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6.0 ENVIRONMENTAL IMPACT ASSESSMENT SCOPE AND APPROACH

6.1 Scope of the Environmental Impact Assessment

The environmental impact assessment (EIA) is intended to address the following primary objectives:

- Assist in the planning and design of the Project by identifying and assessing potential environmental effects and associated mitigation options to avoid or minimize adverse effects and maximize positive effects to the degree feasible;
- Provide meaningful opportunity for Aboriginal and public engagement and input throughout the Project planning and environmental assessment process; and
- Provide sufficient information for regulators to review the Project and exercise their legislated mandate.

The scope of EIA for the proposed P4 All-Season Road Project has been developed with regard to applicable regulatory requirements for environmental approvals as outlined in Manitoba's *The Environment Act* and the federal *Canadian Environmental Assessment Act*, 2012 as well as applicable provincial and federal government policy, standards, and guidance.

With respect to Manitoba's *The Environment Act*, the scope of the EIA has been developed respecting information requirements stipulated in Licensing Procedures Regulation 163/88 of the Act and as outlined in ESRA's 'Project 4 All-Season Road Connecting Berens River to Poplar River First Nation Environmental Assessment Scoping Document' submitted to Manitoba Conservation and Water Stewardship (Manitoba Floodway and East Side Road Authority [MFESRA] 2014) and the response of the Provincial Technical Advisory Committee (TAC) regarding the scoping document[1].

The scope of the EIA has further been established through guidance provided by the Canadian Environmental Assessment Agency (CEA Agency) in their 'Guidelines for the Preparation of an Environmental Impact Statement pursuant to the *Canadian Environmental Assessment Act*, 2012. Project 4 – All-Season Road Connecting Berens River and Poplar River First Nation'.

This EIA considers ecological, social and economic components of the environment consistent with legislative definitions of 'environment' and 'environmental effects' (see Glossary) and further incorporates the principles and guidelines of sustainable development related to the environment as stated in Schedules A and B of Manitoba's *The Sustainable Development Act*.

[1] The Scoping Document and TAC comments regarding the scoping document are provided in the MCWS Public Registry file 5747.00 accessible at: http://gov.mb.ca/conservation/eal/registries/5747berenspoplarroad/index.html

The EIA has been developed considering the expected interactions between the Project and the existing environmental conditions (i.e., baseline) of the Project area. Potential Project-related effects considered in this EIA include potential direct effects on the biophysical environment and potential indirect effects on socio-economic conditions and Aboriginal groups as a result of biophysical changes. Effects that are assessed in relation to human health, socio-economic conditions, and physical and cultural heritage are those effects that are linked to potential changes to the environment resulting from the Project. Particular focus is given to human health, socio-economic, and cultural effects on those communities having the greatest potential to be affected by the Project (i.e., Poplar River and Berens River First Nations and the Berens River Northern Affairs Community).

Effects that are assessed in relation to human health, socio-economic conditions and physical and cultural heritage, including Aboriginal peoples, are those effects that are linked to potential changes to the environment resulting from the Project.

Specific to Aboriginal peoples, potential effects to Aboriginal and treaty rights are addressed through the assessment and mitigation of potential Project effects on resource use (e.g., hunting, fishing, trapping, water use) and cultural or traditional activities and sites in the Project area (**Chapter 10**). Through the Aboriginal and public engagement program (**Chapter 4**), opportunity was provided for the identification and discussion of potential adverse Project effects on Aboriginal and treaty rights. The Berens River and Poplar River First Nations have indicated support for potential benefits of the proposed Project during the Aboriginal and public engagement program and also in the form of executed Community Benefit Agreements with ESRA (**Chapter 4**).

In accordance with CEA Agency guidelines for this Project, and consistent with provincial guidance, the assessment of potential environmental effects uses a values-based framework to promote a comprehensive and focused assessment of the potential effects of the proposed Project. This framework relies on the use of 'Valued Components' as a foundation for the environmental assessment. The selection of Valued Components allows the assessment to be focused on those aspects of the natural and human environment that are identified to be of particular importance to society. The method used to select Valued Components for the EIA is provided in **Section 6.4.2**.

'Valued Components' are used as a foundation for the EIA to focus the assessment on those aspects of the biophysical and human environment that are identified to be of particular importance to society.

Also in accordance with CEA Agency guidelines for this Project, the effects assessment considers the environmental effects that are likely to occur prior to, and after, the implementation of mitigation measures. Where adverse (i.e., negative) effects are identified following the implementation of appropriate mitigation (i.e., residual effects) and those residual effects are determined to be 'significant', commentary on the probability of the effect occurring is provided.

Finally, the scope of this EIA also considers the effects of the environment on the Project (**Chapter 11**) and the effects of potential accidents and malfunctions (**Chapter 12**). Potential cumulative effects from past, present, and reasonably-predictable or publicly-known or expected future projects and activities are assessed in **Chapter 13**.

