Project 6 - All-Season Road

Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation

Summary of

The Environmental Impact Statement

April 2019

Submitted to:

Canadian Environmental Assessment Agency

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TABLE OF CONTENTS

Page

LIST OF TABLES

LIST OF FIGURES

1.0 INTRODUCTION AND ENVIRONMENTAL ASSESSMENT CONTEXT

1.1 Introduction

This document provides a summary of the detailed Environmental Impact Statement (EIS) for the proposed all-season road linking Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation (the 'Project') submitted by Manitoba Infrastructure (MI) to the Canadian Environmental Assessment Agency (Agency) and Manitoba Sustainable Development (MSD). The document provides an overview of the proposed Project components and activities, the extensive engagement activities completed to-date, potential environmental effects of the Project and proposed mitigation measures. MI's conclusions on predicted residual environmental effects and the significance of those effects are presented. This document has been prepared in both of Canada's official languages.

The proposed Project is the construction and maintenance of a 141 km two-lane gravel all-season road to be located on provincial Crown land north-east of Lake Winnipeg linking Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation (**Figure 1**). The proposed Project consists of three road sections that will begin at the Reserve boundaries and generally head west and southwest 71.9 km from Manto Sipi Cree Nation, southeast 39.5 km from Bunibonibee Cree Nation and northwest 29.6 km from God's Lake First Nation where the three sections intersect. The intent of the Project is to provide year-round vehicular access among the communities. Currently all three First Nation communities must depend on restricted seasonal winter road access or other modes of travel (ex: airplane) to access their communities and southern goods and services. Two on-reserve community access roads are required to connect the Project to the communities, one to connect God's Lake First Nation (685 m) and the other to connect Manto Sipi Cree Nation (210 m). These access roads are not a part of the project as they are located on federal lands and beyond provincial jurisdiction. MI can only build on Provincial lands.

The Project is one of a series of all-season roads planned for a regional transportation network on the east side of Lake Winnipeg by MI (**Figure 2**), the proponent of the proposed Project. A key focus of the regional transportation network and this Project is to provide opportunities for east side residents to participate in, and benefit from, the construction of the all-season road network through jobs, training and economic development opportunities. Construction of the proposed all-season road among Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation is expected to generate beneficial economic effects including employment and contract opportunities for east side residents. The decision by the former East Side Road Authority (now absorbed into MI) to initiate the Project prior to the construction of roadways connecting the project to the existing provincial network was made to attempt to develop local construction capacity and to provide economic and social benefits directly to the three First Nation communities and Northern Affairs Community. The area will remain isolated, as other sections of the regional transportation network in the area (Project P2 - PR 373 to Wasagamack and Project P5 - Anderson Junction to Bunibonibee), must first be constructed to connect this Project to the provincial highway

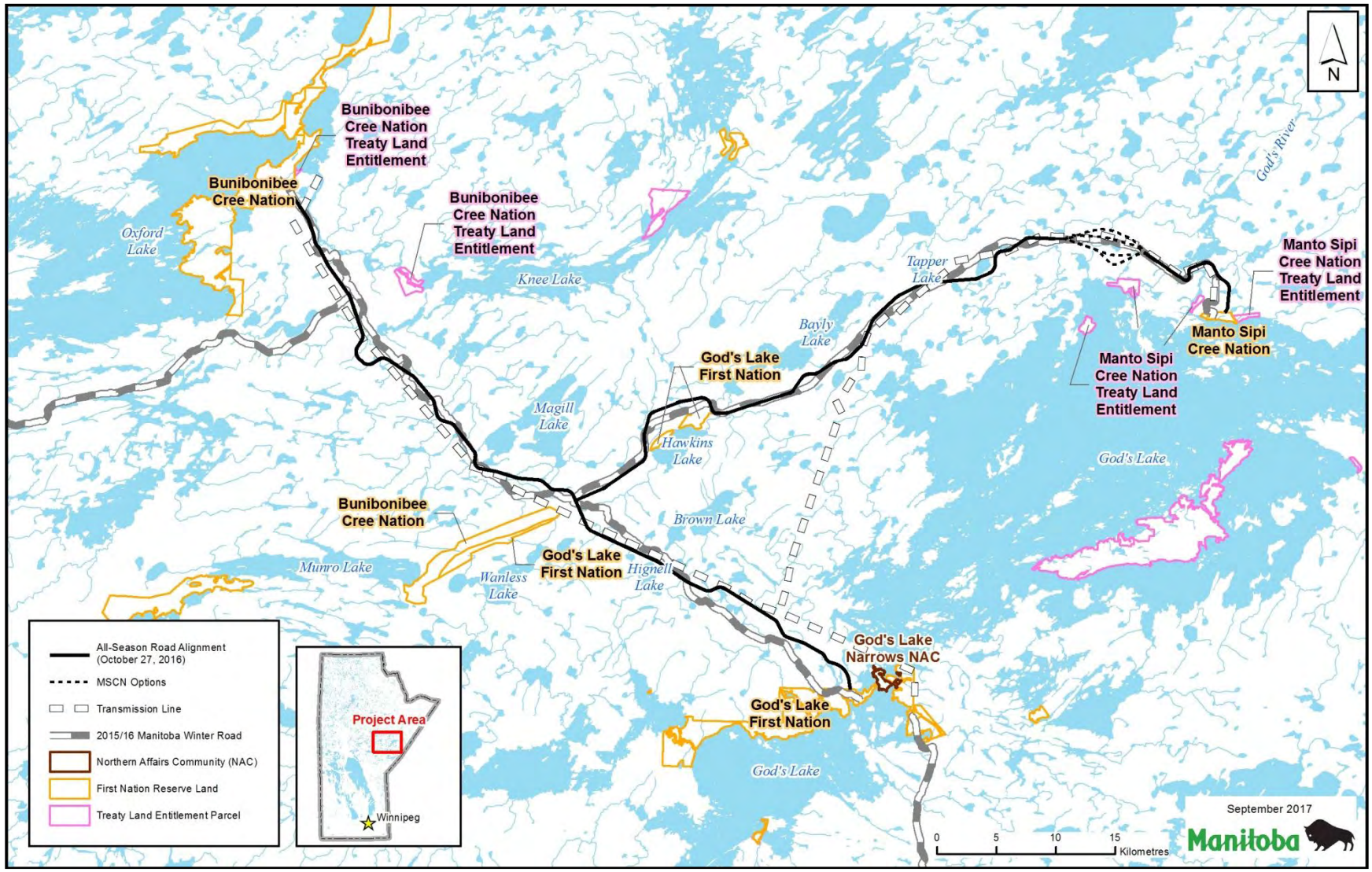

Figure 1: Proposed Project all-season road alignment

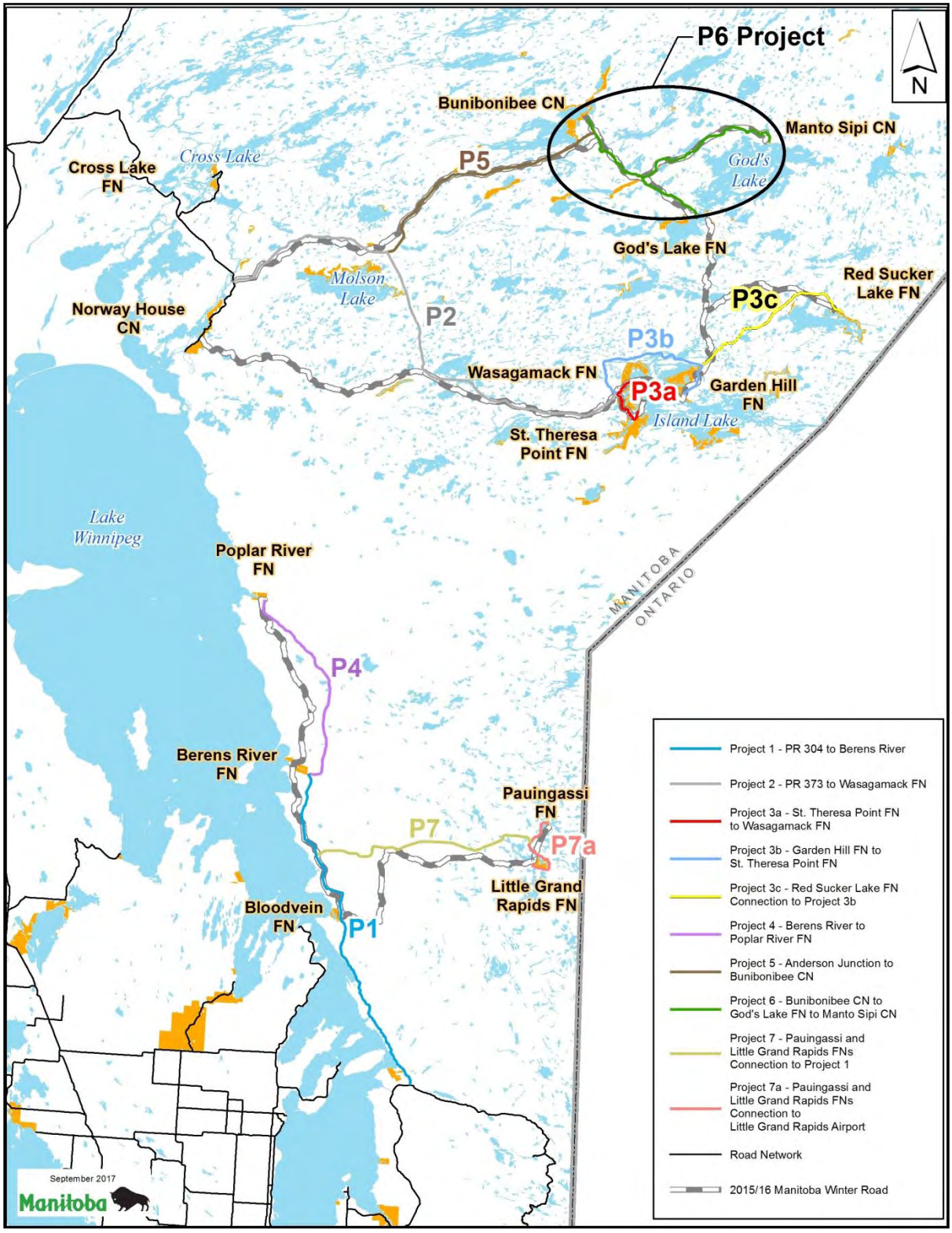

Figure 2: Regional transportation network of planned all-season roads on the east side of Lake Winnipeg in the Large Area Transportation Network Study

system. Planning for projects P2 and P5 have not begun and these projects are not identified within MI's current 10-year plan.

1.2 Environmental Setting of the Project

The proposed Project is located in an undeveloped and largely inaccessible area of the Boreal Shield Ecozone (Smith *et al*. 1998) within the Nelson River drainage system that drains north and east to Hudson Bay. The area is generally characterized by undulating to hummocky and imperfectly drained land with forest patches of black spruce interspersed with bogs and fens and bedrock outcrops.

The Project will cross 25 water bodies that were identified as having habitat to support fish as well as vegetation communities and wildlife habitats. Within these areas, common and less-common aquatic and terrestrial species are known to occur including Species at Risk such as lake sturgeon and boreal woodland caribou. For the purpose of this Environmental Assessment (EA), Species at Risk are defined as:

- federal species listed under the federal *Species at Risk Act* (SARA) or designated by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) for listing on Schedule 1 of SARA, including species in the risk categories of extirpated, endangered, threatened and special concern (Canadian Environmental Assessment Agency 2017a)
- provincial species listed as Endangered or Threatened under *The Endangered Species and Ecosystem Act* (ESEA) (Manitoba)
- 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 (MBCDC)

There are no National Historic Sites, National Parks or other federally protected lands in the vicinity of the proposed Project. The Hayes River, which crosses through the area, was designated as a Heritage River under the Canadian Heritage Rivers System in 2006. The proposed Project does not cross the Hayes River. There are no designated protected areas or other lands protected under the Manitoba Protected Areas Initiative (PAI) in the region. The Knee Lake Area of Special Interest (ASI), which is not yet protected under the PAI, is in the Local Assessment Area (LAA) and surrounding region.

Access to the area is presently restricted to local travel on foot, by boat and snow machine or by air. Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation are currently serviced by winter roads extending from Provincial Trunk Highway (PTH) 6 and Provincial Road (PR) 373, the former which provides all-weather access to the cities of Thompson and Winnipeg. Once completed, the proposed Project will replace the existing winter road segment linking these communities.

Land use in the area of the proposed Project consists mainly of traditional activities by community members of Manto Sipi Cree Nation, Bunibonibee Cree Nation, God's Lake First Nation and God's Lake Narrows Northern Affairs Community including hunting, trapping, fishing, camping, recreation activities, sacred/ceremonial use and food and medicine gathering. There are no known residences or cabins in immediate proximity to the Project. There are no industrial uses and few commercial uses of the land

along the proposed all-season road alignment or in the traditional land use areas in the vicinity of the alignment. While there are no mineral leases, patent mining claims, potash withdrawals, private quarry permits or quarry and surface leases, there are various mines, mining claims, quarry withdrawals and casual quarry permits (annually-issued) within the Regional Assessment Area (RAA). Economic activity includes fishing, trapping and licensed hunting, the latter including caribou, moose, black bear and game birds. There are two Registered Trapline Sections (Oxford House and Gods Lake) in the LAA and 10 Registered Traplines intersect the proposed all-season road alignment. Power to the communities is provided by a 138 kilovolt (kV) transmission line.

The nearest federal lands to the proposed Project are Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation Reserve Lands located at the north-east, north-west and south-east termini of the proposed all-season road, respectively. All three First Nation communities have expressed their support for the proposed Project through community agreements with the former East Side Road Authority and Band Council Resolutions. God's Lake Narrows Northern Affairs Community is located adjacent to God's Lake First Nation, with the two communities connected via an existing all-season road. There are no other Indigenous or other communities located on or near the proposed alignment. Several Treaty Land Entitlement (TLE) areas are present in the vicinity of the Project (**Figure 1**).

Project development is expected to generate economic benefits for Manto Sipi Cree Nation, Bunibonibee Cree Nation, God's Lake First Nation and God's Lake Narrows Northern Affairs Community including employment and contract opportunities for community members, as well as direct and indirect local business opportunities (ex: accommodations, purchase of food, guiding services). Regional hauling companies and suppliers of construction materials, goods and services and other provisions are also expected to benefit from the construction and operation phases of the Project. With the completion of the Project, the communities are expected to benefit from the more cost-efficient and reliable all-season road mode of transportation for people, goods and services among the communities.

1.3 Regulatory Context

The construction and operation of an all-season public highway that requires a total of 50 km or more of new ROW is considered a Designated Project under the *Canadian Environmental Assessment Act* (CEAA), 2012. The proposed Project is, therefore considered a Designated Project that requires a federal EA under the Act. Provincially, the proposed Project is considered a 'Class 2' development (ex: a two lane road at a new location with associated facilities and borrow pits) under the *Classes of Development Regulation (164/88)* of *The Environment Act* (Manitoba) and requires a provincial EA to obtain the required Environment Act Licence.

An existing on-Reserve access road will connect to the proposed all-season road at the Bunibonibee Cree Nation boundary, whereas on-Reserve access roads will need to be constructed separate to this Project on Manto Sipi Cree Nation and God's Lake First Nation to connect to the all-season road that will terminate

at the Reserve boundaries. The approval for these on-Reserve access roads will be subject to separate approvals by Indigenous Services Canada (ISC) under Section 67 of CEAA, 2012.

The Agency and MSD are the authorities responsible for federal and provincial review of the proposed Project, respectively. Project-specific guidance has been issued by the Agency for the preparation of the EIS. With respect to *The Environment Act* (Manitoba), the scope of the EA has been developed respecting information requirements stipulated in *Licensing Procedures Regulation 163/88* of the Act and as outlined in MI's 'Project 6 - All-Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation Environmental Assessment Scoping Document' submitted to MSD and the response of the Provincial Technical Advisory Committee (TAC) regarding the scoping document[1]. This Project Summary and the detailed EIS are being submitted to MSD and the Agency and it is expected that these submissions will be jointly reviewed by both governments.

In addition to the federal and provincial EA regulations, a variety of other federal and provincial legislation and associated regulations and standards will apply to the Project including legislation related to protection of the environment and human health and safety (ex: the federal *Fisheries Act*, *The Workplace Safety and Health Act* of Manitoba). Necessary federal and provincial approvals (ex: Fisheries Act Authorizations, Casual Quarry Permits) will be secured prior to construction of the proposed Project.

[1] The Scoping Document and TAC comments regarding the scoping document are provided in the MSD Public Registry file 5897.00 accessible at: http://www.gov.mb.ca/sd/eal/registries/5897p6road/index.html

2.0 PROJECT OVERVIEW

The proposed Project is the construction and maintenance of a 141 km all-season road linking Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation. The proposed all-season road will be constructed on provincial Crown land. The purpose of the proposed Project is to link these communities located on the east side of Lake Winnipeg for the sole benefit of the directly affected communities. The source of funding for construction and operation of the proposed Project is the Province of Manitoba.

2.1 Project Phases

The key phases of the proposed Project are:

1. Planning;
2. Design;
3. Construction; and
4. Operations, Maintenance and Decommissioning.

2.1.1 Planning and Design Phases

The Project is currently in the planning phase, which began with the identification of broad road corridors, a possible road alignment within the corridors and selection of the final road alignment. Exploratory clearing was required to support information requirements to enable selection of the road alignment. Baseline environmental studies were completed during this phase and included gathering information that influenced the alignment and the development of the road design. This included heritage resources, fisheries, wildlife, soil and vegetation assessments, geophysical surveys, quarry location identification, Indigenous and public engagement and Traditional Knowledge (TK) studies and workshops. The EA was conducted during this planning phase.

Detailed design is anticipated to begin in 2020 and take approximately 3 years to complete, once all appropriate approvals have been obtained. During the design phase, the functional and detailed construction design will be completed and a Construction Phase Environmental Management Plan (EMP) will be finalized. A separate Operational Phase EMP will be prepared during the construction phase, prior to operation. Bridge and stream crossing locations, quarry and borrow areas, temporary access routes, construction laydown areas and construction camps will also be located, surveyed and flagged. Detailed geotechnical investigations and testing will be conducted along the proposed all-season road right-of-way (ROW), temporary access routes and at quarry sites and borrow areas.

2.1.2 Construction

During the construction phase, equipment, machinery, vehicles, construction materials and supplies including fuel, generators, trailers and other provisions will be transported to the Project and laydown

areas via the existing winter road. The Project will be constructed in segments, beginning at Bunibonibee Cree Nation and extending south and eastwards, to optimize construction scheduling and resource use. Segments will be constructed sequentially so that completion of the construction phase at one segment will initiate pre-construction of the adjacent segment. ROW clearing will be conducted in similar segments, with clearing being completed during the winter months, wherever possible, to facilitate clearing machinery access and to minimize potential adverse environmental effects.

Vegetation will be cleared along the ROW to a width of 60 m and potentially wider on the inside of curves, where required, to increase sightlines of road users. Equipment marshalling areas, laydown areas and construction camps will be prepared within the cleared ROW, where possible. Rock quarries and borrow areas will be cleared and prepared for use. Rock fill and granular materials will be excavated, crushed, sorted and stockpiled. The Project roadway, bridges and culvert crossings will then be constructed. Culverts will be installed as construction progresses along the alignment.

Temporary facilities and work areas during construction including quarry and borrow areas, access routes, laydown areas and construction camps that will not be needed for future maintenance activities will be decommissioned following construction.

2.1.3 Operations, Maintenance and Decommissioning

Following construction, the Project will be owned and operated by the Government of Manitoba. The Government of Manitoba will assume responsibility for road safety, operations and stewardship, once the all-season road is designated as a departmental road (Provincial Road) under *The Highways and Transportation Act*. The estimated 10-year average annual traffic volume for the proposed road is less than 300 vehicles per day.

Maintenance activities for the proposed Project, such as winter snow clearing, routine scheduled grading, topping the road with additional aggregate, managing vegetation and cleaning out culverts, will occur over the life of the road. MI, Northern Airports and Marine Operations currently have maintenance facilities, for the storage of equipment, at the airports in each of the communities. Likewise, MI Remote Road Operations, Winter Road Program currently has a maintenance facility at the God's Lake Airport. If additional equipment is required to be stored in the area, the quarry or construction camp closest to each community could be retained as a maintenance yard. Road maintenance and safety methods used will conform to the most current MI practices and guidelines.

There are no plans to decommission or abandon the Project as it will provide all-season road access among Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation for the foreseeable future (greater than 50 years). Decommissioning of temporary components (ex: laydown areas, construction camps, temporary access routes, quarries and borrow areas not required for on-going road maintenance) will occur as part of the construction phase of the Project. Based on the Agency decision statement for the Project 4 All-Season Road Connecting Berens River and Poplar River First Nation, it is anticipated that sections of the existing winter road not used for the all-season road alignment will be progressively

abandoned during the construction phase. This will be done by blocking access points, restoring disturbed areas and allowing for natural revegetation in these areas.

2.2 Project Components and Activities

The main components of the proposed Project are:

- gravel-surface two-lane all-season road (141 km) on new ROW
- potential major water crossings over the God's River and Magill Creek (**Figure 3**)
- culvert crossings at fish-bearing watercourse crossings
- culverts for conveyance and drainage at non-fish-bearing watercourse crossings
- culverts for drainage equalization outside of watercourse crossings to maintain hydraulic functioning of the local landscape
- temporary water crossings to facilitate permanent crossing construction
- temporary construction access routes
- temporary construction laydown areas
- temporary construction camps
- construction quarry sites and borrow areas
- explosives storage facilities

The dimensions and capacities for these physical works are not available at this time as detailed design has not begun. The total permanent footprint area of the Project, including the all-season road, bridges, culverts and quarries required for on-going maintenance will be approximately 924 hectares (ha, 9.24 km^2) within the cleared ROW. The footprint of cleared areas required for temporary Project components and activities during Project construction such as construction camps, equipment laydown areas, borrow areas and most quarries is estimated to be less than 545 ha (5.45 km^2). In total, the Project will therefore result in an estimated permanent and temporary footprint of approximately 1,469 ha (14.7 km^2). The footprint area of temporary Project components and activities that will be required only during Project construction will be rehabilitated by natural re-vegetation and seeding/planting.

Laydown areas will be located to minimize the amount of clearing required, thereby maximizing road construction efficiency and helping to minimize overall effects on the environment, Project construction costs and schedule. New rock quarries and borrow areas will be developed to provide rock fill, crushed rock and granular materials for construction of the all-season road, as well as bridge abutments, culvert crossings, temporary access routes, construction laydown areas and construction camps. All quarry and borrow areas will be located on provincial Crown land as close to the centerline of the proposed road alignment as possible, while maintaining a buffer between roadway and borrows. The buffer is anticipated to be 150 m, as was required for previous all-season road projects, and will be confirmed by Environment Act Licence condition. It is expected that quarry and borrow areas will be within 500 m of the road centreline to minimize the need for temporary access route development and minimize haul distance by heavy construction equipment. The estimated area of quarries and borrow areas required during the construction phase is 384 ha (3.84 km^2).

