



Canadian Environmental  
Assessment Agency

Agence canadienne  
d'évaluation environnementale

# **ENVIRONMENTAL IMPACT STATEMENT GUIDELINES**

**Guidelines for the Preparation  
of an Environmental Impact Statement  
for an Environmental Assessment Conducted Pursuant to the  
*Canadian Environmental Assessment Act, 2012*  
for the  
**Pacific NorthWest LNG Project**  
Proposed by  
**Pacific Northwest LNG Ltd.****

**October 30, 2013**

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## **PREFACE**

In August 2013, the Canadian Environmental Assessment Agency (the Agency) was made aware of public concerns over a map posted on Agency's website for the Pacific NorthWest LNG Project (the Project), proposed by Pacific Northwest LNG Ltd. (the proponent). The map, provided by the proponent, was missing a geographic detail, specifically the Skeena River.

The Agency strives to ensure that its website is accurate and makes every effort to review and ensure quality control on the material provided by proponents. The Agency has corrected the information on its website. However, recognizing the potential for public confusion, on August 21, 2013, the Agency extended the public comment period on the draft Environmental Impact Statement (EIS) Guidelines for the Project through until September 20, 2013.

As a result of the extended comment opportunity, the Agency received additional public submissions. Many of these submissions addressed concerns regarding fish and fish habitat, navigation, wildlife, vegetation, air quality, cumulative effects and impacts to Aboriginal peoples. The Agency carefully reviewed all the submissions and has provided a summary of the comments to the proponent. Further, the Agency has instructed the proponent to ensure that comments within the scope of the environmental assessment are addressed in the preparation of their EIS.

It should be noted that as the EIS Guidelines are a high-level document that set out general information requirements, further modifications to the EIS Guidelines previously issued by the Agency on June 7, 2013 to address the public submissions are not required.

The environmental assessment will include a thorough review of the Project's potential effects on the Skeena River.

## **DISCLAIMER**

This document is not a legal authority, nor does it provide legal advice or direction; it provides information only, and must not be used as a substitute for the *Canadian Environmental Assessment Act, 2012* (CEAA 2012) or its regulations. In the event of a discrepancy, the CEAA 2012 and its regulations prevail. Portions of CEAA 2012 have been paraphrased in this document, but will not be relied upon for legal purposes.

# Part 1 - Background

## 1 INTRODUCTION

The purpose of this document is to identify for the Proponent the information requirements for the preparation of an Environmental Impact Statement (EIS) for a designated project<sup>1</sup> to be assessed pursuant to the *Canadian Environmental Assessment Act, 2012* (CEAA 2012). This document specifies the nature, scope and extent of the information required.

It is the responsibility of the Proponent to provide sufficient data and analysis on any potential changes to the environment to permit a thorough evaluation of the environmental effects of the project by the Canadian Environmental Assessment Agency (the Agency). The EIS Guidelines set out minimum information requirements. It is the Proponent's responsibility to provide any additional information required to assess the environmental effects of the project. Except where specified by the Agency, the Proponent has the discretion to select the most appropriate methods to compile and present data, information and analysis in the EIS.

## 2 GUIDING PRINCIPLES

### 2.1 Environmental assessment as a planning tool

Environmental Assessment (EA) is a planning tool used to ensure that projects are considered in a careful and precautionary manner in order to avoid or mitigate the possible adverse effects of projects on the environment and to encourage decision makers to take actions that promote sustainable development.

### 2.2 Public Participation

One of the purposes of CEAA 2012 is to ensure opportunities for meaningful public participation during an EA. CEAA 2012 requires that the Agency provide the public with an opportunity to participate in the EA and an opportunity to comment on the draft EA report.

The overall objective of meaningful public participation is best achieved when all parties have a clear understanding of the proposed project as early as possible in the review process. The Proponent is required to provide current information about the project to the public and especially to the communities likely to be most affected by the project.

### 2.3 Aboriginal Consultation

One of the purposes of CEAA 2012 is to promote communication and cooperation with Aboriginal peoples, including First Nations, Inuit and Métis. To work toward this goal, the Proponent will ensure that it engages with Aboriginal people and groups that may be affected by the Project, or that have potential or established Aboriginal rights and related interests in the Project area, as early as possible in the Project planning process. The Proponent is strongly encouraged to work with Aboriginal groups in establishing an engagement approach. In addition, the Aboriginal persons involved will have access to relevant information that allows them to understand the proposed Project and to determine its impacts on their

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<sup>1</sup> In this document, "project" has the same meaning as "designated project" as defined in the *CEAA 2012*.

rights and interests. The Proponent will make reasonable efforts to integrate “traditional Aboriginal knowledge” that will contribute to the assessment of environmental impacts.

Information gathered through the EA process and associated engagement by the Proponent and consultation by government with Aboriginal peoples will be used to inform decisions under CEAA 2012. This information will also inform the Crown’s understanding of the potential adverse impacts of the Project on potential or established Aboriginal rights and related interests, and the effectiveness of measures proposed to avoid or minimise those impacts.

### **3 PREPARATION AND PRESENTATION OF THE EIS**

#### **3.1 Agency Guidance**

The Proponent is encouraged to consult relevant Agency Policy and Guidance<sup>2</sup> on topics to be addressed in the EIS. The Proponent is further encouraged to consult with the Agency and federal authorities (see section 3.4.1) during the planning and development of the EIS materials.

#### **3.2 Study Strategy and Methodology**

The Proponent is expected to respect the intent of the EIS Guidelines and to consider the effects that are likely to arise from the Project (including situations not explicitly identified in these guidelines), the technically and economically feasible mitigation measures that will be applied, and the significance of any residual effects. It is possible that the EIS Guidelines may include matters that, in the judgement of the Proponent, are not relevant or significant to the Project. If such matters are omitted from the EIS, the Proponent will clearly indicate it and the justification for their conclusion provided so that the Agency, federal authorities, Aboriginal groups, the public and any other interested party have an opportunity to comment on this decision. Where the Agency disagrees with the Proponent's decision, it may require the Proponent to provide the specified information.

In describing methods, the Proponent will document how it used scientific, engineering, traditional and local knowledge to reach its conclusions. Wherever professional judgement or expert input is asserted, the name(s) and qualifications of the individual(s) making that judgement and the criteria that judgment is based on will be provided. Assumptions will be clearly identified and justified. All data, models and studies will be documented such that the analyses are transparent and reproducible. All data collection methods will be specified. The uncertainty, reliability and sensitivity of models used to reach conclusions must be indicated.

All significant gaps in knowledge and understanding related to key conclusions presented in the EIS must be identified. The steps to be taken by the Proponent to address these gaps will also be identified. Where the conclusions drawn from scientific and technical knowledge are inconsistent with the conclusions drawn from traditional knowledge, the EIS will contain a balanced presentation of the issues and a statement of the Proponent's conclusions.

#### **3.3 Integration of EA, Aboriginal and Public Consultation Information**

In preparing the EIS, the Proponent is encouraged to integrate Aboriginal and public consultation outcomes into the consideration and mitigation of environmental effects at the appropriate EA analytical

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Visit the Canadian Environmental Assessment Agency website: <sup>2</sup> [www.ceaa-acee.gc.ca/default.asp?lang=En&n=F1F30EEF-1](http://www.ceaa-acee.gc.ca/default.asp?lang=En&n=F1F30EEF-1)

steps shown on the next page (Figure 1). The Proponent will ensure that public and Aboriginal concerns are well documented in the EIS. The Proponent will identify and explain all unresolved questions or concerns as part of its analysis of the impacts of the Project as well as any related next steps or further action to be taken to resolve these issues.

This information will help the Crown assess adequacy of consultation with Aboriginal groups, as set out in the Updated Guidelines for Federal Officials to Fulfill the Duty to Consult (2011)<sup>3</sup>.

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<sup>3</sup> Visit the Aboriginal Affairs and Northern Development Canada website at: [www.aadnc-aandc.gc.ca/eng/1100100014680/1100100014681](http://www.aadnc-aandc.gc.ca/eng/1100100014680/1100100014681)



Figure 1. Integration of environmental assessment, Aboriginal and public consultation information into the Environmental Impact Statement.

### **3.4 Use of Information**

#### **3.4.1 Scientific Advice**

Section 20 of CEAA 2012 requires that every federal authority with specialist or expert information or knowledge with respect to a Project subject to an EA make that information or knowledge available to the Agency. The Agency will advise the Proponent of the availability of any pertinent information or knowledge so that it can be incorporated into the EIS, along with, as appropriate, expert and specialist knowledge provided by other levels of government.

#### **3.4.2 Community Knowledge and Aboriginal Traditional Knowledge**

Sub-section 19(3) of CEAA 2012 states that “the environmental assessment of a designated Project may take into account community knowledge and Aboriginal traditional knowledge”. For the purposes of these guidelines, community knowledge and Aboriginal traditional knowledge refers to knowledge acquired and accumulated by a community or an Aboriginal community, through generations of living in close contact with nature.

The Proponent will incorporate into the EIS the community and Aboriginal traditional knowledge to which it has access or that is acquired through Aboriginal engagement activities, in keeping with appropriate ethical standards and without breaking obligations of confidentiality, if any. Agreement should be obtained from Aboriginal groups regarding the use, management and protection of their existing traditional knowledge information during and after the EA.

#### **3.4.3 Existing Information**

In preparing the EIS, the Proponent is encouraged to make use of existing information relevant to the Project. However, when relying on existing information to meet requirements of the EIS Guidelines, the Proponent will either include the information directly in the EIS or clearly direct the reader to where it may obtain the information (i.e., through cross-referencing). When relying on existing information, the Proponent will also comment on how the data have been applied to the Project, clearly separate factual lines of evidence from inference, and state any limitations on the inferences or conclusions that can be drawn from the existing information.

#### **3.4.4 Confidential Information**

In implementing CEAA 2012, the Government of Canada is committed to promoting public participation in the environmental assessment of projects and providing access to the information on which environmental assessments are based. All documents prepared or submitted by the Proponent or any other stakeholder in relation to the environmental assessment are included in the Canadian Environmental Assessment Registry (CEAR) and made available to the public on request. For this reason, the EIS will not contain

- information that is sensitive or confidential (i.e., financial, commercial, scientific, technical, personal, cultural or other nature), that is treated consistently as confidential, and the person affected has not consented to the disclosure, or
- information that may cause harm to a person or harm to the environment through its disclosure.

The Proponent will consult with the Agency regarding whether specific information requested by these guidelines will be treated as confidential.

