach in a current national and international context;

  - document details of transfer parameters and their validation for site conditions. Site-specific data, and/or authoritative data sources, should support model structure and parameter choices;
  - note the choice of food chain transfer factors for VCs, which can vary by orders of magnitude in different environments for different species; and
  - if an approach different from CSA N288.6 [8] is used, describe the model structure and implementation. Regardless of the approach taken, document a few representative samples of dose calculations starting with media and/or food concentrations;
- describe the potential effects of the project on species assessed by the COSEWIC as extirpated, endangered, threatened or of special concern (flora and fauna), as well as on the potential habitat of these species that are not currently listed under SARA;
- describe the area, biophysical attributes and location of habitat including critical habitat affected (e.g. destroyed, permanently altered, disrupted), including direct and indirect effects due to vibration and artificial light in the PA on usage patterns and migratory behaviour of species at risk;
- describe the residual effects that are likely to result from the project after avoidance and minimization measures have been applied, including the extent, duration and magnitude of the effects on:
  - number of individuals killed, harmed, harassed; and
  - number of residences damaged or destroyed.

If a permit under Section 73 of the SARA is anticipated, further information on the SARA permitting process is available in the Permitting Plan [45] on the registry.

The proponent should consult with the Ontario Ministry of the Environment, Conservation, and Parks where an authorization under the *Endangered Species Act* [46] may be necessary and describe how and to what extent this process could address adverse effects.

The Ontario government should be considered a source of information on appropriate methodologies to predict impacts to wildlife species at risk.

5.11 Fish and fish habitat

The impact assessment must assess the effects of the project on fish and fish habitat, as defined in subsection 2(1) of the *Fisheries Act* based on likely effect pathways from project components or activities. The spatial scale and pathway of effects will dictate the appropriate fish and fish habitat assessment methods, such as quantifying habitat loss and/or considering long-term population viability.

Where *Fisheries Act* authorization(s) under section 34.4(2)(b) or 35(2)(b) of the *Fisheries Act* are likely required for the project, the proponent is encouraged to provide the information required for permitting during the impact assessment in support of an efficient and shortened permitting approval process, and refer to Project Planning: Applying for a *Fisheries Act* Authorization and the Applicant's Guide Supporting the Authorizations Concerning Fish and Fish Habitat Protection Regulations. Where it is not possible to eliminate, reduce or control adverse effects to fish and fish habitat, offsetting measures should be considered, which may include restoration of degraded fish habitat, habitat enhancement or construction,

or stocking, referring to the Policy for Applying Measures to Offset Harmful Impacts to Fish and Fish Habitat.

The proponent should consult Technical Considerations and References for the preparation of an Impact Statement for guidance pertaining to fish and fish habitat.

5.11.1 Baseline conditions for fish and fish habitat

The Impact Statement must:

- list in a table all waterbodies and watercourses frequented by fish, or on which fish depend directly or indirectly, likely affected by the project. Include in the table:
    - type and permanence (e.g. temporary, intermittent or ephemeral stream),
    - size (e.g. width at the ordinary high water mark) and depths,
    - ice regime, and
    - whether flows are regulated;
- for each of the waterbodies and watercourses listed above, present maps at appropriate scales using aerial imagery overlaid with relevant descriptions, as well as relevant summary tables, that depict:
    - the location and area of fish habitat, including freshwater mussel habitat;
    - the location of any known or potential barriers to fish passage, both natural and constructed including water management infrastructure or waterbody crossings (e.g. bridges, culverts, dams, weirs, beaver dam, waterfalls);
    - footprint areas of proposed works;
    - physical and biological characteristics at a level of detail commensurate with the potential for effects on fish and fish habitat including:
        - baseline habitat loss or disturbance (e.g. fragmentation);
        - habitat use or suitability, including critical habitat and residences for species at risk, habitat function (e.g. spawning, calving, nursery) and sensitive times for habitat use (e.g. overwintering, migration), or how the habitat directly or indirectly support fish to carry out their life processes;
        - important habitat features (e.g. substrate types, beaver dams, riffles, pools);
        - habitat areas with high fish abundance or diversity;
        - species present, including sub-species and sub-populations, considering inter- and intra-annual variations;
        - if applicable, flow direction;
        - existing local and regional sources of contaminants;
        - proximity to protected or sensitive habitat areas;

        - description and location of erosion-sensitive soils and areas of ground instability; and
        - presence of invasive or introduced species of concern;
- identify the fish species, including freshwater mussels, and benthic macroinvertebrates, that will serve as the focus of the effects assessment, considering that different species may be affected differently by the project and may require different mitigation.
- as needed to assess effects to the identified fish species, including freshwater mussels, and benthic macroinvertebrates and habitat, providing summary data in maps and tables, and ensuring that sampling sites are co-located for different elements (e.g. fish presence, water quality, sediment quality) and including both sites likely and unlikely (as reference) to be affected by the project, describe:
    - underwater soundscape and vibration, including those offshore, based on acoustic measurements, including vibration and sound sources, geographic extent, as well as spatial and temporal variations within the water column and at the lakebed,
    - baseline tissue concentrations for relevant bioaccumulative contaminants for fish and other aquatic biota contributing to bioaccumulation through the food chain in comparison to relevant environmental quality guidelines,
    - benthic invertebrate community in representative habitats, such as flowing waters, near and offshore areas in the Lake Ontario, and embayment wetlands,
    - nutrients and/or productivity. describe primary and secondary productivity in affected waterbodies with a characterization of trophic levels, biodiversity, key functional interactions and processes (e.g. food web and nutrient cycling).
- provide conceptual models of existing baseline aquatic biota endpoints (for example, survival, growth, reproduction, age/size distributions) including linkages with abiotic environmental media and other biota (feeding). The conceptual model must:
    - describe the baseline sources and distribution of stressors along transport and exposure pathways resulting in baseline hazard quotients for contaminants to aquatic organisms through diet and direct exposure; and
    - include potential receptor from each trophic level (for example, piscivore, benthic prey feeder, zooplankton feeder, herbivore, primary producers);

5.11.2 Effects to fish and fish habitat

The Impact Statement must:

- describe the likely effect pathways to fish and fish habitat and aquatic biota from project components or activities for each waterbody, watercourse and location likely affected by the project (e.g. point and diffuse sources of discharges and their receiving environment), including:
    - habitat alteration, disruption or destruction (temporary or permanent) relative to baseline, described in a table in terms of area, habitat type, sensitivity of habitat and impact (e.g. magnitude, intensity, persistence), as well as on maps at appropriate scales,
    - risk from increased access to the area or to fishing,

- risk from noise and vibrations (e.g. blasting);
- risk of entrapment, impingement or entrainment in cooling water intakes,
- effects of project activities, including blasting, thermal effects, and impingement, on aquatic species;
- risk of introduction of aquatic invasive species, including pathogens,
- changes resulting from watercourse-crossing(s). For each crossing, describe and justify the techniques used, and risk of fish habitat loss from obstructions to fish passage;
- changes to the alignment of waterbodies and watercourses, shorelines, locations of any intakes and proposed maximum pumping rates, and any resulting changes in surface water flows based on the quantitative characterization of the hydrology or in groundwater and surface water conditions at a scale, resolution and level of detail relevant to assess the effects to fish and fish habitat,
- changes to surface water flows and levels and to groundwater quantity and flow pattern considering surface water and groundwater withdrawal (e.g. spatial scales, timing, quantity and quality of water withdrawn, flow rates and annual volumes), fluxes and the conditions under which this water is released into the receiving environment. Use a three-dimensional numerical groundwater flow model to simulate the hydrogeological system and estimate key water fluxes based on the calibrated baseline conditions model and include:
    - major project components, including open pits, underground workings, waste rock piles, tailings management facilities, dewatering wells, water diversion ditches, and sediment ponds,
    - changes to surface water flows and hydraulic conditions in the receiving environment caused by project components supported by quantitative data and quantitative characterization through modelling outputs, including:
        - flow regimes (e.g. timing and volumes) based on the hydrological model calibrated to baseline conditions,
        - velocity regimes and flow hydraulics (e.g. localized velocity perturbations, turbulence, shear stresses, flow reversals),
        - sediment transport and deposition patterns affecting habitat structure and water quality, and
        - groundwater-surface water interactions, and
    - an assessment of the sensitivity of key model outputs to hydraulic properties and climatic parameters such as recharge,
- changes to surface water quality due to direct and indirect discharges, surface erosion and sedimentation, generation and deposition of dust and particulate matter, including to physicochemical parameters (e.g. temperature, pH, salinity, dissolved oxygen, total suspended solids),chemical constituents (e.g. major and minor ions, trace metals, radionuclides, nutrients, organic compounds) and changes to water quantity in the receiving environment. Present

expected changes as well as risk-based worst- and best-case scenarios. Use appropriate modelling and describe model assumptions, inputs and associated rationale,

- changes to surface water and groundwater quality resulting from acid rock drainage and/or metal(loid) leaching from mined, excavated or blasted material, including:
  - a consideration of all relevant material, including historical waste, such as waste rock, ore (including off-site), low grade ore, pit wall materials, underground development ramps, process waste (i.e. tailings, heap leach, treatment sludge, coarse coal rejects, processed kimberlite) overburden and potential construction material (i.e. mine rock, quarries, unconsolidated material); and
  - a geochemical characterization study describing the spatial and compositional representativeness of samples, the analytical methods used to evaluate geochemical properties (including mineralogy, metal(loid) leaching, and acid generation potential), and the approach used to predict drainage chemistry trends over time, as well as how uncertainties will be addressed as the project advances. Consider relevant guidance, such as Mine Environment Neutral Drainage (MEND) report 1.20.1, International Network for Acid Prevention's GARD Guide, ECCC's Environmental Code of Practice for Metal Mines, and applicable provincial or territorial guidance. The study must include a Conceptual Geochemical Model that assesses how project activities and components may affect the quality of surface water, groundwater, and sediment in areas that support fish habitat. This model must include risk-based source terms, integrate geochemical data from relevant materials to predict drainage chemistry and quantify the potential for metal(loid) leaching and acid rock drainage under expected site conditions, especially from sulphidic geological materials;
- temporal changes to water quality and sediment quality, compared to applicable guidelines, site-specific objectives or benchmarks, and/or relevant toxicity test results (either site-specific or published):
  - indicate the source(s) of contaminants, and their transport and fate, including geographic extent, in the hydraulic environment;
  - as applicable, indicate where and when the water quality in the immediate receiving environment begins to meet water quality guidelines;
  - estimate quality and quantity of effluent streams released from the site to the receiving environment, including effluent from treatment facilities, dewatering activities, seepage and surface run off from project components and compare their quality to applicable guidelines, objectives or standards. For contaminants without regulatory release limits or water/sediment quality guidelines, predicted concentrations should be as low as reasonably achievable, considering social and economic factors and the implementation of best available treatment technology economically achievable, in consultation with relevant regulators;
  - update the models used to describe baseline conditions, and describe the contaminants associated with the project, their spatial and temporal locations, their potential flow paths (e.g. groundwater seepage pathways and how they relate to potential receptors), effects

of the project on quantity of flow and how they could affect surface water, sediment and groundwater quality; and