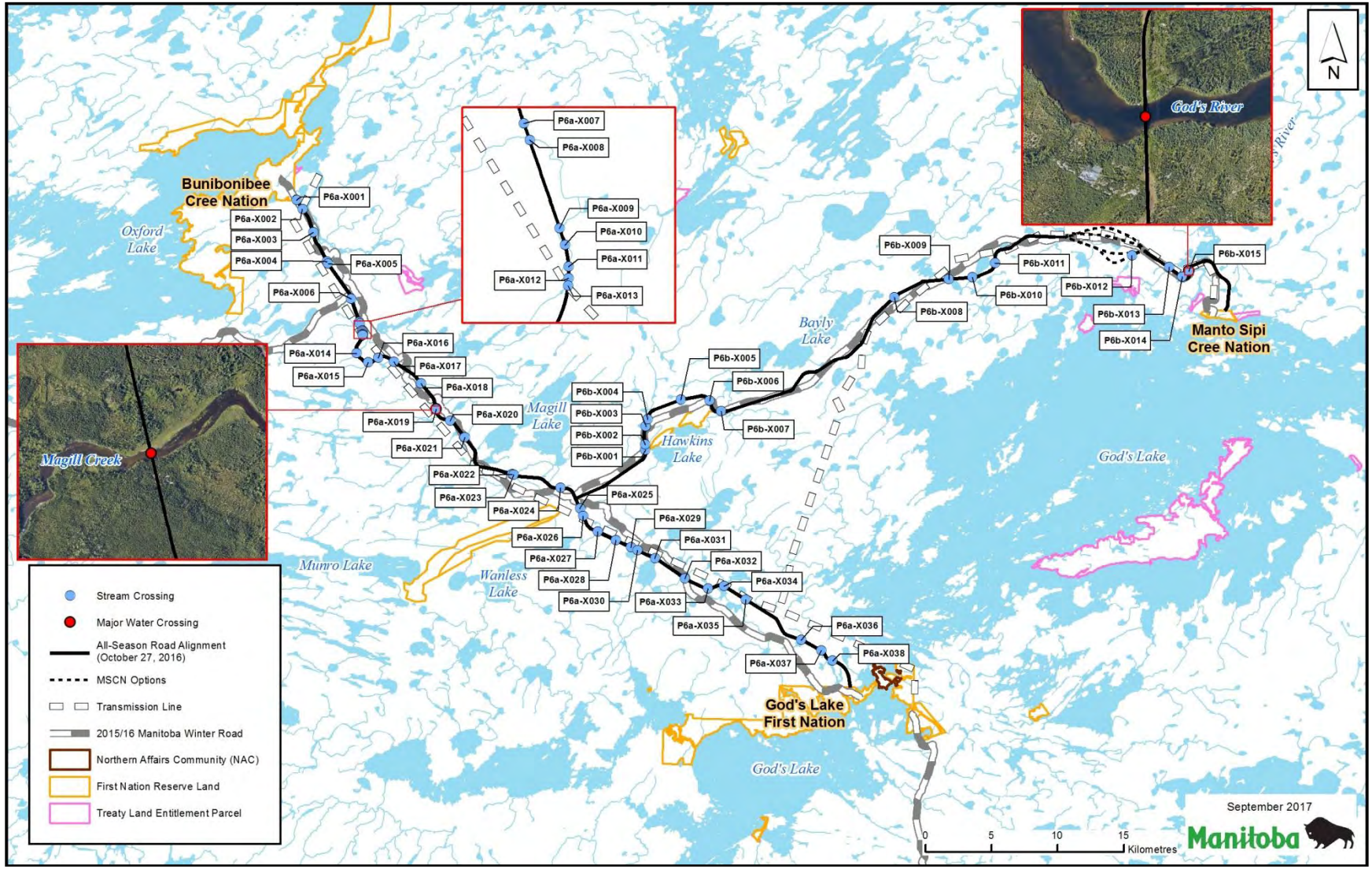

Figure 3: Proposed Project all-season road watercourse crossings

Key Project activities that will be carried out are outlined in **Table 1**.

Table 1: Project Activities Expected During Construction, Maintenance and Operation Project Phases

Project Component	Project Activities	
	Construction	Maintenance and Operation
All-Season Road	▪ Clearing ROW ▪ Salvaging ▪ Windrowing ▪ Burning ▪ Drilling ▪ Blasting ▪ Excavating ▪ Stockpiling ▪ Grading ▪ Contouring ▪ Filling ▪ Controlling erosion ▪ Producing aggregate ▪ Transporting equipment ▪ Operating equipment ▪ Operating machinery ▪ Operating vehicles ▪ Signing ▪ Refueling	▪ Grading ▪ Operating equipment ▪ Operating vehicles ▪ Maintaining ▪ Producing aggregate ▪ Stockpiling ▪ Controlling vegetation ▪ Controlling dust ▪ Clearing snow ▪ Inspecting
Steel Girder Multi-span Bridges	▪ Minor clearing ▪ Staging equipment ▪ Excavating ▪ Filling ▪ Drilling: testing ▪ Blasting ▪ Contouring Coffer damming ▪ Controlling erosion ▪ Operating equipment ▪ Transporting bridge materials Batching concrete ▪ Pouring concrete	▪ Maintaining ▪ Inspecting
Culvert Stream Crossings/ Drainage Equalization Culverts	▪ Coffer damming ▪ Excavating ▪ Filling ▪ Contouring ▪ Controlling erosion ▪ Restoring	▪ Maintaining ▪ Inspecting ▪ Steaming ▪ Cleaning
Temporary Crossings over Watercourses	▪ Minor clearing ▪ Excavating ▪ Filling ▪ Contouring ▪ Coffer damming ▪ Controlling erosion ▪ Crossing stream ▪ Operating equipment ▪ Transporting materials ▪ Dismantling ▪ Recycling materials ▪ Removing abutments ▪ Restoring	▪ Testing for contamination ▪ Inspecting
Temporary Access Routes	▪ Clearing ▪ Grubbing (only for quarries and temporary camps) ▪ Grading ▪ Gravelling ▪ Closing ▪ Restoring ▪ Demobilizing	▪ Inspecting
Temporary Construction Laydown Areas	▪ Clearing ▪ Stockpiling materials ▪ Operating equipment ▪ Storing fuels ▪ Dispensing fuels ▪ Storing explosives ▪ Demobilizing ▪ Restoring	▪ Testing for contamination ▪ Inspecting
Temporary Construction Camps	▪ Clearing ▪ Operating equipment ▪ Operating generator ▪ Housing workers ▪ Storing foods ▪ Sourcing water ▪ Disposing solid wastes ▪ Disposing liquid wastes ▪ Demobilizing ▪ Drilling ▪ Testing soil ▪ Restoring	▪ Testing for contamination ▪ Inspecting
Quarries and Borrow Areas	▪ Clearing ▪ Grubbing ▪ Excavating ▪ Stockpiling soils ▪ Blasting ▪ Crushing rock ▪ Stockpiling rock ▪ Operating equipment ▪ Transporting materials ▪ Closing ▪ Restoring	▪ Testing for contamination ▪ Inspecting For those retained ▪ Operating equipment ▪ Operating vehicles ▪ Maintaining ▪ Producing aggregate ▪ Stockpiling

2.3 Project Workforce

Construction will be carried out under contracts tendered and managed by MI. Presently, the number and scope of the contracts to support the construction of the proposed Project are not fully known. It is anticipated that multiple contractors will be engaged concurrently on the Project. During the period of peak construction on the proposed Project, an estimated maximum workforce of 120 is anticipated. As part of MI's commitment to local residents participating in and benefiting from the Project, MI specifically includes a requirement for a percentage of the construction tenders to be supplied from local sources (ex: equipment, services or employment). The percentage of community involvement is modified for each contract based on discussions with the community to identify and confirm its capacity to deliver equipment, services and or manpower, which is converted to a dollar figure and becomes a percentage of the entire project.

2.4 Project Schedule

Detailed design is anticipated to begin in 2020 (Year 1) and take approximately 3 years to complete, once all appropriate approvals have been obtained. Construction of the proposed Project is estimated to start in 2030 (Year 11) following detailed design and be completed approximately 8 years thereafter (Year 18).

2.5 Environmental Protection Measures

MI's commitment to environmental protection reflects the corporate policies conveyed through the Vision, Mission, Values and Priorities statements. Environmental protection measures are integrated within the development of the Project and describe mitigation specifications and plans that will be implemented throughout the Project design, construction, maintenance and operations phases of the Project. Environmental protection measures used in the proposed Project are derived from MI's corporate policies and environmental and industry standards and best practices and include such measures as design mitigation measures; Environmental Protection Procedures (EP); detailed construction and operational phase environmental management plans; contract specifications; health and safety protocols; and contractor plans such as the emergency response plan. Collectively, these measures are incorporated into the Project's EMP along with MI's commitment to sustainable development.

Design mitigation involves modifying the design of a proposed project to mitigate potential adverse environmental effects prior to completion of the final project design and commencement of construction. At this current Planning Phase for the Project, design mitigation has been accomplished by various means including complying with legislation, adopting national and international design standards and codes, adhering to established design guidelines and best management practices and implementing mitigation measures identified from the EA process.

MI developed an EMP framework (**Appendix 8-1** of the Project 6 – All-Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation Environmental Impact Statement) for

the Project that includes commitments to develop construction phase and operational phase EMPs with input from communities. The Construction Phase Environmental Management Plan will be developed by MI prior to the start of construction and will be submitted to the Approvals Branch of MSD prior to commencing construction. The EMPs describe the management system that will be implemented to ensure compliance with federal and provincial requirements using an adaptive management approach to enable continuous improvement for monitoring, evaluation and adjustment, as required. The EMP provides the framework for the management of environmental components relative to the construction, maintenance and operation of the Project. MI has reviewed best management practices and standard procedures and approved the use subject-specific EPs to provide guidance on environmental protection practices for pre-construction and construction activities. These were previously developed for all-season road projects on the East Side of Lake Winnipeg and document the suite of possible environmental protection and mitigation measures. EPs are supplemented with Environmental Protection Specifications (ES 130s) that will be included in each construction contract.

3.0 ALTERNATIVE MEANS OF CARRYING OUT THE PROJECT

At the outset of the Large Area Transportation Study a number of alternative transportation modes were considered in detail to service the remote communities on the east side of Lake Winnipeg (SNC-Lavalin *et al.* 2010a;b;c;d). These alternative transportation modes represent "alternative means to carry out the Project". The transportation modes considered as an alternative to the all-season road included railway, hovercraft, ferries, airships/dirigibles and improved winter roads. Alternative surface and air transportation modes considered for the Project are summarized in **Table 2**.

Table 2: Alternative Surface and Air Transportation Modes

Transportation Mode	Evaluation Considerations
Railway	▪ Construction cost on a per km basis comparable to that of an all-season road. ▪ Lengthy connections needed to connect to existing railhead/rail line at Wabowden (now decommissioned) and Lac du Bonnet, respectively, duplicates approximately 130 km of existing PR 373 and 110 km of existing Highway 11/PR 304 as well as the P1 all-season road that became operational in 2017. ▪ Flatter gradients required for rail versus road increases cost and may be more difficult to maintain rideable profile over fen and bog complexes. ▪ During construction phase, difficult to offload/reload goods and people at continually advancing rail/winter road interface. ▪ Less freedom to move than with a road system.
Hovercraft	▪ Only suitable over large bodies of open water. ▪ Would likely suffer skirt degradation over fens and bogs. ▪ Damage to the environment over potential multiple routes. ▪ May damage ice surface during freeze up, potentially breaking ice and creating hazards for snowmobilers.
Airships / Dirigibles	▪ Would need to be very large to haul Transportation Association of Canada maximum highway loadings (Boeing SkyHook Heavy Lift Vehicle under development has a maximum payload of 36 tonnes over a distance of 370 km without refuelling). ▪ More sensitive than fixed wing aircraft to inclement weather, potentially a significant factor east of Lake Winnipeg (Boeing SkyHook Heavy Lift Vehicle can only operate in winds up to approximately 45 km/h).
Ferries	▪ May be appropriate for summer transportation across lakes or rivers as an interim lower cost link in an all-season road system. ▪ An ice bridge parallel to the ferry route could be used for winter transportation but has potential to break through ice, with safety and environmental degradation risks and implications.
Improved Winter Roads	▪ Shift existing winter road onto firmer ground along a future all-season road route. ▪ Provide permanent bridges at major water crossings along future all-season road route. ▪ Could be initial phases in development of an all-season road route.

Source: SNC-Lavalin *et al.* 2011a; Manitoba Transportation and Government Services 2005

Generally, alternative modes considered were not deemed appropriate as a permanent solution when assessed against criteria including cost, reliability, environmental effects, safety and movement flexibility (SNC-Lavalin *et al.* 2011a). With regard to the alternative modes of transportation and evaluation considerations listed in **Table 2**, the Large Area Transportation Network Study concluded that the most reliable, safe and equitable improvement to the existing east side of Lake Winnipeg transportation system would be the construction of an all-season road system supplemented during its development with improved winter roads and permanent bridges where appropriate.

In comparison with either the existing system or alternative means such as airships, the rationale for the conclusion of an all-season road network as the best transportation mode and preferred means to carry out the project includes the following.

- Greater long-term reliability for safely moving people and goods during all seasons and most weather conditions.
- Greater freedom of movement for people and goods from all east side communities, individuals and businesses.
- More equitable system for travel and trade, on par with the existing all-season road system serving most communities in the province.

Road route selection criteria included consideration of technical aspects, natural environment, social/cultural environment and capital and maintenance costs.

The proposed Project requires construction of crossings at fish-bearing and non-fish bearing watercourses, and as such, will require the construction of bridges and culverts. Up to two (2) permanent steel girder or concrete bridges are required to provide safe access across the major water crossings at God's River and Magill Creek. The proposed all-season alignment currently crosses God's River at the existing single lane Acrow bridge. MI may opt to replace or upgrade the existing crossing depending on community needs and funding allocations at the time of construction. Proposed bridge locations were also subject to review by aquatic biologists retained to conduct baseline studies and to assess potential effects on the aquatic environment and mitigation measures required, as well as input from First Nations community members regarding proposed bridge locations.

Culvert design alternatives will be considered and appropriate designs will be selected using guidance from the Manitoba Stream Crossing Guidelines (Fisheries and Oceans Canada and Manitoba Natural Resources 1996), Ducks Unlimited Canada Operational Guides and Best Management Practices for wetland road crossings in boreal forests (Louisiana Pacific *et al.* 2014), applicable Department of Fisheries and Oceans Canada guidelines and input from community members of Manto Sipi Cree Nation, Bunibonibee Cree Nation, God's Lake First Nation and God's Lake Narrows Northern Affairs Community. Proposed stream crossing locations were also subject to review by aquatic biologists retained to conduct

baseline studies and to assess potential effects on the aquatic environment and mitigation measures required.

Potential quarry and borrow areas will be selected using a variety of factors including availability and suitability of rock and aggregate materials, degree of road bed preparation required, proximity to the proposed road, proximity to bridge and other construction sites, travel distances for equipment and workers and proximity to known environmentally important or sensitive locations. The selection of final quarry and borrow area locations will consider community input and the goal of minimizing potential adverse effects to environmental, traditional and heritage resources components.

4.0 INDIGENOUS AND PUBLIC ENGAGEMENT

4.1 Background and Purpose

The Indigenous and Public Engagement Program (IPEP) for the Project is considered a fundamental and influential component of the project planning process as it intends to engage multiple parties in all phases of the Project. The primary objective of the IPEP is to provide meaningful opportunities to engage in dialogue and exchange information about the all-season road projects with interested and potentially affected parties[2]. This includes east side communities (ex: local First Nations and Northern Affairs Communities), other Indigenous peoples (Métis) and interested parties such as government agencies, non-government organizations and members of the general public. The traditional territory areas of First Nation communities listed by the CEAA guidelines and the Métis harvesting area relative to the Project area are shown in Figures 4 and 5 respectively.

The information received during interactions with interested and affected parties is integrated into Project design and the EA. MI is committed to working in partnership with the local Indigenous communities, their leadership (Chief and Council) and Elders to forge engagement processes that reflect the priorities of each community.

The approach for Indigenous and public engagement, including the IPEP for the proposed Project, is centred on accommodation through the following.

- Providing participation opportunities for interested and affected parties.
- Addressing relevant biophysical, social and cultural questions and comments so that they can be considered in relation to Valued Components (VCs) and addressed in the effects assessment of the EA and applied in project design, construction and operation phases of the proposed Project.
- Respecting and incorporating community knowledge and TK into the EA and Project processes.
- Conducting communications between MI and interested and affected parties in a culturally sensitive and understandable manner (ex: translation services when needed).

The engagement history of all-season road projects on the east side of Lake Winnipeg stems from a dialogue that began in the 1990s. This history includes a comprehensive engagement program with involvement from Indigenous and local communities, the general public and stakeholders. Early engagement activities by the Province of Manitoba with Indigenous communities on the east side of Lake Winnipeg focused on sustainable development and broad area planning and laid the groundwork for further discussions for the development of an all-season road network on the east side of the lake.

[2] Interested and affected parties – Interested parties are defined as Indigenous and/or non-Indigenous peoples of Manitoba who may be interested in participating or learning about the Project. Affected parties refer to Indigenous and/or non-Indigenous parties who may be directly or indirectly affected by the development of the Project.

In 2008, the East Side Road Authority (ESRA)[3] commissioned a multi-disciplinary planning and engineering study to identify a preferred network of all-season roads connecting communities on the east side of Lake Winnipeg. The study, known as the *Large Area Transportation Network Study*, set out to assess the best route network of all-season roads, the likely scope of social and economic effects and benefits of the road network on local communities, potential environmental and cultural effects and construction and maintenance cost estimates (SNC-Lavalin *et al*. 2011a).

Engagement with Indigenous peoples on the east side of Lake Winnipeg was a key element of the study. Meetings were also held with the Manitoba Metis Federation (MMF) to provide the opportunity for their input into the Large Area Transportation Network Study. Leadership of the communities negotiated and signed agreements with ESRA in preparation for exploratory clearing work and some future pre-construction and construction work related to segments of the all-season road network being planned. The signing of the agreements was consistent with the key objectives of the East Side Transportation Initiative (ESTI), which includes provision for employment opportunities and enhanced opportunities for sustainable economic development. It is also consistent with the early feedback from the communities and the clear interest from the communities for local involvement in the project (Dillon Consulting Limited and H.N. Westdal & Associates 2000; East Side Planning Initiative 2004).

Engagement activities for the proposed Project IPEP were specifically designed to:

- provide information about the proposed Project to engage local First Nations and other potentially interested and affected parties in a dialogue
- gather input on the proposed Project from community leadership, members and other interested and affected parties for consideration early and throughout Project planning and design
- discuss opportunities for economic development and employment related to the Project
- inform community members and other interested parties of the proposed Project and activities

The provision of information and the way in which information is communicated and shared is the foundation for an effective engagement program.

4.2 Methods of Engagement

Methods of communication and involvement used for the IPEP activities for the proposed Project included:

- invitation and notification letters (sent via mail, e-mail and phone calls)
- in-person meetings with targeted audiences (ex: Indigenous and local leadership, Elders, governmental agencies, stakeholders)
- in-community meetings/open houses
- public open houses

[3] ESRA has been dissolved, its all-season road projects have been given to MI to manage.

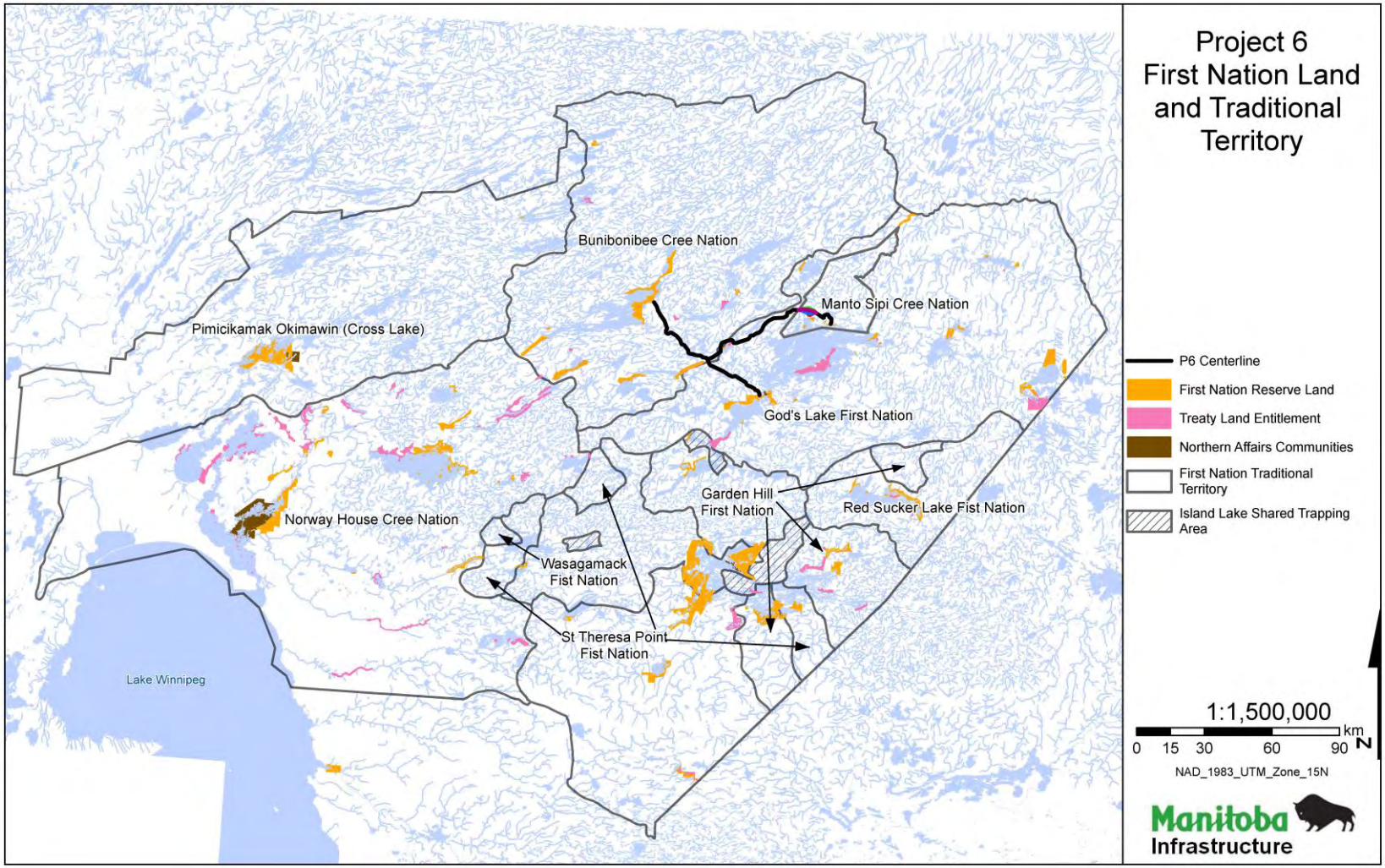

Figure 4: First Nation Reserve Land, Treaty Land Entitlements and First Nation Traditional Territories in proximity to Project 6

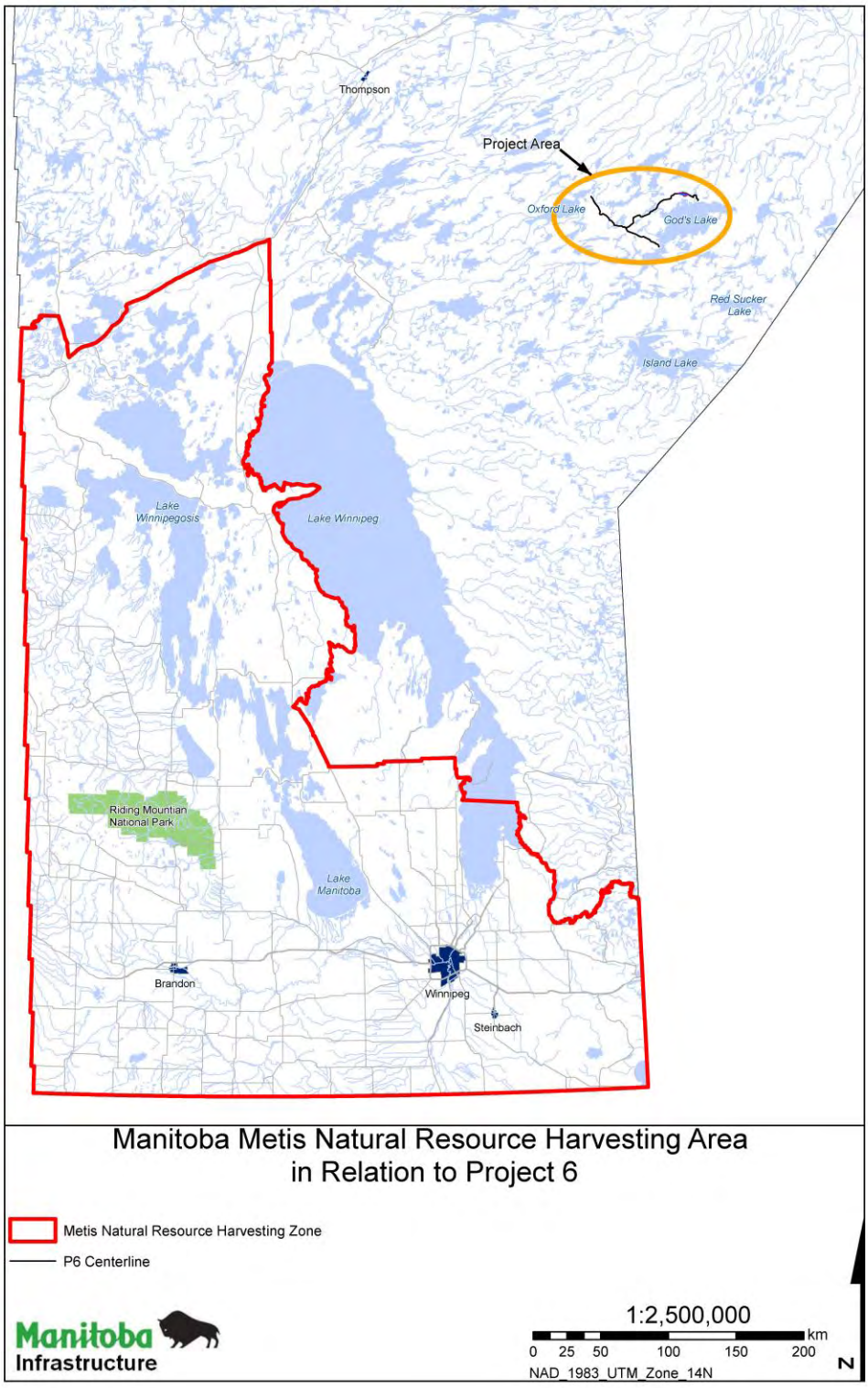

Figure 5: Recognized Métis Harvesting Area in relation to Project 6

- printed material (ex: newsletters, fact sheets, comment sheets, maps and presentation printouts)
- media (ex: public announcements, advertisements, updates in newsletters)
- Traditional Land Use exercises (ex: workshops, interviews)
- use of established communication channels (ex: MI's website, local radio, MI's contact email address, phone and fax numbers)
- community member involvement in environmental baseline study data collection

4.3 Summary of Engagement with Directly Affected Communities

Directly affected Indigenous communities include Manto Sipi Cree Nation, God's Lake First Nation, Bunibonibee Cree Nation, and the God's Lake Narrows Northern Affairs community. Manto Sipi Cree Nation, God's Lake First Nation, and Bunibonibee Cree Nation are members of the Keewatin Tribal Council Inc. and are signatories to the Adhesion to Treaty 5 in 1909.