6.2 Project Assessment Boundaries

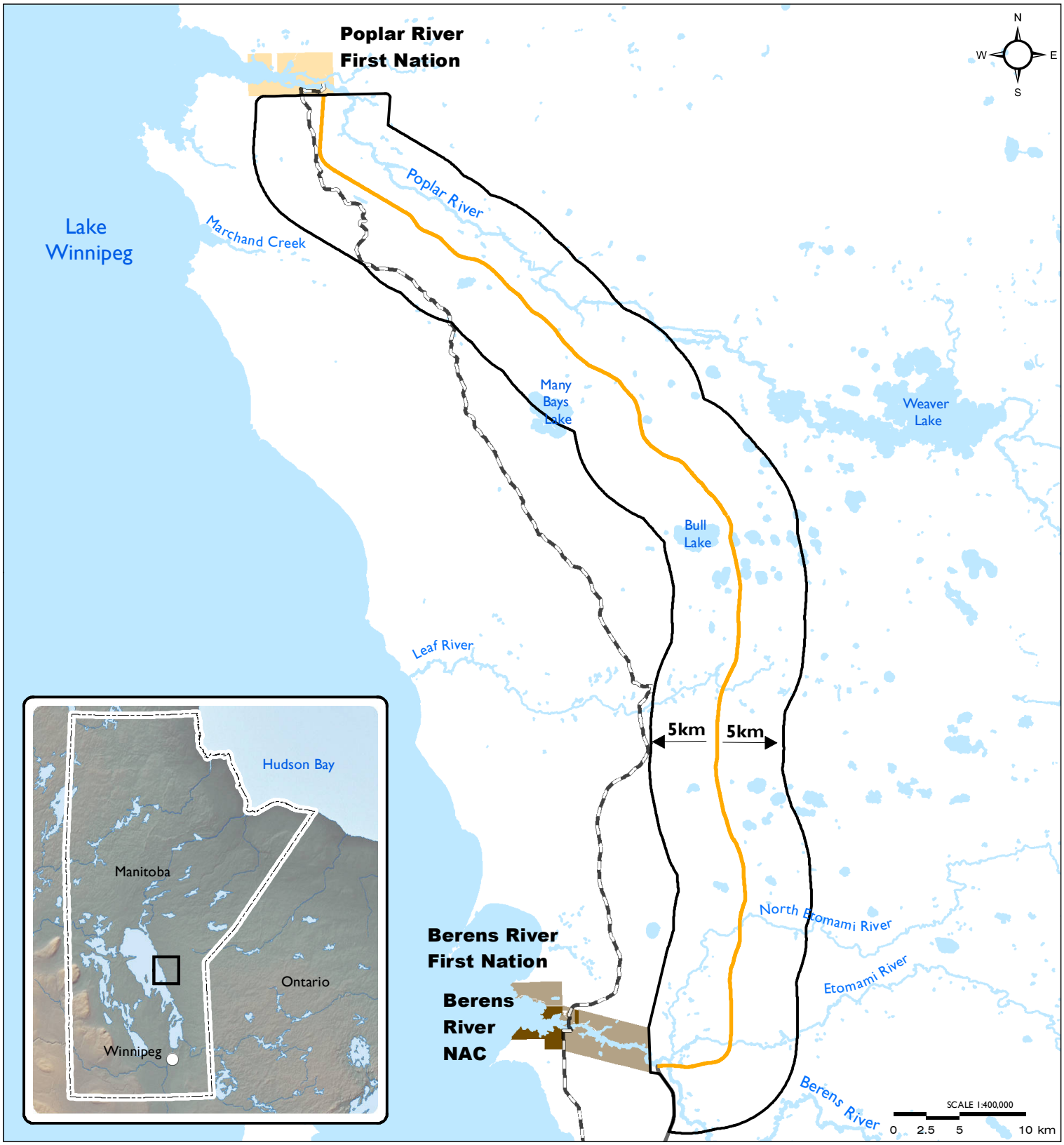
6.2.1 Area Boundaries

For the purpose of assessing the geographic extent of potential Project-related environmental effects that are expected to occur, the following spatial and geographic boundaries have been defined for areas within which Project effects may occur:

- Project Footprint – The physical space or directly affected area within which Project components or activities are located and the immediately adjacent area, which is the defined limits of the all-season road right-of-way (i.e., 100 m). Permanent and temporary facilities (e.g., temporary access routes and quarries) within which effects are likely to be measurable are also included;
- Local Assessment Area – Area within which Project effects are measurable and extending beyond the Project Footprint (see **Figure 6-1**); and
- Regional Assessment Area – Area beyond the Local Assessment Area within which most potential indirect and cumulative effects would occur (see **Figure 6-2**).

Potential adverse effects of the Project may be limited to the area within which permanent Project components occur (i.e., the Project Footprint) and immediate area, or effects may extend beyond the Project Footprint to the nearby Local Assessment Area or more distant Regional Assessment Area.