### **3.5 Presentation and Organization of the EIS**

To facilitate the identification of the documents submitted and their placement in the Canadian Environmental Assessment Registry (CEAR), the title page of the EIS and its related documents will contain the following information:

- project name and location
- title of the document, including the term “environmental impact statement”
- subtitle of the document
- name of the Proponent
- the date

The EIS will be written in clear, precise language. A glossary defining technical words, acronyms and abbreviations will be included. The Proponent will provide charts, diagrams, tables, maps and photographs, where appropriate, to clarify the text. Perspective drawings that clearly convey the various components of the Project will also be provided. Wherever possible, maps will be presented in common scales and datum to allow for comparison and overlay of mapped features.

For purposes of brevity and to avoid repetition, cross-referencing is preferred. The EIS may make reference to the information that has already been presented in other sections of the document, rather than repeating it. The exception to this preference is the cumulative effects assessment, which should be provided in a stand-alone section as described in section 12.1.2. Detailed studies (including all relevant and supporting data and methodologies) will be provided in separate appendices and will be referenced by appendix, section and page in the text of the main document of the EIS. The EIS will explain how information is organized in the document. This will include a list of all tables, figures, and photographs referenced in the text of the EIS. A complete list of supporting literature and references will also be provided. A Table of Concordance which cross references all respective sections containing the information presented in the EIS with the information requirements identified in the EIS Guidelines will be provided. The Proponent will provide copies of the EIS and its summary for distribution, including paper and electronic version in an unlocked, searchable PDF format, as directed by the Agency.

## **Part 2 – Content and Structure of the EIS**

### **4 SUMMARY OF ENVIRONMENTAL IMPACT STATEMENT**

The Proponent will prepare a summary of the EIS in both of Canada's official languages (French and English) to be provided to the Agency at the same time as the EIS and which will include the following:

- a concise description of all key components of the Project and related activities
- a summary of the consultation conducted with Aboriginal groups, the public, and government agencies, including a summary of the issues raised and the Proponent's responses
- an overview of the key environmental effects of the Project and proposed technically and economically feasible mitigation measures and any residual environmental effects
- the Proponent's conclusions on the residual environmental effects of the Project and the significance of adverse environmental effects after taking mitigation measures into account

The summary is to be provided as a separate document and should follow the outline provided below:

1. Introduction and environmental assessment context
2. Project overview
3. Scope of project and assessment
4. Alternative means of carrying out the Project
5. Public and Aboriginal engagement
6. Summary of environmental effects assessment
7. Mitigation measures
8. Proposed significance conclusions

The summary will have a sufficient level of detail for the reader to learn and understand the entire project, potential impacts, mitigation measures proposed by the Proponent, the residual and cumulative effects, and conclusions regarding their significance.

It is strongly recommended that the Proponent translates the summary into the appropriate Aboriginal language(s) in order to facilitate consultation activities during the environmental assessment.

### **5 INTRODUCTION AND PROJECT OVERVIEW**

#### **5.1 Geographical Setting**

The EIS will contain a description of the geographical setting in which the Project will take place. This description will focus on those aspects of the Project and its setting that are important in order to understand the potential environmental effects of the Project. The description will address the natural and human elements of the environment as well as explain the interrelationships between the biophysical environment and people and communities. The following information will be included:

- UTM coordinates of the main project site
- current land use in the area

- relationship of project facilities and components with any federal lands
- environmental significance and value of the geographical setting in which the Project will take place and the surrounding area
- environmentally sensitive areas, such as national, provincial and regional parks, ecological reserves, wetlands, estuaries, and habitats of federally or provincially listed species at risk and other sensitive areas
- local and Aboriginal communities
- traditional asserted Aboriginal territories and Indian reserve lands

The EIS will provide a description and mapping of the project location, including each of the project components as outlined in section 5.6 of this document.

Maps of the Project's location at an appropriate scale will accompany the text. The location map should include the boundaries of the proposed site including UTM coordinates, the major existing infrastructure, adjacent land uses and any important environmental features. In addition, site plans/sketches and photographs showing project location, site features and the intended location of project components will be included.

## **5.2 Regulatory Framework and the Role of Government**

To understand the context of the EA, this section will identify, for each jurisdiction, the government bodies involved in the EA as well as the EA processes. More specifically identify:

- any federal power duty or function to be exercised that may permit the carrying out (in whole or in part) of the Project or associated activities
- environmental and other specific regulatory approvals and legislation that are applicable to the Project at the federal, provincial, regional and municipal levels
- any differences in the scope of assessment between the federal and provincial environmental assessments for this proposed Project and include a concordance table which lists the locations within the EIS where specific provincial requirements are addressed
- government policies, resource management, planning or study initiatives pertinent to the Project and EA and discuss their implications
- whether a request will be made to Transport Canada's Marine Safety Directorate to undertake the TERMPOL review process<sup>4</sup>
- any self-government agreements with Aboriginal groups that are pertinent to the Project or EA
- any relevant Land Use Plans, Land Zoning, Community Plans, or Aboriginal communities' plans or initiatives
- a summary of the objectives, standards or guidelines that have been used by the Proponent to assist in the evaluation of any predicted environmental effects

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<sup>4</sup> Termpol Code: "Code of Recommended Standards for the Safety and Prevention of Pollution for Marine Transportation Systems and Related Assessment Procedures"

The submission of additional regulatory and technical information, necessary for federal authorities to make their regulatory decisions during the conduct of the environmental assessment is at the discretion of the Proponent. Although that information is not necessary for the EA decision, the Proponent is strongly encouraged to submit it concurrent with the EIS to ensure timely completion of regulatory reviews.

### **5.3 Participants in the Environmental Assessment**

Clearly identify the main participants in the EA including jurisdictions other than the federal government, Aboriginal groups, community groups, and environmental organizations.

### **5.4 The Proponent**

The Proponent will

- provide contact information (e.g. name, address, phone, fax, email),
- identify itself and the name of the legal entity that would develop, manage and operate the Project,
- explain corporate and management structures, as well as insurance and liability management related to the Project,
- specify the mechanism used to ensure that corporate policies will be implemented and respected for the Project,
- summarize key elements of its environment, health and safety management system and discuss how the system will be integrated into the Project, and
- identify key personnel, contractors, and sub-contractors responsible for preparing the EIS.

### **5.5 Purpose of the Project**

The Proponent will describe the purpose of the Project by providing the rationale for the Project, explaining the background, the problems or opportunities that the Project is intended to satisfy and the stated objectives from the perspective of the Proponent. If the objectives of the Project are related to or contribute to broader private or public sector policies, plans or programs, this information will also be included. The Proponent should also include reference to any current opportunities and limitations that are guiding project development such as limited windows of opportunity for development due to economic or environmental concerns.

### **5.6 Project Components**

The Proponent will describe the Project, by presenting the project components, associated and ancillary works, activities, scheduling details, the timing of each phase of the Project and other characteristics that will assist in understanding the environmental effects.

If the Project is part of a larger sequence of projects, the Proponent will outline the larger context and present the relevant references, if available.

For project components in the terrestrial environment, the Proponent will provide:

- a description of the facility and all related and supporting infrastructure
- a description of construction components and activities required for the Project

- a description of permanent and temporary access infrastructure, identification of any modifications of current roads or construction of new access roads, water crossings and bridges

For project components in the marine environment, the Proponent will provide:

- a bathymetric survey of the marine terminal area and materials offloading facility (MOF), navigational channel and the sediment disposal site
- marine terminal infrastructure and facilities, specifying the type of vessels that will be used, the construction methods for the wharfs (backfilling, sheet piling, pile dredging), as well as the dimensions of the wharfs, bridges, jetties, berthing areas, anchorage areas at the main terminal and in the navigation channel, and the features and locations of the navigational aids
- construction and maintenance dredging, specifying the nature and volume of sediment, profile drawings of dredge area, substrate information for the dredge footprint, dredging methods (type of dredge, dredging depth, duration, frequency, etc.), surface area of the areas to be dredged, sediment management (land and aquatic) provisions, and sediment disposal area (if necessary)
- navigation activities including number and frequency of trips, mooring, ballast water management, and support vessel (tug) activities

## **5.7 Project Activities**

The EIS will include expanded descriptions of the construction, operation, maintenance, foreseeable modifications, and where relevant, closure, decommissioning and restoration of sites and facilities associated with the proposed Project.

This would include detailed descriptions of the activities to be carried out during each phase, the location of each activity, expected inputs and outputs and an indication of the activity's magnitude and scale.

Although a complete list of project activities is required, the emphasis will be on activities with the greatest potential to have environmental effects. Sufficient information will be included to predict environmental effects and address public and Aboriginal groups' concerns identified. Highlight activities that involve periods of increased environmental disturbance or the release of materials into the environment.

Included in the EIS will be a detailed schedule including time of year, frequency, and duration for all project activities.

The EIS will provide the preliminary outline of a decommissioning and reclamation plan for any components associated with the Project. This will include ownership, transfer and control of the different project components as well as the responsibility for monitoring and maintaining the integrity of some of the structures. The plan would serve to provide guidance on specific actions and activities to be implemented to decrease the potential for environmental degradation in the long-term during decommissioning and abandonment activities for temporary facilities, and to clearly define the Proponent's ongoing environmental commitments. A conceptual discussion on how decommissioning could occur will be provided for permanent facilities.

## **6 SCOPE OF PROJECT**

The scope of project for the purposes of the EA includes the components (section 5.6), physical activities (section 5.7) and federal decisions (section 5.2). The Proponent will consider all the components, activities and decisions identified in these sections as part of the effects assessment.