Six rounds of engagement of Indigenous peoples and Project stakeholders have taken place. The first two rounds (Rounds 1 and 2) focused on the overall plan for the larger east side of Lake Winnipeg area, while the third round (Round 3) was focused on determining potential all-season road alignments. The latter three rounds (Rounds 4, 5 and 6) focused on the proposed Project, delivered through the IPEP.

Rounds 1 to 3 were implemented in partnership with the local communities. The first two rounds of engagement was specific to the all-season road network as a whole and focused on the following exchange of information.

- Round 1 (2009) – Introduction to ESRA and the East Side of Lake Winnipeg Large Area Network Study. Confirmed interest in an all-season road, and obtained input on baseline information and potential route network options.
- Round 2 (2010) – Discussion of the definition and evaluation of preferred route network options based on technical evaluation and input received from Round 1 stakeholder input and TK information.
- Round 3 (2010 to 2016) – Discussion of the preferred road alignment within the corridor confirmed in Round 2; obtained input on baseline information and initial design criteria, discussion and refinement of the road alignment.

Following the initial three engagement rounds, three additional rounds (Rounds 4, 5 and 6) of in-community engagement specific to the Project were implemented. Two open houses focusing on the Project were held in Winnipeg to engage community members living off-Reserve as well as stakeholders and the general public. Activities included in Rounds 4, 5 and 6 included the following.

- Round 4 (December 2016 to September 2017) – Introduced the Project to the local communities and other interested or affected parties in the context of the EA; summarized findings of previous community engagement; provided EA process information; communicated environmental study results; discussed evolution of proposed road alignment based on community feedback; and obtained input on VCs that should be included or highlighted in the process.

- Round 5 (March 2017 to September 2017) – Summarized Round 4 findings; communicated additional environmental study results; reviewed and discussed potential Project effects and mitigation measures; and obtained feedback and input on the EA process and VC selection.
- Round 6 (November 2017 to February 2018) – Summarized Rounds 4 and 5 findings; reviewed preferred road alignment alternative; discussed potential effects and preferred mitigation measures; and obtained feedback on the above with a focus on mitigation measures.

Project engagement activities focused on gathering community and stakeholder input regarding key Project components such as the road alignment, bridges, stream crossings, quarries and borrow areas. Engagement activities included a review of the construction, operations and maintenance activities and mitigation measures proposed to avoid or reduce potential environmental effects of the Project, as well as opportunities for economic development and employment related to the Project for local communities. Coordination of engagement activities were carried out in partnership with the members and leadership.

A summary of comments received by Indigenous Groups and stakeholders during engagement activities during the EA as well as the responses by MI for each comment is provided in **Table 3**.

Table 3: Summary of Key Questions and Comments Received and Response

Topic	Key Questions and Comments Received	Response
Manto Sipi Cree Nation		
Purpose / Benefit	Is the all-season road just to connect the three communities and what happens after Project 6? What are the advantages and disadvantages of building the road? (Round 4/5 and 6)	The purpose of the Project is to provide year round access amongst Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation. This may provide additional services and resources as a result of the increased population base. Disadvantages would be potential environmental effects which will be minimized through Project design and mitigation measures. The timing of a connection to Provincial Road 373 (P2 and P5 projects) will be decided by the Government of Manitoba and is not being planned at this time.
Alignment	What is happening in terms of the four alignment options near the community? A community member wanted to talk with Chief and Council before providing comments on the alignment options. (Round 4/5 and 6)	Manto Sipi Cree Nation initially wanted the road to follow the winter road but, after further investigation, MI confirmed that route was low and wet. MI proposed option 4, which travels near a TLE and a mining claim and the Chief and Council questioned that routing. Two additional options were proposed by MI. An overflight was conducted in June 2017 with Manto Sipi Cree Nation, their consultant and MI to review the four options. MI has provided its recommendation and has requested Manto Sipi Cree Nation confirm its preferred option. MI recommended Option 3 as it appears to be the best option because it will be relatively easy to build on and there is an ample supply of materials along that alignment and close by. If either of the two northern alignment options are selected, an access road will need to be constructed to the south and a quarry developed near the southern alignment options to produce the aggregate material needed to build the road.

Topic	Key Questions and Comments Received	Response
Schedule	What is the Project schedule and when will a connection to Thompson be built. (Round 4/5 and 6)	The approval process is expected to take two years to complete with detailed design expected to begin in 2020. Completing the EA does not guarantee that the Project will be constructed. The Project construction schedule will depend on availability of government funding. Currently MI is focussing on constructing projects which have received environmental approvals.
IPEP	Are only Chief and Council involved in the process? (Round 4/5)	The purpose of the meetings is to inform community members about the Project and EA process to obtain community input.
Decomm-issioning	Will the winter road remain when construction of the all-season road begins? (Round 4/5)	MI will continue to maintain the winter road seasonally when the weather allows it to be operational. When the all-season road is completed and operational, the sections of the winter road no longer required will have the access blocked and allowed to revegetate naturally.
All-Season Road	What type of road will it be (single lane, double lane, divided, paved). (Round 4/5)	The road will be a two lane, undivided, gravel surface, much like unpaved numbered roads in Manitoba.
Employment	Who will construct and maintain the road. What kind of jobs would be created by the Project and what type of education would be required to obtain these jobs? (Round 4/5)	Contracts will be open tenders won by the lowest bidder. Local contractors are likely to have an advantage as their costs will be lower. There will also be a requirement for a percentage of the contract value to be locally sourced (ex: equipment, services or employment). Jobs created by the Project would generally be labour or equipment operation, which does not require a particular level of education but may require specialized training.
Traplines	Desire to maintain access for traplines that the road passes through. (Round 4/5)	TK studies were conducted to help avoid areas of concern such as hunting and trapping areas. Trappers will likely have greater access to their traplines with the road in place. The Project footprint will have little effect on the total area of traplines. MI will work with trappers so that their traps are not damaged by construction. If active traps are discovered, work will stop and the trapper will be notified.
Land Use	Who will have control over access to resources in the area when they are eventually connected to the provincial road network? An Elder indicated that youth do not have enough knowledge of the importance of the land to make these decisions. (Round 6)	*The East Side Traditional Lands Planning and Special Protected Areas Act* enables Indigenous communities to prepare land use plans that state how resources in their traditional territories can be used in the southern East Side Lake Winnipeg area (including Poplar River, Pauingassi, Little Grand Rapids, Bloodvein River First Nations). Over the past ten years, the WNO has worked on various planning initiatives for the east side of Lake Winnipeg including the development of Traditional Area Land Use Plans. Manto Sipi Cree Nation could look into getting the Act amended so it applies to their area and develop a land use plan that would give the community more control over resource use in their traditional territory.
Planning	Why was exploratory clearing stopped where it was? (Round 6)	Exploratory clearing being conducted by Manto Sipi Cree Nation was stopped at the God's Lake First Nation Registered Trapline District boundary as God's Lake First Nation has the first right of refusal to conduct the clearing in this area.

Topic	Key Questions and Comments Received	Response
Economic Opportunity	The community would like to receive benefits from the Project, such as the construction contract being sole sourced to the community. (Round 6)	As part of MI's commitment to local residents participating in and benefiting from the east side Lake Winnipeg all-season road projects, MI has been requiring a minimum percentage of each contract value to go to the local Indigenous community either through jobs, supplies and/or services. The percentage may increase depending on the community capacity. Manto Sipi Cree Nation will have equal opportunity to bid on construction contracts associated with the Project, however, they will not be given preferential treatment such as sole source contracts.
Regulatory Approvals	When ESRA was in place, how much of the approval process was completed, what approvals are required and who will keep the studies and EA so that the Project can proceed once funding is available? (Round 6)	The baseline studies were mainly completed and the EA process had already been started by ESRA. MI has copies of the baseline studies and is in the process of drafting the EIS. Completed chapters have been provided to the communities and a copy of the EIS report will be sent to Chief and Council when MI submits the document to Manitoba and Canada. Parts of the EA may need to be updated prior to beginning construction depending on when it begins. Approvals are needed from MSD under *The Environment Act* and the federal government under the CEAA 2012.
Effects	Will the all-season road affect water and land? (Round 6)	MI will take steps to ensure that there are no significant effects on fish or water quality. Culverts will be installed to ensure that drainage patterns don't change significantly. In terms of land, MI will clear a 60 m wide area which is very small especially relative to the areas shown in the maps. The effects of the Project on water and land were assessed within the EA along with other potential effects and documented in this EIS.
Bunibonibee Cree Nation		
Purpose / Benefit	The community wants an all-season road to PR 373 (Projects 2 and 5) as global warming is limiting the length of time winter roads are open. Project 6 is not seen as a benefit to reduce the price of goods and cost of living without this connection. (Round 4 and 6)	The current focus is obtaining environmental approvals for this Project which has many benefits including better services and improved access among the communities. It is uncertain when a link to PR 373 will be constructed, which will be decided by the Government of Manitoba. MI indicated that it would relay the community's desire to have the link to PR 373 to senior officials in MI.
Economic Opportunity	Economic opportunities are important to the community and Indigenous people. (Round 4)	As part of MI's commitment to local residents participating in and benefiting from the Project, MI specifically includes a requirement for a percentage of the construction tenders to be supplied locally through Manitoba's Indigenous Procurement Initiative (ex: equipment, services, employment).
Schedule	When did the EA start and how long will the EA process take? When will construction of the road begin? The process seems long compared to several	Government legislation and regulations are different now and more stringent in terms of protecting the environment. The approval process is expected to take about two years to complete the baseline studies (started in 2015), engagement process and submit the EIS. Construction could begin in 2020 once the Project has received

Topic	Key Questions and Comments Received	Response
	other past projects (ex: the North Central transmission lines, nickel mine). (Round 4, 5 and 6)	government environmental approvals and detailed design is completed (the start date is now estimated as 2030 depending on government funding). The Project is expected to take approximately 8 years to construct.
Schedule	The community has been meeting with mining companies interested in developing in the area and can have the road built in 1 year. What if the three communities decided to do a joint venture to build the road? (Round 6)	Mining companies or the joint venture would be required to follow the same environmental approval process for any proposed roads, which would take several years. If the mining company or joint venture wants to fund construction of the Project as it is currently proposed, then construction could proceed as soon as approvals are received and design is completed.
Traditional Knowledge	Does MI have a file with all the past engagement and community input provided, in particular TK? (Round 4)	Meeting summaries were prepared for the specific EA meetings, although it is unlikely that MI has files on all the previous engagement. TK from the community, which is confidential, exists in a concise TK Study report listing a summary of comments for each community, although there is not a collection of specific information about individual comments.
IPEP	Will similar meetings be held with God's Lake First Nation and Manto Sipi Cree Nation? Youth should be more involved in the Project (attend the meetings). (Round 4)	Meetings are planned with these other communities, including the Northern Affairs Community. In total, for the EA, MI is planning three meetings with each of the communities connected by the Project. For Round 6, a separate presentation was prepared and a meeting specifically for the community youth was requested.
IPEP	A summary of what the community said during the meeting should be brought to future meetings. (Round 4)	Part of the purpose of Round 5 and Round 6 meetings was to communicate what was heard during the previous engagement. PowerPoint slides and storyboards were prepared summarizing what was heard.
IPEP	Why is MI engaging with the MMF and why do they have a say in whether the Project is approved? (Round 5 and 6)	MI is required to engage with Indigenous groups and the general public who may have an interest in the Project. The Agency considers the MMF an Indigenous group that may be affected by the proposed Project.
IPEP	Copies of the PowerPoint presentation should be provided and posted on the website. (Round 5 and 6)	A copy of the Round 4 and 5 presentations were emailed to the community and paper copies brought to Round 6, with all copies available on the MI website (https://www.gov.mb.ca/mit/hpd/environment/meetings.html).
IPEP	Some community members feel that they are not being listened to and that the engagement being done is just a paper exercise. (Round 6)	Input provided by the communities is incorporated into the alignment selection and included as part of the EA process.
Traplines	Potential for disturbances to traps and trapping activities during clearing activities. The trapper should be identified in each trapline area and	A previous bridge project completed in 2015 disturbed a trapper's line by damaging traps. The trapline holder was compensated with new traps and construction procedures were changed for the Project. Work will be stopped when a trap is encountered, until arrangements can be made with the trapper to move it. MI will continue to obtain

Topic	Key Questions and Comments Received	Response
	discussions held as to what animals are in area of development (prior to construction) and what mitigation measures are proposed. (Round 4 and 6)	community input and work with communities throughout the Project's lifespan.
Traplines	Interested in what data MI has regarding traplines crossed by the road. (Round 5)	MI obtained data on registered traplines crossed by the proposed Project all-season road alignment from MSD.
Wetlands	The importance of wetlands as filters for environmental health was stressed. Where wetlands will be crossed by the road they shouldn't be disturbed or destroyed. (Round 4)	The road alignment tries to stay on ridges to avoid wetlands. Where wetlands are crossed, equalization culverts will be installed and the road will be floated using large rock allowing the water to flow through. A study is currently being conducted to confirm that culverts effectively minimize potential effects.
Wildlife	Potential effect of the Project on wildlife (caribou) migration routes. (Round 4)	It was stated that most wildlife, including caribou will cross the road.
Wildlife VC	Mink, otter, fisher, fox and wolverine were identified by the community as potential wildlife VCs. (Round 4)	Beaver and marten were selected as representative species as their habitat can be modelled to assess effects and the habitat is representative of the other VCs.
Baseline Studies	Interest in how the baseline studies are conducted and whether copies of the reports will be provided to the Chief and Council or made available to community members. (Round 5)	Each baseline study (TK, wildlife, vegetation, heritage, aquatics) follows its own protocol which is summarized in the EIS. Aerial surveys are conducted in the RAA and along the road alignment. Habitats and landscape units are assessed to determine locations for fieldwork. Community members assisted in the baseline studies for the project. Reports were provided to Chief and Council and available to the community.
Fish	Potential effects of the all-season road and culverts on fish and fish spawning. (Round 5 and 6)	Culverts will be galvanized steel to prevent rusting and will be designed and installed to provide fish passage in accordance with the Manitoba Stream Crossing Guidelines. TK studies were conducted to identify and avoid fish spawning areas.
Beaver	Potential effects of beavers on culverts and drainage. (Round 5)	The maintenance program for the all-season road includes removing obstructions such as beaver dams and maintaining drainage.
Alignment	Why is the Project not being built along the existing transmission line? (Round 5)	The routing requirements (terrain) for roads are very different from transmission lines and Manitoba Hydro did not want the road so close to their transmission line.
Alignment	How was the road alignment selected? (Round 6)	As part of the Large Area Network Study in 2010, engagement with communities helped define the broad corridors, which were then refined based on the TK studies, baseline environmental studies and engineering requirements.
Accidents & Malfunctions	Potential effects of a fuel spill on ice roads. (Round 5)	Mitigation measures will be in place to prevent spills, with additional care and precautions taken around water. In the event of a spill, procedures will be in place to ensure the spill is cleaned up.

Topic	Key Questions and Comments Received	Response
Funding	Who is funding the Project? (Round 6)	Currently the Project is being funded by the Province.
Planning	What was the previous tree cutting activities done for and why was it done before the EA was complete? (Round 6)	Exploratory clearing was conducted to facilitate geotechnical studies to advance the Project design and confirm the alignment to be assessed in the EA.
Approach	What is Environmental Assessment? (Round 6)	MI looks at and tries to understand how the Project will interact with and affect the environment (fish, wildlife, vegetation, etc.) and social conditions and what mitigation measures are needed to minimize effects.
Quarries	Why have gravel ridges been claimed by ESRA and will the Province accommodate First Nations crushing, by removing claims on gravel materials so the community benefits from road construction? (Round 6)	When corridors for the all-season road were identified, ESRA took out All-Quarry Rights Withdrawal along the ROW to prevent other projects from using it. The rock within the ROW will be used to build the road where possible.
Regulatory Approvals	Does the Department of Fisheries and Oceans have the power to stop this Project if they do not provide approval? (Round 6)	Approval from the Department of Fisheries and Oceans will be required for major water crossings and likely for culverts crossing smaller fish-bearing water bodies.
Law Enforcement	How will bringing drugs and alcohol to the community, illegal hunting, speeding, collisions with animals and drivers polluting the environment be prevented? (Round 6)	Most of these topics are law enforcement items to be discussed between Chief and Council, the RCMP and MSD, with the exception that MI's role is to design and build the road in a manner that minimizes effect on the environment, such as providing site lines to reduce vehicle collisions with animals, which has been assessed in the EA.
Climate Change	With global warming, there is a shorter time that winter roads can be used. Is climate change a part of the assessment? What time in the future will winter roads no longer be an option? (Round 6)	Climate change has been considered. The proposed Project can be viewed as a mitigation response to the effects of climate change on the transportation needs of the local communities.
Construction	How do you build a road in muskeg? (Round 6)	A geotextile fabric is placed on the muskeg followed by rock to form the road base. These will sink partially into the muskeg until a point where it is supported (floated) and then the road is built on this base.
Construction	What will happen to the cord wood from clearing? (Round 6)	Merchantable wood (that could be used as firewood or lumber) will be made available for community use.
Mitigation	What does the mitigation "Restricting hunting in construction contract areas" mean? (Round 6)	Hunting will not be allowed in active construction areas and construction workers will not be allowed to have guns in construction camps, which is also a measure for safety.

Topic	Key Questions and Comments Received	Response
God's Lake First Nation		
Alignment	When and why was the alignment between God's Lake and the intersection changed from the February 2016 alignment. (Round 4)	The original alignment was based on Lidar and trying to find high ground. Realignments occurred after that based on community input. The February 2016 alignment was then revised in June 2016 after a fly-over because of archaeological and engineering (wet terrain) concerns (labelled October 2016).
Alignment	Will the June 2016 alignment revisions require additional clearing contracts and baseline studies and will this make the EA process longer? (Round 4)	There may be a couple of clearing contracts to permit future geotechnical work. The October 2016 alignment was relocated to higher ground with no additional water crossings and the baseline studies included the area of the realigned route so additional studies are not required and therefore the EA process schedule will not be affected.
Alignment	What will happen with areas that were cleared for road exploration that have been realigned? (Round 4)	These areas, similar to some temporary access routes, were not grubbed when cleared so the vegetation will re-establish from roots and seeds that remain in the soil.
Alignment	An Elder noted a small portion of the proposed alignment which crosses through his Trapline. He was interested in how it may affect the Trapline and whether the alignment could be revised. (Round 5)	MI has discussed the request with Chief and Council and is awaiting their approval to proceed with the alignment revision.
Alignment	The map shows the alignment close to God's Lake, why not move the road away from the lake? (Round 6)	The alignment was determined using input from community, environmental and technical considerations and tried to find the best place to locate the road.
Economic Opportunity	Can MI endorse First Nation communities getting construction contracts? (Round 4)	MI cannot endorse that from a project perspective, but the communities can make a request to Manitoba. As part of MI's commitment to local residents participating in and benefiting from the Project, MI specifically includes a requirement for a percentage of the construction tenders to be supplied from local sources (ex: equipment, services, employment).
IPEP	Youth should be more involved in the Project and specifically invited to attend the meetings. (Round 4 and 5)	For Round 6, a separate presentation was prepared and a meeting specifically for the community youth was requested.
Quarries	The location of quarries and borrow areas needs to be discussed with Chief and Council. What types of materials will be used and will blasting be required? (Round 4)	Quarries and borrow areas would be determined after geotechnical studies (and geochemical assessment). MI will meet with the communities to identify areas located outside of the ROW. Materials will generally include clay, granular and rock, with blasting likely required for rock.

Topic	Key Questions and Comments Received	Response
Culverts	Potential effects of culverts on water flows and levels, in particular overtopping the road in spring floods and heavy rains. (Round 4)	Surface water and groundwater conditions are considered for the design of culverts required for the Project.
VC	Species commonly hunted include geese, moose and caribou. (Round 4)	These species have been identified as VCs that were assessed within the EA and documented in this EIS.
Indigenous Peoples	Potential effects of the Project on the community, in particular related to drugs and alcohol and development of local resources without an economic benefit to the community (ex: American fishing camps). (Round 5)	The effects of the Project on Indigenous Peoples were assessed within the EA and documented in this EIS.
Wildlife	Potential effects of the Project on wildlife. Some indicated the moose population is declining potentially because of clearing. Others indicated that the road won't affect animals and that they would return to the area once construction is completed. (Round 5)	The effects of the Project on moose and other wildlife related to clearing were assessed within the EA along with other potential effects and documented in this EIS.
Schedule	When will construction of the Project start? (Round 6)	MI anticipates it will receive approvals in 2019, after which detailed design is required before construction can begin. As there has been a reduction in the budget available for the east side roads, the Project construction is anticipated to start in 2030. However, if additional funding (ex: federal government funding) becomes available, the Project could start sooner.
Maintenance	Culverts tend to get plugged so who will be maintaining the road after construction and who will be funding maintenance. (Round 6)	Maintenance will be solely funded by MI unless other contributions are received. Maintenance will include culvert clean outs to prevent upstream flooding and culvert washouts. Culverts will also be designed to accommodate higher flows.
Fuel	Will there be a central fuelling location during construction? (Round 6)	Fuel will be stored at the construction laydown areas in tanks (typically 50,000 L). MI may get fuel from the local communities when they are in the vicinity of the communities.
Mitigation	What does the mitigation "Restricting hunting during construction" mean and will it apply to community members? (Round 6)	MI will not allow contractors or community members working on the construction site to bring guns to work or hunt near the construction site (safety issue). Community members have the right to hunt elsewhere when not working.