- describe the contaminant attenuation capacity within the hydrogeological units in the project area and use this input to assess off-site groundwater and surface water contamination. Alternatively, the proponent may conservatively assume no attenuation capacity, and describe degradation products (i.e. daughter materials) during groundwater flow;

- modeled tissue concentrations for relevant bioaccumulative contaminants for fish and other aquatic biota contributing to bioaccumulation through the food chain compared to relevant environmental quality guidelines;
- changes in nutrients and productivity resulting indirect effects on fish (e.g. eutrophication, food availability);
- discharges of hydrostatic testing waters to the aquatic environment; and
- re-suspension, release or disturbance of known or suspected soil or sediment contamination;

- describe residual and, if applicable, cumulative effects to fish and fish habitat based on the likely effect pathways and a comparison with baseline conditions;
- present the explicit calculation of radiation doses to fish with recognized approaches and software tools (example of acceptable approach in CSA N288.6);
  - provide a high-level discussion of the relative merits of alternative approaches to put the presented approach in a current national and international context;
  - document details of transfer parameters and their validation for site conditions. Site-specific data, and/or authoritative data sources, should support model structure and parameter choices;
  - note the choice of food chain transfer factors for VCs, which can vary by orders of magnitude in different environments for different species; and
  - if approach different from CSA N288.6 is used, describe the model structure and implementation. Regardless of the approach taken, document a few representative samples of dose calculations starting with media and/or food concentrations;
- for effects on fish, including freshwater mussels, and other aquatic biota from impingement and entrainment, the estimates of intake losses (cropping rates) for all life stages of aquatic biota in numbers and biomass should be extrapolated to the whole year, with confidence intervals based upon industry-accepted methods of sampling and analysis. This extrapolation includes the conversion of immature stages to age-1 adult equivalents for estimates of losses of local population-level importance for fish. Standard modelling and statistical approaches and contextual methods from government agencies and peer-reviewed published scientific literature should be used to project the effects on individual biota to those of the year-class or local population. Mortality is assumed to be 100 percent from entrainment and impingement, unless a fish handling and return system is included. The effectiveness predictions also vary by species and life stage. For example, alewife are fragile and easily killed, whereas sucker and eels are not; juveniles are easily injured and do not easily withstand mechanical handling systems.

- describe potential effects on fish behaviour, distribution, abundance, and migration patterns;
- include an examination of the correlation between construction periods and sensitive periods for fish (e.g., reproduction), key fisheries windows for freshwater and anadromous/catadromous species, and any potential effects due to overlapping periods;
- describe any positive changes, such as habitat creation and, where applicable, provide information on re-stocking (including the number of fish) or creation of new fish habitat (including the new area created);
- describe any need for a *Fisheries Act* authorization and/or a SARA permit and describe any consideration of Fisheries and Oceans Canada guidance documents;
- if applicable, describe effects from thermal plumes associated with nuclear power generating activities, including:
  - consideration of risk to aquatic biota from "pulse" and sustained temperature increases and decreases relative to ambient changes such as thermal shock from ongoing operations, outages and anticipated operational occurrences;
  - effects of contaminants released in the thermal discharge, including the combined effects of temperature and contaminants, as well as the potential for gas-bubble disease;
  - effects on fish and aquatic ecosystem, including:
    - physical displacement of life stages exposed to discharge jets;
    - changes to aquatic community structure and productivity;
    - lethal and sub-lethal effects;
    - behavioural responses (attraction and avoidance) for all life stages;
    - direct effects (survival, growth, reproduction, diet, condition, life history) and indirect effects (for example, targeted angling associated effort and mortality within thermal plume, increased larval mortality from predation due to physical transfer out of discharge channel to open water body, disease prevalence) analysis and evaluation of the incremental effects from the project, and the cumulative effects of combined discharges;

5.12 Birds and their habitat

For the purpose of the Integrated Guidelines, birds refer to all birds, with emphasis on migratory birds as defined under the *Migratory Birds Convention Act, 1994* [47]. The proponent should consult the additional guidance for requirements pertaining to birds provided in the Compendium.

5.12.1 Baseline conditions

The Impact Statement must:

- identify species likely present in the LSA and RSA based on data from existing sources and recent field habitat surveys for the breeding and non-breeding season, as well as Indigenous Knowledge and community knowledge that is provided;
- identify the bird species (e.g. a species at risk) or groups of species (e.g. shorebirds) that are indicators for effects and will serve as the focus of the effects assessment, considering that different species and groups of species may be affected differently by the project and may require different mitigation. Where there is uncertainty as to bird species likely present in the project areas, the selection of birds should be inclusive and representative.
- as needed to assess effects, for each bird identified:
    - describe population, including subpopulations or subspecies that may have distinct ecological requirements or migratory routes, distribution, seasonal ranges, migration, movements, frequency and timing of occurrence, habitat association(s) and requirements for relevant life cycle stages, and sensitive periods (e.g. seasonal, time of day), including estimates of abundance or density where available,
    - describe and quantify habitat based on the best available existing information and recent field habitat surveys, including:
- maps with habitat survey locations (including details of spatial and temporal coverage),
- maps with expected areas of concentration of key birds, including sites likely used over the course of the year for breeding, feeding, wintering, movement, resting or roosting, staging and migrating, as applicable,
- description and maps of the location of areas important to birds (e.g. bird sanctuaries), and of residences and critical habitat for species at risk as defined in recovery strategies,
- maps of rare, unique or threatened habitat or habitat features (e.g. old forest, species-specific breeding habitat, eskers and other similar geological formations), and a description of how birds are expected to use that habitat year-round (e.g. winter, spring migration, breeding season, fall migration, movement corridors) based on available information,
- maps of the project's footprint relative to information about birds, identifying temporary and permanent infrastructure, and description of whether project components avoid sensitive habitat such as breeding territories or areas of seasonal concentration, and
- maps of nests that will be or have been added to the Abandoned Nest Registry and are being monitored to comply with the *Migratory Birds Regulations, 2022* [48]; and
- justify whether existing information and recent field habitat surveys are sufficient to support the assessment of likely residual and cumulative effects on the birds identified and to determine the extent to which these effects are significant considering uncertainties and bias, as well as spatial and temporal representation, in the baseline. If not sufficient, conduct and include additional field bird or habitat surveys, as needed to assess effects, which may include:
    - targeted field bird surveys of presence or locations of species at risk where unique mitigation measures and/or follow-up could be required,

- field habitat surveys to identify rare habitats or geological features, nests, and critical habitat for species at risk, and
- field bird surveys where risk or uncertainty related to effects on birds are moderate to high, where bird presence, population or distribution are poorly understood (e.g. flyway or stopover that could be affected to a high extent), or where appropriate mitigation measures are unknown or uncertain.

5.12.2 Effects to birds and their habitat

The Impact Statement must:

- describe the likely effect pathways to birds from specific project components (temporary and permanent) and activities during all phases of the project, considering risks of mortality (e.g. from collisions, predators) and disturbances (e.g. from light, presence of workers; and
- describe residual and, if applicable, cumulative effects to birds resulting from the likely effect pathways to birds, including an estimate of effects resulting from habitat changes (e.g. degradation, removal) and of effects to critical habitat of species at risk and habitat of Relatives of specific interest or concern to the First Nations and other Indigenous communities.

6 Health, social and economic conditions

The IAA requires the consideration of changes 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. The IAA also requires the assessment of adverse effects within federal jurisdiction, including non-negligible adverse changes occurring in Canada to the health, social or economic conditions of Indigenous Peoples.

Section 6 of the Integrated Guidelines presents a holistic approach to the requirements for health, social, and economic conditions of those living in the project study area, including the following distinct groups to work with in completing the requirements in Section 6 of the Integrated Guidelines:

- individuals living in the project study area, including Indigenous Peoples and members of the public (referred to collectively as local peoples),
- broad populations living in the project study area (referred to as local communities); and
- First Nations and other Indigenous communities.

Unless noted otherwise, and where First Nations and other Indigenous communities have agreed to including the information in the Impact Statement, all requirements in Section 6 apply to the three groups listed above. For the Impact Statement, the goal of Section 6 is to collect relevant baseline information, conduct effects analysis and provide potential mitigation measures as a result of local community and

Indigenous engagement efforts in the project study area. Collection of baseline data and effects analysis in Section 6 must consider health, social, and economic inequalities between First Nations and other Indigenous communities and local peoples.

Section 7.3.2 Effects to Health, Social, and Economic Conditions of Indigenous Peoples presents a targeted approach by building on the information in Section 6 and providing Nation or community-specific detailed requirements based on input from each First Nation or other Indigenous community listed in 3.1 of the IEPP. The proponent must allow those Nations and communities to identify how their information in Sections 6 and 7 is provided and considered. Where MS-WTFNs do not wish to disclose certain information, the proponent must still assess effects using methods agreed with MS-WTFN (e.g., aggregated findings, sensitivity mapping, confidential annexes, or MS-WTFN-led reporting) that protect confidentiality while ensuring the assessment remains comprehensive. The proponent may provide information in response to Sections 6 and 7 together, if and when appropriate, and as determined by participating First Nations and other Indigenous communities.

Where a First Nation or other Indigenous community undertakes a health and well-being study relevant to the project, the proponent must describe the study's scope, methods, and findings, and explain how those findings were considered and integrated into the baseline characterization, effects assessment, thresholds of concern, mitigation measures, and significance determinations.

The Impact Statement must describe how First Nations and other Indigenous communities defined concepts of health, wellbeing, safety, cultural continuity, and intergenerational responsibilities to inform the assessment. Where differences arise between proponent-led technical studies and Indigenous-led studies (e.g., in scope, indicators, spatial or temporal boundaries, or conclusions), the proponent must clearly describe those differences and explain how they were considered with respect to impacts on Indigenous Peoples' health, wellbeing, and rights.

The proponent should work with, at minimum, the Town of Cobourg, Municipality of Port Hope, Municipality of Trent Hills, Municipality of Brighton, Township of Hamilton, Township of Alnwick/Haldimand, Township of Cramahe and other self-identifying local communities, as well as local peoples, when fulfilling the requirements of Section 6. The proponent must consider the First Nations and other Indigenous communities outlined in 3.1 of the IEPP when fulfilling the requirements in Section 6 and Section 7.3.2.