The Local Assessment Area is the spatial area where measurable changes to environmental components are primarily expected to extend based on the VC being assessed. The boundaries of the Local Assessment Area generally extend five kilometres on either side of the centreline of the proposed all-season road to include the expected area within which measurable potential Project effects on most VCs may occur (e.g., wildlife). However, the boundary of the Local Assessment Area may vary depending on the VC being assessed. For example, potential direct Project effects on vegetation are primarily expected to be measurable within a Local Assessment Area that extends one kilometer on either side of the centreline of the proposed all-season road.



Project 4 - All-Season Road Connecting Berens River to Poplar River First Nation

Figure 6-1

Local Assessment Area

- P4 All-Season Road Alignment
- P1 All-Season Road (South of Berens to PTH 304) - Under Construction
- 2013/2014 Manitoba Winter Road
- Local Assessment Area
- Berens River First Nation Reserve
- Poplar River First Nation Reserve
- Berens River Northern Affairs Community

Map Drawing Information:
ESRI Base Layers, Province of Manitoba, CanVec, GeoGratis, Dillon Consulting Limited

Map Created By: ECH
Map Checked By: MG/PS/LD
Map Projection: NAD 1983 UTM Zone 14N

DATE: 4/8/2016

MANITOBA East Side Road AUTHORITY

Project 4 - All-Season Road Connecting Berens River to Poplar River First Nation

Figure 6-2

Regional Assessment Area

Northern boundary of the Regional Assessment Area follows the northern boundary of the First Nations Protected Area Accord as indicated in the Asatiwisipe Aki Lands Management Plan (Poplar River First Nation 2011). The southern boundary follows the Bloodvein First Nation (FN) boundary to the south, then follows the winter road to Little Grand Rapids FN boundary, then follows that FN boundary to the south, then straight east to the Ontario border from the SE corner of the Little Grand Rapids FN boundary.

- P4 All-Season Road Alignment
- P1 All-Season Road (South of Berens to PTH 304) - Under Construction
- 2013/2014 Manitoba Winter Road
- Regional Assessment Area
- Northern Affairs Community
- Berens River First Nation Reserve
- Poplar River First Nation Reserve
- Other First Nations
- Provincial Park
- Ecological Reserve
- Manitoba / Ontario Border

Map Drawing Information:
ESRI Base Layers, Province of Manitoba, CanVec, GeoGratis, Dillon Consulting Limited

Map Created By: ECH
Map Checked By: MG/PS/LD
Map Projection: NAD 1983 UTM Zone 14N

DATE: 4/8/2016

MANITOBA East Side Road AUTHORITY

The Regional Assessment Area boundary considers the anticipated regional extent of potential indirect and cumulative Project effects to the environment that may extend beyond the Local Assessment Area. In particular, the extent of the Regional Assessment Area boundary considers changes to the environment that may indirectly affect the traditional use areas and resources of local communities.

6.2.2 Temporal Boundaries

As described in the **Chapter 3** (Project Description), the proposed Project is scheduled to initiate construction activities in 2016 with an in-service date of 2024 (i.e., an 8-year construction phase is anticipated). There are no plans to decommission or abandon the Project as it will provide all-season access from Poplar River First Nation to Berens River First Nation and to the southern all-season road network for the foreseeable future. Therefore the operation and maintenance phase will continue through the foreseeable future.

The Project will be constructed in approximately 10 segments beginning from both Berens River First Nation and Poplar River First Nation, with segments being constructed sequentially such that completion of the construction phase at one segment will initiate construction of the adjacent segment. Right-of-way clearing will be conducted in similar segments, with clearing being completed during the winter months where feasible to facilitate clearing machinery access and minimize adverse environmental effects (e.g., disturbance to breeding birds and other wildlife).

6.3 Information Sources for the Environmental Impact Assessment

Sources of information used to identify and assess potential environmental effects of the Project have included the following:

- Other environmental assessments for all-season road projects on the east side of Lake Winnipeg including reviewer comments on previous environmental assessment submissions;
- Baseline studies and other studies that include field surveys undertaken to collect site-specific information necessary for Project planning and environmental impact assessment that was not available from existing sources (i.e., wildlife, aquatic environment, vegetation, heritage resources, and geological resources);
- Local area Traditional Land Use studies and community planning initiative publications;
- Traditional Knowledge studies; and
- Input from the Aboriginal and Public Engagement Program regarding this Project.

A summary of these information sources is presented in **Table 6.1** and **Sections 6.3.1** to **6.3.5**. Project-specific information regarding environmental effects of roads are presented in the 'Environmental Effects and Mitigation' sections of **Chapters 7** through **10** for the physical, aquatic, terrestrial, and socio-economic and cultural environments, respectively.