Topic	Key Questions and Comments Received	Response
Mitigation	What does the mitigation "block access" mean? (Round 6)	MI will remove temporary access roads (ex: to quarries, borrows) after construction by removing the road and putting boulders at the entrance to quarries to be retained for maintenance to reduce increased access into those areas.
Mitigation	What does the mitigation "planting native species" mean? (Round 6)	MI will revegetate disturbed areas using local species of plants growing in the Project area (plants suited to the area).
Sensitive Areas	An Elder indicated that medicinal plants are rare and only grow in certain areas of muskeg so they should not be destroyed. (Round 6)	TK studies were done with the communities to identify areas of medicinal plant gathering and the all-season road will avoid known areas and maintain a buffer around the sites. The all-season road needs to be constructed on higher and drier grounds and will avoid many of these areas.
Sensitive Areas	Each year a traditional canoe quest occurs from God's Lake to Bunibonibee. (Round 6)	TK studies were done with the communities to identify travel routes and MI will work with communities to accommodate key crossing locations by installing portages.
Quarries	Will a lot of quarries be needed to supply the rock for road construction? (Round 6)	The alignment is located on rock where possible to minimize the Project footprint and the road will be constructed with that rock using a cut and fill process. Additional rock will still be required, but MI will try to minimize the footprint and effects of these additional quarries.
God's Lake Narrows Northern Affairs Community		
Schedule	Will there be construction activities during the 2017/2018 winter? (Round 4)	Construction will not begin until after approvals are received and detailed design which is expected to begin in 2020. There may be clearing of a 10 m wide path this winter for pre-construction exploratory work.
Schedule	It was noted that connecting the communities is a good idea but would like to see construction of the road sooner and that maybe mining companies might be able to speed up the timeframe? (Round 6)	MI anticipates it will receive approvals in 2019, after which detailed design is required before construction can begin. As there has been a reduction in the budget available for the east side roads, the Project construction is anticipated to start in 2030. However, if additional funding becomes available, the Project could start sooner.
Moose	It was noted that Touchwood Lake and Knife Lake provide important habitat for moose and that a lot of moose hunting occurs at Bayly Lake, God's Lake and Fishing Eagle. (Round 4)	These locations were noted and the potential effects of the Project on moose and important habitat were assessed within the EA and documented in this EIS.
All-Season Road	Safety has to be a consideration; the road should be built well to avoid accidents and collisions. (Round 4)	The road will be a two lane, undivided, gravel surface, much like unpaved numbered roads in Manitoba, with appropriate design criteria.

Topic	Key Questions and Comments Received	Response
IPEP	Youth should be more involved in the Project with other means of engagement and feedback. (Round 4)	For Round 6, a separate presentation was prepared and a meeting specifically for the community youth was requested.
Purpose	Would like to see a permanent road between Oxford House, God's Lake Narrows, God's River and the Island Lake communities first to provide easier, safer and earlier access to these neighbouring communities. Connection to Provincial Road 373 should be after we have intercommunity access. (Round 4)	The purpose of the Project is to provide year round access amongst Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation. The timing of a connection to Provincial Road 373 (P5 Project) will be decided by the Government of Manitoba and is not being planned at this point in time.
Access	Potential effects of increased public access to previously inaccessible areas and natural resources (ex: fishing, zebra mussels). (Round 4)	The effects of increased access on natural resources were assessed within the EA and documented in this EIS.
Employment	The Project will provide much needed employment for our local and neighbouring community people that will make our lives easier and safer. (Round 4)	As part of MI's commitment to local residents participating in and benefiting from the Project, MI specifically includes a requirement for a percentage of the construction tenders to be supplied from local sources (ex: equipment, services, employment).
Traplines	Interest in the all-season road crossing registered traplines. (Round 5)	Traplines will be respected during clearing and construction. MI will work with trappers so that their traps are not damaged by construction. If active traps are discovered, work will stop and the trapper will be notified. Access will be maintained to traplines and trails during construction and trail crossings will be designed to maintain trapper access and trails.
Culverts	Potential for flooding at creek crossings. (Round 5)	Culverts will be installed at creek crossings to maintain flow, with culverts periodically cleaned out as part of the maintenance program.
All-Season Road	How will the road be constructed and can it be paved/ (Round 5)	Final design is not complete but will generally have a base of large rocks with rock of decreasing size in each layer laid on top to a gravel surface. It is too costly to pave the road.
Wildlife	A community member indicated that animals get used to changes and adapt to noise and people. Animals, in particular beaver and fox, returned to the area around the airport after construction and don't appear to be	The effects of the Project on wildlife, in particular sensory disturbance, were assessed within the EA and documented in this EIS.

Topic	Key Questions and Comments Received	Response
	bothered by the airplanes. (Round 5)	
Nesting Site	It was stated that cranes nest on the east end of God's Lake annually so this area should be avoided during nesting season. (Round 5)	The effects of the Project on bird nesting were assessed within the EA and documented in this EIS.
Mitigation	It was indicated that MI had done a good job identifying potential effects and mitigation measures. (Round 6)	Details of proposed mitigation will be provided in the EIS.

Additional information and details of the Project IPEP is provided in **Chapter 5** of the Project 6 – All-Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation Environmental Impact Statement as well as **Annex A**.

4.4 Summary of Engagement with the Public, Other Indigenous Groups and Government

As part of the EA for the proposed Project, two Public Open Houses were held in Winnipeg to engage community members living off-reserve, as well as stakeholder groups and the general public. The first open house, held on May 17, 2017, was a combination of the Rounds 4 and 5 **(Section 4.3)** of engagement held with directly affected communities. The second open house, held on November 22, 2017, was consistent with Round 6 **(Section 4.3)** of engagement held with directly affected communities**.**

The Agency's guidelines for the Project identified the communities of Norway House Cree Nation, Cross Lake Band of Indians/Pimicikamak Okimawin, Garden Hill First Nation, Red Sucker Lake First Nation, St. Theresa Point First Nation, Wasagamack First Nation and the MMF as groups that MI should provide specific opportunity for input into the Project. First Nation traditional territory areas relative to the Project area is shown in **Figure 4**. The Métis harvesting area is shown relative to the Project area in **Figure 5.**

Wasagamack First Nation, Garden Hill First Nation, St. Theresa Point First Nation, and Red Sucker Lake First Nation are members of the Island Lake Tribal Council Inc. and are signatories to the Adhesion to Treaty 5 in 1909. Norway House Cree Nation, and the Cross lake Band of Indians (Pimicikamak Okimanwin) are not affiliated with a tribal council and are signatories to the Adhesion to Treaty 5 in 1908. Norway House Cree Nation and the Cross lake Band of Indians (Pimicikamak Okimanwin) are also signatories on the Northern Flood Agreement (1977) with the Governments of Manitoba and Canada, and Manitoba Hydro, as members of the Northern Flood Committee. The Manitoba Metis Federation (MMF) is not a

signatory of any treaty but has been representing the Métis people of Manitoba since its formation in 1967. The land rights of the Métis people are recognised by section 31 of the Manitoba Act (1870) and in 2012 the MMF signed the Métis Harvesting Agreement with the Province of Manitoba.

MI notified each of these groups of the EIS and made efforts to further engage them and receive their input on the Project and EA through specific invitation to identify and describe potential effects of the Project on the environment and on their community. With the exception of a letter received from the MMF, no other communities responded to MI's specific request as the project proponent.

To further engage communities and meet guideline requirements, on 24 July 2018, MI sent copies of the EIS and copies of the applicable baseline environmental study reports to each of these communities for their review and comment as a part of the Agency's conformity review process. On 21 August 2018 MI sent letters to these communities informing them that engagement records related to the Project EIS were available on MI's website. MI received conformity comments from the Agency on August 27, 2018. MI has revised the EIS as needed and is sending revised sections of the EIS to the Agency and each of these communities for review and comment during the official federal and provincial public comment periods for the Project.

Engagement with provincial and federal government representatives relevant to the ESTI, including the proposed Project, has been on-going for many years. MI maintains close contact with Manitoba Sustainable Development (MSD) staff of various branches. On August 26, 2014, MI staff met with representatives from MSD, Environmental Approvals Branch, the Agency and members of the provincial and federal Technical Advisory Committee (TAC).

Provincial TAC members represented branches of MSD with expertise in wildlife, Designated Protected Areas and water resource licenses/permits. Federal departments represented on the TAC were Environment and Climate Canada, Health Canada, Indigenous Services Canada, Department of Fisheries and Oceans and Transport Canada. Although the focus of the meeting was Project P4, the proposed Project was introduced within the context of the larger ESTI. Government representatives were provided information on the timing of the EA process, policies and likely information requirements.

Several meetings and workshops were also held with the MSD Wildlife Branch between 2011 and 2017. These were regarding wildlife and caribou monitoring in relation to the proposed Project and throughout the east side of Lake Winnipeg to obtain input and adjust the Wildlife Monitoring Program and to fulfil provincial Species at Risk Permitting requirements.

Two meetings were held with the Integrated Resource Management Team, Northeast Region to present and discuss the Project. A presentation was given on October 12, 2015 to provide an update on the ESTI and discuss baseline environmental data collection and monitoring. A second presentation was given on

January 22, 2018 to provide an update on the ESTI, discuss data collection and monitoring specific to the proposed Project and the EIS.

MI also received comments from federal and provincial departments following their review of the Project Description, Scoping Document and the Agency's guidelines. As part of the federal review of the Project under CEAA 2012, the Agency sought comments from the public and Indigenous groups on the Project Description and potential effects of the Project on the environment between June 13 and July 4, 2017. The Agency also sought comments from the public and Indigenous groups on the draft EIS Guidelines between July 28 and August 28, 2017.

MI requested a copy of the comments the Agency received to better understand stakeholder interests. Manto Sipi Cree Nation, Norway House Cree Nation, Cross Lake Band of Indians/Pimicikamak Okimawin and the MMF all provided responses to the Agency identifying their interests related to the Project. Summaries of comments received as a result of the Agency's actions are provided in the following sub-sections.

Upon receipt of the Agency's request for input on the Project, the MMF, Cross Lake Band of Indians/Pimicikamak Okimawin and Manto Sipi Cree Nation expressed their interest to Manitoba to participate in Manitoba's Crown-Aboriginal Consultation process for the Project. In Manitoba, the Crown Consultation is a separate process from the EA, but relevant information is shared between the two processes to inform licencing decisions. Garden Hill First Nation also requested to meet with MI staff to discuss the Project and EA processes.

Table 4: Summary of Key Questions and Comments Received and Response

Topic	Questions and Comments Received	MI Response
Norway House		
Future All-season Roads	Future all-season road projects within East Side of Lake Winnipeg Transportation Initiative will affect Norway House Cree Nation.	Future ESTI road segments are beyond the scope of this EIS. Reductions in provincial funding for east side Lake Winnipeg All-Season Road projects have halted planning of future projects. If funding becomes available for additional all-season roads, baseline studies and EAs will be required to describe and evaluate effects as required under CEAA, 2012 and *The Environment Act*.
Water Crossings	The proposed Project's bridges and culverts may affect the flows of streams and rivers in Norway House Resource Management Area that flow into Hayes River Watershed.	Bridges and culverts will be designed to accommodate 1:50 year flood levels and sediment and erosion control measures will be employed to minimize potential negative effects to water quality during construction and operation. Regular culvert maintenance and cleanout will be conducted to ensure flows and fish passage is maintained. Assessment of and mitigations to minimize

Topic	Questions and Comments Received	MI Response
		potential effects to surface water, including water crossing are presented in **Section 5.3.4.1.**
Traffic	Potential to affect Norway House Resource Management Area and members from increased traffic along PR 373 and the winter road to transport supplies and equipment for construction and operation.	Project materials will be sourced from the Project area (aggregate and borrow) or manufactured at a major center (culverts and bridge components). During construction, a large increase to winter road traffic relative to current winter road traffic levels is not expected. The heavy equipment used by the local communities for building the winter road every year may also be used to build the Project, further reducing the amount of potential traffic increase along the winter road. Winter road traffic during Project operation will be no different from current levels. Assessment of and mitigations to minimize potential effects to human health and safety during construction and operation are presented in **Section 5.3.9.5**.
Accidents and Malfunctions	It is anticipated that fuels for construction, explosives and other dangerous products will be hauled into the Project area using the existing road network with potential for spills or products left behind if roads deteriorate prior to being products delivered to their destination.	Transportation and handling of dangerous goods will be carried out in accordance with applicable legislation and mitigation measures will be in place to prevent spills, with additional care and precautions taken around water. In the event of a spill, procedures will be in place to ensure the spill is cleaned up. Material and equipment used for the Project and temporary facilities and work areas will be located within 500 m of the Project ROW, well outside of Norway House Resource Management Area. Procedures for Accidents and Malfunctions are presented in **Section 5.5**.
Natural Resources	Potential to affect Norway House Resource Management Area and members from effects to resources including fish, fish habitat, spawning, wetlands, traditional medicines, caribou, moose, wolves and other game/fur bearing animals.	The Project is not located within Norway House Resource Management Area and is wholly contained within Bunibonibee Cree Nation, Manto Sipi Cree Nation and God's Lake First Nation traditional territories. Mitigation measures will be implemented to minimize effects to VCs, maintain current travel routes and limit new access beyond the Project footprint. Assessment of and mitigations to minimize potential effects to fish and fish habitat are presented in **Section 5.3.6.1** and **Section 5.3.6.2.** Assessment of and mitigations to minimize potential effects to wetlands are presented in **Section 5.3.5.1**. Assessment of and mitigations to minimize potential effects for plant species identified as

Topic	Questions and Comments Received	MI Response
		having sustenance and cultural value to local communities (for food, medicinal and firewood purposes) are presented in **Section 5.3.9.1**. Assessment of and mitigations to minimize potential effects to caribou, moose, wolves and other game/fur bearing animals are presented in **Sections 5.3.5.2.1** and **5.3.5.2.2**.
Pimicikamak Okimawin		
Natural Resources	Potential decrease in fish, aquatic species, migratory birds, game, furbearing animals within Pimicikamak territory due to increased harvesting by non-Pimicikamak members within Pimicikamak territory and increased harvesting in areas which are part of Treaty No 5 territory that are ecologically connected to the lands and waters of Pimicikamak's territory.	The Project is not located within Pimicikamak territory and is wholly contained within Bunibonibee Cree Nation, Manto Sipi Cree Nation and God's Lake First Nation traditional territories. Mitigation measures will be implemented to minimize effects to VCs, maintain current travel routes and limit new access beyond the Project footprint. Assessment of and mitigations to minimize potential effects to current land and resource use are presented in **Section 5.3.9.1**.
Traditional Activities	Potential decrease in traditional activities including fishing, trapping and hunting by Pimicikamak's members on its territory due to resource depletion by non-Pimicikamak members with increased access to Pimicikamak's territory and ecologically connected areas.	Assessment of and mitigations to address potential effects to fish and fish habitat are presented in **Section 5.3.6**.1 and **Section 5.3.6.2.** Assessment of and mitigations to minimize potential effects to caribou, moose, wolves and other game/fur bearing animals are presented in **Sections 5.3.5.2.1** and **5.3.5.2.2**. Assessment of and mitigations to minimize effects to birds are presented in **Section 5.3.7**.
Heritage Resources	Potential to affect archaeological and cultural sites on and around Oxford Lake and its tributaries due to increased traffic to the location by non-Pimicikamak members	Heritage Resource Impact Assessments were conducted for the Project and the all-season road alignment has been selected to avoid sensitive sites of high and medium priority. Mitigation measures will be incorporated into Project design. Construction tenders will have requirements to address archaeological or historic artifacts if encountered and include stop work, contact Manitoba Historic Resources Branch and implement recommended mitigation measures. Mitigation measures will be implemented to limit new access beyond the Project Footprint. Assessment of and mitigations to minimize potential effects to Heritage and Archaeological Resources is presented in **Section 5.3.9.4**.

Topic	Questions and Comments Received	MI Response
Section 35 – Consultation	Potential effects on Pimicikamak's established and claimed Aboriginal and Treaty rights to harvest resources within their territory due to resource depletion and increase in non-members using land and resources without passing through the Reserve where Pimicikimak's public education and regulatory resources are located.	Aboriginal-Crown consultation is beyond the scope of the proponent's EIS. The Project is not located within Pimicikamak territory and is wholly contained within Bunibonibee Cree Nation, Manto Sipi Cree Nation and God's Lake First Nation traditional territories. Mitigation measures will be implemented to minimize effects to VCs, maintain current travel routes and limit new access beyond the Project footprint. Assessment of and mitigations to minimize potential effects to current land and resource use are presented in **Section 5.3.9.1**. Assessment of and mitigations to minimize potential effects to fish and fish habitat are presented in **Section 5.3.6**.1 and **Section 5.3.6.2.** Assessment of and mitigations to minimize effects to caribou, moose, wolves and other game/fur bearing animals are presented in **Sections 5.3.5.2.1** and **5.3.5.2.2**. Assessment of and mitigations to minimize effects to birds are presented in **Section 5.3.7.**
Garden Hill		
EA Process	Why is the Agency requesting information from Garden Hill First Nation on a project located in the traditional territories of God's Lake, Bunibonibee and Manto Sipi?	As a part of the federal EA process under CEAA 2012, the Agency wants to understand Garden Hill's use of the land and if Garden Hill First Nation thinks the Project will impact them.
Land and Resource Use	Garden Hill would be concerned if there were impacts to their trapline areas.	The Project is not located within Garden Hill First Nation's RTL areas and is wholly contained within Bunibonibee Cree Nation, Manto Sipi Cree Nation and God's Lake First Nation traditional territories. Assessment of and mitigations to minimize potential effects to current land and resource use are presented in **Section 5.3.9.1**. When MI finishes drafting the EIS, MI will supply Garden Hill with a copy review and provide comments on during the public comment period of the EA process.
MMF		
Land and Resource Use	Negative effects to current use of lands and resources for traditional purposes by MMF citizens including harvesters (fishing, hunting, gathering).	The Project is not located within the recognized Métis Natural Resource Harvesting Zone and is wholly contained within Bunibonibee Cree Nation, Manto Sipi Cree Nation and God's Lake First Nation traditional territories. Assessment of and mitigations to minimize potential effects to current land and resource use are presented in **Section 5.3.9.1**.

Topic	Questions and Comments Received	MI Response
Socio-economic	Negative effects to MMF individual commercial harvesting associated with traditional land use.	The Project is not located within the recognized Métis Natural Resource Harvesting Zone and is wholly contained within Bunibonibee Cree Nation, Manto Sipi Cree Nation and God's Lake First Nation traditional territories. The traditional territories are defined by the RTLs held by the communities and represent the traditional lands used by a community. The RTL is a commercial furbearer harvest management system whereby the lineholder is granted exclusive opportunity to harvest furbearing animals within a specified trapline section. Use of RTLs by others can only occur with permission from the trapline holders so that furbearer populations in the area are not jeopardized. Holders of RTLs within the Project's Indigenous RAA are community members from God's Lake First Nation, Bunibonibee Cree Nation and Manto Sipi Cree Nation. MI has met with these trappers and information received was used to inform the EIS and Project design. The proposed all-season road alignment is located on the existing winter road alignment, where possible. The Project will employ mitigation measures to minimize effects to the environment. Assessment of and mitigations to minimize potential effects to current land and resource use are presented in **Section 5.3.9.1**.
Economic	Ability of MMF citizens, including Harvesters to equitably participate in the economic benefits and opportunities of the Project.	Construction tenders for the Project will be issued using standard MI tendering practices. Competitive bids will be sought and tenders will be posted on MERX. Contracts will include a condition that a minimum percentage of the total work is to be delivered through Indigenous involvement and resources. This includes labour from Indigenous communities and hiring of equipment from or purchasing of supplies sold or produced by companies listed in the Government's Indigenous Business Directory.
Heritage Resources	Negative effects to the physical, archaeological and cultural heritage of Métis peoples in Manitoba	Heritage Resource Impact Assessments were conducted for the Project and the all-season road alignment has been selected to to avoid sensitive sites of high and medium priority. Mitigation measures will be incorporated into Project design. Construction tenders will have requirements to address archaeological or historic artifacts if encountered and include stop work, contact Manitoba Historic Resources Branch and implement recommended mitigation measures. Assessment of and mitigations to minimize potential effects to Heritage and Archaeological resources is presented in **Section 5.3.9.4**.

Topic	Questions and Comments Received	MI Response
Section 35 – Consultation	The ability of MMF, through ongoing consultation and specific roles and/or employment, to participate in the environmental (including archaeologic/cultural) monitoring and management of the Project.	In Manitoba, Aboriginal-Crown consultation and EIA are two different processes. The development and submission of the EIS is completed by the proponent in advance of Consultation. Consultation outcomes are considered by regulators when deciding whether to issue an Environment Act licence. MMF has specifically requested consultation and accommodation. Whether accommodation is needed and what form it will take is dependent on the consultation process and includes consideration of the potential effects and mitigations proposed in the EIS (post filing). With respect to the specific request to participate in environmental monitoring (including archaeological/ cultural environmental monitoring), baseline studies on wildlife, aquatics, archaeology/heritage resources and vegetation have already been completed for this project. A heritage resource impact study was conducted to identify heritage resources within the area and assess potential impacts to those resources if the project were built. Under Manitoba Heritage Resources Act "sites of heritage significance" are protected and managed, and any work, activity or development is subject to the approval of the minister *(Section 13(1) Manitoba Heritage Resources Act)*. Part II, section 12(1) of the Act requires that a Heritage Resources Impact Assessment be conducted and proponents undertake appropriate measures to protect resources regardless of their cultural lineage under the supervision of Manitoba Historic Resources Branch. The Branch maintains a record of Heritage Resources found in the province of Manitoba, which was also consulted when developing the EIS. The HRIA identified four sites within 100 m of the ROW, 2 sites were portages that will require signage and 2 sites that the archaeologist recommended avoidance or systematic salvage if P6 ASR construction could not avoid them. Archaeological data indicate cultural continuity and occupation of the area by historic populations of people now identified as Cree. During detailed design, if it is determined that avoidance is not possible, MI will consult Manitoba Historic Resources Branch and the First Nation community who's

Topic	Questions and Comments Received	MI Response
		traditional territory the site is located within (Bunibonibee Cree Nation, Manto Sipi Cree Nation or God's Lake First Nation) to identify how best to address and resolve the situation. Measures describing the protection of heritage resources are also provided for in GR130.18 *Heritage Resources* and EPP13 *Heritage Resources*, as described in Chapter 8 of the EIS and further mitigate any potential unforeseen encounters of archaeological or historic sites during construction and maintenance activities. Should an artifact be recovered that is distinctly of Métis origin (as confirmed by an archaeologist/historic resources consultant), the Manitoba Historic Resources Branch and the MMF would be contacted to identify how best to address and resolve the situation.
Public		
EA	An EA needs to occur in consultation with people who live in the area before an all weather road is built.	MI is preparing an EIS for submission to the Agency and MSD to meet CEAA 2012 and *The Environment Act* (Manitoba). Indigenous communities, interested stakeholders and the public have been and will continue to be engaged throughout the Project.
Heritage Resources	A member from God's Lake First Nation was interested in the Heritage Resources Impact Assessment and what happened to the Stone tools found.	The Heritage Resource Consultant submitted the artifacts recovered from the Heritage Resource Impact Assessment to the Historic Resources Branch as per permits received to complete the study.
Wildlife VC	Were any sensitive caribou sites found in the area?	The LAA has Pen Islands Caribou and not Boreal Woodland caribou. Therefore, the habitat is not as sensitive as some of the Boreal Woodland caribou locations in Project 4 and Project 7a. TK and wildlife data were used in the development of the alignment.
IPEP	Is there a website where they could find more information?	In response, it was indicated that Project information will be made available on the Manitoba Infrastructure website.
IPEP	MI should contact individual lodges and outfitters directly.	These groups were invited to both of the open houses in Winnipeg and were contacted directly to obtain input on the proposed Project.
Mitigation	Will salt be used on the road?	Salt will not be used on the road, it will likely just be sand which is the standard practice for MI.