The proponent is encouraged to refer to: [10] [49] [50] [51] [52] [53] [54] [55] [56] [8]

6.1 Health, social and economic conditions

6.1.1 General baseline conditions

For all baseline conditions in Section 6 of the Integrated Guidelines, the Impact Statement must:

- describe relevant community history or context, including historical impacts on health, social, and economic conditions;

- provide a comparison of data at the provincial, regional or national level, if possible, to better interpret baseline conditions;
- describe baseline conditions using disaggregated data for diverse population groups and their different access to resources, opportunities and services within the community to support GBA Plus; and
- be sufficiently detailed to provide a comprehensive understanding of the health, social and economic conditions, including relevant trends.

6.1.2 General effects assessment

The Impact Statement must:

- assess positive and adverse effects of the project on health, social and economic conditions;
- describe how the differential effects identified in the GBA Plus results - relating to human health, social and economic conditions - affect diverse population groups (e.g., Indigenous women, girls, gender-diverse and Two-Spirit peoples);
- describe potential effects from the influx of transient workers on health, social, and economic conditions, including local housing, services and infrastructure, traditional activities, recreational activities (e.g., hunting, fishing, camping), and community safety (e.g., gender-based violence);
- describe the interconnections between social, health and economic conditions and other VCs, as well as interactions between effects; and,

As applicable to the assessment, the analysis should describe the goals of First Nations and other Indigenous communities, local or regional land use plans or local or regional development plans and the extent to which the project is aligned with such plans to avoid or enhance effects. The assessment should be informed by community-defined land and water priorities, laws, and care of Relatives responsibilities, whether articulated through formal plans or through Indigenous Knowledge, engagement, and community-led processes, where these are provided to the proponent. The effects assessment should explore and discuss opportunities by which benefits to local communities can be enhanced.

6.2 Health conditions

6.2.1 Baseline for health conditions

The Impact Statement must:

- describe current health conditions in the context of physical, mental and social well-being and incorporate a determinants of health approach that extends beyond biophysical health considerations:
    - provide a demographic profile for local communities and First Nations and other Indigenous communities, and describe other community-relevant health information;
    - develop community health profiles that describe the overall biophysical, social and economic health of each First Nation and other Indigenous community and local community including

baseline information. Health profiles should include the Community Well-Being Index, consider psychosocial factors, and be co-developed, where possible.

- include a description of any context-specific definitions of health and well-being, from the perspective of First Nations and other Indigenous communities and local communities;
- include regional data and health studies, including all relevant data available from the CNSC's Independent Environmental Monitoring Program (IEMP) sample results for nuclear facilities near the Project site.
- use, where available, secondary information sources (e.g., CNSC, Public Health Agency of Canada, Statistics Canada, Indigenous Services Canada, Indigenous health authorities, provincial health authorities, municipalities).

- be sufficiently detailed to describe the pathways by which the project's influence on the determinants of health may affect health outcomes;
- 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, including:
  - a description of land uses and activities by local human receptors including, but not limited to, gathering, hunting, trapping and fishing, and traditional cultural and recreational activities;
  - registered or recognized hunting, guiding or trapping areas, preferred harvesting areas, and recreational and commercial fishing areas;
  - a description for Indigenous Peoples' permanent and temporary residences (e.g., camps identified in collaboration with Indigenous Peoples);
  - sensitive receptors (e.g., churches, daycares, schools, hospitals, community centres, retirement complexes, health care centres) near the project;
- describe surface waterbodies used for recreational purposes, specifying whether their use is seasonal or year-round, as well as their distance from project activities. For First Nations and other Indigenous communities, identify surface waterbodies used for traditional and cultural practices;
- describe drinking water sources and intakes, both surface and groundwater (permanent, seasonal, periodic or temporary), for farms, industries, local peoples, and municipalities. Include flow rates, approximate wellhead capture zones, and the distance from project activities;
- describe the consumption of country foods (traditional foods) as a health-related behaviour, including, if possible, identifying the subpopulations consuming foods, along with what species are used, quantities, frequency, harvesting locations and how the data were collected;
- provide baseline contaminant concentrations in ambient air, drinking water and tissues of country foods consumed by First Nations and other Indigenous communities and local communities. The proponent should work with First Nations and other Indigenous communities and local communities to collect tissue samples where appropriate and to ensure samples collected are representative of the population;
- work with First Nations and other Indigenous communities to develop sampling plans, data governance, and reporting protocols for country foods, water, and tissue sampling, including how

results will be communicated to communities and how findings will trigger mitigation, advisories, or changes to project design;

- describe the level of food security and food sovereignty within First Nations and other Indigenous communities and local communities;
- describe the current cancer occurrence among local peoples in the region, including cancer rate, type, mix, stage of cancer, age of detection/diagnosis, and lifespan of cancer patient. Include provincial and national information on cancer occurrence, among Indigenous Peoples and local peoples, to put regional information into perspective.

Guidance for developing the appropriate baseline information relevant to human health is identified in the section 6 preamble (above), and the proponent must justify any deviation from this guidance. The proponent should refer to the Health Canada guides to ensure that best practices are followed in collecting baseline information for the assessment. Receptor exposure characteristics (for example, inhalation or ingestion rates), when used, should be referenced from accepted Canadian or international sources. Examples are identified in the Compendium.

6.2.2 Effects on health conditions

The Impact Statement must:

- describe any potential project effects on community health profiles (see section 6.2.1);
- describe potential effects of the project on human health:
    - provide a Health Impact Assessment and a Human Health Risk Assessment (HHRA);
        - conduct a problem formulation exercise and/or preliminary model predictions to determine whether a complete HHRA is required. The proponent must provide a rationale if the problem formulation and/or preliminary model predictions indicate that a complete HHRA is not warranted. The problem formulation exercise and HHRA, if a HHRA is conducted, must use best practices in health risk assessments methods (see Health Canada, 2023 and CSA N288.6-22 [8]. Guidance for Evaluating Human Health Impacts Effects in Environmental Assessments Impact Assessment: Human Health Risk Assessment);
        - describe and quantify specific thresholds used for HHRA and document if different thresholds were considered for vulnerable populations, including by sex and age. Provide a justification if any applicable threshold was not used;
        - problem formulation and screening decisions for the HHRA should be informed by engagement with First Nations and other Indigenous communities and consider Indigenous-specific exposure pathways, including harvesting practices, consumption of country foods, use of surface and groundwater, seasonal and mobile use patterns, and intergenerational considerations.
        - where exposure pathways, contaminants, or receptors are excluded from the HHRA, or where a complete HHRA is not undertaken, provide a clear scientific rationale and describe how First Nations and other Indigenous communities' input and concerns were considered in that decision.

- apply a determinants of health lens and describe any potential health effects resulting from changes on biophysical, social and economic determinants of health, including relevant interconnections and interactions;

- describe any potential effects on health inequalities between First Nations and other Indigenous communities and local communities;

6.2.2.1. Effects on biophysical determinants of health

The Impact Statement must:

- document and take into account tolerance thresholds for potential adverse effects on health identified by First Nations and other Indigenous communities and local communities;
- provide an assessment of the potential effects on human health in consideration of, but not limited to, potential changes in:
  - air quality;
  - noise exposure and vibration;
  - light levels;
  - drinking water quality and quantity including flow rates, as applicable;
    - assessment should be based on the strictest guideline values for the following criteria: Guidelines for Canadian Drinking Water Quality (GCDWQ), or any relevant provincial water quality standards or guidelines, and compliance with existing provincial regulatory mechanisms;
    - describe the fate and estimated travel times of contaminants of potential concern (COPC[8]) from contaminant source areas to drinking water sources;
  - current and future availability and quality of country foods;
    - describe how the project-related contaminants (as identified in sections 5.3 Topography, soil and sediment, 5.6 Atmospheric, acoustic and visual environment, and 5.7 Groundwater and surface water) can potentially end up in the water, air or soil, can be absorbed in country foods (i.e., foods that are trapped, fished, hunted, harvested or grown for subsistence, cultural or medicinal purposes);
    - provide the rationale if a determination is made that an assessment of the potential for contamination of country foods is not required or if some contaminants are excluded from the assessment;
  - current and future availability and quality of water for drinking, recreational and cultural uses;

[8] COPC: Any chemical substance, radiological or non-radiological contaminant for which the concentration in an environmental medium is likely to be high due to the Project's activities may first be considered as a COPC. However, if it is established that the sum of the modeled 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.

- estimate radiological doses to:
    - workers from routine and non-routine work practices, including the maximum annual effective and equivalent doses to categories of workers;
    - to the general public through any direct or indirect pathways (e.g., environmental)
    - First Nations and other Indigenous communities who have historically used, or identify potential or future use and reconnection priorities within the area of potential effects. This includes Indigenous Peoples who practice traditional ways of life in proximity to the project through any direct or indirect pathways (i.e., hunting, trapping, fishing, harvesting, etc.) This may be reflected in a HHRA.
- describe and document the method used to estimate effective and equivalent doses (see methodology guidance in REGDOC-1.1.1 appendix, section G.7.1), considering statistical interpretations of acute exposures;
- reference and describe alternative interpretations of radiation risk;
    - address the effects of using radiation weighting factors suggested in CSA N288.6, for calculating a "biota effective dose" from absorbed dose (i.e., weighting factors of 40 for alpha particles, and 3 for tritium beta particles);
    - use a probabilistic modelling approach if there is ambiguity in the validity of dose estimates for site-specific conditions and/or VCs (i.e., a probabilistic approach is appropriate when it is necessary to grossly extrapolate information for other areas or species, or when there is ambiguity in the protection of any threatened or endangered species, or species of concern;
- describe how engagement with First Nations and other Indigenous communities informed the interpretation of results in relation to Indigenous Rights, health and wellbeing, cultural practices, and community-defined thresholds of concern where provided;
- explain how risk and uncertainty were communicated in accessible ways and how identified concerns informed avoidance and mitigation measures, monitoring, and follow-up;
- provide a detailed justification for every COPC or exposure route that would be excluded or eliminated from the assessment of the human health risks;
- identify other potential pathways of exposure to contaminants;
- provide an assessment of the carcinogenicity of diesel exhaust when diesel engines are a source of air pollutant emissions for the project;
- in situations where project-related air, water or noise emissions meet local, provincial or federal guidelines, and yet concerns from local peoples were raised regarding human health effects, provide a description of the local peoples concerns and how they were or are to be addressed;
- evaluate the potential risk to human and non-human biota from biocides and other means used to manage biohazards and invasive species; and
- describe any project-related changes that could result in a positive health effect (e.g., remediation projects).