Based on information received in the project description from the Proponent, the Agency defines the scope of project to be assessed as the construction, operation and decommissioning of the following project components:

Construction Related Components and Activities:

- construction, operation and decommissioning of a 3,500 person temporary camp for the purposes of constructing the facility and all related infrastructure, services and facilities
- construction of an LNG terminal and related infrastructure up to the point of connection with the natural gas transmission line
- construction of the associated marine terminal
- tree removal, vegetation clearing, peat removal and general site preparation
- disposal of cleared vegetation, peat, waste rock and overburden
- construction, operation, related shipping activities, and decommissioning of a materials offloading facility
- removal, transportation and disposal of dredged sediments
- post-construction clean-up and on-site grounds reclamation
- commissioning of the LNG facility and marine terminal
- bridge and road construction connecting Lelu Island to Port Edward
- any supporting temporary facilities (e.g. barge landing sites, access roads, off-site materials storage)

Operations Related Components and Activities:

- feed gas receiving equipment including a pig receiver, pressure let-down station, metering station with telemetry, and inlet gas separator
- gas treatment equipment to remove any trace amounts of CO<sub>2</sub>, H<sub>2</sub>S, mercury, or water
- up to three identical 6 million tonnes per annum (MTA) liquefaction trains (two to be constructed in Phase I with provision for a third train in Phase II)
- electrical power plant producing up to 700 MW of combined mechanical and electrical power or any off-site power sources that are under consideration
- any electrical transmission lines constructed as a component of the LNG facility
- two or more nitrogen generation and vaporization packages with liquid nitrogen storage
- up to three 180,000 m<sup>3</sup> full containment LNG storage tanks (two to be constructed in Phase I with provision of a third in Phase II)
- instrument and facility compressed air system
- flare system for emergency, start-up hydrocarbon releases, and annual maintenance
- any other bulk storage systems

- storage and use of additional facility materials such as diesel fuel and propane
- loading of LNG carriers
- one berth for propane import, if needed
- off-loading of propane and other facility materials
- ship and tug activities, including moorage and transit and on site refuelling associated with the operation of the marine terminal between the terminal and the Triple Island pilotage station
- any on-going sediment management activities such as dredging and disposal at sea
- jetty supported by a trestle and including a control room, dual berths, and insulated cryogenic piping with loading platform
- two berths capable of berthing two 217,000 m<sup>3</sup> LNG carriers (Q-Flex) up to 315 m in length
- trestle and berth topside infrastructure including a control room, insulated cryogenic piping, pumping equipment, and LNG loading infrastructure

Supporting Infrastructure:

- utilities supply infrastructure
- wastewater treatment systems (for sewage and all other liquid effluents)
- storm water management infrastructure
- firewater system
- bunkering facilities (diesel fuel)
- administration and maintenance buildings
- site fencing
- any fish habitat constructed as a component of a fish habitat compensation plan
- Any wetlands constructed or enhanced as a component of a wetlands compensation plan.

Decommissioning Activities:

- decommissioning of the LNG facility and marine terminal and all associated components

## **7 SCOPE OF ASSESSMENT**

### **7.1 Factors to be Considered**

#### **7.1.1 Valued Components**

Valued Components (VCs) refer to attributes of the physical, biophysical and human environment that may be affected by the Project that have been identified to be of concern by the Proponent, government agencies, Aboriginal peoples and the public. The value of a component not only relates to its role in the ecosystem, but also to the value placed on it by people.

The Proponent will identify the VCs deemed appropriate to ensure the full consideration of the factors listed in subsection 19(1) of CEAA 2012 as well as the 2012 amendment to section 79 of the *Species at Risk Act*. As a minimum, the Proponent must consider the list of environmental components provided in section 9.1 of this document. The final list of VC to be presented in the EIS will be completed according to the evolution and design of the Project and reflect the knowledge acquired on the environment through public and Aboriginal consultations. The Proponent will describe how the VCs were selected and what methods were used to predict and assess the adverse environmental effects of the Project on these components.

The VCs will be described in sufficient detail to allow the reviewer to understand their importance and assess the potential for environmental effects arising from the project activities. The rationale for selecting these components as VCs and for excluding others will be stated. Challenges may arise regarding particular exclusions, so it is important to document the information and the criteria used to make each determination. Examples of justification include primary data collection, computer modelling, literature references, public consultation, expert input or professional judgement. If comments are received on a component that has not been included as a VC, these comments will be summarised and addressed in this section.

For consultations associated with the identification of VCs, the Proponent will identify those VCs, processes, and interactions that either were identified to be of concern during any workshops or meetings held by the Proponent or that the Proponent considers likely to be affected by the Project. In doing so, the Proponent will indicate to whom these concerns are important and the reasons why, including Aboriginal, social, economic, recreational, and aesthetic considerations. The Proponent will describe any issues raised or comments noted regarding the nature and sensitivity of the area within and surrounding the Project and any planned or existing land and water use in the area. The Proponent will also indicate the specific geographical areas or ecosystems that are of particular concern to interested parties, and their relation to the broader regional environment and economy.

#### 7.1.2 Effects of Potential Accidents or Malfunctions

The Proponent will list and identify probability of potential accidents and malfunctions related to the Project, including an explanation of how those events were identified, potential consequences (including the environmental effects), the plausible worst case scenarios and the effects of these scenarios.

The geographical and temporal boundaries for the assessment of malfunctions and accidents may be different than those in the scope of factors for each VC. This will include an identification of the magnitude of an accident or malfunction, including the quantity, mechanism, rate, form and characteristics of the contaminants and other materials likely to be released into the environment during the accident and malfunction events.

The EIS will also describe the safeguards that have been established to protect against such occurrences and the contingency/emergency response procedures in place if accidents or malfunctions do occur and the efficacy of those respective plans. Detailed contingency and response plans will be presented.

#### 7.1.3 Effects of the Environment on the Project

The EIS will take into account how local conditions and natural hazards, such as severe or extreme weather conditions and external events (e.g. flooding, landslides, avalanches, erosion, subsidence, fire, and seismic events) could adversely affect the Project and how this in turn could result in impacts to the

environment (e.g., extreme environmental conditions result in malfunctions and accidental events). These events will be considered in different probability patterns (i.e. 5-year flood vs. 100-year flood). Longer-term effects of climate change will also be discussed up to the projected post-closure phase of the Project. This discussion will include a description of climate data used.

The EIS will provide details of a number of planning, design and construction strategies intended to minimize the potential environmental effects of the environment on the Project.

## **7.2 Scope of the Factors**

Scoping establishes the boundaries of the EA and focuses the assessment on relevant issues and concerns. The spatial and temporal boundaries used in the EA may vary depending on the VC.

### **7.2.1 Spatial Boundaries**

The EIS will clearly indicate the spatial boundaries to be used in assessing the potential adverse environmental effects of the proposed project and provide a rationale for each boundary. It is recognized that the spatial boundaries for each VC may not be the same.

Spatial boundaries will be defined taking into account as applicable the appropriate scale and spatial extent of potential environmental effects, community and Aboriginal traditional knowledge, current land and resource use by Aboriginal groups, ecological, technical and social and cultural considerations. The description of the Project setting will be presented in sufficient detail to address the relevant environmental effects of the Project.

The Proponent is advised to consult with the Agency, federal and provincial government departments and agencies, local government and Aboriginal groups, and take into account public comment when defining the spatial boundaries used in the EIS.

### **7.2.2 Temporal Boundaries**

The temporal boundaries of the EA will span all phases of the Project: construction, operation, maintenance, foreseeable modifications, and where relevant, closure, decommissioning and restoration of the sites affected by the Project. Temporal boundaries will also consider variations related to VCs for all phases of the Project, where appropriate. Community and Aboriginal traditional knowledge should factor into decisions around appropriate temporal boundaries.

If the temporal boundaries do not span all phases of the Project, the EIS will identify the boundaries used and provide a rationale.

## **8 ALTERNATIVE MEANS OF CARRYING OUT THE PROJECT**

The EIS will identify and consider the effects of alternative means of carrying out the Project that are technically and economically feasible. The Proponent will complete the following procedural steps for addressing alternative means:

- Identify the alternative means to carry out the Project.
- Develop criteria to determine the technical and economic feasibility of the alternative means.
- Identify those alternative means that are technically and economically feasible, describing each alternative means in sufficient detail.

Identify the effects of each alternative means.

- Identify those elements of each alternative means that could produce effects in sufficient detail to allow a comparison with the effects of the Project.
- The effects referred to above include both environmental effects and potential adverse impacts on potential or established Aboriginal rights and related interests.

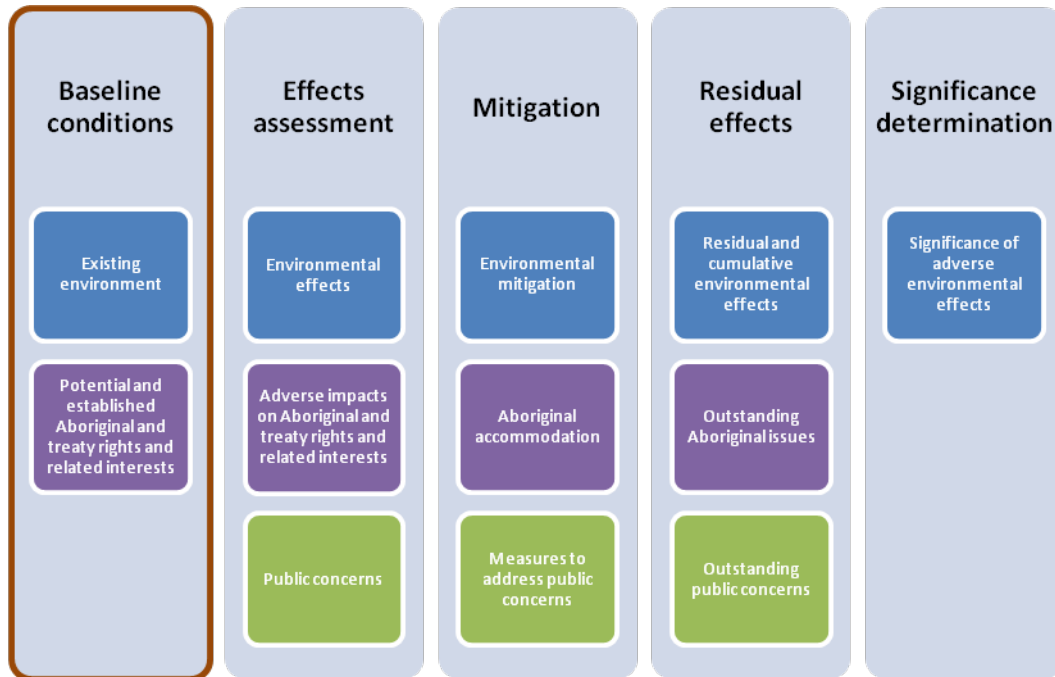
Identify the preferred means.

- Identify the preferred means based on the relative consideration of effects; and of technical and economic feasibility.
- Determine criteria to examine the effects of each remaining alternative means to identify the preferred means.

In its alternative means analysis, the Proponent will address, as a minimum, the following Project components:

- LNG production process
- power generation
- land based access to Lelu Island
- placement of jetty
- locations for the disposal at sea of marine sediment
- alternatives to disposal at sea for sediments.
- site layout
- site locations
- alternative construction camp locations

## 9 BASELINE CONDITIONS



### 9.1 Existing Environment

#### 9.1.1 Methodology

The EIS will include a description of the environment, including the components of the existing environment and environmental processes, their interrelations and interactions as well as the variability in these components, processes and interactions over time scales appropriate to the Project. The description will be sufficiently detailed to characterize the environment before any disturbance to the environment due to the Project and to identify and assess the significance of the potential adverse environmental effects of the Project. This data should include results from studies done prior to any physical disruption of the environment due to initial site clearing activities. The information describing the existing environment may be provided in a stand-alone chapter of the EIS or may be integrated into clearly defined sections within the effects assessment of each VC. This analysis will include environmental conditions resulting from historical and present activities in the local and regional study area.