Table 6.1: Information Sources for the EIA

Information Type	Source	Description
Environmental Assessments and Reviews	Public Works and Government Services Canada (2001)	A Comprehensive Study Report of the proposed New Airport and Road between St. Theresa Point and Wasagamack Island Lake, Manitoba.
	Manitoba Transportation and Government Services (2006)	The Rice River Road Upgrading and Extension.
	CEA Agency (2011)	The PR 304 to Berens River All-Season Road, P1 Project.
	Pearse (2011)	Review of the Proposed East Side Road Environmental Impact Assessment. Report prepared for the Manitoba Metis Federation regarding the East Side Road Authority P1 Project.
	MFESRA (2011)	The Bloodvein Community All-Season Access Road.
Baseline Studies: ▪ Aquatics	North/South Consultants Inc. (2014)	Field and desktop studies, Risk and effects assessments conducted to assess potential effects of watercourse crossing construction on aquatic habitats and fish, including Species at Risk. See **Chapter 8** (Aquatic Environment) for details.
▪ Wildlife	Joro Consultants (2015a)	Provides a summary of the wildlife field and desktop studies and analysis conducted for the proposed Project, including moose, caribou, furbearers, birds, reptiles, and amphibians. See **Chapter 9** (Terrestrial Environment) for details.
▪ Vegetation and Soils	Szwaluk Environmental Consulting Ltd. *et al.* (2015a)	Characterization and assessment of vegetation and soils for the proposed P4 Project. Mitigation measures are identified. See **Chapter 9**, Terrestrial Environment and **Chapter 7** (Physical Environment) for details.
	Szwaluk Environmental Consulting Ltd. *et al.* (2015b)	Characterization of representative forest and wetland sites sampled along the right-of-way and proposed quarry areas. See **Chapter 9**, Terrestrial Environment and **Chapter 7** (Physical Environment) for details.
Traditional Knowledge, Land Use and Heritage Resource Studies	Northern Lights Heritage Services Inc. (2013a)	A Heritage Resource Impact Assessment (HRIA) was conducted within a 3 km buffer of a former alignment of the proposed all-season road from Poplar River First Nation to approximately 40 km north of Berens River First Nation. See **Chapter 10** (Socio-economic and Cultural Environment) for details.
	Centre for Indigenous Environmental Resources (2015)	Berens River First Nation Traditional Knowledge Study providing Project-specific information used to characterize baseline conditions and to assess potential Project effects on the Berens River community and the environment.
	Centre for Indigenous Environmental Resources and Poplar River First Nation (2015)	Poplar River First Nation Traditional Knowledge Study including workshops and interviews conducted by this First Nation and providing Project-specific information used to characterize baseline conditions and to assess potential Project effects on the Poplar River community and the environment.
	AMEC Foster Wheeler Environment & Infrastructure (2015a)	A HRIA was conducted within a 1 km wide area from the centerline of the proposed all-season road from Poplar River to east of Bull Lake. See **Chapter 10** (Socio-economic and Cultural Environment) for details.

Information Type	Source	Description
	AMEC Foster Wheeler Environment & Infrastructure (2015b)	An HRIA was conducted within a 1 km wide area from the centerline of the proposed all-season road from Bull Lake to Berens River. See **Chapter 10** (Socio-economic and Cultural Environment) for details.
	AMEC Foster Wheeler Environment & Infrastructure (2015c)	An HRIA was conducted for quarry sites.
	SNC Lavalin *et al.* (2011b)	Broad-based Traditional Knowledge studies completed with communities on the east side of Lake Winnipeg as a part of the Large Area Transportation Network Study.
	Manitoba Metis Federation (2011)	Traditional Land Use and Knowledge Study conducted by the Manitoba Metis Federation which included a study area east of Lake Winnipeg from PR 304 north to Poplar River First Nation.
Other Local Information Sources	Northern Lights Heritage Services (2000)	Ecoregion 90: Traditional Land Use and Occupancy Study.
	East Side Planning Initiative (2004)	Promises to Keep… Towards a Broad Area Plan for the East Side of Lake Winnipeg.
	Poplar River First Nation (2011)	Asatiwisipe Aki Management Plan: Poplar River First Nation.
	Davidson-Hunt *et al.* (2012)	Pimachiowin Aki "The Land that Gives Life" Cultural Landscape Atlas.

6.3.1 Other Environmental Assessments

Other environmental assessments have been conducted for all-season road projects on the east side of Lake Winnipeg including:

- Rice River Road Upgrading and Extension (Manitoba Transportation and Government Services 2006);
- Comprehensive Study Report of the proposed New Airport and Road between St. Theresa Point and Wasagamack Island Lake, Manitoba (Public Works and Government Services 2001);
- PR304 to Berens River all-season road, Project 1 (CEA Agency 2011); and
- Bloodvein Community All-Season Access Road (MFESRA 2011).

The environmental effects, mitigation measures and follow-up identified in these reports were considered in the identification, assessment, and mitigation of environmental effects for this proposed Project.

In addition, feedback on reviews of the Berens River all-season road (Project 1) environmental assessment was also considered in the development of the environmental assessment of this Project including:

- Comments in a review report of the PR304 to Berens River all-season road (Project 1) EIA by the Manitoba Metis Federation (Pearse 2011); and
- Regulatory comments on the Project 1 EIA.