6.2.2.2. Effects on social determinants of health

The Impact Statement must:

- document and take into account tolerance thresholds for potential adverse effects identified by First Nations and other Indigenous communities and local communities;
- describe the potential positive and adverse health effects from project-related interactions to relevant social, cultural, psychosocial[9] and economic factors along effect pathways and their respective indicators, reflecting the input of the affected communities;
- identify and describe anticipated changes to determinants of health, including psychosocial factors, that may be related to the project, including:
    - housing availability, housing affordability, home ownership and home value;
    - demographic information on the region, including available descriptive statistics (e.g., age, ethnicity, sex and gender, language);
    - access to health and social services;
    - access to green spaces, parks and recreational facilities;
    - community cohesion;
    - average income and wage inequality;
    - education level;
    - factors supporting mental health and community well-being (including perceived risks to personal and community health and safety, and concern for future generations); and
    - safety of Indigenous women, girls and 2SLGBTQIA+ People (including concerns regarding gender-based violence);
- identify any emotional or social stress factor that may result from the project, particularly concerns regarding perceived public safety risks due to the project or due to potential accidents or malfunctions to those living in proximity to the project;
- describe potential effects on access to health, public safety, and social services, including the increased use of these services in local communities and the region;
- describe potential effects of project conditions (e.g., transient employment, high wages, high stress work, coupled with gender-based norms) on community safety, including increased risks of harm from family conflict, sexual exploitation, and gender- and family-based violence, particularly during the construction phase;
- indicate the potential health effects, short-term or long-term, resulting from changes on community cohesion and perception of well-being during the construction phase, and determine whether and how those effects would change during the operation phase;
- with consent from First Nations and other Indigenous communities, describe any potential avoidance of areas of project-related disturbances, or any potential changes to their relationship with the land, air,

[9] Psychosocial factors represent the psychological dimension of social (including cultural) and economic conditions directly linked to mental well-being, underlying physical well-being. They also refer to the perception of environmental health risks and nuisances within the human environment, which may contribute to the community's stress burden.

and water due to real or perceived changes to safety, environmental quality and tranquillity. Explain how these potential avoidances or relationship changes were considered in assessing potential effects on the diet and mental well-being of Indigenous Peoples;

- include an analysis of the pathways of impacts, developed in collaboration with First Nations and other Indigenous communities, linking project activities (including land conversion, exclusion zones, security restrictions, and potential contamination or perceived contamination) to changes in access, harvesting practices, land use decisions, cultural continuity, governance responsibilities, and intergenerational knowledge transfer. These pathways must inform the characterization of impacts on Indigenous health, wellbeing, and the exercise of rights;
- with regard to potential effects on food security and safety:
    - describe changes in terms of quality, usage and stability of locally grown and country foods (traditional foods) for local communities and First Nations and other Indigenous communities, including possibilities of avoidance of certain country food sources or drinking or recreational water sources due to the perception of contamination; and
    - describe the potential effects related to these changes on the physical and mental health of local communities and First Nations and other Indigenous communities due to the perception of contamination;
- describe any positive health effects (e.g., resulting from improved economic opportunities, increased access to services).

6.3 Social conditions

6.3.1 Baseline for social conditions

The Impact Statement must:

- identify the social area of influence of the project;
- describe the natural and cultural heritage of local communities including maps for buildings, sites and things of historical, archaeological, paleontological or architectural significance in the study area, including land, natural features and resources considered to be heritage.
- describe baseline conditions for land and resource use of local communities, including:
    - a brief history of human occupancy and of land resource use in the study area based on selected spatial and temporal boundaries (include maps, if possible), including information on major industries and initiatives in the vicinity of the project site, including the Port Hope Area Initiative;
    - a consideration of relevant current and future land use from local, regional, or provincial land use or resource development plans;
    - sites or areas that are used by local peoples either as a permanent residence or as a seasonal/temporary location, and the number of people using each identified site or area (include a map, if possible);

- identify remote, rural and urban residential areas (including seasonally and year-round occupied establishments);
- identify parks and primary recreation areas (including local and provincial/territorial parks, recognized scenic areas, and recreational water bodies);
- identify monitored or administered forest areas (including forests under agreement and areas designated for timber sales); and
- any other relevant land and resource use baseline information identified in section 6.2.1

- describe baseline conditions for community well-being and way of life, including:
  - community cohesion, including level of support and engagement in community or neighborhood, social networks and social activities;
  - the psychosocial environment and its influence on community well-being;
  - relevant protection factors that contribute to community well-being and resilience, including any interactions between these factors (e.g., sense of belonging, cultural continuity, language, family supports);
  - demographic characteristics and major socio-cultural values and concerns;
  - relevant historical local community background; and
  - applicable history of the local community with previous developers and industry.
- describe baseline conditions for services and infrastructure, including:
  - describe and evaluate the local, regional, First Nation and other Indigenous community, and local community infrastructure and services in the study areas. Evaluations should consider the existing capacity, functionality, and ability of infrastructure and services to meaningfully meet the needs of local peoples:
    - road infrastructure and traffic safety,
    - active transportation (e.g., cycle and pedestrian routes);
    - railways;
    - barges/docks
    - airports;
    - information related to existing traffic;
    - pipelines, water mains and sewer lines;
    - power lines;
    - utilities;
    - housing, accommodation and lodging (e.g., affordability including rental prices, availability, suitability), including camping facilities and recreational dwellings;
    - public transportation;
    - recreation and parks;
    - waste management;

        - educational services, facilities, and childcare, including enrolment capacity and utilization rates;
        - elder care and services;
        - Indigenous-specific health services and programs (e.g., land-based healing, traditional medicine, mental wellness teams);
        - existing health services and programs, including healthcare provider capacity, and emergency services;
        - emergency services, including ambulance services;
        - police and fire departments;
        - social and community services; and
        - all other potentially affected infrastructure and services.
    - capacity of municipal governments and First Nations and other Indigenous communities to collaborate with provincial and federal authorities and to secure funding and support required to upgrade the current regional infrastructure and services; and
    - where applicable, describe the distinct end users of infrastructure and include any agreements (e.g. Municipal-Type Service Agreements) with municipal or regional governments and First Nations and other Indigenous communities for the access and use of infrastructure and services for community needs.
- describe baseline conditions for navigation, including:
    - existing navigable waterways and all their uses; and
    - potentially affected waterway users and existing concerns regarding navigable water use and access.

6.3.2 Effects on social conditions

6.3.2.1. Effects on community well-being and way of life

The Impact Statement must:

- document and take into account tolerance thresholds for potential adverse effects identified by First Nations and other Indigenous communities and local communities;
- describe the likely effects on the project's contribution to components of the Community Well-Being Index for local peoples located in the LSA identified as of importance through consultations with First Nations and other Indigenous communities and local communities;
- describe potential adverse and positive effects, at the community level, of changes to community well-being including, but not limited to:
    - safety and security;
    - food security;

- income inequity;
- housing prices and availability;
- cost of living;
- non-commercial/trade economy; and
- those conditions considered for analysis of determinants of health in Section 6.2 Effects to health, social and economic conditions;

- consider potential effects related to greater propagation of infectious diseases and gender-based violence;
- describe, at the community level, the expected interactions and their effects, between the project's construction, operation and maintenance workforce and local communities, businesses and residents;
- describe in-and out-migration effects, related to activities in all phases of the project lifecycle, including changes in population;
- evaluate effects on access, ownership and use of resources (e.g., land tenure, food, water, social infrastructure); and
- describe any positive effects on well-being (e.g., resulting from improved economic opportunities, increased access to services).

6.3.2.2. Effects on services and infrastructure

The Impact Statement must:

- describe the adverse and positive effects to the local and regional services and infrastructure, including their capacity and functionality, anticipating and considering increased demand on these services including those identified under section:
  - take into account potential effects arising from a higher risk of accidents for each phase of the project, (e.g., a higher risk of impact on the road system and emergency services during the construction phase due to an increased use of roads);
- describe any need for government or proponent expenditures for new or expanded services, facilities or infrastructure, arising out of project-related effects; and
- assess potential effects on First Nations and other Indigenous communities' infrastructure, programs, and service delivery capacity, including governance and delivery of community services. This includes identifying any project-driven demands on services (e.g., health, emergency response, housing, community infrastructure, social services, and administrative capacity), estimating incremental costs and resourcing needs, and describing mitigation measures and proposed commitments to avoid, reduce, or address these effects.

6.3.2.3. Effects on navigation

The Impact Statement must describe effects on navigation and navigation safety, including:

- navigable waterways that could be impacted by the project, and specify the proposed crossing method;
- ancillary project components that will be constructed in, on, under, over, through or across navigable waterways to support the project, and specify the proposed crossing method;
- potentially affected waterway users and describe consultation with waterway users such as First Nations and other Indigenous communities regarding navigational use, issues raised and how issues were addressed.

6.4 Economic conditions

6.4.1 Baseline for economic conditions

The Impact Statement must:

- describe the local and regional economic conditions for First Nations and other Indigenous communities and local communities, including:
    - main economic activities in the study areas, including the extent to which each activity contributes to the local and regional economies;
    - demographic features of the local and regional population, including educational attainment and income;
    - prevalent economic concerns and economic aspirations of residents, families and workers in the study area;
    - any local, Indigenous, provincial, or federal economic development and land use plans for the study areas;
    - existing employment rates and economic well-being in the study area and impacted communities;
    - labour force indicators, including participation rates, unemployment rates, employment by industry and by occupation, the availability of skilled and unskilled workers, existing working conditions, wages and average salary range, full-time and part-time employment, and an assessment of any existing gaps in employment equity;
    - existing training opportunities to examine gender, Indigenous, and diverse subgroup inequities such as for skilled trades and in wages and qualifications;
    - local and regional workforce development and training plans, including those specific for Indigenous Peoples and First Nations and other Indigenous communities;
    - an overview of the local, regional, national, and potential international businesses that may provide supplies and services required for the project;
    - current use of land and waterbodies for economic activities in the study areas including a description of tourism, hunting, guiding, recreational and commercial fishing (including catch rates, visitation rates, and angling days), trapping, outdoor recreation, outfitters, and forestry;

    - local peoples and communities, and First Nations and other Indigenous communities interested in local land uses and resources for previous projects in the regional study area; and
- describe agricultural activities, including the major crops, commercial livestock held, the growing season, and the size of local farms.

6.4.2 Effects on economic conditions

The Impact Statement must evaluate and describe the net economic effects for each phase of the project, including:

- an estimate of total investment requirements;
- an estimate of contributions to gross domestic product at the local, provincial and federal levels;
- a quantitative or qualitative evaluation, as applicable, of project benefits (e.g., tax levies, royalties, and revenue sharing), as well as any adverse fiscal effects, on municipal, provincial, and federal governments, and First Nations and other Indigenous communities;
- a detailed forecast of project revenues, capital and operating costs, including applying sensitivity analyses based on qualitative (e.g., cost overruns, anticipated electricity rates, etc.) and quantitative (e.g., discounted cash-flow analysis or levelized cost of electricity, etc.) factors; and
- the sources and methodologies used for developing multipliers and estimates, as applicable.