Topic	Questions and Comments Received	MI Response
Monitoring	The proposed Project needs to be approved by the Agency. They are mandating monitoring during planning, construction and the life of a project. There have been policy changes at the Federal level. Indigenous people need to be involved in monitoring.	MI is in contact with the Agency on a regular basis and the Agency is providing guidance on the proposed Project. MI is familiar with the Agency's monitoring requirements, as described in the CEAA, 2012 approval received for Project 4 (all-season road connecting Berens River to Poplar River). For this Project, MI invited local Indigenous communities to assist with conducting the field work for the baselines studies. Chapter 9 of the EIS discusses proposed monitoring activities planned for the Project. MI will work with the local Indigenous communities to further develop and implement monitoring for the construction and operation of the Project.
Monitoring	Monitoring commitments should be made public.	MI noted mitigation and monitoring commitments are made public via inclusion in the EIS that is being prepared for submission to the Agency under CEAA, 2012 and MSD under *The Environment Act* (Manitoba).
Schedule	MI needs to be more transparent on what the schedule is for the proposed Project.	The schedule is uncertain as a result of budgetary considerations. MI has discussed the timelines for construction with the communities during recent community meetings and will continue to provide Project updates through the IPEP.
Manitoba Sustainable Development – Lands Branch		
Project Designs	Will the EIS have finalized designs that can be reviewed and commented on at that time?	Detailed design is estimated to begin in 2020. Bridge designs will not be available for review during the EA process but can be submitted when they become available if requested by MSD Lands Branch.
Lodges & Outfitters	There is a lodge on Knee Lake and four on God's Lake. There is a boat cache on Magill Lake.	MI has noted the lodges on God's Lake and Knee Lake and boat cache on Magill Lake and has discussed the Project directly with local lodge owners.
IPEP	The EIS should specifically address consultation with the existing lodges in the area. While this Project may not affect these operations much at this point, the eventual completion of an all weather road attached to the provincial network likely would and they would have an interest in being engaged at this point.	During the Public Open House, a lengthy discussion was held with the Executive Director of Manitoba Lodges and Outfitters Association. He provided a list of 3 lodges that he believed could be affected by the Project and requested a map of the Project alignment relative to Knee Lake. MI emailed the map to the Executive Director of Manitoba Lodges and Outfitters Association and he in turn passed on to the lodge owner along with MI contact information if they have any questions. MI followed up directly with the Regional Land Manager for North East region as requested to obtain contact info of existing lodges and outfitters in the area. These groups were invited to both of the open houses in Winnipeg and were contacted directly to obtain

Topic	Questions and Comments Received	MI Response
		input on the Project. All groups wanted the Project to be constructed as soon as possible. They also wanted Projects 2 and 5 to be constructed to gain access to the provincial highway system.
Manitoba Sustainable Development – Forestry and Peatlands Branch		
Construction Methods	Wetland/peatland specific road construction methods are needed.	Specific wetland/peatland road construction methods are being proposed including installation of equalization culverts to maintain landscape hydraulic movements. The EIS contains drawings of typical cross sections for areas of shallow and deep peat.
Alignment	Agree that the alternative options should be considered instead of the initial alignment near Manto Sipi Cree Nation. Initial path follows the winter road and bisects a large peatland complex. Although Option 1 is the longest route, from the imagery, it appears to most closely follow upland features and natural flow patterns.	Based on a flyover conducted in June 2017 with Manto Sipi Cree Nation and its consultant, MI has recommended Option 2 as its preferred choice. It is the most cost effective option requiring less blasting but still has a rock supply through cut and fill for construction. Before the flyover, Option 1 was initially chosen and Manto Sipi Cree Nation took issue with that option as they deemed it to be too close to one of their Treaty Land Entitlement areas. MI is looking to Manto Sipi Cree Nation to identify which option they prefer and issue a Band Council Resolution to support the final Project alignment.
Wetland	Are there plans for re-vegetation in peatlands? Natural re-vegetation strategies could probably suffice if the site is prepared appropriately.	MI is planning to allow re-vegetation to occur naturally in peatland areas that have been disturbed and will work with Forestry and Peatlands branch to identify appropriate site preparation methods during detailed design and construction phases to promote successful natural re-vegetation.
Manitoba Sustainable Development – Wildlife and Fisheries Branch		
Wildlife	MI should be cognisant of potential for human-wildlife conflict. The protection plans should address how attractants (food, garbage, etc.) will be managed in construction camps, if any mitigation measures to prevent beaver damage to the roads (beaver deceivers and pond levellers) will be required and used and safety training for wildlife encounters be provided for employees and contractors working in remote areas	Comments have been noted. Contractors will be required to develop waste management plans, notify MSD Northeast Region and onsite supervisors of any nuisance wildlife. A beaver management program will be implemented to control problem beaver. MI will continue its efforts of keeping MSD Northeast Region informed and seeking MSD input throughout the Project.
Engagement	MSD would like to review field investigation methods used to collect wildlife data and continue on-going consultations with branch staff.	Meetings were held with MSD Wildlife Branch and the Integrated Resource Management Team, Northeast Region to discuss data collection methods, results and EIS for the Project.

Topic	Questions and Comments Received	MI Response
Natural Resources Canada (NRCan)		
Explosives	NRCan may be a regulatory authority for this Project under the Explosives Act.	MI or its contractor will apply for permits under the Explosives Act where applicable and will seek NRCan's expertise on explosives storage or manufacturing where needed.
Indigenous Services Canada		
Indigenous Peoples and Lands	The description of the environmental effects presented in the project description report is not adequate to determine whether significant negative environmental effects may occur on adjacent Federal lands or affect Treaty or Aboriginal rights.	The EIS describes the project setting and baseline conditions including Indigenous peoples, predicted effects, mitigation measures proposed and assesses significance based on key criteria outlined in the Agency's guidance document.
Federal Lands	Permits from Indigenous Services Canada would be required for any work carried out on Reserves.	No federal land will be used for carrying out the designated Project.
Waste Management	Permits would be required from First Nations for use of landfill sites.	The contractor is responsible for managing wastes associated with their construction and/or maintenance contracts and is required to provide a waste management plan at the beginning of the contract, prior to work being started. Appropriate permits will be acquired prior to the start of work.
Health Canada		
Human Health	Health Canada is looking to understand if there are potential effects to drinking and recreational water; air quality/dust; noise effects; country foods; cumulative human health effects; locations of temporary and seasonal traditional use sites as a result of the Project.	The EIS describes the predicted effects to Indigenous peoples and human health, fish, ground and surface waters and atmospheric environment as well as mitigation measures proposed. Assessment of and mitigation to minimize potential effects to air quality/dust are presented in **Section 5.3.1.1**. Assessment of and mitigation to minimize effects to surface/recreational water are presented in **Section 5.3.4.1.** Assessment of and mitigations to minimize potential effects to human health, including drinking water, noise effect, and country foods are presented in **Section 5.3.9.5.** Assessment of and mitigations to minimize potential effects to traditional use sites are presented in **Section 5.3.9.1.**
Human Health	Health Canada is looking to understand the potential for cumulative human health effects with other planned projects; country food quality effects on human health; locations of temporary/seasonal traditional use sites; locations of all sources (surface	Cumulative effects are discussed in the EIS. The remote nature of the region has resulted in the limitation of past, present and reasonably foreseeable physical activities; there is very little temporal and spatial overlap of reasonably foreseeable physical activities with the Project.

Topic	Questions and Comments Received	MI Response
	and groundwater) of drinking water and waters used for recreational purposes.	
Environment and Climate Change Canada		
Fish Habitat	Details should be provided on how sedimentation effects will be characterized, prevented and mitigated.	The EIS describes effects and mitigation measures proposed to fish and fish habitat including the procedures MI will follow when working in or Near Water. Assessment of and mitigations to minimize potential effects to fish and fish habitat are presented in **Section 5.3.6**.1 and **Section 5.3.6.2.**
Air Quality	Air emissions from this Project are not anticipated to cause significant adverse effects, provided appropriate dust mitigation measures are put in place.	Measures are proposed to mitigate potential adverse effects of fugitive dust, GHG emissions and noise. Assessment and mitigations of impacts to air quality are presented in **Section 5.3.1.1**.
Geology and Geochemistry	Quarry locations should be tested for potential presence of acid-generating rock that should be eliminated and different quarry locations investigated.	Potential quarry sites will be evaluated for the presence of sulphide mineralization or pyritic lithologies prior to construction with the intent of not developing such sites.
Fish and Fish Habitat	Setback distances from waterbodies for Project activities should be identified and runoff management systems should be in place in quarries and borrow pits to prevent effects to fish and fish habitat.	Except where crossing watercourses, a 100 m setback from waterbodies is proposed for Project activities. Procedures have been proposed for working in and near water and for quarry site selection and requirements.
Wildlife	The Project Description indicates that most of the alignment is located on or within 1-3 km of the existing winter road corridor and is close to an existing transmission line that crossed through the area. While there is a reference to routing the new ROW to avoid the lower and wetter conditions on the existing winter road, a comparative analysis of the environmental effects of the route alternatives and the rationale for the chosen route is needed, including an analysis of the impacts on wildlife. A similar analysis should also be included for the locations of temporary access trails, borrow pits and quarries, etc.	MI's routing selection process began with the Large Area Transportation Network Study that assessed several initial routes, had considerable input from local communities and resulted in the corridor selected for the Project. The alignment selected within the corridor was based on feedback received from communities through meetings and traditional knowledge studies, other baseline study results and preliminary engineering analysis. To reduce impacts of fragmentation to wildlife, routing follows close to the existing winter road corridor and avoids lower and wetter conditions where feasible. Other than a section near Manto Sipi, and a segment in God's Lake Traditional Territory that was identified by a local trapper, there are no alternative routes proposed at this stage. Other routes which were previously discussed were dismissed to ensure avoidance of traditional use and heritage resources areas and to ensure feasibility of construction.

Topic	Questions and Comments Received	MI Response
		Locations of temporary access trails, borrow pits and confirmed quarries have not yet been selected. Impacts to wildlife will be considered and measures to minimize impacts will be implemented when these components are being confirmed.
Wildlife	Upon reviewing the MB11 range maps in the federal "Recovery Strategy for Woodland Caribou (*Rangifer tarandus caribou*), Boreal Population, in Canada" 2012, it appears that the Project is at least partially contained within this range of boreal woodland caribou.	The MB11 range map in the federal recovery strategy from 2012 do not have the same boundaries as the range maps in "Manitoba's Boreal Woodland Caribou Strategy" by Manitoba Conservation (2015). MI chose to use the more up-to-date range mapping for the EIS. Although the Molson Management Unit identified in this document does have some overlap with the RAA, the range of the Norway House herd has a smaller overlap with RAA.
Wildlife	The Project Description includes some uncertainty as to the identity of the caribou group (s) inhabiting the Local Assessment Areas, indicating only that they "may be a part of the migratory Pen Island group" (P38-39) and that "Remote Road Operations is currently working to identify the movement patterns of caribou through the region to identify potential interactions with activities related to all-season road development". (P42)	Results from telemetry data on the Pen Islands herd (collected by SD) and the Norway House herd (collected by MI) was analysed to draft the Wildlife Characterization and Effects Assessment Report and used to inform the EIS. Pen Islands animals occur within the Wildlife RAA during all seasons with the largest portion of a seasonal core use area occurring in the Wildlife RAA in late winter. Pen Islands animals also occur within the Wildlife LAA during early and late winter, however, only a small proportion of its seasonal core use areas occur within the Wildlife LAA, primarily in early winter. The Norway House core use areas occur to the west of the Wildlife RAA, with no seasonal core use areas occurring within the RAA. There is little seasonal movement in the Norway House caribou core use areas.
Wildlife	It is important to identify to the Proponent that eastern migratory caribou were recently assessed by COSEWIC as Endangered (April 2017) and barren-ground caribou were assessed by COSEWIC as Threatened (November 2016)	MI has included information on the listing of Eastern Migratory caribou and has considered them as a species at risk.
Wildlife	There is a need for a map overlaying the Manitoba East range of boreal woodland caribou, as well as the Pen Island population of eastern migratory caribou, and any nearby barren ground populations within the Project area. There is also a need for monitoring information showing caribou year-round use in the vicinity of the Project	There has been year round monitoring and mapping done for both the Pen Islands (Eastern Migratory) and Norway House (Boreal woodland) caribou. No barren ground caribou ranges are near the Project area and were not included in the assessment.

Topic	Questions and Comments Received	MI Response
	(foraging, calving, movement), including along the existing transmission lines and winter roads. This will better clarify the use of the area by woodland, barren ground and eastern migratory caribou.	
Wildlife	For migratory birds, there is a need to better define the commitments to avoid impact under the *Migratory Birds Convention Act* (MBCA)	MI has general environmental requirements and environmental specifications to ensure compliance with the MBCA.
Wildlife	There is a need to identify potential caribou avoidance and mortality associated with the road.	MI has undertaken studies related to wolf predation on caribou and studies of caribou crossing linear features in the vicinity of the Project.
Wildlife	There is a need to identify whether roads and bridges may impede wildlife movement. Bridges may force wildlife, which typically use riparian areas as movement corridors, onto roads if not properly designed to facilitate movement.	MI has done an impact assessment for wildlife on all Project components.
Wildlife	There is a need to identify the numerous wildlife issues (including increased access and predation risks) associated with the lack of planned restoration for linear features and other Project areas (old winter road, temporary access trails, borrow areas) and the likely impacts of this.	As part of the environmental assessment, MI has identified potential effects on wildlife for all Project components at all Project stages. Additionally, MI has provided mitigations for decommissioning of Project components.
Wildlife	There is a need to identify potential impacts on wetlands.	MI has done an impact assessment for wetlands.

Topic	Questions and Comments Received	MI Response
Fisheries and Oceans Canada (DFO)		
Fish and Fish Habitat	The effect to fish and fish habitat should be assessed and the potential to cause serious harm by permanent alteration or destruction of fish habitat should be described. If serious harm is anticipated, an application for a section 35(2)b Fisheries Act Authorization should be submitted, which includes offsetting. Detailed designs are required to determine significance of effects to fish and fish habitat. DFO is responsible for aquatic species at risk.	No significant residual effects are anticipated to fish populations and fish habitat provided mitigation measures such as maintaining fish passage and effective sediment control are applied. MI is aware of the proposed changes to the *Fisheries Act*. Projects will be planned and executed in accordance to the legislation in place at the time of construction. Detailed crossing designs that identify crossing footprints on the landscape are not yet available for inclusion in the EIS. When detailed design is completed and crossing footprints are identified (prior to construction), Project plans will be discussed with DFO to ensure work complies with provisions of the Fisheries Act. If Authorization is required, MI recognizes that planning and implementing offsetting project(s) may also be required and will be subject to DFO approval. These projects will be discussed with community members from Manto Sipi Cree Nation, Bunibonibee Cree Nation, God's Lake First Nation and God's Lake Narrows Northern Affairs Community through the IPEP. Additional opportunity for input into the offsetting projects may occur through the local liaison committees as described in the management plan.

5.0 ENVIRONMENTAL EFFECTS SUMMARY

5.1 Approach to the Environmental Assessment

Potential Project-related effects considered in this EA include potential effects on the biophysical environment and direct and indirect effects on Indigenous People and the human environment as a result of biophysical changes and Project activities. Effects on Indigenous People are assessed in relation to health and socio-economic conditions, physical and cultural heritage, the current use of lands and resources for traditional purposes and any structure site or thing that is of historical, archaeological, paleontological or architectural significance. Particular focus is given to health, socio-economic and cultural effects on communities directly affected by the proposed Project (ex: Manto Sipi Cree Nation, Bunibonibee Cree Nation, God's Lake First Nation and God's Lake Narrows Northern Affairs Community).

In accordance with Agency guidelines for the proposed 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 VCs as a foundation for the EA. The selection of VCs allows the assessment to be focused on those aspects of the natural and human environment that are identified to be of importance to their role in the ecosystem and of particular importance to society. The selection of VCs assessed in the EA follow requirements for the assessment of environmental components indicated in Section 5 of CEAA, 2012.

The EA involved a series of steps to identify potential effects of the proposed Project. Key steps in the process included the following:

- Step 1: Project Definition as expressed in the Project Description
- Step 2: Scope of Environmental Assessment
- Step 3: Project Setting and Baseline Conditions
- Step 4: Identification of Potential Effects
- Step 5: Mitigation of Adverse Effects
- Step 6: Assessment of Residual Effects – Including Significance Determination
- Step 7: Cumulative Effects Assessment and Other Effects
- Step 8: Follow-up and Monitoring

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 involved the consideration and evaluation of specific assessment criteria based on the degree (level) of potential Project effects. The evaluation considers the social and 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 Indigenous peoples

and treaty rights). Residual environmental effects of the proposed Project on VCs were assessed against a series of criteria to assist in determining their significance. As per the Agency guidelines for the proposed Project (Canadian Environmental Assessment Agency 2018), criteria used to determine the significance of residual effects were:

- 'Direction' or nature of effect (type of effect)
- 'Duration' of time that the effect occurs
- 'Magnitude' (severity) of the effect
- 'Timing'
- 'Geographic Extent' of the effect
- 'Frequency' of the effect (how often the effect occurs)
- 'Reversibility' of the effect (if the effect can be reversed)
- 'Ecological and Social Context' (resilience of a VC to adapt to changes as a result of the project)
- existence of environmental standards, guidelines or objectives for assessing the effect

A three-level ranking system was identified for each criteria with the exception of the direction or nature of effect (positive, negative or negligible/neutral) as this establishes whether the VC needs to be assessed further. Definitions for the three-level ranking of the assessment criteria are provided in **Table 5** and **Table 6.** 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 EAs and were used to determine conclusions on significance of residual effects for each VC. Detailed tables identifying the level each criteria was ranked for each VC before and after the application of proposed mitigation measure, are provided in **Chapter 6** and **Chapter 7** of the Project 6 – All-Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation Environmental Impact Statement.

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

- *A Level III rating result for ecological and social context; and*
- *A Level II or III rating result for each of the effect attributes of duration, magnitude, extent, timing, frequency and reversibility.*

5.2 Study Area Boundaries

For the purpose of assessing the geographic extent of potential Project-related environmental effects that are expected to occur, the following spatial 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 and activities are located and the immediately adjacent area, which is the defined limits of the all-season road 100 m road ROW. Permanent and temporary facilities (ex: temporary access routes, as well as

Table 5: Description of Assessment Criteria and Levels of Potential Environmental Effects

Assessment Criteria	Range of Criteria	Level of Effect and Definition[4]
Direction of Change (type of effect)	Neutral or Negligible	No measurable change on the VC.
	Negative	Net loss (adverse or undesirable change) on the VC.
	Positive	Net benefit (or desirable change) on the VC.
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 during construction, maintenance, or rehabilitation activities (a timeframe of several months up to one year).
	Medium-Term	**Level II** - The potential effect is likely to persist until the completion of construction and rehabilitation activities (> 1 year 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 (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 (potential effect is within a normal range of variation) or is below established thresholds of acceptable change (ex: water quality guideline). See **Table 6** for VC specific criteria.
	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. See **Table 6** for VC specific criteria.
	High	**Level III** – A change that will have potential effects that are easily observed, measured and described (readily detectable without a monitoring program) and are well beyond guidelines or established thresholds of acceptable change. See **Table 6** for VC specific criteria.
Timing[5]	No Sensitivity	**Level I** – Effect does not occur during critical life stage / effect does not occur during harvesting times as identified in Harvest Calendars created through Traditional Knowledge Studies.
	Moderate Sensitivity	**Level II** – Effect occurs at the start or end of a critical life stage / effect occurs during opportunistic harvesting times as identified in Harvest Calendars created during Traditional Knowledge Studies
	High Sensitivity	**Level III** – Effect occurs during a critical life stage / effect does occurs during focused harvesting times as identified in Harvest Calendars created during Traditional Knowledge Studies.

[4] **Chapter 6** outlines VC specific definitions for the three level ranking system.

[5] In terms of **Timing**, the critical life stages include things such as nesting, breeding, spawning and calving which will vary by VC and will vary annually depending on seasonal conditions. For example, it is clear that winter is outside of bird nesting and breeding period and that spring is fully within this critical time period, whereas early spring and late fall is a transitional period that depending on the seasonal conditions may or may not affect the life stage.

Assessment Criteria	Range of Criteria	Level of Effect and Definition[4]
Extent (spatial boundary)[6]	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 100 m all-season road ROW and permanent and temporary facilities (ex: temporary access routes and quarries) within which potential effects are likely to be measurable.
	LAA	**Level II** - Area within which potential Project effects are measurable and extending beyond the Project Footprint to, but not beyond, the LAA (either a 2 km or 20 km corridor centred on the all-season road alignment depending on the VC (**Figure 4**).
	RAA	**Level III** - The maximum anticipated regional extent of potential direct, indirect and cumulative effects that may extend beyond the LAA. The boundaries of the RAA will vary depending on the VC.
Frequency (how often the effect occurs)	Infrequent	**Level I** - The potential effect occurs once or seldom during the life of the Project (ex: initial clearing of the ROW).
	Sporadic/Intermittent	**Level II** - The potential effect occurs only occasionally and without any predictable pattern during the life of the Project (ex: blasting at quarries; site-specific construction equipment noise; potential wildlife-vehicle collisions).
	Regular/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 (ex: operations traffic).
Reversibility (the degree of permanence)	Reversible (short-term)	**Level I** – Potential effect is readily reversible over a relatively short period (< than eight years).
	Reversible (long-term)	**Level II** - Potential effect is potentially reversible but over a long period (> than eight years).
	Irreversible	**Level III** - Project-specific potential effects are permanent and irreversible.
Ecological and Social Context (resilience of a VC to adapt to changes as a result of the project)	Low	**Level I** – Ecological - the VC is not rare or unique and is resilient to imposed change. Social - Indigenous people/communities in the RAA are able to adapt with relative ease and maintain pre-project development activities.
	Moderate	**Level II** – Ecological - the VC is moderately/seasonally fragile and has some capacity to adapt to imposed change. Social - Indigenous people/communities in the RAA are able to adapt with some adjustments and maintain pre-project development activities but only with a degree of support.
	High	**Level III** – Ecological -the VC is a protected/designated species under ESEA, SARA and species listed by COSEWIC and by the MBCDC as very rare (S1) to rare (S2) or fragile with low resistance to imposed change or part of a very fragile ecosystem. Social - affected Indigenous people/communities in the RAA will not be able to adapt to changes or maintain pre-project development activities.

[6] **Figures 4-1** and **4-2** illustrate the VC specific spatial boundaries of the LAA and RAA, which are discussed in greater detail in **Chapter 6**.

Table 6: Description of Magnitude Criteria and VC Specific Levels of Potential Environmental Effects

Component	Factor	Level I	Level II	Level III
Physical Environment	Air Quality	Emissions are above the baseline but are within applicable federal and provincial regulations and guidelines.	Emissions have the potential to exceed federal or provincial guidelines resulting in the potential for adverse environmental effects to resources (land, water, biota) or residents.	Emissions are likely to exceed federal or provincial guidelines resulting in unacceptable adverse environmental effects to resources (land, water, biota) or residents.
	Climate	Greenhouse gas emissions of <0.1% of Canada's 2030 target CO2 emission rate of 523 Mt/a.	Greenhouse gas emissions of 0.1 to 1.0% of Canada's 2030 target CO2 emission rate of 523 Mt/a.	Greenhouse gas emissions of >1.0% of Canada's 2030 target CO2 emission rate of 523 Mt/a.
	Terrain, Soils and Geology	Effects considered minor and any soil alteration, loss or contamination is within applicable federal and provincial regulations and guidelines.	Any soil alteration, loss or contamination has the potential to exceed applicable federal and provincial regulations and guidelines resulting in the potential for adverse environmental effects.	Any soil alteration, loss or contamination exceeds applicable federal and provincial regulations and guidelines resulting in unacceptable adverse environmental effects.
	Water Quality - Surface	Water quality effects in receiving waters are within applicable federal and provincial regulations and guidelines; or if guidelines exceeded, no anticipated adverse environment effects beyond any defined mixing zones.	Water quality effects in receiving waters exceed applicable federal and provincial regulations and guidelines and have the potential to adversely affect drinking water uses, aquatic life and/or wildlife, beyond any defined mixing zones.	Water quality effects in receiving waters exceed applicable federal and provincial regulations and guidelines and are likely to adversely affect drinking water uses, aquatic life and/or wildlife, beyond any defined mixing zones, likely resulting in unacceptable adverse environmental effects.
	Water Quantity - Surface	Change to creek and river flows is within the range of natural variation or <15% of the seasonal average.	Change to creek and river flows is outside the range of natural variation and 15 to 25% of seasonal average.	Change to creek and river flows is outside the range of natural variation and >25% of seasonal average.