Feedback from Manitoba Conservation and Water Stewardship (eastern region) during construction of the PR304 to Berens River all-season road (Project 1) was also considered.

6.3.2 Baseline Studies and Site Visits

Baseline studies including site visits, reconnaissance surveys, and field work were conducted within the Project Footprint and Local and Regional Assessment Areas to provide baseline information on the existing environment to inform the environmental impact assessment of the Project. These baselines studies are listed in **Table 6.1** and include studies on fish and aquatic resources, wildlife, vegetation, and heritage and cultural resources. Aquatic field study methods included fish and mollusc sampling, riparian and instream habitat assessments, and the measurement of water quality parameters. Wildlife study field methods included aerial surveys, collaring, aerial telemetry, the use of trail cameras and Automatic Recording Units (ARUs), and ground-based pedestrian surveys. Baseline information on furbearers was also obtained from ESRA's Trapper Participation Program (**Section 6.3.3**). Vegetation field study methods included field observations and sample plot analysis. Technical reports that summarize the baseline aquatic, wildlife, and vegetation studies are provided in **Chapters 8** and **9**.

6.3.3 Traditional Knowledge, Land Use & Heritage Resource Studies

Table 6.1 lists the Traditional Knowledge, land use, and heritage resources study reports commissioned by ESRA and information from community members with specific Traditional Knowledge of the P4 Project area. Traditional knowledge used in the environmental impact assessment of the proposed Project was collected through interviews at community meetings, workshops, and interviews with knowledgeable members of Berens River and Poplar River First Nations. The heritage resources baseline studies involved mapping workshops in the communities with selected Elders and archaeological field surveys along the proposed alignment.

An additional source of input to Project planning is an on-going Trapper Participation Program developed by ESRA which includes trapper involvement in research and monitoring activities on furbearers on the east side of Lake Winnipeg. The Trapper Participation Program contributed to the acquisition of baseline data and helped to assess the potential effects of construction and operation and maintenance activities of the Project on furbearer distribution and trapline harvest. Program initiatives were developed with the specific intent of incorporating local trapper knowledge in baseline studies and to promote collaboration with the trapping community including wildlife stakeholders such as the Manitoba Trappers Association.

In addition to studies conducted with Aboriginal and local community participants within the P4 Project area, relevant information was obtained from the broader-area Traditional Knowledge studies that overlap, in part, with the P4 Project area. These included:

- Broad-based Traditional Knowledge studies completed with communities on the East side of Lake Winnipeg as a part of the Large Area Transportation Network Study (SNC-Lavalin *et al.*, 2011b); and
- Traditional Land Use and Knowledge Study conducted by the Manitoba Metis Federation in 2010 which included a study area east of Lake Winnipeg from PR 304 north to Poplar River First Nation.

An overview of information from these Traditional Land Use and Knowledge studies is discussed in **Chapter 10** 'Socio-economic and Cultural Environment', as well as referenced in relation to the other environmental impact assessment chapters (i.e., **Chapters 7**, **8**, and **9**). This information has been used in the environmental impact assessment to assist in the characterization of baseline conditions and to assess effects of the Project on Aboriginal groups, local communities, and the environment.

6.3.4 Aboriginal and Public Engagement

An extensive Aboriginal and Public Engagement Program (APEP) was developed by ESRA to provide meaningful opportunities to engage in dialogue and exchange information about this Project, and other proposed East Side of Lake Winnipeg transportation initiatives, with potentially interested and affected communities. Through ESRA's Aboriginal and Public Engagement Program, which is detailed in **Chapter 4**, local communities provided substantial input to the Project development process by providing feedback on proposed locations of Project components, proposed mitigation measures to avoid or reduce potentially adverse Project effects, and providing local information and knowledge of traditional resource use and sensitive areas. ESRA's Aboriginal and Public Engagement Program is continuing the dialogue that began in 2000 between the Manitoba Government, East Side of Lake Winnipeg communities, and other stakeholders (SNC-Lavalin *et al.* 2010b; 2011b).

6.3.5 Other Local Area Information Sources

Information from studies listed above has been supplemented with additional information contained in other studies conducted on lands east of Lake Winnipeg to the Ontario border that overlap with the P4 Project area. Other information sources and studies undertaken in the local area are summarized in **Table 6.1** and described in more detail in the Socio-economic and Cultural Environment **Chapter 10.**

6.4 Environmental Impact Assessment Methods

Once the scope of the EIA is determined, as explained in **Sections 6.1** and **6.2**, the assessment of potential environmental effects is based on a stepwise approach with the following five steps:

1. Selection of Valued Components (VCs) potentially affected by the Project on which to focus the EIA;
2. Identification of the potential environmental effects of the Project prior to the implementation of mitigation measures;
3. Initial screening of potential environmental effects to evaluate the level of effect prior to the implementation of mitigation measures;
4. Identification of appropriate mitigation measures and their application to address potential adverse effects; and
5. Prediction of residual adverse environmental effects remaining after mitigation and determining the significance of those residual adverse effects.

These steps are described in **Sections 6.4.1** to **6.4.5**.