6.4.2.1. Effects on employment

The Impact Statement must:

- describe the potential changes in employment including
    - an estimate of the direct, indirect and induced employment, including income or wages, at each phase of the project (including an estimate of the full-time equivalent (FTE) employment, and an estimate of full- and part-time employment);
    - a description of the types and duration of employment anticipated to be created at each phase of the project;
    - a description of skill and education levels required for the positions;
    - anticipated workplace policies and programs, including hiring policies and programs, employee assistance programs and benefits programs;
    - an estimate of anticipated workforce region of origin (i.e. local, regional, out-of-province or international employees);
    - an estimate of the ability of the local and regional labour market to meet the employment demand;
    - an analysis of the potential for labour shortages in relevant sectors as a result of the project;
    - a description of the plans and the justification for hiring of temporary workers to make up for any local shortage of labour and skills;

  - situations where the project may cause the displacement of local workers; and
  - any potential short, medium and long-term changes to the local and regional labour markets as a result of the project;
- describe expected investments in training and skills development opportunities, including training and funding programs required to improve employment opportunities for local peoples and First Nations and other Indigenous communities; and
- describe the project's diversity and inclusion workforce plans, policies and practices, including related to workplace safety, cultural training, and to increase the employment of Indigenous Peoples, First Nations and other Indigenous communities, women and diverse population groups.

6.4.2.2. Effects on economies and economic participation

The Impact Statement must:

- assess potential positive and adverse effects to the local, Indigenous, regional, provincial and national economies (e.g., job creation, youth retention in the area, and indirect effects on local businesses total dollar value of contracts):
  - 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., total dollar value of contracts);
  - include a description of effects on First Nations and other Indigenous communities' ability to manage or improve social and economic conditions including in relation to engaging in traditional and other economic activities;
- describe any proposed or anticipated models for Indigenous economic participation in the project, where applicable, including equity ownership, revenue-sharing arrangements, joint ventures, contracting opportunities, employment and training initiatives, and capacity-building measures across project phases;
- describe any collaborative studies completed with First Nations and other Indigenous communities on socio-economic projections including workforce and population;
- describe collaboration with First Nations and other Indigenous communities to develop training, employment and procurement strategies with priority for members of, and businesses owned by, members of First Nations and other Indigenous communities;
- describe in general terms, any economic benefit agreements under consideration or concluded with First Nations, other indigenous communities and local communities;
- describe, if applicable, any actions to increase procurement from local or regional businesses, and from businesses owned by Indigenous Peoples, First Nations and other Indigenous communities, women, or diverse population groups;
- describe the potential effects of changes to economic conditions for specific sectors, for example:
  - fishing, hunting, guiding and trapping;

  - commercial outfitters;
  - commercial recreation and tourism;
  - agriculture, including predicted effects to crops and livestock health and productivity; and
  - commercial fisheries, including species fished (along with catch rates and fishing days), number of licences, value of fisheries and breakdown between domestic vs. international fisheries, where applicable;
- describe situations when the project may directly or indirectly create economic hardships for, or the displacement of, businesses such as non-nuclear companies in the region (e.g., construction industry and low wage jobs);
- describe the potential effects of changes to land and resources used in local economic activity, including potential effects of the project on the availability, value and quality of commercial land and real estate.
- assess the potential positive and adverse economic effects on First Nations and other Indigenous communities, including implications for governance structures, distributional effects within communities, and measures to address potential inequities;

The economic information provided will be made publicly available and should not contain confidential business information.

6.5 Mitigation and enhancement measures for health, social and economic conditions

The Impact Statement must:

- describe the proposed mitigation and enhancement measures for effects on human health, including:
  - effects identified related to Indigenous Peoples, First Nations and other Indigenous communities' or local communities' health profiles;
    - take into account perceived effects as identified by local peoples, First Nations and other Indigenous communities, and local communities.
  - any additional mitigation considered if the level of emissions from a particular project emission or effluent discharge is below or at the applicable limits. If a project-related change is substantial (even within established limits) as a result of local or regional circumstances, the proponent must provide additional mitigation to minimize pollution and risks to human health;
  - when potential effects on human health exist due to exposure to a non-threshold contaminant (e.g., certain air pollutants such as fine particulate matter and nitrogen dioxide, describe mitigation aimed at reducing residual effects to as low a level as reasonably possible;
  - how radiation protection measures maintain doses to the public and the environment to a level that is As Low As Reasonably Achievable (ALARA) through the application of Best Available Technology and Techniques Economically Achievable (BATEA);

        - Calculated doses to persons, both on and offsite, should be traceable to the input data (for example, receptor exposure characteristics, relevant radiological data). Sample dose calculations should be included that demonstrate the link from input data (such as concentrations of radionuclides in air) to doses to persons, with all relevant assumptions provided;
    - Identification of mitigation and prevention measures to eliminate or minimize the radiological hazards through design and engineering controls;
        - ensure that engineered controls demonstrate that the controls reduce the magnitude of each radiation source and keep radiological exposures of workers as low as reasonably achievable (ALARA) during routine and non-routine work practices (for example, operating and maintenance activities;
        - specify radiological design objectives for engineered controls;
        - identify the administrative controls that will be used to minimize doses to workers (e.g., personal protective equipment, training and procedures);
        - describe contingency responses in the events of failed engineered and administrative controls; and
        - describe the mitigation that will be taken in the event radiological hazards are identified during the site preparation or construction phases;
- identify and describe the proposed mitigation and enhancement measures that will be implemented for all social effects, taking into account local, Indigenous and regional land use and development plans, including:
        - effects on infrastructure and services;
            - where applicable, provide documented confirmation from the grid owner(s) that, with appropriate grid and plant mitigation measures in place, the location of the reactor facility will not adversely affect the grid
        - effects on community well-being and resilience;
        - mitigation 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 field studies or project activities; and
        - opportunities to enhance positive impacts.
- describe the proposed mitigation and enhancement measures that will be implemented for all economic effects, including:
    - mitigation measures to address potential shortage of skillsets (such as training programs), in order to adequately assess potential economic impacts and support the population;
    - describe plans, programs and policies to encourage contracting and procurement opportunities for local and regional businesses and First Nations and other Indigenous communities:
        - describe any procurement policies that facilitate the opportunities for local companies;

  - 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;
  - describe 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
- describe opportunities for enhancing positive effects, such as:
  - education, training and hiring practices that encourage employment of local and Indigenous Peoples and First Nations and other Indigenous communities;
  - actions taken to increase access to education and training opportunities for different groups (e.g., provision of transportation, flexible hours);
  - a summary of commitments made with respect to employment, training and trade; and
  - 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, the targeted demographics, such as local residents, Indigenous Peoples, First Nations and other Indigenous communities, and diverse population groups (e.g., Indigenous women), and describe any plans for ensuring that these programs are culturally responsive to targeted demographics;
- assess benefits separately from adverse effects and mitigation measures. The identification of benefits does not substitute for the requirement to avoid, reduce, mitigate, or accommodate adverse effects on Indigenous Rights or responsibilities.

7 First Nations and other Indigenous communities

The Impact Statement must demonstrate how impacts on Indigenous Peoples and their rights were considered and assessed, including:

- impacts resulting from any change to the environment on *nike gaabinjibaad Nishnaabe, kina ngadmawaad, kina gaabmishjigewaad, nike wanishaawaad*[10] or physical and cultural heritage or any structure, site or object, including tangible and intangible items, features, places or elements that is of historical, archaeological, paleontological or architectural significance;

[10] *nike gaabinjibaad Nishnaabe, kina ngadmawaad, kina gaabmishjigewaad, nike wanishaawaad is an Anishinaabemowin phrase provided by MS-WTFN and is used to express MS-WTFN's own concept, which most closely corresponds with the western concept, or term, 'cultural heritage'. It can be loosely translated as 'where we came from, what we left behind, what we did and where we are going', in English*

- impacts resulting from any change to the environment on the current use of lands, waters and Relatives and resources for traditional purposes;
- changes to the health and wellbeing, social or economic conditions of Indigenous Peoples; and
- any adverse impacts on Indigenous rights.

MS-WTFNs will be carrying out their own assesment to consider the project impacts on rights, relationships, responsbilities and Relatives. Outcomes or information from the MS-WTFNs led assessment can be brought forward into the Impact Assessment and decision making phases of the impact assessment by the proponent and/or MS-WTFNs in order to support the requirements of the *Impact Assessment Act*, the Crown's duty to consult and to inform the *Impact Assessment Act* and LTPS decisions.

First Nations and other Indigenous communities are best placed to understand how a project may impact them. The assessment of impacts on Indigenous Peoples and their rights must be done in collaboration as outlined in Section 3 Description of engagement with First Nations and other Indigenous communities. Where relevant, the proponent must collaborate with First Nations and other Indigenous communities to incorporate information from or about them into the assessment of all VCs (e.g. biophysical VCs) including incorporating information from specific studies or Indigenous-led assessments and describing how these findings informed proponent conclusions. The proponent must respect each First Nation or Indigenous community's preferences for assessing impacts, and discuss with them whether it is appropriate for the proponent to provide its own conclusions regarding (residual and cumulative) impacts on Indigenous People and their rights. If a First Nation or Indigenous community has provided their own conclusion, the proponent is not required to provide one.

The proponent is expected to engage with all First Nations and other Indigenous communities impacted by the project, as set out in the IEPP, and to describe the outcomes of that engagement in the Impact Statement. In addition, the results of engagement should be analyzed and presented separately for each First Nation or Indigenous community. This group-specific assessment does not need to repeat the entire analysis of each VC, but should summarize and present the information relevant to that group. To the extent possible, each group-specific assessment should be done in a way that works best for that First Nation or Indigenous community.

Where requested by First Nations and other Indigenous communities, parts or all of the assessments of effects on Indigenous Peoples and their rights can be combined in the group-specific assessment. For example, effects on the current use of lands, waters and Relatives and resources for traditional purposes and impacts on Indigenous rights to hunt, fish, and trap can be reported together. First Nations and other Indigenous communities may also identify holistic VCs that encompass multiple environmental, health, social, or economic elements. Undertaking these assessments together, when requested, will support consistent conclusions. In all cases, the Impact Statement must demonstrate that all requirements were met.

The Impact Statement must contain an assessment for each First Nation and other Indigenous community potentially affected by the project, and summarize any past, present and anticipated future use of, and practices within, the study areas.

The Proponent must work with the First Nations and other Indigenous communities identified in sections 3.1 and 3.2 of the IEPP in the development of the Impact Statement. As described in the IEPP, the degree of engagement with each community will be contextualized based on the 3.1 and the 3.2 distinction, as well as information provided by each First Nation or Indigenous community regarding potential pathways of impact from the project on their Indigenous or Treaty rights and interests.

The proponent should consult IAAC guidance documents on this topic. The proponent must also comply with REGDOC-3.2.2.

7.1 Indigenous physical and cultural heritage, and structures, sites, or objects of significance

The Impact Statement must assess and clearly distinguish the impacts of the project to physical or cultural heritage from the impacts to specific structures, sites or objects, as well as align with the considerations set out in the Technical Guidance for Assessing Physical and Cultural Heritage or any Structure, Site or Thing, or subsequent revisions made prior to submission of the Impact Statement to ensure that the relevant provisions of the IAA are met. Cultural heritage can include tangible and intangible elements. Tangible elements include physical spaces such as traditional territories and areas or sites used for cultural and spiritual practices. Intangible elements can include cultural and spiritual practices themselves, Indigenous Knowledge, and the broader ability of Indigenous Peoples to exercise their culture and rights.