Component	Factor	Level I	Level II	Level III
Physical Environment	Water Quality - Ground	Water quality effects in receiving waters are within applicable federal and provincial regulations and guidelines; or if guidelines exceeded, no anticipated adverse environment effects.	Water quality effects in receiving waters exceed applicable federal and provincial regulations and guidelines and have the potential to adversely affect drinking water uses.	Water quality effects in receiving waters exceed applicable federal and provincial regulations and guidelines and are likely to adversely affect drinking water uses, likely resulting in an unacceptable adverse effect.
	Water Quantity - Ground	Change to groundwater fed creek or river flows or well production is <15% of seasonal average.	Change to groundwater fed creek or river flows or well production is 15 to 25% of seasonal average.	Change to groundwater fed creek or river flows or well production is >25% of seasonal average.
Biological Environment	Aquatic Environment (aquatic life, fish and fish habitat)	In water work or structures necessary but no net loss of the productive capacity of fish habitat and no measurable reduction to fish communities or populations.	In water work or structures necessary resulting in a net loss of the productive capacity of fish habitat affecting local fish communities and populations.	In water work or structures necessary resulting in a net loss of the productive capacity of fish habitat affecting fish communities and populations.
	Aquatic Species at Risk - Lake Sturgeon	In water work or structures necessary but the effect is considered minor, habitat alteration/loss is restricted to non-limiting habitat and considered to be minor relative to availability.	In water work or structures necessary and will have a potential measurable effect on individuals, such as displacement of critical life stages (can be detected with a well-designed monitoring program). The potential effect is considered to be minor relative to population size or habitat availability and does not affect limiting habitat.	In water work or structures necessary and will have potential effects on individuals such as mortality, that are easily observed, measured and described (readily detectable without a monitoring program) and affects limiting habitat.
	Vegetation and Wetlands	Effect considered minor (only affecting common species or communities).	Activity has the potential to measurably affect vegetation communities or species but the effect is limited to common species or communities.	Activity is likely to measurably affect vegetation communities or species and may affect rare or protected species.

Component	Factor	Level I	Level II	Level III
Biological Environment	Wildlife and Wildlife Habitat, (amphibians and reptiles, migratory birds, furbearers, large game)	A change that is not likely to have a definable, detectable or measurable potential effect and considered to occur at the individual level, not affecting population or habitat availability.	A change that will have a potential measurable effect on populations (readily detected with a well-designed monitoring program) and considered to be moderate relative to habitat availability.	A change that will have potential population effects that are easily observed measured and described (readily detectable without a monitoring program) and considered to have a major effect on habitat availability.
	Wildlife Species at Risk	Effect is considered minor, habitat alteration/loss is limited to non-critical habitat and considered to be minor relative to availability.	A change that will have a potential measurable effect on individuals, such as displacement critical life stages (can be detected with a well-designed monitoring program). The potential effect is considered to be minor relative to habitat availability and does not affect critical habitat.	A change that will have potential effects on individuals such as mortality or destruction of nests, that are easily observed, measured and described (readily detectable without a monitoring program) and affects critical habitat.
Indigenous People (how changes to the environment as a result of the Project will affect activities exercised)	Socio-economic conditions including the use of navigable waters, recreational use and commercial fishing, hunting, trapping and gathering activities.	Indigenous people/communities in the RAA are able to adapt with relative ease and maintain pre-project development activities.	Indigenous people/communities in the RAA are able to adapt with some adjustments and maintain pre-project development activities but only with a degree of support.	Affected Indigenous people/communities in the RAA will not be able to adapt to changes or maintain-pre-project development activities.
Human Environment (how changes to the environment as a result of	Current land use in the area including commercial activities, use of waterways and	Current land uses in the RAA are able to continue with relative ease and maintain pre-project development levels.	Current land uses in the RAA are able to continue with some adaptation and maintain pre-project development levels but only with a degree of support.	Current land uses in the in the RAA will not be able to continue and maintain-pre-project development levels.

Component	Factor	Level I	Level II	Level III
the Project will affect land use)	outdoor recreation.			
	Human Health (noise, air quality, drinking and recreational water quality and country foods).	Selected parameter changes by <10% from baseline conditions within the RAA.	Selected parameter changes by 10 to 20% from baseline conditions within the RAA.	Selected parameter changes by >20% from baseline conditions within the RAA.
Human Environment (how changes to the environment as a result of the Project will affect land use)	Physical and cultural heritage and structures, sites or things of historical, archaeological, paleontological or architectural significance	Resources are disturbed by the proposed Project and are recoverable.	Resources of local importance are disturbed by the proposed Project and are not recoverable.	Resources of regional/national importance are disturbed by the proposed Project and are not recoverable.

construction camps, borrow pits and quarries, where possible) within which effects are likely to be measurable are also included.

- LAA – is the spatial area where measurable changes to most VCs are primarily expected to occur. The boundaries of the LAA vary depending on the VC. The LAA is area within which Project effects are measurable and extending beyond the Project Footprint as shown in **Figure 4**.
  - Wildlife (ungulates) LAA
    - 2,924 km^2
    - 20 km centred on the all-season road alignment
  - Indigenous Land/Resource Use LAA, Aquatic LAA, Wildlife (other than ungulates) LAA
    - 1431 km^2
    - 10 km centred on the all-season road alignment
  - Vegetation and Heritage Resources
    - 284 km^2
    - 2 km centred on the all-season road alignment
- RAA – is the area beyond the LAA within which most potential indirect and cumulative effects are expected to occur as shown in **Figure 5.**
  - Indigenous Land/Resource Use RAA
    - 31,936 km^{2-}
    - encompasses the Traditional Territories of Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation as identified by traditional knowledge
  - Aquatic RAA
    - 20,842 km^2
    - includes areas upstream and downstream of the LAA that are connected to watercourses potentially affected by the Project Footprint, headwater areas of the affected streams and downstream receiving waterbodies such as the Hayes River and God's Lake
  - Heritage Resources RAA
    - 18,093 km^2
    - based on the NTS map sheet boundaries within which the all-season road alignment is located, or were near the alignment and contain a large enough sample to compare newly discovered sites to the baseline data
  - Wildlife RAA
    - 8,991 km^2
    - selected to ensure home ranges of large ranging species and areas of traditional use were considered, determined using a multi-disciplinary approach incorporating both biophysical and social factors (species of special importance to local communities were determined through workshops, open houses and community discussions)
  - Vegetation RAA
    - 1,431 km^2
    - area beyond the LAA within a 10 km corridor centred on the all-season road alignment

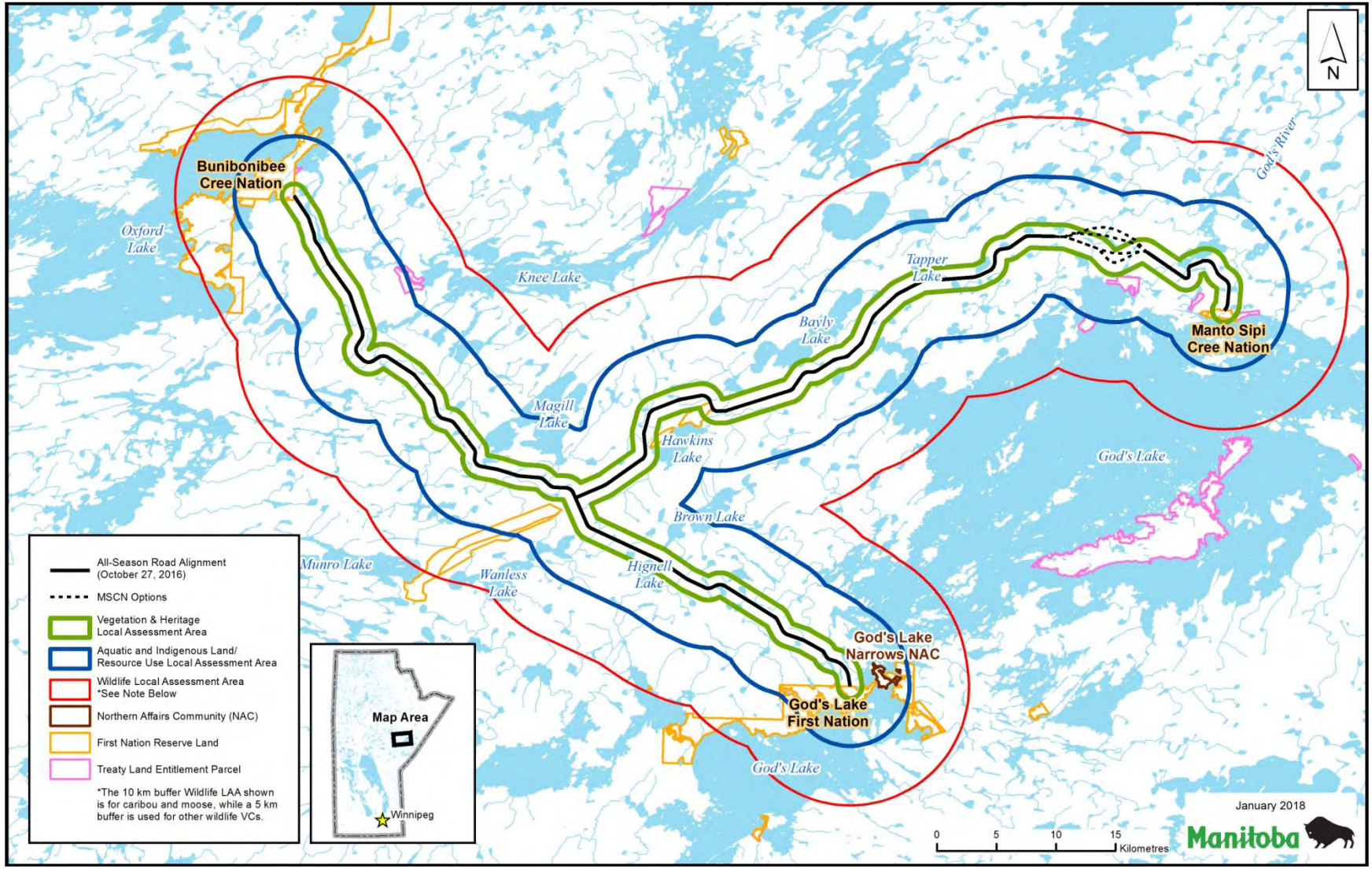

Figure 6: Local Assessment Area for the proposed Project

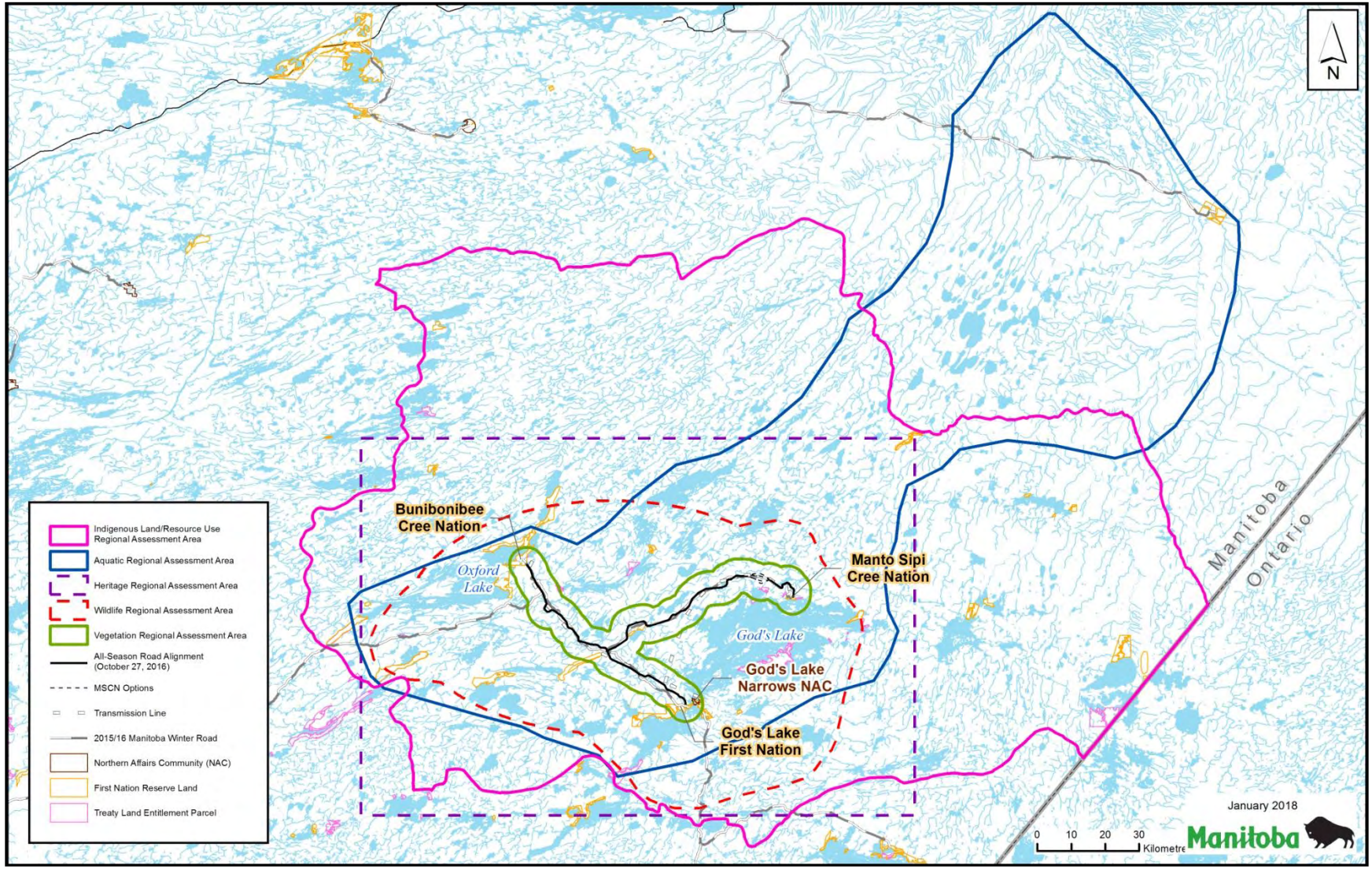

Figure 7: Regional Assessment Area for the proposed Project

5.3 Valued Components

The VCs that were selected for the effects assessments and the rationale as to why each of these components was selected is outlined in **Table 7**. A description of each selected VC is provided in **Sections 5.3.1 to 5.3.9**, including an overview of baseline activities conducted to date, anticipated changes to the environment and associated effects, mitigation measures to address potential effects and a discussion of potential residual effects that may occur as a result of the Project. A detailed description of anticipated effects to VCs as a result of the Project as well as specific mitigation measures that will be implemented is provided in **Chapter 6** of the Project 6 – All-Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation Environmental Impact Statement.

Environmental information for each VC was primarily obtained through the completion of detailed technical studies; local area Traditional Land Use and TK studies; published sources; and input received through the IPEP regarding this Project.

5.3.1 Atmospheric Environment

5.3.1.1 Air Quality

The Project falls within the High Boreal Ecoclimatic Region that forms a continuous belt from Northwestern Ontario, across central Manitoba and Saskatchewan to Great Slave Lake in the southern Northwest Territories (Smith *et al*. 1998). Four seasons with distinct temperature and precipitation regimes occur due to the continental climate. The RAA has relatively short cool summers, characterized by long days with minimal night-time darkness and long cold winters with short days and long nights.

Air quality is expected to be very good in the vicinity of the Project as the area is remote and there are no major emission sources in the RAA. It is unlikely that air quality is influenced by anything other than localized anthropogenic sources from Manto Sipi Cree Nation, Bunibonibee Cree Nation, God's Lake First Nation and God's Lake Northern Affairs Community related to operations of vehicles in the communities and along the winter road when open. The most noteworthy influence on air quality of the RAA is forest fires that occur within and beyond the RAA.

Air quality of the Project Footprint and LAA can be adversely affected by road construction, maintenance and operation activities through the generation of air-borne dust/particulates from blasting, rock crushing, stockpiling, roadbed construction, roadbed/surface repair and hauling; and emissions produced by vehicle and equipment operations. Potential environmental effects of airborne dust and emissions during Project construction, maintenance and operation phases are expected to be minor and primarily localized within the Project Footprint and LAA.

Noise is limited in the RAA and is restricted to local sources such as airplanes, vehicles on First Nation reserve roads, vehicular traffic along the winter road and snowmobile and ATV traffic on trails. Sustained sources of

Table 7: Valued Components of the Project EA and Rationale for Their Selection

Valued Component	Importance				Selection Rationale	Assessment Areas
	FN[1]	Gov't	Public [2]	Other [3]		
Physical Environment						
Atmospheric Environment		√		√	▪ there is a strong link between air quality, noise levels and vibration and other VCs ▪ changes in air quality, noise levels or vibration can affect the quality of life of people in the vicinity of the proposed Project ▪ changes in noise levels and vibration can affect fish and wildlife and disturb local residents or resource users ▪ changes to the atmospheric environment can have potential effects on climate and microclimate ▪ Agency Guidelines identify atmospheric environment as a VC to be considered for the EA (Canadian Environmental Assessment Agency 2017)	▪ Indigenous Land/Resource Use (Indigenous) LAA and RAA
Groundwater and Surface Water Quality		√		√	▪ changes to groundwater can affect the quantity and quality of surface water, which can affect the aquatic and terrestrial environments, as well as people that use these resources ▪ changes to the surface water quality can affect the aquatic and terrestrial environments and, as a result, the use of these resources for Indigenous people ▪ Agency Guidelines identify groundwater and surface water as a VC to be considered for the EA (Canadian Environmental Assessment Agency 2017) ▪ water quality is regulated under *The Water Protection Act* (Manitoba)	▪ Indigenous LAA and RAA
Fish and Fish Habitat						
Fish Habitat	√	√		√	▪ supports fish species that are of importance for Indigenous and local community culture, traditional and economic activities and values ▪ protected under the federal *Fisheries Act* which prohibits the permanent alteration or destruction of fish habitat that are part of or support a Commercial, Recreational, or Indigenous Fishery as defined by the Act ▪ effects on fish habitat is an area of federal jurisdiction and therefore is pursuant to section 5 of CEAA, 2012 ▪ Agency Guidelines identify fish habitat as a VC to be considered in the EA (Canadian Environmental Assessment Agency 2017) ▪ encompasses biophysical features of the aquatic environment and lower tropic levels (ex: aquatic plants and benthic invertebrate communities) ▪ fish habitat is often used as a surrogate for the productive capacity of aquatic habitats	▪ Aquatic LAA and RAA

Valued Component	Importance				Selection Rationale	Assessment Areas
	FN[1]	Gov't	Public [2]	Other [3]		
Fish	√	√		√	▪ fish that are part of or support the Commercial, Recreational, or Aboriginal Fishery as defined by the federal *Fisheries Act* are protected under the Act ▪ effects on fish is an area of federal jurisdiction and therefore is pursuant to section 5 of CEAA, 2012 ▪ Agency Guidelines identify fish as a VC to be considered in the EA (Canadian Environmental Assessment Agency 2017) ▪ important as a food source to people, local communities and the ecosystem that inhabit the area	▪ Aquatic LAA and RAA
Lake Sturgeon	√	√		√	▪ Southern Hudson Bay-James Bay population assessed as "Special Concern" by the COSEWIC ▪ effects on aquatic species as defined in SARA is an area of federal jurisdiction and therefore is pursuant to section 5 of CEAA, 2012 ▪ Agency Guidelines indicate that Species at Risk are to be considered in the EA (Canadian Environmental Assessment Agency 2017) ▪ subsistence harvest by First Nations in the RAA and of cultural, social and economic importance	▪ Aquatic LAA and RAA
Terrestrial Environment						
Species at Risk (Vegetation)		√		√	▪ protected under the federal SARA ▪ assessed by the COSEWIC ▪ protected under ESEA and those listed as very rare to rare by the MBCDC ▪ Agency Guidelines indicate that Species at Risk are to be considered in the EA (Canadian Environmental Assessment Agency 2017)	▪ Vegetation LAA and RAA
Key Community Harvest Areas (Vegetation)	√	√		√	▪ are of importance for Indigenous and local community culture, traditional and economic activities and values ▪ vegetation communities are an integral part of the ecosystem and provide food and habitat for wildlife	▪ Vegetation LAA and RAA
Moose (Mammals; Ungulates)	√		√	√	▪ important for Indigenous cultural and traditional activities ▪ First Nations and others hunt moose in the region as a food source ▪ ecological importance/function as prey to wolves ▪ habitat indicator – generalist and represents habitat requirements for large species group	▪ Wildlife LAA and RAA

Valued Component	Importance				Selection Rationale	Assessment Areas
	FN[1]	Gov't	Public [2]	Other [3]		
Caribou (Mammals; Ungulates)	√	√	√	√	▪ boreal woodland caribou (Norway House Range) are ranked "Threatened" by the COSEWIC, Schedule 1 of SARA and the ESEA (Manitoba), Pen Islands caribou (Eastern Migratory) are assessed as "Endangered" by the COSEWIC, regulatory need to assess critical habitat for woodland caribou ▪ Agency Guidelines indicate that Species at Risk are to be considered in the EA (Canadian Environmental Assessment Agency 2017) ▪ ecological importance/function as prey to wolves ▪ highly sensitive to construction noise and human presence ▪ First Nations hunt caribou as a food source and they are of social and cultural importance	▪ Wildlife LAA and RAA
Beaver (Mammals; Aquatic Furbearers)[7]	√		√	√	▪ commercial harvest for First Nations and others ▪ keystone and representative aquatic furbearer ▪ tolerant of human activities but, may be affected by habitat loss	▪ Wildlife LAA and RAA
Marten (Mammals; Terrestrial Furbearers)[8]	√		√	√	▪ commercial harvest for First Nations and others ▪ top level predator characteristic of upland terrestrial environments ▪ important predator/prey species	▪ Wildlife LAA and RAA
Canada Geese (Birds; Waterfowl)	√	√		√	▪ protected under the *Migratory Bird Convention Act* ▪ effects on migratory birds under the *Migratory Bird Convention Act* is an area of federal jurisdiction and therefore is pursuant to section 5 of CEAA, 2012 ▪ First Nations identified Canada Geese as an important species that is hunted in the spring and fall ▪ hunting and license under *The Wildlife Act* (Manitoba) ▪ geese are a migratory bird species that forage on grasses along shorelines and uplands, use wetlands for loafing and staging	▪ Wildlife LAA and RAA

[7] First Nation communities identified mink, muskrat and otter as potential VCs, but they were not included for the following reasons. Beaver was selected as a VC representing aquatic furbearers, which includes habitat suitable for mink, muskrat and otter. Beaver habitat can also be modelled with existing information, and their distribution and abundance can be measured through lodge and pond surveys.

[8] First Nation communities identified fisher, which is a terrestrial furbearer, as a potential VC, but it was not included for the following reasons. Marten represents habitat suitable for fisher. Marten are the main species trapped in the RAA, and baseline data from track surveys and trappers in the region exists. Data on fisher is limited and their numbers are thought to be much lower than marten in this region. Likewise, wolverine did not qualify as a VC due to their very low numbers, extremely large home ranges, and dependence on carrion, making modelling and monitoring extremely difficult.