In describing the physical and biological environment, the Proponent will take an ecosystem approach that considers both scientific and traditional knowledge and perspectives regarding ecosystem health and integrity. The Proponent will identify and justify the indicators and measures of ecosystem health and integrity used for analysis and relate these to the identified VCs and proposed monitoring and follow-up measures.

For the biophysical environment, baseline data in the form of inventories alone are not sufficient to assess effects. The Proponent will consider the resilience of relevant species populations, communities and their habitats. The Proponent will summarize all pertinent historical information on the size and geographic extent of relevant species populations as well as density, based on best available information. Where little

or no information is available, specific studies will be designed to gather further information on species populations, densities and the interrelations of these species to the ecosystem.

The Proponent will make all reasonable efforts to gather information from any previous studies for the Lelu Island area, and include this information in relevant portions of its baseline conditions.

Habitat at regional and local scales should be defined in ecological mapping of aquatic and terrestrial vegetation types and species (e.g. ecological land classification mapping). This mapping should include reference to Terrestrial Ecosystem Mapping using the applicable provincial Resource Information Standards Committee (RISC) standards. Habitat use will be characterized by type of use (e.g. spawning, breeding, migration, feeding, nursery, rearing, wintering), frequency and duration. This assessment will consider all relevant variations for all VCs as appropriate. Emphasis will be on those species, communities and processes identified as VCs. However, the interrelations of these components and their relation to the entire ecosystem and communities of which they are a part will be indicated (e.g. population-level risk assessment). The Proponent will address issues such as habitat, nutrient and chemical cycles, food chains, productivity, to the extent that they are appropriate to understanding the effect of the Project on ecosystem health and integrity. Range and probability of natural variation over time will also be considered. The Proponent will also examine changes in the distribution, populations, behaviour, and availability of wildlife, fish, and flora in the important context of implications to current use of lands and resources by Aboriginal peoples.

If the baseline data have been extrapolated or otherwise manipulated to depict environmental conditions in the study areas, modelling methods and equations will be described and will include calculations of margins of error and other relevant statistical information, such as confidence intervals and possible sources of error. Models that are developed should be validated using field data from the appropriate local and regional study areas.

### 9.1.2 Biophysical Environment

Based on the scope of project described in section 6, the Proponent will present the following baseline information to facilitate the identification of valued components for the purposes of the environmental assessment. Should other VCs be identified during the conduct of the EA, these will also be described in the EIS.

#### *Atmospheric Environment and Climate*

The EIS will describe the following:

- ambient air quality in the project area and, the results of a baseline survey of ambient air quality, including the following contaminants: PM2.5, PM10, SO<sub>x</sub>, NO<sub>x</sub>, VOCs, CO and H<sub>2</sub>S
- information to facilitate the assessment of the potential acidification of ecosystems which may include dispersion modelling. (estimates of dry deposition of nitrates and sulphates, measurements of wet deposition of nitrates (NO<sub>3</sub>) and sulphates (SO<sub>4</sub>) including precipitation chemistry measurements of pH, acidity, alkalinity, base cations (Ca, Mg, K, Na), PO<sub>4</sub>, NH<sub>4</sub> and Cl, etc.)
- current ambient noise levels within the local area, including the results of a baseline ambient noise survey, typical sound sources, geographic extent and temporal variations

- existing ambient light levels at the project site and at any other areas where project activities could have an effect on light levels and night-time illumination levels during different weather conditions and seasons
- seasonal and climactic information including historical records of total precipitation (rain and snow), mean, max and min temperatures, wind directions and velocity, frequency of fog, tidal fluctuations and storm surges and extreme climate events
- greenhouse gas (GHG) jurisdictional considerations including GHG related policies, plans or programs

*Terrestrial and Marine Environment-Geology and Geochemistry*

The EIS will describe the following:

- a delineation of the regional and local geological and oceanographic structures in the project area that may affect the proposed infrastructure including major structural features as well as lesser local structures, their ecological functions and distribution in the local study area.
- Geomorphology, bathymetry and topography of areas proposed for construction of major project components
- bedrock lithology, morphology, geomorphology and soils, sediments where earthworks or dredging is proposed
- a description of geological hazards that exist in the areas planned for the project facilities and infrastructure, including :
  - history of seismic activity in the area
  - isostatic rise or subsidence landslides, slope erosion and the potential for ground and rock instability, and subsidence following project activities
  - history of landslide or seismic generated tsunamis.
  - sites of paleontological importance

*Surficial Geology (i.e. Terrain and Soil)*

The EIS will describe the following:

- baseline mapping and description of landforms and landform processes and soils within the local and regional project area
- geochemical characteristics of surficial sedimentary units and soils
- a description/details of soil sample analysis completed and the quality assurance/quality control program followed
- suitability of topsoil and overburden for use in the re-vegetation of surface-disturbed areas

- a summary of the baseline data for determining impacts on soils resulting from the deposition of acidifying compounds

#### *Water Resources*

The EIS will describe surface water quality, hydrology and sediment quality within the area of influence of the Project. The baseline will provide the basis for the assessment of potential effects to surface water, presenting the range of water and sediment quality and surface water hydrology.

Furthermore, the EIS will describe:

- the delineation of drainage basins, at appropriate scales
- the assessment of hydrological regimes
- flows or design peak flows for selected periods for the project area
- surface water properties used in determining impacts to aquatic resources from the aerial deposition of acidifying compounds
- any local and regional potable surface water resource
- seasonal water quality field and lab analytical results for representative local watercourse and marine water monitoring stations established at the project site

#### *Wetlands*

The locations and extent of all wetlands in the project area, including coastal wetlands (e.g., salt marshes and eelgrass beds), shall be mapped. The EIS shall provide an estimate (in hectares) of each type of wetland ecosystem in the project area. Reference can be made to the US Army Corps of Engineers (1987) Wetland Delineation Method, the Canadian Wetland Classification System - National Wetlands Working Group [NWWG] (1997) and Terrestrial Ecosystem Mapping 4 methods following the applicable RISC standards. Efforts should focus on describing the wetlands with the greatest potential to be potentially affected, including those within the project footprint. An overview of the key plant communities and animals that rely on wetlands will be presented. An evaluation of wetland functions, including hydrological and biogeochemical processes, and habitat, will be presented. The functions assessment will be based on the baseline data collected by the Proponent, existing data sources relevant to the project area, and literature sources. Additional information on evaluating wetland functions is included within the document titled, 'Wetland Ecological Functions Assessment: An Overview of Approaches', available at: [www.ec.gc.ca/Publication](http://www.ec.gc.ca/Publication)

The EIS will identify and describe the methodology(s) that were used for the wetland functions assessment, including the use of aerial photos, TEM/VRI/TRIM maps, and wildlife baseline data.

To address any residual impacts to wetlands that provide habitat functions for migratory birds and species at risk, the EIS shall include a proposed wetland compensation plan. The Proponent is encouraged to consult with Environment Canada in the preparation of the wetland compensation plan before submission of the EIS.

### *Fish and Fish Habitat*

To enable analysis of the project's effects, the EIS will document the physical and biological characteristics of the fish and fish habitat likely to be directly or indirectly affected by the Project.

The EIS will describe the limnology, hydrology, marine ecology, freshwater and marine biota, presence of fish and other freshwater species, associated habitats and habitat distribution and fisheries in potentially affected surface waters, based on available published information, information resulting from community consultation, and results of on-site baseline surveys.

Furthermore, the EIS will:

- characterize fish populations on the basis of species and life stage for affected water bodies (i.e., project footprint, tidal and sub-tidal) and consider seasonal and annual variations
- list any rare fish or invertebrate species that are known to be present, and
- identify any potential areas and fish habitat sites that could be rehabilitated, restored or created for possible habitat gains to offset losses from the Project.

Note that certain intermittent streams, wetlands or intertidal areas may constitute fish habitat or contribute indirectly to fish habitat. The absence of fish at the time of the survey does not irrefutably indicate an absence of fish habitat.

The EIS will illustrate, on a topographic scale map, the hydrographic network (water bodies and watercourses), including intermittent streams, flood risk areas and wetlands. It will also indicate the boundaries of the watershed and subwatersheds of the study area.

Emphasis will be placed on the watercourses and water bodies likely to be affected by the Project and their physical characteristics, water quality and hydrological regime and marine currents and tides.

More specifically, if fish-bearing watercourses are present, for all water bodies on which effects are anticipated, the EIS will describe the following biophysical characteristics:

- For each water body, indicate the name and provide a description of the habitat by homogeneous section. The parameters that must be determined are length of the section, width of the channel from the high water mark (bankful width), water depths, type of substrate (sediments), aquatic and riparian vegetation, including bank slopes. It is recommended that photos be attached to the description.
- For each watercourse or water body affected, indicate the name and provide a description. The parameters that must be determined are total surface area, bathymetry, maximum and mean depths, water level fluctuations or tides, type of substrate (sediments), and location of submerged, floating and emergent aquatic vegetation, and water quality parameters (e.g. water temperature, turbidity, pH, dissolved oxygen profiles).
- Describe monthly/seasonal/annual water flow (discharge) and tidal data, including minimum and maximum flows and sea levels.

- Describe natural obstacles (e.g. falls, beaver dams) or existing structures (e.g. water crossings) that hinder the free passage of fish for freshwater water bodies and watercourses.
- Include habitat maps at a suitable scale indicating the surface area of habitat for spawning, nursery, feeding, migration routes, etc. This information should be linked to water depths (bathymetry) to identify the extent of the littoral or tidal zones.

Fish sampling survey methods used will be described in order to allow experts to ensure the quality of the information provided. If studies on fish and fish habitat were carried out previously, they are to be submitted with the EIS.