7.1.1 Baseline conditions for physical and cultural heritage, and structures, sites, or objects of significance

Protocols and participation in any assessment of physical and cultural heritage, that are being carried out or led by the proponent, including but not limited to archaeological investigations, must be developed in collaboration with First Nations and other Indigenous communities and must abide by provincial standards and standards set by applicable First Nations and other Indigenous communities.

The Impact Statement must describe baseline conditions including:

- how existing cumulative effects have already impacted physical and cultural heritage;
- the location of physical and cultural heritage features on maps, if they have been shared by First Nations and other Indigenous communities with the proponent and if the proponent has permission from the First Nations and other Indigenous communities for the information to be shared publicly. If required, a coarser geographic resolution can be presented; and
- how First Nations and other Indigenous communities participated, including by leading or contributing to studies.

7.1.2 Effects to physical and cultural heritage, and structures, sites, or objects of significance

The Impact Statement must:

- assess effects to physical and cultural heritage, and structures, sites or objects of historical, archaeological, paleontological or architectural significance based on a comparison with and without the project, including:
  - effects on structures, sites or object of significance including:
    - burial sites,
    - spiritual sites, including rivers and watercourses,
    - cultural landscapes,
    - teaching areas used to transfer knowledge between generations,
    - sacred, ceremonial or culturally important places, plants, animals, objects, or beings,
    - places with archaeological potential or artefacts,
    - historically occupied sites,
    - elements of the environment identified by First Nations and other Indigenous communities as having heritage value,
  - loss or destruction of physical and cultural heritage, including:
    - oral histories,
    - cultural values and experiences on the land,
    - Indigenous governance systems and Indigenous laws tied to the landscape, and
    - place names, language and other elements that make up a culture, and
    - connection to Relatives, identity, knowledge generation and transmission, sense of belonging and place.
  - continued and ongoing changes in direct access to and/or experience with physical and cultural heritage,
  - changes to the cultural value, spirituality, or importance associated with physical and cultural heritage,
  - changes to sacred, ceremonial or culturally important places, objects or things,
  - changes to visual aesthetics over the life of the project and post-project abandonment or decommissioning,
  - changes to elements of the environment identified by First Nations and other Indigenous communities as having heritage value, and
  - any other effects identified by First Nations and other Indigenous communities;
- describe how impacts on Indigenous Peoples and their rights will also impact the ability of Indigenous Peoples to transmit their culture, language or Indigenous Knowledge

intergenerationally, for example, through ceremonies, harvesting, teaching of stewardship laws, or a community tradition of sharing; and

- provide copies of correspondence with provincial, territorial or Indigenous authorities responsible for heritage resources with comments on any physical and cultural heritage resource assessment.

7.2 Current use of lands, waters and Relatives for traditional purposes

The Impact Statement must assess the impacts of the project to the current use of lands, waters and Relatives for traditional purposes. The analysis must align with the steps set out in the Technical Guidance for Assessing the Current Use of Lands and Resources for Traditional Purposes under CEAA, 2012 or subsequent revisions made prior to submission of the Impact Statement to ensure that the relevant provisions of the IAA are met.

7.2.1 Baseline conditions for current use of lands, waters and Relatives for traditional purposes

The Impact Statement must describe baseline conditions, including:

- how existing cumulative effects have already impacted the current use of lands, waters and Relatives for traditional purposes;
- Indigenous governance systems and Indigenous laws associated with the current use of lands, waters and Relatives for traditional purposes;
- traditional activities presently or historically practised (e.g. hunting, fishing, trapping, gathering of plants or medicines, access or travel routes); and
- baseline conditions for likely effect pathways to impacts on the current use of lands, waters and Relatives by Indigenous Peoples for traditional purposes, in sufficient detail to support the assessment of impacts, including:
  - species use (e.g. magnitude, timing) and availability as country foods (traditional foods) or for other traditional purposes;
    - Include a description of each species of importance and whether their consumption has cultural importance for First Nations and other Indigenous communities, including medicinal uses;
    - For each species, describe baseline conditions at a level of detail relevant to assess adverse federal effects considering population, distribution, seasonal ranges, migration, movements, frequency and timing of occurrence, habitat association(s) and

requirements for all relevant life cycle stages, sensitive periods (e.g. seasonal, time of day), including maps and, where available, estimates of abundance or density;

- For fish and birds, refer to the requirements in the fish and fish habitat section, and birds and their habitat section of the Integrated Guidelines respectively; and
- Where possible, sites used in the study areas or historically important sites for the collection of country foods must be identified and mapped, such as important fishing sites;

- existing navigable waters and their uses, navigable water users, and existing concerns regarding navigable water use and access, including cumulative effects on navigable waters.

7.2.2 Effects to current use of lands, waters and Relatives for traditional purposes

The Impact Statement must:

- assess the effects on current use of lands, waters and Relatives for traditional purposes, based on likely effect pathways and a comparison with and without the project, including changes to:
  - the quantity, distribution, and quality (including perceived quality) of resources available for harvesting and consumption of country foods (traditional foods), specifying the species and resources used or important for traditional and cultural purposes;
  - navigation and navigation safety, including to navigable waters for each affected waterway and likely effect pathway (dewatering of watercourse or water body, water-level changes, diversion, crossing, etc.);
    - specify the crossing method for all project components that will be constructed in, on, under, over, through or across navigable waters (e.g., temporary or permanent bridges),
  - navigable water users and navigational use;
  - the locations, frequency, duration or timing of fishing, hunting, trapping, gathering, cultural or ceremonial activities and other traditional practices, including any avoidance of resources due to perceived quality;
  - access to:
    - culturally important harvesting areas or resources and travel routes for conducting traditional practices (e.g., physical access to harvest-specific species, culturally important locations);
    - traditional territories, communities and reserves; and
    - locations of importance for traditional use, including camps, cabins and gathering, staging, or teaching grounds;
  - economic burdens of, and increased time for, travelling further to hunting, fishing, trapping, and gathering opportunities;
  - efforts by First Nations and other Indigenous communities to restore traditional practices;

- the experience of being on the land (e.g., changes in air quality, noise and sensory disturbance, artificial light, fragmentation of traditional territory, visual aesthetics/landscape and any corollary wellness impacts as a result of sensory changes, including perceived contamination);
- the use of riverbanks, travel ways, navigable waterways and waterbodies, including for social and ceremonial purposes, travel or recreation; and
- sites of interest to communities including for commercial and non-commercial fishing, hunting, trapping and gathering and cultural or ceremonial activities and practices, and other current uses identified by First Nations and other Indigenous communities;

- describe how the information provided by First Nations and other Indigenous communities, including Indigenous Knowledge, has been considered;
- describe all reasonable alternatives considered that would avoid impacts on current use of lands, waters and Relatives for traditional purposes considered during project development; and
- assess other potential project effects identified by First Nations and other Indigenous communities.

7.3 Health, social and economic conditions of Indigenous Peoples

7.3.1 Baseline conditions

The baseline conditions established for First Nations and other Indigenous communities must meet the requirements set out in Section 6 Health, social and economic conditions, and take into account GBA Plus specific to Indigenous Peoples as well as Indigenous governance regimes and Indigenous laws.

A health baseline study, where applicable based on potential project effects, should be tailored to each of the First Nations and other Indigenous communities. First Nations and other Indigenous communities should be offered the opportunity to carry out their own study.

The Impact Statement must identify and describe the following components identified by First Nations and other Indigenous communities: valued components or health, social or economic concerns relevant to the project identified by each First Nation or Indigenous community.

7.3.2 Effects to health, social and economic conditions of Indigenous Peoples

In addition to the requirements set out in Section 6 Health, social and economic conditions, the Impact Statement must include a health impact assessment tailored to each of the impacted First Nations and other Indigenous communities as listed in 3.1 of the IEPP.

The Impact Statement must describe the health, social and economic effects that the project may have on Indigenous Peoples, including any other potential project effects not outlined in Section 6 that are identified by First Nations and other Indigenous communities, as described below.

7.4 Rights of Indigenous Peoples

The IAA affirms the Government of Canada's commitment to ensure respect for the rights of Indigenous Peoples recognized and affirmed by section 35 of the *Constitution Act, 1982*. The proponent is encouraged to refer to IAAC's Guidance: Assessment of Potential Impacts on the Rights of Indigenous Peoples, Policy Context: Assessment of Potential Impacts on the Rights of Indigenous Peoples or subsequent revisions made prior to submission of the Impact Statement to ensure that the relevant provisions of the IAA are met and IAAC's Indigenous Advisory Committee Principles to Guide the Assessment of Impacts to Indigenous Inherent and Treaty Rights.

7.4.1 Baseline conditions

The Impact Statement must:

- describe the rights of Indigenous Peoples impacted by the project, including historical context and the importance of the rights to the rights-bearing communities (e.g. the connection of rights to practices, customs, beliefs, worldviews, and livelihoods);
- include information on how rights have already been impacted by cumulative effects, and how existing and reasonably foreseeable future activities could affect the conditions that support or limit the ability of Indigenous Peoples to meaningful exercise their rights;
- document the nature and extent of the exercise of rights of Indigenous Peoples, impacted by the project, as identified by the First Nation or Indigenous community(s); and
- consider how the information requirements related to physical and cultural heritage, use of lands, Indigenous health, social, and economic conditions, are applicable to the nature and extent of the exercise of rights.

First Nations and other Indigenous communities must be engaged on the baseline characterization of their rights, to the extent they choose to be involved.

7.4.2 Impacts on rights of Indigenous Peoples

The proponent must share studies and information about the project and its potential impacts with First Nations and other Indigenous communities prior to assessing the impact of the project on their rights, and collaborate with First Nations and other Indigenous communities in assessing impacts on those rights. Where findings differ between the proponent and First Nations and other Indigenous communities, the proponent should clearly present how both were considered in the Impact Statement.