Valued Component	Importance				Selection Rationale	Assessment Areas
	FN[1]	Gov't	Public [2]	Other [3]		
Mallard (Birds; Waterfowl; Dabbling Duck)	√	√		√	▪ protected under the *Migratory Bird Convention Act* ▪ effects on migratory birds under the *Migratory Bird Convention Act* is an area of federal jurisdiction and therefore is pursuant to section 5 of CEAA, 2012 ▪ Boreal Conservation Region 8 and North American Wildlife Management Plan (Ducks Unlimited 2012) identify mallards as a priority species ▪ First Nations in the region hunt mallards ▪ mallards are a migratory bird species that forage in areas of aquatic vegetation in shallow marshes and wetlands	▪ Wildlife LAA and RAA
Ring-necked Duck (Birds Waterfowl; Diving Duck)	√	√		√	▪ protected under the *Migratory Bird Convention Act* ▪ effects on migratory birds under the Migratory Bird Convention Act is an area of federal jurisdiction and therefore is pursuant to section 5 of CEAA, 2012 ▪ Boreal Conservation Region 8 and North American Wildlife Management Plan (Ducks Unlimited 2012) identify Ring-necked ducks as a priority species ▪ First Nations in the region hunt Ring-necked ducks ▪ ring-necked ducks are a migratory bird species that use meadows adjacent to water or emergent vegetation	▪ Wildlife LAA and RAA
Bald Eagle (Birds; Raptor)	√	√		√	▪ important to First Nations culture ▪ top predator ▪ *The Wildlife Act* (Manitoba) protects nests and nesting trees	▪ Wildlife LAA and RAA
Ruffed Grouse (Birds; Upland Game Bird)	√	√		√	▪ First Nations hunt Ruffed Grouse ▪ prey species which represent deciduous forest ▪ hunting and license under *The Wildlife Act* (Manitoba)	▪ Wildlife LAA and RAA
Magnolia Warbler (Birds; Migratory Songbird)		√		√	▪ protected under the *Migratory Bird Convention Act* ▪ effects on migratory birds under the *Migratory Bird Convention Act* is an area of federal jurisdiction and therefore is pursuant to section 5 of CEAA, 2012 ▪ found in sufficient numbers during Breeding Bird Assessment to monitor ▪ other studies to compare – increases during spruce budworm outbreaks	▪ Wildlife LAA and RAA

Valued Component	Importance				Selection Rationale	Assessment Areas
	FN[1]	Gov't	Public [2]	Other [3]		
Ovenbird (Birds; Migratory Songbird)		√		√	▪ protected under the *Migratory Bird Convention Act* ▪ effects on migratory birds under the *Migratory Bird Convention Act* is an area of federal jurisdiction and therefore is pursuant to section 5 of CEAA, 2012 ▪ well-studied (ex: fragmentation) ▪ Boreal Avian Monitoring (www.borealbirds.ca) Project test case and area-sensitive species ▪ Boreal Conservation Region 8 strategy Priority species list for stewardship	▪ Wildlife LAA and RAA
Yellow-Bellied Flycatcher (Birds; Migratory Songbird)		√		√	▪ protected under the *Migratory Bird Convention Act* ▪ effects on migratory birds under the *Migratory Bird Convention Act* is an area of federal jurisdiction and therefore is pursuant to section 5 of CEAA, 2012 ▪ ground nesting ▪ Boreal Conservation Region 8 strategy Priority species list for stewardship	▪ Wildlife LAA and RAA
Palm Warbler (Birds; Migratory Songbird)		√		√	▪ protected under the *Migratory Bird Convention Act* ▪ effects on migratory birds under the *Migratory Bird Convention Act* is an area of federal jurisdiction and therefore is pursuant to section 5 of CEAA, 2012 ▪ neotropical migrant songbird occupying bogs and open coniferous forests	▪ Wildlife LAA and RAA
Spring Peeper (Amphibian)		√		√	▪ numerous in the RAA ▪ characteristic of woodland ponds, near their northern range which generally extends east of Lake Winnipeg ▪ food web function	▪ Wildlife LAA and RAA
Indigenous and Human Environment						
Land and Resource Use	√	√	√	√	▪ effects on the current use of lands and resources for traditional purposes is an area of federal jurisdiction and therefore is pursuant to section 5 of CEAA, 2012 ▪ Agency Guidelines indicate that Indigenous peoples be considered for the EA (Canadian Environmental Assessment Agency 2017) ▪ several fish, plant and wildlife species are important to Indigenous and local community cultural, traditional and/or economic activities and values	▪ Indigenous LAA and RAA

Valued Component	Importance				Selection Rationale	Assessment Areas
	FN[1]	Gov't	Public [2]	Other [3]		
Travel Routes	√			√	▪ may interact with, and potentially be affected by, the proposed Project, types of travel routes that may be affected include access to waterways, portages and other trails ▪ Agency Guidelines indicate that Indigenous peoples be considered for the EA (Canadian Environmental Assessment Agency 2017) ▪ importance for Indigenous and local community culture, as well as traditional activities and values ▪ First Nations rights to navigation of waterways are protected under Treaty (Government of Canada 2013)	▪ Indigenous LAA and RAA
Economy	√	√		√	▪ changes to the economy and potential effects of these changes on Indigenous people must be evaluated pursuant to section 5 of CEAA, 2012 ▪ Agency Guidelines indicate that Indigenous peoples be considered for the EA (Canadian Environmental Assessment Agency 2017) ▪ concern was raised during Round 4 of the IPEP about the price of goods and cost of living given that winter roads are not open as much as in the past given the effects of global warming	▪ Indigenous LAA and RAA
Heritage and Archaeological Resources	√	√		√	▪ effects on physical and cultural heritage and any structure, site or thing that is of historical, archaeological, paleontological or architectural significance is an area of federal jurisdiction and therefore is pursuant to section 5 of CEAA, 2012 ▪ Agency Guidelines indicate that Indigenous peoples be considered for the EA (Canadian Environmental Assessment Agency 2017) ▪ important for Indigenous and local community cultural and traditional activities and values ▪ protected under *The Heritage Resources Act* (Manitoba)	▪ Heritage Resources LAA and RAA
Human Health and Safety		√		√	▪ linked to section 5 of CEAA, 2012 ▪ Agency Guidelines indicate that the EA should describe how changes to the environment potentially caused by the proposed Project will affect human health (Canadian Environmental Assessment Agency 2017) ▪ changes to the atmospheric environment can affect human health	▪ Indigenous LAA and RAA

[1] Bunibonibee Cree Nation, Manto Sipi Cree Nation, God's Lake First Nation and God's Lake Narrows Northern Affairs Community.

[2] Public and stakeholder input.

[3] Primary data collection, literature references, expert input and professional judgement.

noise originate only from the communities of Manto Sipi Cree Nation, Bunibonibee Cree Nation, God's Lake First Nation and God's Lake Northern Affairs Community.

Few human receptors are present within the Project Footprint as there are no known residences or cabins in immediate proximity to the proposed all-season road alignment. Construction activities for the project are located approximately 250 m from the nearest known residence in Manto Sipi Cree Nation, 1.5 km in Bunibonibee Cree Nation and God's Lake First Nation and 3 km in God's Lake Narrows Northern Affairs Community. Ambient noise levels may increase from vehicle and equipment use during construction, maintenance and operation of the all-season road. In addition, rock blasting represents a source of noise during construction.

Project-related construction or operational noise would be well below levels which would affect human health given the distance between the all-season road and buildings in the communities. Noisy construction activities such as blasting are confined to daylight times (8 AM to 6 PM) by Manitoba Regulations (*The Mines and Minerals Act*) and within construction areas. No adverse effects of noise on local communities related to the construction phase are expected due to landscape buffering features and distance of Project components from local buildings (see also **Section 5.3.9.5** Health and Safety).

Potential environmental effects on air quality that may occur over the course of the Project and proposed mitigation measures that will be used to reduce the potential for effects to the atmospheric environment are summarized in **Table 8**.

Table 8: Summary of Potential Environmental Effects and Proposed Mitigation Measures during Construction, Maintenance and Operation Phases for Air Quality

Potential Environmental Effects	Mitigation Measures
▪ increase in particulates (dust) from construction, maintenance and operation activities (ex: blasting, rock crushing, stockpiling, roadbed construction, roadbed/surface repair, hauling and public road traffic) and use of construction vehicles and equipment, maintenance equipment and public vehicles ▪ increase in vehicle emissions (ex: sulfur oxide, nitrogen oxide and diesel particulates) from vehicle and equipment use during construction, maintenance and operation ▪ increase in ambient noise levels from blasting and vehicle and equipment use during construction, maintenance and operation	▪ dust suppression (EP18 and ES 130.11) ▪ construction vehicle speed limits during construction ▪ public vehicle speed limits ▪ dust control product application in key problem areas (EP18 and ES 130.11) ▪ aggregate size control and use of granitic material reduces dust generation from roadbed ▪ use low sulphur fuels ▪ require a high standard of maintenance of equipment and vehicles ▪ limit unnecessary long-term idling ▪ apply typical noise suppression techniques (EP4 and ES 130.12) ▪ forest buffers will be retained, unless clearing is required for safety reasons, around quarries to reduce noise from blasting operations

Following the application of mitigation measures, the residual Project–related effects remaining for air quality are as follows.

- An increase in particulates from road construction, maintenance and operation activities (ex: blasting, rock crushing, stockpiling, roadbed construction, roadbed/surface repair, hauling and public road traffic) and use of construction vehicles and equipment, maintenance equipment and public vehicles.
- An increase in vehicle emissions from vehicle and equipment use during construction, maintenance and operation.
- An increase in ambient noise levels from blasting and vehicle and equipment use during construction, maintenance and operation.

Increases in particulates ($PM_{2.5}$, PM_{10}) from road construction are anticipated to be short-term, associated with discrete activities, and occur sporadically. Increases in particulates are expected to be above baseline but within Canadian Ambient Air Quality (CAAQS) Standards and Manitoba Ambient Air Quality Objectives and Guidelines (MAAQOG) criteria and limited to the immediate vicinity (100 m) of the portion of the Project Footprint under active construction.

Increases in particulates ($PM_{2.5}$, PM_{10}) from road maintenance are anticipated to be long-term, over the life of the Project, and occur sporadically. Increases in particulates are expected to be above baseline, but within CAAQS Standards and Manitoba MAAQOG criteria and limited to the immediate vicinity (100 m) of the portion of the Project Footprint under active maintenance.

Increases in particulates ($PM_{2.5}$, PM_{10}) from operation (traffic) are anticipated to be long-term, over the life of the Project and occur regularly and frequently during summer and fall. Increases in particulates are expected to be above baseline but within CAAQS and MAAQOG criteria and limited to the Project Footprint (60-m cleared area).

Increases in vehicle emissions (sulfur oxides, nitrogen oxides, and diesel particulates) during construction, maintenance, and operation are anticipated to be long-term, over the life of the Project, and occur regularly and frequently. Increases in vehicle emissions are expected to be above baseline but within CAAQS and MAAQOG criteria and emissions sources will be limited to the Project Footprint (60-m cleared area).

Increases in ambient noise levels during construction, maintenance, and operation are anticipated to be long-term, over the life of the Project, and occur regularly and frequently. Increases in ambient noise levels are expected to be above baseline but below World Health Organization guidelines (Berglund Et. Al., 1999), and Manitoba Quarry Regulations (Mines and Minerals Act, 1992) for local receptors and regulations for construction workers (Workplace Safety and Health Regulations M.R. 217/2006), and limited to the LAA (10-km buffer of ASR).

No significant adverse residual effects on air quality are anticipated to occur as a result of the Project following the implementation of mitigation measures.

5.3.1.2 Greenhouse Gases

Climate change has been linked to greenhouse gas (GHG) emissions that contribute to atmospheric increases in levels of CO_2 and other gases (ex: CH_4, N_2O) that increase global temperatures, change climate and precipitation patterns and increase the frequency of extreme weather events. GHG emissions for the current, undeveloped state of the Project are estimated at 1,953 tonnes of CO_2, 20 tonnes of CH_4 and 0.1 tonnes of N_20, which equate to a total of 2,481 tonnes of CO_2equivalent (CO_2e) per year (Dillon Consulting Limited 2017). This value includes the estimated GHG emissions associated with the existing winter road (construction and vehicular use), area air travel and forest processes (land cover and forest sequestration).

Construction of the Project is expected to increase annual GHG emissions to 16,548 tonnes of CO_2, 21 tonnes of CH_4 and 0.8 tonnes of N_20, which equate to a total of 17,288 tonnes CO_2e during the construction phase of the project (Dillon Consulting Limited 2017). During operation, the increase in GHG emissions related to the loss in carbon sink would be offset by a reduction in GHG emissions with the change in mode of transportation. GHG emissions during operation are estimated to be 2,369 tonnes CO_2e per year which is a slight decrease (positive change). The decrease in emissions relates to the improved road surface on the all-season road relative to the winter road and subsequent improvements in fuel efficiency.

GHG emissions can be affected by operation of equipment, machinery and vehicles during road construction, maintenance and operation activities. Potential environmental effects of GHG emissions during Project construction, maintenance and operation phases are expected to be minor with emission sources limited to the Project Footprint. **Table 9** summarizes the potential environmental effects on GHG emissions that may occur over the course of the Project and proposed mitigation measures that will be used to reduce the potential for effects to the atmospheric environment.

Table 9: Summary of Potential Environmental Effects and Proposed Mitigation Measures during Construction, Maintenance and Operation Phases for Greenhouse Gas Emissions

Potential Environmental Effects	Mitigation Measures
▪ increase in GHG emissions from construction vehicles and equipment ▪ increase in GHG emissions from operation of the all-season road and loss of carbon sink from ROW clearing	▪ use low sulphur fuels ▪ regular vehicle/equipment maintenance (ES 130.6.3) ▪ limit traffic to construction vehicles and equipment during construction activities ▪ alignment selected to traverses some already disturbed areas to reduce the loss of carbon sink ▪ limit maintenance and operation equipment idling ▪ improved road surface reduces GHG production by improved road surface and reducing air traffic among communities

Following the application of mitigation measures, the residual Project–related effects remaining for GHG emissions are as follows.

- An increase in GHG emissions from construction vehicles and equipment during construction.
- A negligible increase in GHG emissions from operation of the all-season road and loss of carbon sink from ROW clearing that would likely be offset by increased efficiency and change in modes of transportation utilized.

Increases in greenhouse gas emissions (carbon dioxide, methane, and nitrous oxide) during construction are anticipated to be medium-term, until construction completion, and occur regularly and frequently. Increases in greenhouse gas emission are expected to be less than 0.1% of Canada's 2030 target and emission sources will be limited to the Project Footprintt (60-m cleared area).

Increases in greenhouse gas emissions (carbon dioxide, methane, and nitrous oxide) and loss of carbon sink during maintenance and operation, are anticipated to be long-term, for the life of the Project, and regular and frequent. Increases in greenhouse gas emission are expected to be less than 0.1% of Canada's 2030 target and emission sources will be limited to the Project Footprint (60-m cleared area).

No significant adverse residual effects related to GHG emissions are anticipated to occur as a result of the Project following the implementation of mitigation measures.

5.3.2 Geology and Geochemistry

The bedrock geology in the vicinity of the proposed Project consists of Precambrian rock from the Archean era (Manitoba Growth, Enterprise and Trade 2017; Betcher *et al*. 1995). The surficial geology of the area is characterized by discontinuous till deposits over bedrock outcrops, organic deposits and glaciolacustrine sediments (Smith *et al*. 1998). Baseline concentrations of contaminants of concern and characterization of geochemical leaching potential were not collected as this is beyond the scope of the EA.

Given the nature of the all-season road, there is little to no likelihood of significant adverse effects due to acid rock generation resulting from the Project. The effects of construction activities would generally be limited to surface and sub-surface soils in areas that are physically disturbed within the construction footprint. An evaluation of the potential for local bedrock formations to generate acid drainage would be undertaken in the future during project design. This would be done by examining available geological and mineralogical data such as records of known sulphide mineralization including pyrite lithologies for the detailed road design and quarry areas, with the intent of avoiding formations with high acid drainage generation potential. As part of the quarry site selection criteria, potential sites and construction materials would be assessed for presence of sulphide mineralization or pyritic lithologies as discussed in EPs.

There are no mineral leases, patent mining claims, potash withdrawals, private quarry permits or quarry and surface leases in the vicinity of the proposed Project. There are however various mines, mining claims, quarry withdrawals, mineral exploration licences and casual quarry permits (annually-issued).

The Project would have little to no change to geology or geochemistry, and therefore there are no significant residual effects.

5.3.3 Topography and Soil

The Hayes River Upland Ecoregion is underlain by crystalline Archean massive rocks which form broad sloping uplands and lowlands. The area was strongly glaciated and is characterized by ridged to hummocky bedrock outcrops covered with discontinuous areas of acidic sandy till to the south and calcareous, sandy to loamy cobbly glacial till to the north. The physiography consists of undulating, hummocky and ridged morainal plains. Clayey glaciolacustrine veneers and blankets occur throughout and are common on lower slopes and in depressions (Smith *et al*. 1998). The glaciolacustrine sediments are often covered by peat bogs and fens which occupy extensive areas.

There would be little potential change to local physiography as a result of the Project. Construction of quarries and borrows pits for road construction would result in removal of soil and subsequent terrain alteration. Physical disturbance to soils along the road alignment would generally be limited to the removal of soils (where required to achieve desired grade/elevation), surface grading of soils directly within the construction footprint and the placement of non-native materials in places where soils are not suitable for road construction.

Soils consist of well to imperfectly drained eluviated eutric brunisols and grey luvisols, which can be found on upland clayey glaciolacustrine deposits. Soils within bogs consist of deep slightly decomposed sphagnum and feather moss peat (fibrosols), moderately decomposed moss and forest peat (mesisols) and areas of permafrost (organic cryosols). In the northern part of the all-season road alignment organic soils including organic cryosols associated with widespread permafrost in peatlands such as veneer and peat plateau bogs.

Soils can be affected by terrain alteration during construction, contamination from equipment, machinery and vehicles during road construction, maintenance and operation activities. **Table 10** summarizes the potential environmental effects of the Project on soils that may occur over the course of the Project and proposed mitigation measures that will be used to reduce the potential for effects to the environment.

Table 10: Summary of Potential Environmental Effects and Proposed Mitigation Measures during Construction, Maintenance and Operation Phases for Soils

Potential Environmental Effects	Mitigation Measures
▪ terrain alterations resulting from quarries and borrow pits developed during construction ▪ increase in contaminant concentrations (ex: hydrocarbons) in soil due to spills of fuel or hazardous materials from construction equipment or vehicles and vehicular accidents ▪ loss of granular/lacustrine soils (sand and gravel) for use as construction materials ▪ loss of granular/lacustrine soils (sand and gravel) for use as maintenance materials throughout operation	▪ alignment avoids low lying areas requiring extensive fill ▪ design to minimize requirements for terrain alterations associated with construction, borrow and quarrying activities ▪ decommission and rehabilitate disturbed areas not required for Project maintenance and operation (EP22 and ES 130.8.7) ▪ designated re-fuelling areas and fuel handling procedures (EP2 and ES 130.9.2.5 ex: secondary containment, approved storage tanks, maintain spill control and clean-up equipment, emergency response plan with spill containment/clean-up procedures) ▪ improved road conditions, sight lines and approaches will reduce likelihood and frequency of accidents and improve access for spill response crews ▪ soil remediation to CCME guidelines (EP3 and ES 130.10) ▪ road design minimizes long term maintenance and wash out potential to reduce need for materials

Following the application of mitigation measures, the residual Project–related effects remaining for soils are as follows.

- The negligible alteration of terrain due to quarry and borrow pit development during construction.
- An increase in contaminant concentrations in soil due to spills of fuel (ex: hydrocarbons) or hazardous materials from construction equipment or vehicles and vehicular accidents.
- Loss of granular/lacustrine soils (sand and gravel) for use as construction and maintenance materials.

Terrain alterations during the development of quarries and borrow pits during construction are anticipated to be short-term and only occur at the time of quarry/borrow pit development and use. Effects to terrain are expected to be minor and limited to the Project Footprint (60-m cleared area).

Increase in contaminant concentrations (ex. hydrocarbons) in soil from spills of fuel or hazardous materials from construction equipment or vehicles and vehicular accidents are anticipated be long-term, for the life of the Project and will occur infrequently during operation and sporadically during construction. Soils with contaminants will be limited to the Project Footprint (60-m cleared area) and will be remediated to CCME regulations.

Loss of granular/lacustrine soils (sand and gravel) from use as construction materials is anticipated to be long-term, for the life of the Project and occur infrequently during construction. Loss of granular/lacustrine soils during maintenance and throughout operation is anticipated to be long-term, for the life of the Project and occur sporadically during operation and maintenance. Loss of

granular/lacustrine soils during construction and operation/maintenance is expected to be minor and limited to the Project Footprint (60-m cleared area).

No significant adverse residual effects related to soils are anticipated to occur as a result of the Project following the implementation of mitigation measures.

5.3.4 Groundwater and Surface Water

5.3.4.1 Surface Water

Surface waters in the area generally drain to the north-east as part of the Hayes River Drainage Basin. Oxford Lake (location of Bunibonibee Cree Nation) is situated on the Hayes River system and flows in a generally north-east direction until it discharges into Hudson Bay. God's Lake (location of Manto Sipi Cree Nation and God's Lake First Nation) outlets to God's River which flows north-east until it discharges into the Hayes River and on to Hudson Bay. Water levels in the region are not regulated. The extensive bogs and fens in this area provide considerable surface water storage and drain to area creeks, rivers and lakes via small, often undefined drainage paths. Lake water levels in the region remain relatively stable with slightly higher levels in late spring/early summer. River water levels show expected seasonal discharge patterns with a spring freshet flow increase beginning in April to May, generally peaking in May and reducing to a relatively stable level by summer for the remainder of the year.

Field studies were carried out to assess baseline surface water quality in the LAA at planned major watercourse crossings. As is typical in boreal forest areas, water quality in waterbodies along the all-season road alignment had slightly acidic pH values (low pH), low specific conductance, relatively low nutrient concentrations and high clarity. The proposed Project would require construction of 51 culvert crossings at watercourses along the all-season road alignment and the God's River and Magill Creek crossings would require bridges. Smaller streams in the area are often part of boreal wetlands such as bogs and fens that drain local areas into larger creeks, rivers or lakes and are usually less than 1 m in depth. Surface water is used for potable water in the communities of Manto Sipi Cree Nation, Bunibonibee Cree Nation, God's Lake First Nation and God's Lake Northern Affairs Community.

Potential effects to surface water are anticipated to be related to Project construction, maintenance and operation activities such as vegetation clearing, equipment set-up and use, road construction activities (topsoil stripping, soil removal, rock placement), various in-stream works (culvert installation, bridge construction), concrete use and debris removal. **Table 11** provides a summary of potential environmental effects on surface water that may occur over the course of the Project and proposed mitigation measures that will be used to reduce potential effects.

Table 11: Summary of Potential Environmental Effects and Proposed Mitigation Measures during Construction, Maintenance and Operation Phases for Surface Water

Potential Environmental Effects	Mitigation Measures
▪ disruption of surface drainage and flow systems from the all-season road, quarries and borrow pits, access roads, watercourse crossings and road drainage resulting in increased or decreased flows in watercourses ▪ reduced surface water quality as a result of erosion and sedimentation from all-season road, quarries, borrow pits, access roads, watercourse crossings and associated work areas ▪ reduced surface water quality as a result of spills of fuel or hazardous materials from construction equipment or vehicles and vehicular accidents	▪ bridges and culverts at watercourse crossings and equalization culverts will accommodate 1:50 year flood events ▪ regular culvert maintenance and cleanouts (EP11 and ES 130.15.9) ▪ adhere to Manitoba Stream Crossing Guidelines for Protection of Fish and Fish Habitat, Fisheries and Oceans Canada's (DFO) measures to avoid causing harm to fish and fish habitat including aquatic species at risk, EP7 and ES 130.15.5 ▪ minimize clearing and soil disturbance ▪ limit vehicle/equipment use to ROW ▪ install erosion and sediment control measures (EP16 and ES 130.16, ex: silt fencing, erosion control blanket, straw wattle, geotextile) ▪ maintain natural drainage and re-grade disturbed areas to limit erosion ▪ conduct clearing during winter months (ES 130.17) ▪ preserve vegetation buffers at watercourses (ES 130.15.1) ▪ suspend construction activities during extreme weather events (EP6) ▪ energy dissipation controls (ex: ditching, rip-rap, collection ponds) ▪ decommission and rehabilitate disturbed areas not required for Project maintenance and operation (EP22 and ES 130.8.7) ▪ designated re-fuelling areas and fuel handling procedures (EP2 and ES 130.9.2.5 ex: at least 100 m from water bodies, secondary containment, approved storage tanks, maintain spill control and clean-up equipment, emergency response plan with spill containment/clean-up procedures) ▪ equipment and vehicles will be clean and free of leaks upon arrival to site and kept in good repair (EP6 and ES 130.15.3) ▪ improved road conditions, sight lines and approaches will reduce likelihood and frequency of accidents and improve access for spill response crews ▪ soil remediation to CCME guidelines (EP3 and ES 130.10)

Following the application of mitigation measures, the residual Project–related effects remaining for surface water are as follows.

- Disruption of surface drainage and flow systems from all-season road, quarries and borrow pits, access roads, watercourse crossings and road drainage resulting in increased or decreased flows in watercourses.
- Reduced surface water quality as a result of erosion and sedimentation from the all-season road, quarries, borrow pits, access roads, watercourse crossings and associated work areas.
- Reduced surface water quality as a result of spills of fuel or hazardous materials from construction equipment or vehicles and vehicular accidents.

Disruption of surface drainage and flow systems resulting in increased or decreased flows in watercourses from development of quarries and borrow pits, access roads, road drainage during construction, and maintenance of all-season road and watercourse crossings is anticipated to be long-term, for the life of the Project and occur infrequently. Changes in flows will likely be within the natural variation; however, flows may be altered in watercourse beyond the footprint within the LAA (10-km of ASR).

Reduced surface water quality as a result of erosion and sedimentation during the development of quarries and borrow pits, access roads and associated work areas during construction and construction and maintenance of the ASR and water crossings are anticipated to be medium-term, for >1 year to 10 years and occur sporadically. As suspended sediment concentrations will be within applicable regulations, no adverse effects are anticipated beyond defined mixing zones. Erosion and sedimentation may alter water quality within the Project Footprint (100-m ROW)

Reduced surface water quality from spills of fuel or hazardous materials from construction equipment or vehicles and vehicular accidents are anticipated to be long-term, for the life of the Project, where spills to soil would be remediated, preventing effect to water. As contaminant concentrations in soils will be remediated to within applicable CCME guidelines, there are no anticipated effects to surface water quality beyond the defined mixing zones. Water quality may be altered within the Project Footprint (100-m ROW).