For all watercourses or water bodies on which the Project is likely to have effects, the EIS will:

- describe the fish species present on the basis of the surveys carried out and the data available (e.g. electric and experimental fishing, government and historical databases, sport fishing data, traditional and local knowledge). Identify the sources of the data and provide the information concerning the fishing carried out (e.g. location of sampling stations, catch methods, date of catches, species importance of each fish species in terms of its role in Aboriginal subsistence and commercial fishing and Aboriginal cultural activities)
- specify the location and areas of potential or confirmed fish habitats and describe how they are used by fish (spawning, rearing, growth, feeding, migration, overwintering),
- locate and describe suitable habitats for species at risk that appear on federal and provincial lists and that are found or are likely to be found in the study area,
- document any blasting activity near water where vibrations may affect fish behaviour, such as spawning or migrations
- indicate how fish passage will be maintained for sites where stream crossings are to be installed, constructed or modified
- The EIS will describe marine plants, including all benthic and detached algae, marine flowering plants, brown algae, red algae, green algae and phytoplankton

#### *Wildlife and Wildlife Habitat*

The EIS will describe migratory and non-migratory birds (including waterfowl, raptors, shorebirds, marsh birds and other land birds), ungulates, furbearers, amphibians, small mammals, bats, reptiles, invertebrates, and their habitat at the project site and within the local and regional areas. The EIS will include an assessment of wildlife habitat features, including for example mineral licks, bat roosts/hibernacula, and wallows. The results of any baseline surveys and a description of their methodologies will be included. The survey methodologies used will be by inventory group following RISC or other appropriate standards (for example, bird inventory groups include songbirds, woodpeckers, swallows and swifts, shorebirds, waterfowl, riverine birds, raptors, Marbled Murrelet, nighthawks and poorwills). Discussion of the results will include abundance, distribution and diversity, as well as habitat use.

Migratory birds are protected under the *Migratory Birds Convention Act* (MBCA) and associated regulations. Preliminary data from existing sources will be gathered on year-round migratory bird

use of the area (e.g., winter, spring migration, breeding season, fall migration). In addition to information obtained from naturalists, other relevant datasets should be consulted.

Existing data will be supplemented by surveys, where appropriate. Surveys should be designed with reference to Environment Canada's - Canadian Wildlife Service's guidance such as Technical Report No. 508, *A Framework for the Scientific Assessment of Potential Project Impacts on Birds* (Hanson *et al.* 2009). Appendix 3 of the Framework provides examples of project types and recommended techniques for assessing impacts on migratory birds.

Other wildlife and their habitat, including marine mammals, that could be impacted by project activities will be characterized using existing data, and can include traditional Aboriginal knowledge, supplemented by surveys as appropriate. The EIS will give particular consideration to areas of concentration of migratory animals, such as breeding, denning and wintering areas, as well as breeding areas of species low in number and high in the food chain (e.g. furbearers such as black bear and wolf).

The description of the existing environment will include consideration of existing or proposed protected areas, special management areas, and conservation areas in the regional study area.

The species selected within each biotic VC should include those of importance to health and socio-economic conditions, cultural heritage and the current use of land and resources for traditional purposes by Aboriginal persons

#### *Species at Risk and Species of Conservation Concern*

As background for the analysis of the project's effects on Species at Risk (SAR), the EIS will:

- identify all SARs that may be affected by the Project, using existing data and literature as well as surveys to provide current field data, as appropriate,
- incorporate any published studies that describe the regional importance, abundance and distribution of SARs, and
- identify residences, seasonal movements, movement corridors, habitat requirements, key habitat areas, identified critical habitat and recovery habitat (where applicable) and general life history of SARs that may occur in the project area, or be affected by the Project.

The following information sources on species at risk and species of conservation concern should be consulted:

- SARA ([www.sararegistry.gc.ca](http://www.sararegistry.gc.ca))
- Committee on the Status of Endangered Animals in Canada (COSEWIC)
- relevant government agencies
- local naturalist and interest groups
- Aboriginal groups

*Ecosystems (grassland, temperate forest, etc.)*

The EIS will describe the various ecosystems found in the project area which are likely to be affected by the Project.

#### *Flora*

The EIS will describe potential or known plant species in the project area, which are listed under the *Species at Risk Act* or other provincial or territorial endangered species legislation, and critical habitat that are likely to be affected by the Project.

For rare plant surveys, the Proponent is encouraged to reference the Protocols for Rare Plant Surveys by Penny and Klinkenberg, available through the CDC and E-Flora websites. Appropriately qualified botanists will complete the surveys.

In order to complete the description of the baseline information regarding the biophysical environment, the Proponent may consider the inclusion of other biophysical VCs in the EIS.

The species selected within each biotic VC should include those of importance to health and socio-economic conditions, cultural heritage and the current use of land and resources for traditional purposes by Aboriginal persons.

#### 9.1.3 Human Environment

The definition of the human environment will be interpreted broadly. Based on the scope of project described in section 6, the Proponent will provide the following baseline information to facilitate the identification of the valued components (VC):

- land use context (e.g., hunting, fishing, outdoor recreation, use of seasonal cabins, existing land development)
- health and socio-economic conditions
  - The Proponent will include all baseline information relevant to human health in one section of the EIS. The Proponent should refer to Health Canada's *Useful Information for Environmental Assessments* document <sup>5</sup> in order to include the appropriate baseline information relevant to human health.
  - In describing the socio-economic environment, the Proponent will provide information on the functioning and health of the socio-economic environment, encompassing a broad range of matters that affect communities and Aboriginal peoples in the study area in a way that recognizes interrelationships, system functions and vulnerabilities.
  - A description of the rural and urban settings likely to be affected by the Project will be provided.
- physical and cultural heritage
  - The EIS will describe physical and cultural heritage, and will provide information on heritage resources.

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<sup>5</sup> This document can be obtained at [http://www.hc-sc.gc.ca/ewh-semt/pubs/eval/envIRON\\_assess-eval/index-eng.php](http://www.hc-sc.gc.ca/ewh-semt/pubs/eval/envIRON_assess-eval/index-eng.php)."

- any structures, sites or things of historical archaeological, paleontological or architectural significance
- current use of land and resources for traditional purposes by Aboriginal peoples
  - In describing current uses of land and resources by Aboriginal groups for traditional purposes, the Proponent will include activities related, but not limited, to hunting, fishing, trapping, cultural and other traditional uses of the land (e.g. collection of medicinal plants, use of sacred sites). Potential effects on current uses include access to areas that are of importance or concern to Aboriginal groups.

In describing how the Project may impede navigation, the EIS will

- identify any vessel exclusion areas, project components and a description of any activities (e.g., dredging, alteration of water bed or water banks) that may affect waterways and water bodies,
- describe any Aboriginal, commercial and recreational uses of natural waters (i.e., swimming, canoeing, fishing, etc.), and
- provide information on current and historic usage of all waterways and water bodies that will be affected by the Project, including vessel types, sizes and frequencies of use.

This is a minimum list that is not meant to be exhaustive. The Proponent may consider the inclusion of other human environment baseline information in the EIS.

## **9.2 Potential or Established Aboriginal Rights and Related Interests**

For the purposes of developing the EIS, the Proponent will engage with Aboriginal groups whose potential or established Aboriginal rights and related interests may be affected by the Project, which include at a minimum the following groups:

- Metlakatla First Nation
- Lax Kw'alaams First Nation
- Gitxaala Nation
- Kitselas First Nation
- Kitsumkalum First Nation

In preparing the EIS, the Proponent will ensure that Aboriginal groups, especially those most likely to be affected by the Project, have access to timely and relevant information that they require in respect of the Project and how the Project may adversely impact them.

For the above-named Aboriginal groups, the Proponent will hold meetings and facilitate these by making key EA summary plain language documents (baseline studies, EIS and key findings) accessible. At a minimum, the EIS will summarize available information on the potential or established Aboriginal rights and related interests of the above-named Aboriginal groups that have the potential to be adversely impacted by the Project. As part of this summary, the EIS will include for each Aboriginal group:

- background information and a map of the group's asserted traditional territory
- a summary of engagement activities conducted prior to the submission of the EIS, including the date and means of engagement (e.g. meeting, mail, telephone)

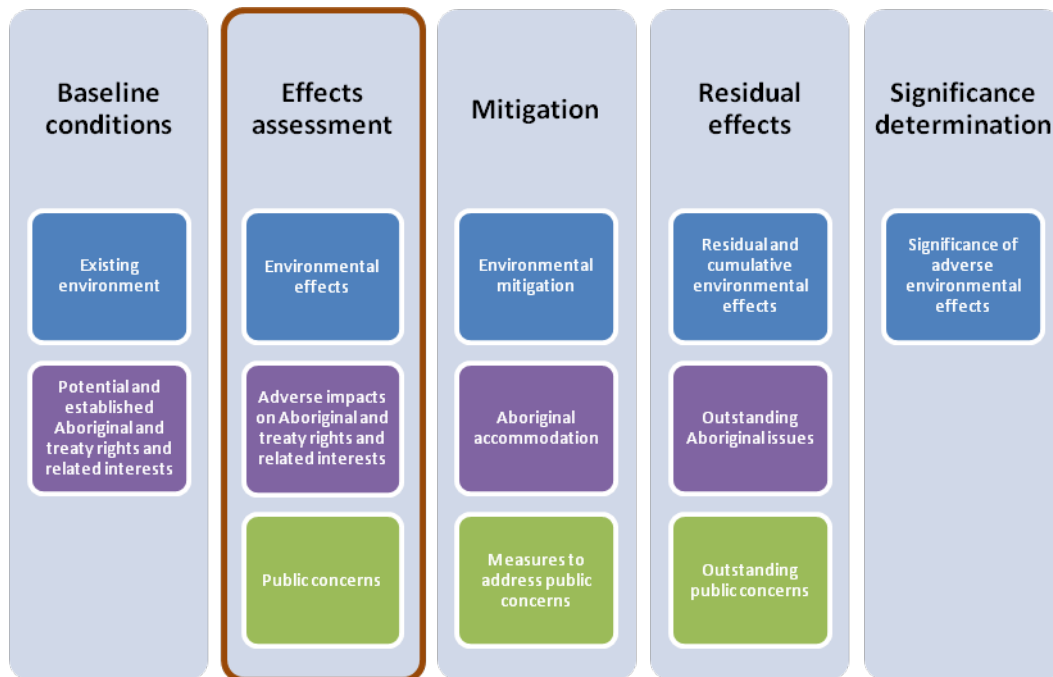
- information on each group’s potential or established rights (including geographical extent, nature, frequency, timing), including maps and data sets (e.g. fish catch numbers) when this information is provided by a group to the Proponent
- an overview of key comments and concerns provided by each group to the Proponent;
- responses provided by government and the Proponent, as appropriate
- future planned engagement activities
- efforts undertaken to engage with Aboriginal groups as part of developing the information identified above

The Proponent will describe all efforts, successful or otherwise, taken to solicit the information required to prepare the EIS.

The Agency will provide additional instructions to the Proponent in cases where further research and engagement effort by the Proponent is required to support Canada’s ability to fulfil the duty to consult with one or more Aboriginal groups that may be adversely affected by the Project.

Should the Proponent have knowledge of potential adverse impacts to an Aboriginal group not appearing on the above list; the Proponent will bring this to the attention of the Agency at the earliest opportunity.