6.4.1 Selection of Valued Components

Environmental assessment in Manitoba and Canada uses a 'values-based framework' to achieve a comprehensive yet focused and understandable assessment of potential Project effects, while making the most effective and efficient use of resources. 'Valued Components[2]' (VCs) are the foundation for the assessment of Project effects and refer to environmental biophysical or human features[3] that may be impacted by the Project as related to the role of the VC in the ecosystem and the value people place on it.

As presented in the CEA Agency Guidelines for the P4 Project (CEA Agency 2015a) and the Environmental Assessment Scoping Document (MFESRA 2014) provided to Manitoba Conservation and Water Stewardship, the assessment will evaluate potential Project effects on identified VCs. CEA Agency Guidelines for this Project indicate that the VCs to be considered by this EIA must include, but not necessarily be limited to:

- Fish and fish habitat including locally-valued fish species;
- Migratory birds;
- Species at Risk; and
- Aboriginal peoples.

Selection of Valued Components for focused assessment in this EIA included input from local communities.

Additional VCs are also considered in accordance with the Scoping Document for this Project submitted to the province (MFESRA 2014).

Potential effects on the transboundary environment (i.e., lands outside of Manitoba) have been considered within the assessment of Project effects on VCs and within the assessment of cumulative effects (**Chapter 13**).

The selection of VCs assessed in the EIA follows requirements for the assessment of environmental components indicated in Section 5 of the *Canadian Environmental Assessment Act*, 2012. The environmental (i.e., biophysical and human) components of the Project area were subject to an initial screening process using the following criteria to identify a preliminary list of VCs:

- **Potential for the environmental component to occur within the Project footprint or potential for significant interaction with Project activities**
  Based on the site-specific surveys completed or on existing information for the study area, a determination was made regarding the potential for a specific environmental component to occur within the Project footprint (road right-of-way, borrow areas, temporary construction components) or to interact, directly or indirectly, with Project activities.

[2] Valued Component is defined by the Canadian Environmental Assessment Agency as "*the environmental element of an ecosystem that is identified as having scientific, social, cultural, economic, historical, archaeological, or aesthetic importance*" (CEA Agency 2014a).
[3] For the purpose of this environmental impact assessment, 'human features' include archaeological and cultural sites and travel routes.

- **Identification of the environmental component by First Nations or other Aboriginal communities**
  Information regarding environmental components having specific economic, societal and/or cultural significance was primarily obtained through the Aboriginal and Public Engagement Program (**Chapter 4**) and Traditional Knowledge Study (**Section 6.3**) specifically for communities potentially affected by this Project. Environmental components identified as important by the Manitoba Metis Federation were also considered (e.g., Pearse 2011).
- **Identification of the environmental component by government regulators**
  Federal and provincial regulators were consulted during the planning and design stage of the Project. Regulators focused on environmental components with perceived ecological importance and those covered under provincial and/or federal legislation (e.g., the federal *Fisheries Act*; federal *Species at Risk Act*; *The Endangered Species and Ecosystems Act* of Manitoba). CEA Agency Guidelines issued for the preparation for the P4 Project EIA listed environmental categories that must be assessed (CEA Agency 2015a).
- **Identification of the environmental component by other stakeholders**
  The input of other stakeholders was obtained through the Aboriginal and Public Engagement Program which included Project-specific local First Nation community meetings, meetings in Winnipeg with Winnipeg-based community members and the public, and discussions with representatives of the Manitoba Model Forest, Manitoba Wildlife Federation, the Eastern Region Caribou Advisory Committee, the Manitoba Trappers Association, and the Lac du Bonnet Wildlife Association (**Chapter 4**).

Species at Risk have special protection status by virtue of the federal *Species at Risk Act* and Manitoba's *The Endangered Species and Ecosystems Act*. Therefore, Species at Risk occurring in the Project area are considered as potential VCs for assessment within the EIA. For the purpose of this EIA, Species at Risk are defined as federal species designated by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) for listing on Schedule 1 of the federal *Species at Risk Act*, including species in the risk categories of extirpated, endangered, threatened, and special concern (CEA Agency 2015a); provincial species listed as Endangered or Threatened under the Manitoba *Endangered Species and Ecosystems Act* (*MBESEA*); and species listed as very rare (provincial status of S1) or rare (provincial status of S2) throughout their range as listed by the Manitoba Conservation Data Centre (Manitoba Conservation Data Centre 2015).

Species at Risk potentially occurring in the Project area are considered as VCs within the EIA.

Following the initial screening process of environmental components, a list of preliminary VCs was identified and presented at in-community meetings (**Chapter 4**) to verify the appropriateness of the proposed VCs and to revise the VC list to be assessed, as needed, based on input from community members. Based on the above screening criteria, final VCs for focused environmental impact assessment were selected and are evaluated in the 'Valued Components' sections of the following Chapters:

- Physical Environment, **Chapter 7**, **Section 7.2**;

- Aquatic Environment, **Chapter 8**, **Section 8.2**;
- Terrestrial Environment, **Chapter 9**, **Section 9.2**; and
- Socio-Economic and Cultural Environment, **Chapter 10**, **Section 10.2**.