The Impact Statement must:

- document the project's potential impacts on the rights of Indigenous Peoples and their severity, considering links between resources, access, and experience, including:
    - residual impacts on the exercise of rights;
    - interference with the quality and quantity of resources available for the exercise of rights (including preferred species);
    - changes to the ability to travel freely in the territory and to access areas important to the exercise of rights;
    - changes to the experience associated with the exercise of rights, including in connection to land, well-being, knowledge of the landscape, air quality, noise exposure, effects of vibrations, artificial light, fragmentation, visual aesthetics and safety;
    - impacts on Indigenous traditions, laws and governance;
    - impacts to First Nations and other Indigenous communities' governance authority and decision-making systems, including impacts to MS-WTFNs' governance inclusive of laws, responsibilities, intergenerational transmittal of governance knowledge, and ability to carry out responsibilities to care for lands, waters, and Relatives now and in the future;
    - impacts on stewardship of traditional lands and resources by First Nations and other Indigenous communities;
    - changes to the ability of First Nations and other Indigenous communities to derive future economic benefits from the land or water;
    - changes to the ability to maintain an ongoing relationship with the land or water;
    - alignment with the values, political direction and/or objectives of First Nations and other Indigenous communities' actions to mitigate or to adapt to a changing climate;
    - changes to the authority of First Nations and other Indigenous communities on their territory; and
    - all other elements of significance identified by First Nations and other Indigenous communities;
- document the level of engagement with First Nations and other Indigenous communities and the approach taken to support First Nations and other Indigenous communities in identifying the potential impacts of the Project on their rights, including the hypotheses put forward;
- describe solutions to concerns raised about impacts on the exercise of rights, as agreed to by First Nations and other Indigenous communities;
- describe how the assessments of impacts on Indigenous Peoples (including impacts on physical and cultural heritage, current use of lands, waters and Relatives for traditional purposes, and the health, social, and economic conditions of Indigenous Peoples) were integrated into the assessment of impacts on Indigenous rights and considered in determining residual and cumulative impacts and their severity;
- describe the methodology used and agreed to by First Nations and other Indigenous communities for assessing impacts on their rights, and include any Indigenous-led studies that

were provided if permission has been obtained from the First Nation or Indigenous community to include them; and

- where a First Nation or Indigenous community has not provided its views on the impact of the project on their rights to the proponent, or where the proponent and a First Nation or Indigenous community, in consultation with IAAC, agree that the First Nation or Indigenous community will provide information on impacts on their rights directly to the review panel, provide an explanation.

8 Security Considerations

The following requirements and guidance on security considerations apply to the entire project lifecycle.

For new nuclear sites and new reactor facilities on existing sites, the proponent must develop security-related physical protection objectives for reactor facilities. To do so, the proponent must include the gathering of information about the reactor facility's proposed siting location, in order to study threats or issues presented by the geographical location and characteristics of the proposed site, including potential acts of terrorism. The proponent must compile the findings from this study in a site selection threat and risk assessment (SSTRA) report. Should the project be allowed to proceed, the contents of the SSTRA report may be merged into the licensee's overall security program after the LTPS has been granted.

A SSTRA must be conducted prior to the submission of an application for a LTPS. The resulting report contains an analysis of threats to security presented by the location of the site over the proposed lifecycle of the project. It includes an assessment of the consequences of successful threat events, proposed mitigation measures and the resulting risk levels associated with these threat events. The intent of the SSTRA is to aid the proponent in determining the suitability of the site from a security perspective. The information from the SSTRA feeds into the development of appropriate security mitigation measures for activities to be encompassed by a licence under the NSCA, to ensure that all security-related regulatory requirements are met. The SSTRA also identifies security concerns that may render the site undesirable from a security perspective and must not be restricted to those threats defined by the Design Basis Threat.

Should the project be allowed to proceed, the SSTRA report and its basis information must be maintained as security baseline characterization data for the lifecycle of the facility. The SSTRA must include comprehensive consideration of both physical protection concerns and transportation routes, as described in the following subsections.

The SSTRA report must be classified as prescribed information and protected from release under access to information / freedom of information requests, on the basis of national security.

The Impact Statement must provide a commitment that the SSTRA and basis information will be maintained as security baseline characterization data for the lifecycle of the facility.

8.1 Physical protection

The proposed physical protection requirements must ensure that the appropriate detection, delay, and response considerations are taken into account.

Physical protection design requirements are influenced by the site location. Site evaluation must, therefore, address the physical dimensions of the reactor facility and its surrounding environment, including:

- the topology of the area that can be considered a component of the overall security barrier design (such as line-of-sight view);
- the proximity of various infrastructure elements that could adversely affect physical protection, such as a chemical plant that could release a noxious substance, a hydroelectric dam that could be accidentally or deliberately breached (resulting in flood), or an airport that provides significant flight traffic in the vicinity of the site;
- site boundaries;
- weather that could factor as a potential impediment to the operability of physical protection systems (that is, systems that monitor the operation of a reactor and which, on sensing an abnormal condition, automatically initiate actions to prevent an unsafe or potentially unsafe condition); and
- details pertaining to the establishment of a construction site, such as the positioning of perimeter fences, access and egress points, and storage of construction drawings.

8.1.1 Remote areas

The proponent must evaluate remote sites with respect to the anticipated time required to implement essential response services, including how long it will take offsite armed responders to reach the reactor facility. This aspect of the SSTRA should support early identification of the need for establishing an onsite nuclear response force capability, to ensure that a trained response group is in position during the construction phase of possible target sets (such as vital areas) that are part of the reactor facility.

8.2 Transportation routes

The Impact Statement must consider the transportation routes in close proximity of the site, to ensure that they are adequately taken into account during future site development activities. IAAC proposes to assess the potential adverse effects of project-related transportation on applicable valued components within a defined geographic scope. This scope will be **established at the end of the Planning Phase when these Guidelines are finalized** and will focus on transportation activities in close proximity to the project site.

The routes to be considered include waterways, land routes and airspace, as described in the following text. For each of the routes in close proximity of the site and associated security measures, as outlined below, the proponent must also consider and describe First Nations and other Indigenous communities'

use, harvesting areas and cultural landscapes, and assess potential effects on navigation, access, mobility, and the exercise of rights.

8.2.1 Waterways

The site evaluation must include assessment of all waterways in close proximity of the site, from the perspective of physical protection. For example, a waterborne vehicle – or its personnel or contents – may be used in a manner that may pose a threat to the reactor facility (for example, being an explosive risk) to disable operations, equipment, or systems, in an act of sabotage that could have radiological implications.

8.2.2 Land routes

The Impact Statement must assess all vehicular access land routes in close proximity to the site, including rail lines, to determine the security threat they may pose to potential locations of future vital areas.

Where possible, the surrounding terrain may be considered as a natural barrier in reducing vehicle-borne explosive risk. Where this is not possible, the proponent should consider delineating areas from which land vehicles must be restricted.

8.2.3 Airspaces

The SSTRA must consider the threats and risks associated with private and commercial airports, including associated flight pathways. This requirement involves discussions with municipal, provincial or territorial, and federal governments to confirm interdiction capabilities and coordinating points of contact.

9 Effects of Potential Accidents or Malfunctions

9.1 Risk assessment

The Impact Statement must:

- identify hazards for each project phase that could lead to accidents and malfunctions related to the project;
  - describe the methods use to identify hazards and potential accidents and malfunctions, such as the use of existing information sources, recognized risk assessment methodology, the site selection threat and risk assessment (see section 8 Security Considerations), analysis of natural hazards (see Generic Requirements for Impact Statements), professional expertise, experience from similar projects, and input from participants;

- explain how the lifespan and design of different project components has been taken into account in the identification of hazards, and accidents and malfunctions;
- include consideration of:
  - natural events such as flooding, earthquake, forest fires, high winds, tornadoes, hurricanes, blizzards, drought, ice storms, hail and lightning;
  - malevolent acts, including the potential for vandalism or sabotage;
  - vehicle accidents and collisions;
  - other human-induced external events, such as at other facilities, including adjacent nuclear facilities, where applicable; and
  - potential climate change over the project lifecycle;

- conduct an analysis of the risk of each hazard and adverse events based on consideration of likelihood and consequences for these events;
- describe the potential consequences of accidents and malfunctions in terms of environmental, health, social and economic effects, and effects to Indigenous Peoples from their perspective;
  - characterize the risk to health and safety of workers and the public over the lifecycle of the project, in as much detail as possible; and
  - engage with First Nations and other Indigenous communities to understand community-identified risks and thresholds for unacceptable harm and describe how these perspectives informed the assessment;
- describe the plausible worst-case scenarios, representative severe accident sequences, and the more-likely but lower-consequence alternative scenarios, including:
  - the magnitude, duration and extent of effects;
  - the quantity, mechanism, rate, form and characteristic of contaminants, greenhouse gas (GHG) emissions and other materials released or discharged into the environment;
  - influence of local and regional terrain, topography and weather conditions (e.g., difficult access for interventions);
  - modelling for any, direct and indirect, contaminants spilled or released into the environment;
  - potential adverse environmental effects of any event sequence that may result in hazardous substance releases or large releases of energy (such as steam or electrical arcs);
  - potential environmental, health, social and economic effects, as well as impacts on Indigenous rights and interests;
    - With respect to human health specifically, consideration should be given to potential pathways of effects associated with surface water, groundwater, 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);

- timing related to sensitive receptors (e.g., migration and nesting periods of birds, spawning periods for fish, hunting season, tourist season); and
- 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;

- identify and justify the spatial and temporal boundaries for the effect assessment associated with accidents and malfunctions. The spatial boundaries identified for effects from potential accidents and malfunctions will generally be larger than the boundaries for the project effects alone, and may extend beyond Canada's jurisdiction. Spatial boundaries must be defined through a process that incorporates feedback from First Nations and other Indigenous communities and must consider First Nations-defined territories and areas of use, including seasonal and mobile use patterns. Where the spatial boundaries adopted for the assessment differ from those identified by First Nations or other Indigenous communities, the Impact Statement must clearly describe and justify the rationale for that divergence;
- describe long-term consequences of accidental releases (i.e., as shown from studies of major nuclear accidents);
  - the notional range of 1–10 Gy to describe the effects of acute exposure should be used;
- provide environmental sensitivity mapping that identifies site-specific conditions and sensitive receptors adjacent to project activities, including shores, streams and wetlands frequented by fish and/or birds, and likely routes to them. Shoreline classification surveys and mapping must be conducted along major waterways where large spills or other accidents and malfunctions may occur, and must identify the route of the effects to the sensitive receptors. The characterization criteria established by Environment and Climate Change Canada (ECCC) contained in the *Field Guide for Intervention in the Event of an Oil Spill on Maritime Shores* [57] constitutes a useful guide in this regard;
- identify all external, non-malevolent, human-induced events over the lifecycle of the proposed project applying a systematic approach in accordance with REGDOC-1.1.1 sections 3.6.1 to 3.6.4 [3]. Examples of such events include aircraft crashes, other transportation hazards, fires and explosions, chemical and radiological hazards, and electromagnetic interference hazards; and
- identify and justify temporal boundaries appropriate to the nature of the potential accident and malfunction event, including consideration of long-term and intergenerational effects. Temporal boundaries must extend beyond the operational life of the facility, where necessary, to assess post-closure, decommissioning, and reasonably foreseeable long-term contamination or exclusion scenarios that may affect access to lands, waters, relatives, and the exercise of Indigenous Rights.