## 10 EFFECTS ASSESSMENT



### 10.1 Environmental Effects

#### 10.1.1 Methodology

The Proponent will indicate the Project’s effects during construction, operation, maintenance, foreseeable modifications, and where relevant, closure, decommissioning and restoration of sites and facilities associated with the Project, and describe these effects using appropriate criteria. To the maximum extent possible, this documentation will include, for each potential project-related environmental effect, an

indication of the nature of the effect, mechanism, magnitude, duration, frequency, geographic extent, and the degree to which it may be reversible. The Proponent will consider both the direct and indirect, reversible and irreversible, short- and long-term environmental effects of the Project. In predicting and assessing the Project's effects, the Proponent will indicate important details and clearly state the elements and functions of the environment that may be affected, specifying the location, extent and duration of these effects and their overall impact.

The assessment of the effects of each of the project components and physical activities, in all phases, will be based on a comparison of the biophysical and human environments between the predicted future conditions with the Project and the predicted future conditions without the Project. In undertaking the environmental effects assessment, the Proponent will use best available information and methods. All conclusions will be substantiated. Predictions will be based on clearly stated assumptions. The Proponent will describe how it has tested each assumption. With respect to quantitative models and predictions, the Proponent will discuss the assumptions that underlie the model, the quality of the data and the degree of certainty of the predictions obtained.

#### *Risk Assessment Framework*

The Proponent is expected to employ, where appropriate, standard ecological risk assessment frameworks that categorize the levels of detail and quality of the data required for the assessment. These tiers are as follows:

- Tier 1: Qualitative (expert opinion, including traditional and local knowledge, literature review, and existing site information);
- Tier 2: Semi-quantitative (measured site-specific data and existing site information); and,
- Tier 3: Quantitative (recent field surveys and detailed quantitative methods).

Thus, if the Tier 2 assessment still indicates a potential for effects to VCs, a Tier 3 assessment may need to be conducted to reduce the level of uncertainty. If the risk characterization component is uncertain this may necessitate the probabilistic modelling of the population-level consequences of the proposed project.

Biophysical changes to the environment that may impact human health include changes to: air quality, water quality, noise levels, contaminants in country food sources, and radiation levels. Such changes in the biophysical environment, as described in Section 9 (Baseline Environment), can impact human health. When risks to human health due to changes in one or more of these components are predicted, a complete Human Health Risk Assessment (HHRA) examining all exposure pathways for pollutants of concern may be necessary to adequately characterize potential risks the human health.

#### *Impact Matrix*

An impact matrix methodology in combination with identification of VCs should be used to evaluate environmental effects of the proposed project, including those related to Aboriginal peoples. The assessment will include the following general steps:

- identification of the activities and components of the Project
- predicting/evaluating the likely effects on identified valued components
- identification of technically and economically feasible mitigation measures for any adverse environmental effects
- conclusions regarding any residual environmental effects
- ranking of each residual adverse environmental effect based on various criteria

- conclusions of the potential significance of any residual environmental effect following the implementation of mitigation

#### *Application of Precautionary Approach*

In documenting the analyses included in the EIS, the Proponent will:

- demonstrate that all aspects of the Project have been examined and planned in a careful and precautionary manner in order to ensure that they would not cause serious or irreversible damage to the environment, especially with respect to environmental functions and integrity, system tolerance and resilience, and the human health of current or future generations,
- outline and justify the assumptions made about the effects of all aspects of the Project and the approaches to minimize these effects,
- ensure that in designing and operating the Project, priority has been and would be given to strategies that avoid the creation of adverse effects,
- develop contingency plans that explicitly address accidents and malfunctions, and
- identify any proposed follow-up and monitoring activities, particularly in areas where scientific uncertainty exists in the prediction of effects.

#### 10.1.2 Changes to the Environment

Section 5 of CEAA 2012 describes specific categories of direct and indirect environmental effects that will be considered in the EA (see Figure 2). However, to be able to assess these categories of environmental effects, a complete understanding of the changes the Project will cause to the environment is required, including changes that are directly linked or necessarily incidental to any federal decisions that would permit the Project to be carried out.

The EIS will describe any change that may be caused by the Project (as scoped in section 6 of this document) on the environment, which is defined as the components of the Earth, including:

- land, water and air, including all layers of the atmosphere,
- all organic and inorganic matter and living organisms, and
- the interacting natural systems that include the components described above.

These descriptions will be integrated into the effects assessment sections of each VC included in the EIS.

#### *Changes to components of the environment within federal jurisdiction*

The EIS will include a stand-alone section that summarises those changes that may be caused by the Project on the components of the environment listed in paragraph 5(1)(a) of CEAA 2012, namely fish and fish habitat, aquatic species and migratory birds.

*Changes to the environment that would occur on federal or transboundary lands*

The EIS will include a stand-alone section that summarises changes the Project may cause to the environment on federal lands or lands outside the province in which the Project is to be located (including outside of Canada).

*Changes to the environment that are directly linked or necessarily incidental to federal decisions*

As the Project requires one or more federal decisions identified in section 5.2, the EIS will also include a stand-alone section that summarizes changes that may be caused by the Project on the environment that are directly linked or necessarily incidental to these decisions.

### 10.1.3 Effects of changes to the Environment

*Effects of changes to the environment on Aboriginal peoples*

From the perspective of the Proponent, the EIS will describe the effects of any changes the Project may cause to the environment, with respect to Aboriginal peoples, on health and socio-economic conditions, physical and cultural heritage, the current use of lands and resources for traditional purposes, or any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.

*Effects of changes to the environment that are directly linked or necessarily incidental to federal decisions*

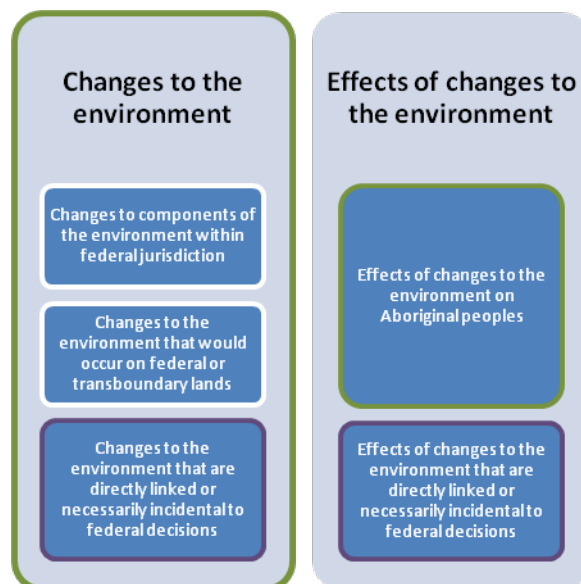
In relation to the changes to the environment that are directly linked or necessarily incidental to federal decisions identified in section 5.2, the EIS will also include a stand-alone section that describes the effects of these changes on health and socio-economic conditions, physical and cultural heritage, or any structure, site or thing that is of historical, archaeological, paleontological or architectural significance, other than as they pertain to Aboriginal peoples (who are considered in the previous section).

## 10.2 Adverse Impacts on Aboriginal Rights and Related Interests

The EIS will describe, from the perspective of the Proponent, the potential adverse impacts of the Project on the ability of Aboriginal peoples to exercise the potential or established Aboriginal rights and related interests identified in section 9.2. As part of this description, this section will summarise:

- Potential adverse impacts (on potential or established Aboriginal rights and related interests) that were identified through the environmental effects described in sections 10.1.2 and 10.1.3
- Specific issues and concerns raised by Aboriginal groups in relation to the potential adverse impacts of the Project on potential or established Aboriginal rights and related interests;
- VCs suggested for inclusion in the EIS by Aboriginal groups, whether or not those factors were included, and the rationale for any exclusions;

Figure 2. “Environmental effects” under CEAA 2012.



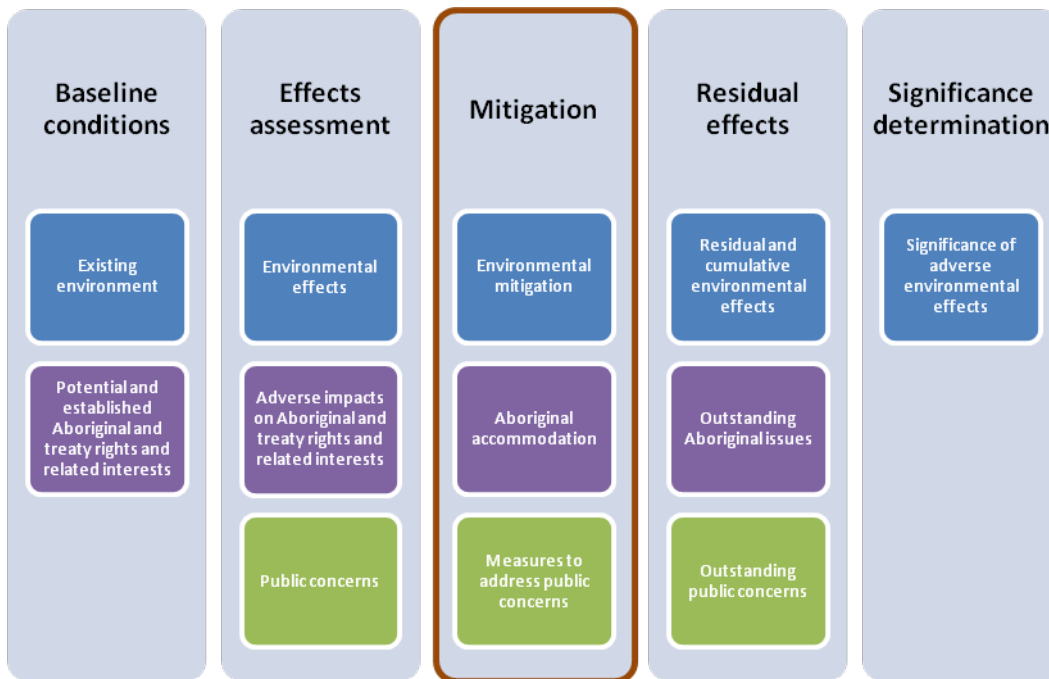
- Where and how Aboriginal traditional knowledge or other Aboriginal views were incorporated into the consideration of environmental effects and potential adverse impacts on potential or established Aboriginal rights and related interests; and
- Efforts undertaken to engage with Aboriginal groups as part of collecting the information identified above.

The assessment of the potential adverse impacts of each of the Project components and physical activities, in all phases, will be based on a comparison of the exercise of the identified rights between the predicted future conditions with the Project and the predicted future conditions without the Project. It is recommended that the impact matrix methodology described in section 10.1.1 be adapted for this purpose.

### 10.3 Public Concerns

This section will detail public concerns raised in relation to the Project, including through public consultation conducted prior to the preparation of the EIS, and community knowledge that may have been provided.