The final list of VCs for focused environmental impact assessment, and the rationale for their selection, is provided in **Appendix 6-1**.

Appendix 15-1 in **Chapter 15** (Summary and Conclusion) also provides a check-list of which of the selected VCs can be considered 'environmental effects' as defined in section 5 of the *Canadian Environmental Assessment Act*, 2012 and specifies which subsection of this *Act* is relevant to the selected VCs.

6.4.2 Identification of Potential Environmental Effects of the Project Prior to Mitigation

Potential effects of the Project prior to the implementation of mitigation measures were identified using the current environmental conditions as the baseline from which to assess the potential effects of the Project (i.e., the existing environmental conditions prior to the development of the Project). As described above, a variety of information sources were used to describe the baseline (i.e., pre-Project) existing environmental condition of the Project area such that changes to the environment due to the phases of the Project can be assessed. Factors considered in determining potential environmental effects include, but are not necessarily limited to, those key factors summarized in **Table 6.2**.

Table 6.2: Factors Considered in Determining Potential Environmental Effects

Changes in the Environment	Effects on Aboriginal Peoples Resulting from Environmental Changes
▪ Effects on the atmospheric environment (i.e., air quality, ambient noise levels, night-time light levels); ▪ Changes to groundwater; ▪ Changes to surface water; ▪ Identification and assessment of the potential for serious harm to fish including potential habitat loss; ▪ Changes to the terrestrial landscape, including changes to wildlife and migratory bird habitat and critical habitat for Species at Risk where critical habitat has been defined in Recovery Strategies or Action Plans; ▪ Direct and indirect effects on wildlife (including migratory birds) including potential for disturbance and mortality; and ▪ Changes in the transboundary environment (i.e., federal lands or lands outside of Manitoba).	▪ Changes in habitat for species important to Aboriginal current use of resources; ▪ Changes in current uses of land and resources for traditional purposes; ▪ Effects to human health related to changes in the environment such as changes to air quality, water quality and quantity, or availability of country foods; ▪ Changes to socio-economic conditions due to changes in the environment (e.g., use of navigable waters, hunting, trapping , fishing and gathering activities, recreational activities); and ▪ Changes to historical, archaeological, or cultural resources.

Source: Summarized from CEA Agency (2015a)

6.4.3 Initial Screening of Potential Environmental Effects

The initial screening step was used to evaluate the level of potential environmental effect on a VC prior to mitigation and to determine if further analysis is required. A level of effect was assigned to the assessment criteria presented in **Table 6.3**. As part of the initial screening step, an overall potential environmental effect was evaluated as low, moderate, or high based on its probability to occur.

6.4.4 Mitigation

After potential adverse effects of the Project are identified, mitigation measures that are technically and economically feasible are applied to avoid or minimize potential adverse effects. ESRA's general environmental protection policies, procedures, and plans are described in **Chapter 5**. Specific measures that will be applied to mitigate potential Project-specific adverse effects on VCs relating to the physical, aquatic, terrestrial, socio-economic, and cultural environments are presented in **Chapters 7** through **10**, respectively. In some cases, even after the application of mitigation measures, some potential adverse effects may remain. These remaining effects are referred to as residual effects. **Section 6.4.5** below discusses how the significance of the residual effects of the Project is determined.

6.4.5 Determining Significance of Residual Effects

Residual effects are the environmental effects remaining following the implementation of technically and economically feasible mitigation measures. Determining the significance of residual environmental effects of the Project on VCs involves the consideration and evaluation of specific impact assessment criteria based on the degree (i.e., 'level') of potential Project effects. The evaluation considers the ecological context of potential Project effects in terms of the influence of the affected VC on the ecosystem and in turn, how the potentially affected ecosystem directly affects socio-economic interests (including Aboriginal peoples and treaty rights). Residual environmental effects of the Project on VCs were assessed against a series of criteria to assist in determining their significance. Criteria used to determine the significance of residual effects were:

- Direction of change (i.e., type of effect) either positive or negative;
- Duration of time that the effect occurs;
- Magnitude or intensity of the effect;
- Spatial extent of the effect;
- Frequency of the effect (i.e., how often the effect occurs);
- Reversibility of the effect (i.e., if the effect can be reversed); and
- Ecological context (degree of adverse influence on the ecosystem).

Each of these criteria were qualified by applying a three-level ranking system to distinguish between: short-term and long-term effects; less intense and more intense effects; localized and widespread effects; infrequent and frequently occurring effects; effects that are reversible and effects that are permanent; and effects that have little effect on the ecosystem and effects that disrupt ecological functions and relationships. Definitions for the three-level ranking of each assessment criterion are

provided in **Table 6.3**. These definitions were developed based on the Canadian Environmental Assessment Agency Comprehensive Study Report for ESRA's all-season road Project 1 and other recent environmental impact statements.