The risk assessment must also:

- meet the requirements and comply with relevant guidance provided in section 1.1 Site evaluation and site preparation for new nuclear reactor facilities, including the consideration of potential cliff-edge effects that may arise from small increases in the severity of events;
- address severe accident sequences, which include, where applicable, simultaneous multiple-unit events, with loss of grid / station blackout events, and events with a simultaneous loss of offsite power

with loss of normal access to the ultimate heat sink for an extended period of time. Considerations must also include radioactive sources such as the wet storage bay (also called irradiated fuel bay or spent fuel pool);

- explain how the potential for cascading or cumulative events was taken into account as part of the risk assessment and identification of worst-case scenarios, such as the potential for a tsunami generated by an earthquake as experienced during the Fukushima nuclear accident; and
- describe the risks that geohazards pose to the project, which should be described and evaluated through numerical or physical modelling.

The Compendium includes guidance that should be consulted to support the assessment of accidents and malfunctions on a nuclear facility, including: [19]; [58]; [59]; [60]; and [61].

Mitigation and enhancement measures

The Impact Statement must:

- describe security measures to reduce the potential for malevolent acts that could lead to accidents or malfunctions, including:
  - protection of prescribed information;
  - site security program;
  - site access clearance;
  - security arrangements with offsite response forces;
  - physical security;
  - cyber security; and
  - security program officer;
- describe long-term monitoring and recovery measures that would be implemented to manage effects to the environment and health, social and environmental conditions, as well as impacts on Indigenous rights and interests, from accidents and malfunctions, including measures 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;
- assess the nature of potential impacts to Indigenous Rights, cultural practices, and long-term access to lands and waters in the event of an accident or malfunction. The Impact Statement must document Indigenous perspectives regarding these potential impacts and any residual concerns related to recovery and restoration;
- describe mutual aid arrangements or memorandums of understanding with off-site response organizations in the event that the incident exceeds proponent resources and how to access these resources; and
- outline the strategy that will be taken upon the potential discovery of additional risks to the health and safety of the public and environment that were not anticipated in the Impact Statement, including the development of additional mitigation measures.

9.2 Emergency management

The Impact Statement must describe an emergency response plan and, as part of this plan, must:

- address the safety and control area regarding emergency response captured in REGDOC 1.1.1 [3]. Section 4.6 Physical Design and 4.10 Emergency management and fire protection for the activities that would be conducted under the LTPS, such as requirements for exclusion zones, emergency planning, preparedness, management and response, and fire protection;
- identify the types of accidents and malfunctions scenarios that would require emergency response, beyond those related to activities that would be conducted under the LTPS;
- identify emergency planning zones and emergency response for accident and malfunction scenarios, taking into account population density, the transient workforce, seasonal population fluctuations, and population projections for the life cycle of the project;
- present preliminary emergency response measures, 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., population density, 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 the potential effects of accidents and malfunctions on the emergency plan execution, including on evacuation routes;
- describe existing emergency preparedness and response systems and existing arrangements and/or coordination with the responsible response organizations in the spatial boundaries associated with the project and describe potential impacts to these existing systems, arrangements, and/or coordination;
- describe emergency response training and exercise programs, including a description of the participation and training agreements with First Nations and other Indigenous communities that could be impacted by accidents or malfunctions;
- describe any plans for delivering training and exercise programs in local Indigenous languages for potentially affected First Nations and other Indigenous communities;
- consider the locations of First Nations and other Indigenous communities, seasonal access conditions, transportation routes, and community-identified safety priorities in emergency planning and evacuation modelling. Describe how engagement with First Nations and other Indigenous communities informed modelling assumptions and response measures, including evacuation, sheltering, and KI-pill distribution strategies;
- engage with affected First Nations and other Indigenous communities and consider their governance structures, community locations, seasonal access realities, and safety priorities. The Impact Statement must describe how Indigenous input informed evacuation modelling, sheltering strategies, communication approaches, and recovery planning;

- consider culturally safe and trauma-informed approaches, including culturally appropriate communication and support measures developed in collaboration with First Nations and other Indigenous communities;
- develop monitoring and follow-up programs for accidents and malfunctions in collaboration with First Nations and other Indigenous communities and include relevant Indigenous-led or co-developed components. The Impact Statement must describe how Indigenous input informed recovery objectives, monitoring indicators, and considerations related to the resumption of access to lands and waters;
- consider, where identified by First Nations and other Indigenous communities, any specific conditions under which lands or waters would be considered safe for renewed use in the development of recovery measures and follow-up programs;
  - 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 and public notification plans, community awareness plans and public reporting;
  - describe emergency communication plans that would provide emergency instructions to surrounding communities, including First Nations and other Indigenous communities, and how these will be informed by the public and First Nations and other Indigenous communities. The proponent should consider the following:
    - 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;
    - longer-term actions, such as a general website and telephone helplines, updates on the status of incidents, injured animal reports;
    - the contact information for entities (municipal/provincial/federal/other) involved in ongoing long-term monitoring of air quality, water quality, and/or country (traditional) foods (such as fish) and details about such monitoring;
    - translation to local Indigenous languages; and
    - the Interim Service Standards for Culturally-Relevant Emergency Management Services of Indigenous Services Canada's Emergency Management Assistance Program [62];
  - describe liaison, training and continuous education plans linked to emergency preparedness for surrounding communities that may be affected by the consequences of a significant incident, including for First Nations and other Indigenous communities;
    - describe measures to ensure engagement is carried out with First Nations and other Indigenous communities to meet requirements as co-determined with respective First Nations and other Indigenous communities;
  - describe past, ongoing and planned outreach efforts to ensure the public and First Nations and other 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); and

- describe any waste management plan as it pertains to waste generated during an emergency response.

10 Contributions to inform decision making

At the decision-making phase of the IAA, should the decision maker determine that the adverse federal effects that are likely to be caused by the project are likely to be, to some extent, significant, the decision maker will decide whether they are justified in the public interest in light of the extent to which they are significant and of the factors set out in section 63 of the IAA. The requirements in this section of the Integrated Guidelines may inform the analysis of these factors.

10.1 Canada's environmental obligations and climate change commitments

IAAC, with the support of federal authorities, will analyze the project's likely effects in the context of Canada's environmental obligations relevant to this project, as well as the project's GHG emissions in the context of Canada's emissions targets and forecasts. Where the proponent is of the view that the likely effects of the project contribute to the Government of Canada's ability to meet its environmental obligations and/or its commitments in respect of climate change, the proponent is encouraged to substantiate this view in the Impact Statement by describing these likely effects and the extent of their contribution (e.g. net increase in biodiversity through habitat restoration; net GHG reductions domestically through carbon capture).

10.1.1 Environmental obligations

Federal environmental obligations relevant to this project include those set out in the following instruments:

Biodiversity

- *Convention on Biological Diversity* and *Kunming-Montreal Global Biodiversity Framework* and its domestic framework: Canada's 2030 Nature Strategy, as well legislations supporting its implementation including SARA and recovery strategies and action plans developed under SARA for species at risk likely affected by the project available on the species at risk public registry;
- Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar), as implemented in part under the Federal Policy on Wetland Conservation and the North American Waterfowl Management Plan;

- *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 conservation objectives from ECCC's bird conservation regions and strategies;

Air pollution

- the Canada-United States Air Quality Agreement, as implemented under the Air Quality Management System;

Water quality and quantity

- the Canada-US Boundary Waters Treaty, as implemented by the International Joint Commission
- the Great Lakes Water Quality Agreement between the United States and Canada, and the Lake
- Ontario Lakewide Action and Management Plans;

Where the proponent is of the view that the likely effects of the project contribute to environmental obligations, the proponent is encouraged to:

- describe plans and commitments that contribute to the above-listed environmental obligations; and
- with respect to the biodiversity[11] obligations:
  - describe and, where possible, quantify likely changes in biodiversity resulting from the project referring to relevant guidance such as the *Convention on Biological Diversity's* Voluntary Guidelines on Biodiversity-Inclusive Impact Assessment,
  - describe whether, applying the mitigation hierarchy, the project would result in no net loss or in net positive impacts on biodiversity, and
  - describe whether and how the project's likely effects will contribute to the targets identified in Canada's 2030 Nature Strategy such as Target 2 (ecosystem restoration), Target 3 (protected and conserved areas), Target 4 (species recovery), Target 6 (invasive alien species), Target 7 (pollution and biodiversity, focusing on chemicals and air pollutants), Target 11 (ecosystem services and functions), Target 14 (mainstreaming of biodiversity values), Target 21 (knowledge sharing), and Target 22 (inclusion of Indigenous Peoples, women/girls, youth/children, persons with disabilities, and environmental human rights defenders in decision making).

10.1.2 Climate change commitments

As part of its decision, should the Governor in Council determine that the adverse federal effects are, to some extent significant, the Governor in Council must consider only whether the extent to which the effects that are likely to be caused by the carrying out of the project, contribute to the Government of Canada's

[11] The *Convention on Biological Diversity* defines biological diversity, or biodiversity, as "the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems".

ability to meet its commitment in respect of climate change, when considering whether the effects are justified in the public interest.

Greenhouse gases emissions

The proponent must assess the project's GHG emissions following the Strategic Assessment of Climate Change (SACC) and the technical guides related to the SACC, developed by ECCC, including the Draft Guidance on quantification of net GHG emissions, impact on carbon sinks, mitigation measures, net-zero plan and upstream GHG assessment (Technical Guide). The proponent is encouraged to keep apprised of updates to the SACC and related technical guides published by ECCC.

The Impact Statement must:

- assess the project's GHG emissions and emissions intensity as described in sections 3 and 5 of the SACC and section 2.1 and 2.5 of the Technical Guide; and
- provide an explanation of how the project may impact Canada's efforts to reduce GHG emissions, in Canada and globally as described in section 5.1.3 of the SACC and in the Technical Guide.

10.2 Sustainability

Sustainability is the ability to protect the environment, contribute to the social and economic well-being of Indigenous Peoples and the people of Canada and preserve their health in a manner that benefits present and future generations. Information throughout the Integrated Guidelines can be used to support the analysis of the extent to which the likely effects of the project contribute to sustainability.

10.2.1 Extent to which the likely effects of the project contribute to sustainability

The Impact Statement must:

- provide an analysis of the extent to which the project's likely positive effects and adverse federal effects contribute to sustainability according to the following steps:
  - identify the four to six key VCs from section 1.3 Selection of Valued Components relevant to long-term well-being to be included in the sustainability analysis, informed by Indigenous Knowledge and the project context,
  - establish temporal boundaries, considering how long-term effects on the identified VCs could affect future generations including beyond the project lifecycle, and

- apply the following sustainability principles to determine whether and the extent to which the project's likely positive effects and adverse federal effects result in a net positive contribution to sustainability (based on the criteria of no contribution, to low, moderate or high contribution):
  - consider interconnectedness and interdependence of human-ecological systems;
  - consider well-being of present and future generations;
  - consider positive effects and reduce adverse federal effects of the designated project; and
  - apply the precautionary principle and consider the uncertainty and risk of irreversible harm.