## 11 MITIGATION



### 11.1 Environmental Mitigation

#### 11.1.1 Methodology

Every EA conducted under CEAA 2012 will consider clear, enforceable measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the Project.

As a first step, the Proponent is encouraged to use an approach based on the avoidance and reduction of the effects at the source. Such an approach may include the modification of the design of the Project or relocation of project components.

The EIS will describe the standard mitigation practices, policies and commitments that constitute technically and economically feasible mitigation measures and that will be applied as part of standard practice regardless of location. The Proponent will then describe its environmental protection plan and its environmental management system, through which it will deliver this plan. The plan will provide an overall perspective on how potentially adverse effects would be minimized and managed over time.

The EIS will then describe mitigation measures that are specific to each environmental effect identified in section 10.1. Measures will be written as specific commitments that clearly describe how the Proponent intends to implement them. Where mitigation measures have been identified in relation to species or critical habitat listed under the *Species at Risk Act*, the mitigation measures will be consistent with any applicable recovery strategy and action plans.

The EIS will describe Proponent commitments, policies and arrangements directed at promoting beneficial or mitigating adverse socio-economic effects. The EIS will further discuss the mechanisms the Proponent would use to require its contractors and sub-contractors to comply with these commitments and policies and with auditing and enforcement programs.

The EIS will specify the actions, works, minimal disturbance footprint techniques, best available technology, corrective measures or additions planned during the Project's various phases (construction, operation, modification, decommissioning, abandonment or other undertaking related to the Project) to eliminate or reduce the significance of adverse effects. The impact statement will also present an assessment of the effectiveness of the proposed technically and economically feasible mitigation measures. The reasons for determining if the mitigation measure reduces the significance of an adverse effect will be made explicit.

The EIS will indicate what other technically and economically feasible mitigation measures were considered, including the various components of mitigation, and explain why they were rejected. Trade-offs between cost savings and effectiveness of the various forms of mitigation will be justified. The EIS will identify who is responsible for the implementation of these measures and the system of accountability.

Where mitigation measures are proposed to be implemented for which there is little experience or for which there is some question as to their effectiveness, the potential risks and effects to the environment should those measures not be effective will be clearly and concisely described. In addition, the EIS will identify the extent to which technology innovations will help mitigate environmental effects. Where possible, it will provide detailed information on the nature of these measures, their implementation, management and the development of the Follow-up Program as described in section 11.4.

Adaptive management is not considered a valid mitigation measure, but if the Follow-up Program indicates that corrective action is required, the proposed approach for managing the response should be identified.

#### 11.1.2 Summary of Environmental Mitigation

In addition, the EIS will summarise the mitigation measures, follow-up and related commitments identified to address the categories of environmental effects specified in section 10:

- changes to components of the environment within federal jurisdiction

- changes to the environment that would occur on federal or transboundary lands
- changes to the environment that are directly linked or necessarily incidental to federal decisions
- effects of changes to the environment on Aboriginal peoples
- effects of changes to the environment that are directly linked or necessarily incidental to federal decisions

## **11.2 Measures to Address Impacts on Aboriginal Rights**

This section will describe, from the perspective of the Proponent, the measures identified to mitigate the potential adverse impacts of the Project described in section 10.2 on the potential or established Aboriginal rights and related interests identified in section 9.2. These measures will be written as specific commitments that clearly describe how the Proponent intends to implement them. This description will include a summary of:

- specific suggestions raised by Aboriginal groups for avoiding, reducing, mitigating or otherwise accommodating the potential adverse impacts of the Project on potential or established Aboriginal rights and related interests in relation to environmental effects specified in sections 10.1.2 and 10.1.3
- environmental mitigation and avoidance measures identified in section 11.1 that also serve to address potential adverse impacts on potential or established Aboriginal rights and related interests
- any potential cultural, social or economic impacts or benefits to Aboriginal groups that may arise as a result of the Project
- where and how Aboriginal traditional knowledge or other Aboriginal views were incorporated into the mitigation or avoidance of environmental effects of potential adverse impacts on potential or established Aboriginal rights and related interests
- efforts undertaken to engage with Aboriginal groups as part of developing the information identified above

In preparing the EIS, the Proponent will ensure that Aboriginal people and groups have access to the information that they require in respect of the Project and of how it may impact them. The Proponent will describe all efforts, successful or not, taken to solicit the information required to prepare the EIS.

The Proponent will structure its Aboriginal engagement activities to provide adequate time for Aboriginal groups to have reviewed the relevant information in advance and to ensure there are sufficient opportunities for individuals and groups to provide oral input in the language of their choosing. Consultation activities must be appropriate to the groups' needs and should be arranged through discussions with the groups.

## **11.3 Measures to Address Public Concerns**

This section will describe measures identified for addressing public concerns in relation to the Project identified in section 10.3. Measures will be written as specific commitments that clearly describe how the Proponent intends to implement them.

For any consultations undertaken with the general public, the EIS will describe the ongoing and proposed consultations and information sessions with respect to the Project at the local, regional and provincial levels, where applicable. The EIS will provide a summary of discussions, indicate the methods used and their relevance, locations, the persons and organizations consulted, the concerns raised, the extent to

which this information was incorporated in the design of the Project as well as in the EIS, and the resultant changes. The Proponent will also provide a description of efforts made to distribute project information and provide a description of information and materials that were distributed during the consultation process.

#### **11.4 Follow-Up Program**

A Follow-up Program is designed to verify the accuracy of the effects assessment and to determine the effectiveness of the measures implemented to mitigate the adverse effects of the Project. The EIS will describe the proposed Follow-up Program in sufficient detail to allow independent judgment as to the likelihood that it will deliver the type, quantity and quality of information required to reliably verify predicted effects (or absence of them), and to confirm both the assumptions and the effectiveness of mitigation. The Follow-up Program will include specific commitments that clearly describe how the Proponent intends to implement them.

The Follow-up Program will be designed to incorporate baseline data, compliance data (such as established benchmarks, regulatory documents, standards or guidelines) and real time data (such as observed data gathered in the field). The Proponent will describe the reporting methods to be used, including frequency, methods and format.

The effects predictions, assumptions and mitigation actions that are to be tested in the follow-up program must be converted into field-testable monitoring objectives. The monitoring design must include a statistical evaluation of the adequacy of existing baseline data to provide a benchmark against which to test for project effects, and the need for any additional pre-construction or pre-operational monitoring to establish a firmer project baseline.

The Follow-up Program will include a schedule indicating the frequency and duration of effects monitoring. This schedule is to be developed after an evaluation of the length of time needed to detect effects given estimated baseline variability, likely magnitude of environmental effect and desired level of statistical confidence in the results (Type 1 and Type 2 errors).

The description of the Follow-up Program will include any contingency procedures/plans or other adaptive management provisions as a means of addressing unforeseen effects or for correcting exceedances as required to comply or to conform to benchmarks, regulatory standards or guidelines.

The Follow up Program will also be designed to monitor the implementation of mitigation measures resulting from Aboriginal consultation, including:

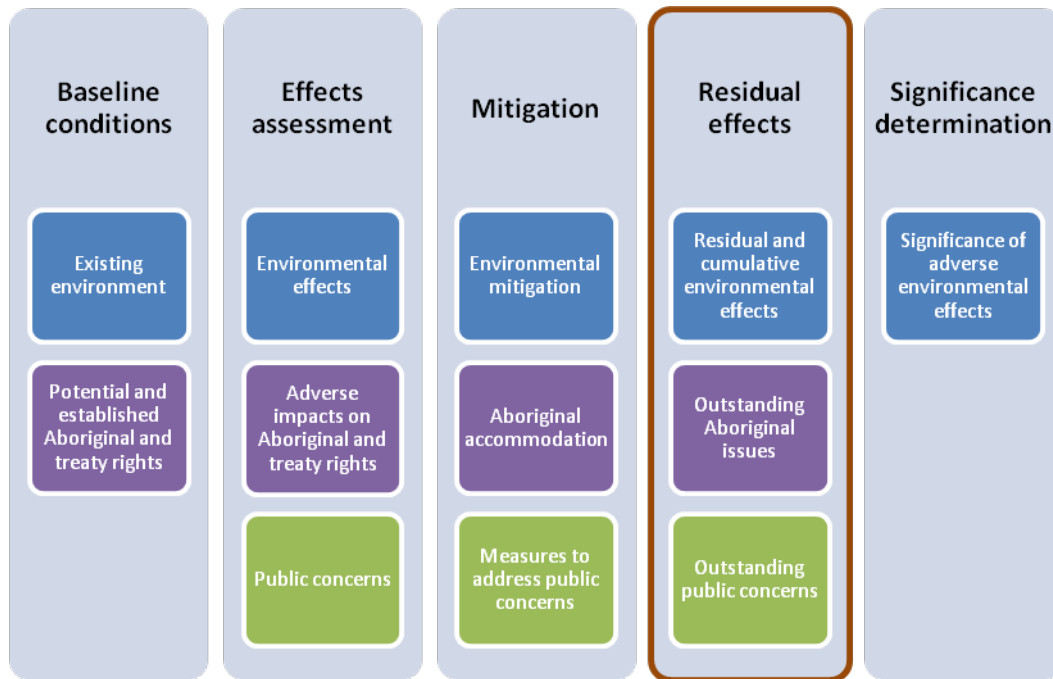
- verifying predictions of environmental effects with respect to Aboriginal peoples, as well as residual impacts that could not be addressed within the context of the EA
- determining the effectiveness of mitigation measures as they relate to environmental effects with respect to Aboriginal peoples in order to modify or implement new measures where required
- supporting the implementation of adaptive management measures to address previously unanticipated adverse environmental effects with respect to Aboriginal peoples or unanticipated adverse impacts to Aboriginal rights
- verifying measures identified to prevent and mitigate potential adverse effects of the Project on potential or established Aboriginal rights
- providing information that can be used to improve and support future EAs and Aboriginal consultation processes

Where appropriate, the Follow-up Program can also encompass measures identified to address public concerns identified in section 11.3.

### 11.5 Proponent Commitments

Proponent commitments identified in the EIS, including environmental mitigation measures to address public and Aboriginal peoples concern, and Follow-up Program elements, may be considered for inclusion as conditions in the EA decision statement or as part of other compliance and enforcement mechanisms. Each commitment will be specific, achievable, measurable and verifiable, and described in a manner that avoids ambiguity in intent, interpretation and implementation.

## 12 RESIDUAL EFFECTS



### 12.1 Residual and Cumulative Environmental Effects

#### 12.1.1 Residual Environmental Effects

After having established the technically and economically feasible mitigation measures, the EIS will present any residual environmental effects of the Project on the biophysical and human environments after these mitigation measures have been taken into account. The residual effects, even if very small or deemed insignificant will be described.