For the EIA, ESRA defines an adverse residual effect associated with a selected VC as significant if it meets both of the following criteria:

1) *A Level III rating result for ecological context; and*
2) *A Level II or III rating result for the effect attributes of duration, magnitude, extent, and frequency.*

In cases where a significant adverse residual effect occurred, the following descriptors of the effect are provided:

- Level of confidence in the data and methods used in the framework of the environmental analysis of the significance determination; and
- The likelihood of the significant effect occurring, which refers to the probability of occurrence (i.e., the risk of an event occurring) and is described as very unlikely, unlikely, likely, or very likely.

Potential residual effects of the proposed Project on VCs identified in **Section 6.4.2** are assessed in **Chapters 7** through **10** of this environmental impact statement. Within those Chapters, assumptions and limits to the impact assessment criteria mentioned above are explained in context with the residual impact assessment determinations for each VC as required.

Table 6.3: Description of Assessment Criteria and Levels of Potential Environmental Effects

Assessment Criteria	Range of Criteria	Level of Effect and Definition
Direction of Change (type of effect)	Negative	Net loss (adverse or undesirable change) to the environmental component.
	Positive	Net benefit (or desirable change) to the environmental component.
Duration (period of time the effect occurs)	Short-Term	**Level I** - The potential effect results from short-term events or activities such as the time required to complete a discrete component (e.g., culvert installation), seasonal or annual construction, maintenance, or rehabilitation activities (i.e., a timeframe of several months).
	Medium-Term	**Level II** - The potential effect is likely to persist until the completion of construction and rehabilitation activities (i.e., a timeframe of 8 to 10 years).
	Long-Term	**Level III** -The potential effect is likely to persist beyond the completion of construction and rehabilitation activities into the operations and maintenance phase of the Project (i.e., a timeframe of greater than 10 years).
Magnitude (degree or intensity of the change)	Negligible or Low	**Level I** - A change that is not likely to have a definable, detectable or measurable potential effect above baseline (i.e., potential effect is within a normal range of variation) or is below established thresholds of acceptable change (e.g., water quality guideline).
	Moderate	**Level II** – A change that will have a potential measurable effect that can be detected with a well-designed monitoring program; but is only marginally beyond standards/guidelines or established thresholds of acceptable change.
	High	**Level III** – A change that will have potential effects that are easily observed, measured, and described (i.e., readily detectable without a monitoring program) and are well beyond guidelines or established thresholds of acceptable change.
Extent (Spatial Boundary)[4]	Project Footprint	**Level I** - The physical space or directly affected area on which Project components or activities are located and/or immediately adjacent area which is within the defined limits of the P4 All-season road right-of-way (i.e., 100 m) and permanent and temporary facilities (e.g., temporary access routes and quarries) within which potential effects are likely to be measurable.
	Local Assessment Area	**Level II** - Area within which potential Project effects are measurable and extending beyond the Project Footprint to, but not beyond, the Local Assessment Area (**Figure 6-1**).
	Regional Assessment Area	**Level III** - Area beyond the Local Assessment Area within which most potential indirect and cumulative effects would occur.

[4] **Figures 6-1** and **6-2** illustrate the general boundaries of the 'Local Assessment Area' and the 'Regional Assessment Area'. Adjustments to these assessment boundaries are indicated in **Chapters 7** through **10** as necessary where more appropriate boundaries are required to assess specific VCs.

Assessment Criteria	Range of Criteria	Level of Effect and Definition
Frequency (how often the effect occurs)	Once	**Level I** - The potential effect occurs once over the duration of the disturbance (e.g., initial clearing of the right-of-way).
	Intermittent	**Level II** - The potential effect occurs at sporadic or intermittent intervals during the Project phase in which they occur or over the life of the Project (e.g., blasting at quarries; site-specific construction equipment noise; potential wildlife-vehicle collisions).
	Continuous	**Level III** – The potential effect occurs at regular and frequent intervals during the Project phase in which they occur or over the life of the Project (e.g., construction traffic; operations traffic).
Reversibility (the degree of permanence)	Reversible (short-term)	**Level I** – Potential effect is readily reversible over a relatively short period of time (i.e., ≤ to the Project construction phase of approximately 8 years).
	Reversible (long-term)	**Level II** - Potential effect is potentially reversible but over a long period of time (i.e., many years into the Project operations phase).
	Irreversible	**Level III** - Project-specific potential effects are permanent.
Ecological Context (degree of adverse influence on the ecosystem)	Low	**Level I** – Effect results in minimal disruption of ecological functions[5] and relationships in the area.
	Moderate	**Level II** – Effect results in some disruption of non-critical ecological functions and relationships in the area.
	High	**Level III** – Effect results in disruption of critical ecological functions and relationships in the impacted area.

[5] Ecological functions are processes (such as nutrient cycling or seed dispersal) that are carried out or enabled by an ecosystem and that are necessary for the self-maintenance of that ecosystem (Environment and Climate Change Canada 2016)