### 12.1.2 Cumulative Environmental Effects

The Proponent will identify and assess the Project's cumulative effects using the approach described in the Agency's Operational Policy Statement Addressing Cumulative Environmental Effects under the Canadian Environmental Assessment Act <sup>6</sup>.

Cumulative effects are defined as changes to the environment due to the Project combined with the existence of other works or other past, present and reasonably foreseeable physical activities. Cumulative effects may result if,

- implementation of the Project being studied may cause direct residual adverse effects on the environmental components, taking into account the application of technically and economically feasible mitigation measures, and
- the same environmental components may be affected by other past, present or reasonably foreseeable physical activities.

The EIS will describe the analysis of the total cumulative effect on a VC over the life of the Project, including the incremental contribution of all current and proposed physical activities, in addition to that of the Project. The EIS will include different forms of effects (e.g. synergistic, additive, induced, spatial or temporal) and identify impact pathways and trends.

The EIS will include a narrative discussion of existing projects in the vicinity of the proposed project. The narrative will include the description of any existing studies of changes to the environment resulting from those projects that are similar to potential changes resulting from the Project, including any mitigation measures that were implemented, and any long term monitoring or follow up program that were conducted. The effectiveness of those mitigation measures and key results of monitoring or follow-up programs will be described. This narrative discussion should include historical data, where available and applicable, to assist interested parties to understand the potential effects of the Project and how they may be addressed.

The cumulative effects assessment may consider the results of any relevant study conducted by a committee established under section 73 or 74 of CEAA 2012.

### 12.1.3 Summary of Residual Environmental Effects

In addition, the EIS will summarise the residual environmental effects (including cumulative environmental effects) identified in relation to the categories of environmental effects specified in sections 10.1.2 and 10.1.3:

- changes to components of the environment within federal jurisdiction
- changes to the environment that would occur on federal or transboundary lands
- changes to the environment that are directly linked or necessarily incidental to federal decisions
- effects of changes to the environment on Aboriginal peoples
- effects of changes to the environment that are directly linked or necessarily incidental to federal decisions

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<sup>6</sup> Visit the Canadian Environmental Assessment Agency's website at: [www.ceaa-acee.gc.ca/](http://www.ceaa-acee.gc.ca/)

## **12.2 Outstanding Aboriginal Issues**

This section will describe, from the perspective of the Proponent, the potential adverse impacts on potential or established Aboriginal rights and related interests that have not been fully mitigated as part of the environmental assessment and associated consultations with Aboriginal groups. This includes potential adverse impacts (on potential or established Aboriginal rights and related interests) that may result from the residual and cumulative environmental effects described in section 10.2.

The information in this section will assist the Crown in assessing the adequacy of consultation and accommodation as set out in the Updated Guidelines for Federal Officials to Fulfill the Duty to Consult (2011)<sup>7</sup>.

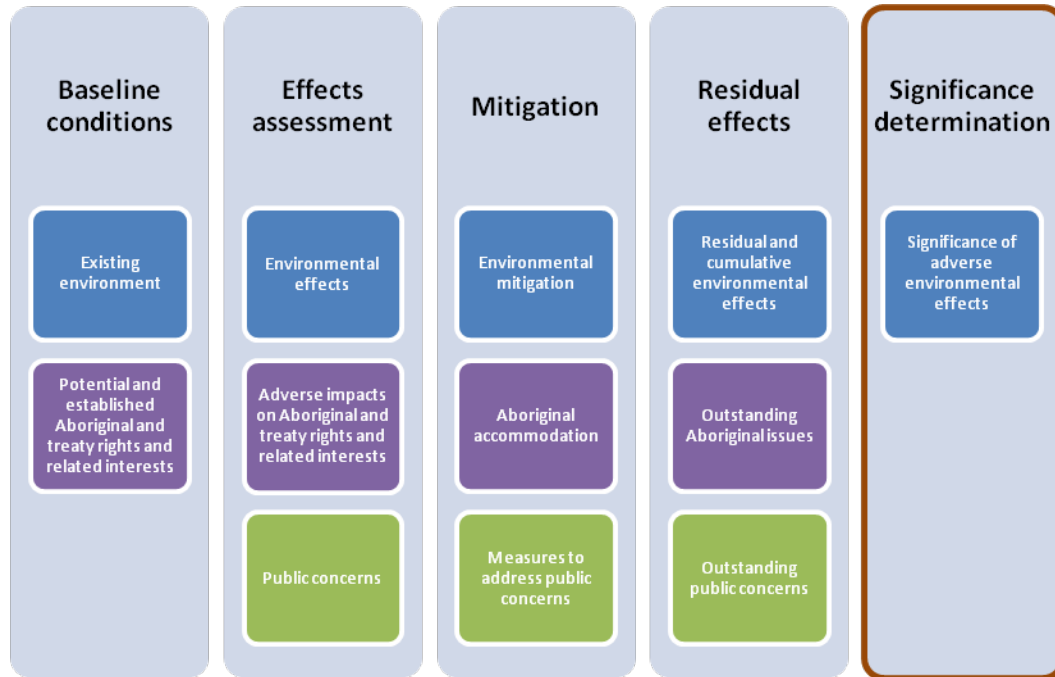
## **12.3 Outstanding Public Concerns**

This section will describe the outstanding public concerns in relation to the Project that have not been resolved as a result of changes to the Project, mitigation measures, or public consultation.

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<sup>7</sup> Visit the Aboriginal Affairs and Northern Development Canada website at: [www.aadnc-aandc.gc.ca/eng/1100100014680/1100100014681](http://www.aadnc-aandc.gc.ca/eng/1100100014680/1100100014681)

## 13 SIGNIFICANCE DETERMINATION



### 13.1 Significance of Adverse Environmental Effects

#### 13.1.1 Methodology

This section will provide a detailed analysis of the significance of the residual environmental effects (including cumulative environmental effects) that are considered adverse, using the approach described in the Agency's Reference Guide Determining Whether a Project is Likely to Cause Significant Adverse Environmental Effects<sup>8</sup>.

The EIS will identify the criteria used to assign significance ratings to any predicted adverse effects. It will contain clear and sufficient information to enable the Agency, technical and regulatory agencies, Aboriginal groups and the public to review the Proponent's analysis of the significance of effects. The Proponent will define the terms used to describe the level of significance.

The following elements should be used in reaching conclusions on the significance of residual effects:

- magnitude
- geographic extent
- duration and frequency
- reversibility
- ecological and social context
- existence of environmental standards, guidelines or objectives for assessing the impact

<sup>8</sup> Visit the Canadian Environmental Assessment Agency's website at: [www.ceaa-acee.gc.ca/default.asp?lang=En&n=D213D286-1&offset=&toc=hide](http://www.ceaa-acee.gc.ca/default.asp?lang=En&n=D213D286-1&offset=&toc=hide)

In assessing significance against these criteria the EIS will, where possible, employ relevant existing regulatory documents, environmental standards, guidelines, or objectives such as prescribed maximum levels of emissions or discharges of specific hazardous agents into the environment. The EIS will contain a section which explains the assumptions, definitions and limits to the criteria mentioned above in order to maintain consistency between the effects on each VC.

Where significant adverse effects are identified, the EIS will set out the probability (likelihood) that they will occur, and describe the degree of scientific uncertainty related to the data and methods used within the framework of its environmental analysis.

### 13.1.2 Summary of Significant Adverse Environmental Effects

In addition, the EIS will summarise the significant adverse environmental effects identified in relation to the categories of environmental effects specified in sections 10.1.2 and 10.1.3:

- changes to components of the environment within federal jurisdiction
- changes to the environment that would occur on federal or transboundary lands
- changes to the environment that are directly linked or necessarily incidental to federal decisions
- effects of changes to the environment on Aboriginal peoples
- effects of changes to the environment that are directly linked or necessarily incidental to federal decisions

## 14 SUMMARY TABLES

The EIS will contain a series of tables summarising the following key information:

- potential environmental effects (section 10.1), adverse impacts on potential or established Aboriginal rights and related interests (section 10.2) and public concerns (section 10.3)
- proposed mitigation measures and commitments (section 11.5) by Proponent to address potential impacts on environment, (section 11.1), Aboriginal rights (section 11.2) and public concerns (section 11.3), and Follow-up Program (section 11.4)
- potential residual and cumulative environmental effects (section 12.1) and the significance of the residual environmental effects (section 13.1) ; outstanding Aboriginal issues (section 12.2) and outstanding public concerns (section 12.3)
- comments from the public and responses
- comments from Aboriginal groups and individuals and responses
- relationship of the identified Valued Components (section 7.1.1) to Aboriginal groups' potential or established Aboriginal rights and related interests (section 9.2)

The summary tables will be used in the EA Report prepared by the Agency. Proponent commitments may be considered for inclusion as conditions in the EA decision statement and as part of other compliance and enforcement mechanisms.

## 15 BENEFITS TO CANADIANS

### 15.1 Changes to the Project Since Initially Proposed

The EIS will include a summary of the changes that have been made to the Project since originally proposed, including the benefits of these changes to the environment, Aboriginal peoples, and the public.

## **15.2 Benefits of the Project**

The EIS will include a section describing the predicted environmental, economic and social benefits of the Project. This information will be considered in assessing the justifiability of the significant adverse environmental effects, if necessary.

## **16 MONITORING PROGRAM AND ENVIRONMENTAL MANAGEMENT PLANS**

The goal of a monitoring program is to ensure that proper measures and controls are in place in order to decrease the potential for environmental degradation during all phases of project development, and to provide clearly defined action plans and emergency response procedures to account for human and environmental health and safety. In the EIS, the Proponent will describe the monitoring activities at all stages of the Project, the Proponent's proposed commitment to implementing these activities and the resources provided for this purpose. The program will need to provide the key information such as contacts, protocols, measured parameters, deadlines, intervention in case of non-compliance of legal requirements and production of monitoring reports.

The finalization of a detailed monitoring program will occur through consultation with federal and provincial government agencies, Aboriginal groups, the public and other stakeholders. This may occur after the environmental assessment but will be consistent with the information presented in the EIS. Pertinent legislation, regulations, industry standards, documents and legislative guides will be used in the development of the monitoring program.

Environmental management plans (EMPs) are an example of a tool that can be used to ensure that proper measures and controls are in place in order to decrease the potential for environmental degradation during all phases of project development, and to provide clearly defined action plans and emergency response procedures to account for human and environmental health and safety. The EMPs will serve to provide guidance on specific actions and activities that will be implemented to decrease the potential for environmental degradation during construction and operation, and to clearly define the Proponent's ongoing environmental commitment.