No significant residual adverse effects on surface water are anticipated to occur as a result of the Project following the implementation of mitigation measures.

5.3.4.2 Groundwater

The demand for groundwater in the region is low as surface water is abundant. Consequently, there is little information known about the distribution of aquifers, their yield or water quality. Supplies of groundwater are available from Precambrian crystalline igneous and metamorphic rocks and from sand and gravel materials in the overlying Quaternary sediments (Betcher *et al*. 1995). Unfractured crystalline igneous and metamorphic rocks typically have low hydraulic conductivity. Movement of groundwater commonly occurs through secondary permeability features such as faults, sheers or joints. The zone of groundwater circulation is thought to occur in the upper 60 to 150 m of bedrock where some features (joints) are more common. Frozen ground affects northern hydrology through influence on infiltration, runoff and groundwater storage and flow (Woo *et al*. 1992). The presence of permafrost can restrict groundwater flow.

Potential effects to ground water availability and quality are anticipated to be related to Project construction, maintenance and operation activities such as quarry and borrow pit construction and spills of fuel or hazardous substances materials. Anthropogenic contamination of groundwater in the RAA is expected to be negligible due to the remoteness of the proposed Project and the relative absence of human settlement and industrial or commercial development. A summary of potential environmental effects on ground water that may occur over the course of the Project and proposed mitigation measures that will be used to reduce potential effects is provided in **Table 12**.

Table 12: Summary of Potential Environmental Effects and Proposed Mitigation Measures during Construction, Maintenance and Operation Phases for Groundwater

Potential Environmental Effects	Mitigation Measures
▪ dewatering of local groundwater at construction quarries and borrow pits ▪ reduced groundwater quality as a result of spills of fuel or hazardous materials from construction equipment or vehicles and vehicular accidents	▪ quarries will be appropriately located (EP20, ex: locate quarries and borrow pits away from existing wells) ▪ designated re-fuelling areas and fuel handling procedures (EP2 and ES 130.9.2.5 ex: away from existing wells, secondary containment, approved storage tanks, maintain spill control and clean-up equipment, emergency response plan with spill containment/clean-up procedures) ▪ improved road conditions, sight lines and approaches will reduce likelihood and frequency of accidents and improve access for spill response crews ▪ soil and groundwater remediation to CCME guidelines (EP3 and ES 130.10)

Following the application of mitigation measures, the residual Project–related effects remaining for groundwater are as follows.

- The dewatering of local groundwater at construction quarries and borrow pits.
- A reduction in groundwater quality as a result of spills of fuel or hazardous materials from construction equipment or vehicles and vehicular accidents.

Reduced groundwater table from dewatering of local groundwater at construction quarries and borrow pits is anticipated to be short-term, associated with discrete activities and would occur sporadically. A potential change to the groundwater table of <15% of seasonal average could occur, but is expected to be localized to areas around quarries and borrow pits within the Project Footprint (100-m ROW).

Reduced groundwater quality from spills of fuel or hazardous materials from construction equipment or vehicles and vehicular accidents is anticipated to be long-term, for the life of the Project. However, spills to soil would be remediated to CCME guidelines to prevent effects to groundwater. As soil contaminant concentrations will be keep within applicable guideline levels, no adverse effects to surface water are anticipated. Groundwater quality may be altered within the Project Footprint (100-m ROW).

No significant residual adverse effects on ground water are anticipated to occur as a result of the Project following the implementation of mitigation measures.

5.3.5 Riparian, Wetland and Terrestrial Environment

5.3.5.1 Vegetation and Wetlands

Information collected during the baseline field and desktop studies was used to characterize the vegetation communities in the Project study areas and provide an assessment of potential effects on vegetation communities in relation to the proposed Project. Vegetation surveys were conducted to record vegetation species and community composition along the proposed all-season road alignment and quarry areas. A total of 143 plant species were recorded, included 116 angiosperms (37 monocotyledons and 79 dicotyledons), eight primitive vascular plants (ex: ferns and horsetails), 5 gymnosperms (ex: conifers) and 14 non-vascular plants (ex: mosses and lichens) (Szwaluk Environmental Consulting Ltd *et al*. 2017b). No

plant Species at Risk were observed during field studies. No invasive and non-native species were observed during field studies.

Forested sites were classed into 11 vegetation community types using the Forest Ecosystem Classification for Manitoba (Zoladeski *et al*. 1995) and wetland sites were classed into five community types (Ducks Unlimited Canada 2015). Vegetation classes within the Project study areas consist predominantly of coniferous forest, with abundant wetland areas and smaller areas of deciduous forest, mixedwood and tall shrub. The distribution of wetlands types in the Project study areas includes primarily bog and fen complexes, with occasional non-patterned fens classed as shrubby, or with an open (less than 10%), or treed (greater than 10%) canopy.

Plant species identified as having sustenance and cultural value to the local communities (for food, medicinal and firewood purposes), were identified at sites surveyed along the proposed all-season road and quarry areas. A total of 12 cultural plant species were observed during Project field studies.

Potential effects on vegetation communities may be related to Project construction, maintenance and operation processes such as vegetation clearing, introduction and spread of non-native and invasive plants, release of hazardous substance and increased risk of forest fire. Potential environmental effects that may occur over the course of the Project and proposed mitigation measures that will be used to reduce the potential for effects to vegetation and wetland communities are summarized in **Table 13**.

Table 13: Summary of Potential Environmental Effects and Proposed Mitigation Measures during Construction, Maintenance and Operation Phases for Vegetation

Potential Environmental Effects	Mitigation Measures
▪ disturbance to or loss of plant communities (reduced diversity) and fragmentation due to clearing of native vegetation within the ROW, temporary access roads, quarries, borrow pits, work areas and camps during construction and maintenance ▪ disturbance to or loss of wetlands (ex: fens, bogs, marshes, peatlands) due to clearing and construction of the all-season road ▪ increased risk for invasive and non-native plant species to displace native plant communities, modifying the vegetation composition and structure during construction, maintenance and operation	▪ limit clearing to designated areas within the ROW (EP1 and ES 130.17.1) ▪ restrict equipment and vehicle use outside of cleared areas (ES 130.6.1) ▪ decommission and rehabilitate disturbed areas not required for Project maintenance and operation (EP22 and ES 130.8.7) ▪ follow clearing and grubbing timelines and restrictions (EP1 and ES 130.17.1) ▪ re-vegetation will use locally and regionally compatible species (native) (ES 130.16.13) ▪ alignment avoids low lying wetland areas where there are better conditions in the immediate vicinity ▪ undertake construction activities in bog/fens during winter months to extent possible ▪ camps, temporary access roads, work areas and quarries and borrow pits will not be located in wetlands (EP20) ▪ equalization culverts will accommodate 1:50 year flood events and maintain local landscape hydraulics ▪ regular culvert maintenance and cleanouts (EP11 and ES 130.15.9) ▪ clean construction equipment and vehicles prior to bringing them to site (EP25) ▪ targeted herbicide use, where to manage invasive weedy species

Potential Environmental Effects	Mitigation Measures
▪ impairment or loss of vegetation and desirable species as result of spills of fuel or hazardous materials from construction equipment or vehicles and vehicular accidents and potential use of herbicides during maintenance ▪ increased risk of wildfires from fires and explosions during construction and maintenance and carelessness during operation	▪ designated re-fuelling areas and fuel handling procedures (EP2 and ES 130.9.2.5, ex: secondary containment, approved storage tanks, maintain spill control and clean-up equipment, emergency response plan with spill containment/clean-up procedures) ▪ improved road conditions, sight lines and approaches will reduce likelihood and frequency of accidents and improve access for spill response crews ▪ soil remediation to CCME guidelines (EP3 and ES 130.10) ▪ limit herbicide application beyond road shoulder and apply according to manufacturers' guidelines and permit terms and conditions ▪ combustible materials and explosives will be stored and handled in a safe manner (EP2 and ES 130.9) ▪ burning will only be done under controlled conditions (monitored), according to burning permits and avoid windy and dry conditions (EP1, EP15 and ES 130.20) ▪ wildfires will be immediately reported to MSD and construction activities stopped until safe to resume (ES 130.20.11) ▪ reasonable attempts will be made to extinguish wildfires (ES 130.20.12)

Following the application of mitigation measures, the residual Project–related effects remaining for vegetation and wetlands are as follows.

- Disturbance to or loss of plant communities (reduced diversity) and fragmentation due to clearing of native vegetation within the ROW, temporary access roads, quarries, borrow pits, work areas and camps during construction and maintenance.
- Disturbance to or loss of wetlands (ex: bog, fen, marsh, swamp, shallow water) due to clearing and construction of the all-season road.
- An increased risk for invasive and non-native plant species to displace native plant communities and modify the vegetation composition and structure during construction, maintenance and operation.
- Impairment or loss of vegetation and desirable species as result of spills of fuel or hazardous materials from construction equipment or vehicles and vehicular accidents and potential use of herbicides during maintenance throughout the life of the Project.
- An increased risk of wildfires from fires and explosions during construction and maintenance and carelessness during operation.

Disturbance to or loss of plant communities (reduced diversity) and fragmentation from clearing of native vegetation within the ROW, temporary access roads, quarries, borrow pits, work areas and camps during construction and maintenance are anticipated to be long-term, for the life of the Project, and occur infrequently. This disturbance may measurably affect common vegetation species or communities but would be limited to the Project Footprint (100-m ROW).

Disturbance to or loss of wetlands (ex. fens, bogs, marshes, peatlands) during clearing and construction of the ASR is anticipated to be long-term, for the life of the Project and occur infrequently. This disturbance may measurably affect common vegetation species and plant communities, but will be limited to the Project Footprint (100-m ROW).

Increased risk for invasive and non-native plant species to displace native plant communities, modifying the vegetation composition and structure during clearing of native vegetation and use of equipment and vehicles during construction is anticipated to be long-term, for the life of the Project and occur continuously. This risk may measurably affect common vegetation species or communities, but will be limited to the Project Footprint (100-m ROW).

Impairment or loss of vegetation and desirable species from spills of fuel or hazardous materials from construction equipment or vehicles and vehicular accidents and potential use of herbicides during maintenance are anticipated to be long-term, for the life of the Project and occur sporadically. The effects to impairment or loss of vegetation and desirable species is considered minor to common vegetation species and communities and is limited to the Project Footprint (100-m ROW).

Increased risk of wildfires from fires and explosions during blasting, burning and use of equipment during construction and maintenance and carelessness during operation is anticipated to be long-term, for the life of the Project and occur sporadically. This risk may measurably affect common vegetation species or communities and the effect may extend beyond the LAA (2-km of ASR).

No significant residual adverse effects on vegetation, including wetlands and plants of cultural importance are anticipated to occur as a result of the Project following the implementation of mitigation measures.

5.3.5.2 Mammals

5.3.5.2.1 Ungulates

Ungulate species in the Project area include moose and woodland caribou. Two woodland caribou ecotype populations overlap the RAA including the Pen Islands (Eastern Migratory) and Norway House (Boreal Woodland) caribou ranges/populations. Pen Islands caribou are categorized as the migratory ecotype, also referred to as “forest-tundra” ecotype, whereas Norway House caribou are classified as the sedentary ecotype, also referred to as “forest-dwelling” or “boreal forest” ecotype (COSEWIC 2011b; Manitoba Boreal Woodland Caribou Management Committee 2015). Ungulates are important for food and cultural purposes, play a key role in the local ecosystem and are of high hunting value (moose).

Ungulate studies, as well as broader wildlife investigations, were conducted in the RAA to identify Species at Risk, assess habitat types and complete habitat modelling. Potential effects on ungulates and ungulate habitat may occur as a result of Project construction, maintenance and operation activities such as vegetation clearing, equipment set-up and use (sensory disturbance), increased hunting pressure, collisions with vehicles, increased predation and introduction of disease. Potential environmental effects that may occur over the course of the Project and proposed mitigation measures that will be used to reduce the potential for effects to ungulates are summarized in **Table 14**.

Table 14: Summary of Potential Environmental Effects and Proposed Mitigation Measures during Construction, Maintenance and Operation Phases for Ungulates

Potential Environmental Effects	Mitigation Measures
▪ alteration, fragmentation and/or loss of moose and caribou habitat due to clearing of native vegetation within the ROW, temporary access roads, quarries, borrow pits, work areas and camps during construction and maintenance ▪ increased sensory disturbance to and displacement of moose and caribou due to vehicle and equipment noise and vibration during construction, maintenance and operation ▪ increased moose and caribou mortality due to increased hunting pressures during construction and with increased access along the all-season road during operation ▪ increased moose and caribou mortality due to vehicular collisions during construction, maintenance and operation ▪ increased moose and caribou mortality due to increased predation by wolves from increased access beyond that provided by the existing winter road and transmission lines ▪ increased moose and caribou mortality due to introduction of disease from white-tailed deer (ex: brainworm, liverfluke)	▪ follow clearing and grubbing (EP1 and ES 130.17.1) and blasting (EP14 and ES 130.19) timelines and restrictions to avoid critical calving times ▪ use baseline studies to identify location of calving areas and mineral licks to be avoided ▪ limit clearing to designated areas within the ROW using existing cutlines, routes and trails where they are present (EP1 and ES 130.17.1) ▪ restrict equipment and vehicle use outside of cleared areas (ES 130.6.1) ▪ decommission and rehabilitate disturbed areas not required for Project maintenance and operation (EP22 and ES 130.8.7) ▪ bridges and culverts at watercourse crossings will accommodate 1:50 year flood events with regular culvert maintenance and cleanouts (EP11 and ES 130.15.9) to maintain wetland hydrologic regime ▪ preserve vegetation buffers at watercourses (ES 130.15.1) ▪ stage construction activities to limit the extent of noise disturbance during critical calving times to defined areas ▪ apply typical noise (EP4 and ES 130.12) and dust suppression (EP18 and 130.11) techniques ▪ prohibit hunting by MI employees and contractors working on the Project (EP14 and ES 130.19.1) ▪ firearm possession prohibited in construction camps ▪ decommission and reclaim temporary access roads and winter road access points following completion of construction (EP21, EP22 and ES 130.8.7) ▪ restrict access to quarry areas during maintenance and operation phase ▪ design road with no pullouts or parking areas ▪ MI will liaise with MSD and participate on committees and working groups and share wildlife information obtained through monitoring efforts ▪ design road to optimize line of sight and reduce collisions ▪ provide wildlife awareness information to construction workers ▪ reduce speed limits at identified problem areas ▪ construction vehicle speeds adhere to posted limits and wildlife warning signs shall be installed at identified problem areas (EP14) ▪ remove trees and tall shrubs to maintain line of sight ▪ avoid using wildlife-attracting road salts

Following the application of mitigation measures, the residual Project–related effects remaining for ungulates are as follows.

- The alteration, fragmentation and/or loss of moose and caribou habitat due to clearing of native vegetation within the ROW, temporary access roads, quarries, borrow pits, work areas and camps during construction and maintenance.
- An increase in sensory disturbance to and displacement of moose and caribou due to vehicle and equipment noise and vibration during construction, maintenance and operation.
- An increase in moose and caribou mortality due to increased hunting pressures during construction and with increased access along the all-season road during operation throughout the life of the Project.
- An increase in moose and caribou mortality due to vehicular collisions during construction, maintenance and operation throughout the life of the Project.

- An increase in moose and caribou mortality due to increased predation by wolves from increased access beyond that provided by the existing winter road and transmission lines.
- A negligible increase in risk of moose and caribou mortality due to introduction of disease from white-tailed deer (ex: brainworm, liverfluke).

Alteration, fragmentation and/or loss of moose and caribou habitat during clearing of native vegetation within the ROW, temporary access roads, quarries, borrow pits, work areas and camps during construction and maintenance is anticipated to be long-term, for the life of the Project and occur sporadically. This effect may measurable affect populations, but is limited to the Project Footprint (100-m ROW).

Increased sensory disturbance to and displacement of moose and caribou from vehicle and equipment noise and vibration during construction, maintenance and operation is anticipated to be long-term, for the life of the Project and occur continuously. The effects from disturbance and displacement are likely to occur at the individual level, not measurably affecting the population. Effect may extend beyond the Project Footprint within the LAA (20-km buffer of ASR).

Increased caribou mortality due to increased hunting pressure from the ASR providing increased access to caribou habitat during construction, maintenance and operation of the ROW, watercourse crossings, temporary access roads, quarries, borrow pits and work areas is anticipated to be long-term, for the life of the Project. This effect is expected to occur seasonally, as caribou are typically hunted in winter. This increased mortality from hunting on caribou is likely to occur at the individual level, not measurably affecting the population and may extend beyond the Project Footprint within the LAA (20-km buffer of ASR).

Increased moose mortality due to increased hunting pressure from the ASR providing increased access in spring, summer and fall to moose habitat during construction, maintenance and operation of the ROW, watercourse crossings, temporary access roads, quarries, borrow pits and work areas is anticipated to be long-term, for the life of the project and continuous. Effect of increased moose mortality from hunting pressure may measurably affect populations and may extend beyond the Project Footprint within the LAA (20-km buffer of ASR).

Increased moose and caribou mortality due to vehicular collisions from vehicle and equipment use during construction, maintenance and operation is expected to be long-term, for the life of the Project and occur infrequently. This increased mortality is expected to occur at the individual level, not measurably affecting the population and will be limited to the Project Footprint (60-m cleared area).

Increased moose and caribou mortality due to increased access and predation by wolves along the ROW during construction, maintenance and operation of the ASR, work areas and watercourse crossings is anticipated to be long-term, for the life of the Project. Mortality of caribou and moose by wolves is likely to occur at the individual level, while effects may extend beyond the Project Footprint within the LAA (20-km buffer of ASR).

Increased moose and caribou mortality due to increased wildlife access and introduction of disease from white-tailed deer (ex. brainworm, liverfluke) during construction, maintenance and operation of the ASR, work areas and watercourse crossings is anticipated to be long-term, for the life of the Project and occur infrequently. This effect is likely to occur at the individual level, not measurably affecting the population and may extend beyond the LAA (20-km buffer of ASR).

No significant residual adverse effects on ungulates are anticipated to occur as a result of the Project following the implementation of mitigation measures.

5.3.5.2.2 Furbearers

Furbearing mammal species that occur in the vicinity of the Project are those species typical of the boreal landscape such as beaver and marten. These two species were selected to serve as representative VCs as their life requisites represent two broad and ecologically distinct habitat types that provide habitat for other furbearing species. Beaver represent aquatic furbearers while marten represent terrestrial furbearers. Both species are trapped by local community members. Other furbearers present in the Project area include muskrat, mink, weasel, river otter, fisher, fox, lynx, snowshoe hare, wolf and wolverine.

Field studies, including extensive monitoring programs, were carried out to assess important terrestrial and aquatic furbearer habitat. Information regarding the effects of furbearers on the ecology of the area was also considered in baseline data collection. Potential effects to furbearers and associated habitat may be associated with Project construction, maintenance and operation activities such as vegetation clearing, equipment set up and use (sensory disturbance) and collisions with vehicles. **Table 15** provides a summary of the potential environmental effects that may occur over the Project development phases and proposed mitigation measures that will be used to reduce the potential for effects to furbearers.

Table 15: Summary of Potential Environmental Effects and Proposed Mitigation Measures during Construction, Maintenance and Operation Phases for Furbearers

Potential Environmental Effects	Mitigation Measures
▪ alteration, fragmentation and/or loss of furbearer (ex: beaver, marten) habitat due to clearing of native vegetation within the ROW, temporary access roads, quarries, borrow pits, work areas and camps ▪ increased sensory disturbance to and displacement of furbearers (ex: beaver, marten) due to vehicle and equipment noise and vibration during construction, maintenance and operation ▪ increased furbearer (ex: beaver, marten) mortality due to vehicular collisions and nuisance wildlife management during construction, maintenance and operation	▪ use baseline studies to identify location of denning areas and lodges to be isolated with construction setbacks ▪ limit clearing to designated areas within the ROW using existing cutlines, routes and trails where they are present (EP1 and ES 130.17.1) ▪ restrict equipment and vehicle use outside of cleared areas (ES 130.6.1) ▪ if required beaver dams will be removed gradually (ES 130.15.10) ▪ alignment selected so no work within 100 m of a waterbody (retained vegetated buffer) except at crossings (EP6 and 130.15.1) ▪ decommission and rehabilitate disturbed areas not required for Project maintenance and operation (EP22 and ES 130.8.7) ▪ bridges and culverts at watercourse crossings will accommodate 1:50 year flood events with regular culvert maintenance and cleanouts (EP11 and ES 130.15.9) to maintain wetland hydrologic regime ▪ stage construction activities to limit the extent of noise disturbance at a given time to defined areas ▪ apply typical noise (EP4 and ES 130.12) and dust suppression (EP18 and ES 130.11) techniques ▪ design road to optimize line of sight and reduce collisions ▪ wildlife awareness information provided to construction workers ▪ reduce speed limits at identified problem areas ▪ construction vehicle speeds adhere to posted limits and wildlife warning signs shall be installed at identified problem areas (EP14) ▪ remove trees and tall shrubs to maintain line of sight ▪ preserve vegetation buffers at watercourses (ES 130.15.1)

Following the application of mitigation measures, the residual Project–related effects remaining for furbearers are as follows.

- The alteration, fragmentation and/or loss of furbearer habitat due to clearing of native vegetation within the ROW, temporary access roads, quarries, borrow pits, work areas and camps.
- An increase in sensory disturbance to and displacement of furbearers due to vehicle and equipment noise and vibration during construction, maintenance and operation.
- An increase in furbearer mortality due to vehicular collisions and nuisance wildlife management during construction, maintenance and operation.

Alteration, fragmentation and/or loss of furbearer (ex. beaver, marten) habitat from clearing of native vegetation within the ROW, temporary access roads, quarries, borrow pits, work areas and camps is anticipated to be long-term, for the life of the Project and occur infrequently. This effect is likely to occur at the individual level, not measurably affecting the population, and will be limited to the Project Footprint (100-m ROW).

Increased sensory disturbance to and displacement of furbearers (ex. beaver, marten) from vehicle and equipment noise and vibration during construction, maintenance and operation is anticipated to be long-

term, for the life of the Project. This effect is likely to occur at the individual level, not measurably affecting the population and will be limited to the Project Footprint (100-m ROW).

Increased furbearer (ex: beaver, marten) mortality due to vehicular collisions and nuisance wildlife management during construction, maintenance and operation activities including general vehicular use is anticipated to be long-term, for the life of the Project and occur sporadically. This effect is likely to occur at the individual level, not measurably affecting the population and is limited to the Project Footprint (60-m cleared area).

No significant adverse residual effects on furbearers are anticipated to occur as a result of the Project following the implementation of mitigation measures.

5.3.5.3 Reptiles and Amphibians

The only reptile species present in the Project area is the red-sided garter snake, while amphibian species that may occur within the area include the American toad, boreal chorus frog, northern spring peeper, northern leopard frog and wood frog (Joro Consultants 2018b). No amphibian or reptile Species at Risk are expected in the Wildlife RAA and none were recorded during field investigations or identified as part of community wildlife workshops. No amphibian or reptile species of social, economic or cultural significance were identified as part of the wildlife workshops.

The assessment of reptiles and amphibians included desktop investigations, monitoring via automated recording units (ARUs) and local and traditional wildlife knowledge gathered from community wildlife workshops as described in the following sections. Potential effects related to reptiles and amphibians may be associated with Project construction, maintenance and operation activities such as vegetation clearing and compaction and freezing of soils. **Table 16** provides a summary of potential environmental effects that may occur during Project construction, maintenance and operation, and proposed mitigation measures that will be used to reduce the potential for effects to reptiles and amphibians.

Table 16: Summary of Potential Environmental Effects and Proposed Mitigation Measures during Construction, Maintenance and Operation Phases for Reptiles and Amphibians

Potential Environmental Effects	Mitigation Measures
▪ alteration, fragmentation and/or loss of amphibian habitat due to clearing of native vegetation within the ROW, temporary access roads, quarries, borrow pits, work areas and camps ▪ increase in winter mortality through compaction and freezing of soils in habitat where amphibians may be over wintering	▪ follow clearing and grubbing timelines and restrictions to avoid critical breeding times (EP1 and ES 130.17.1) ▪ limit clearing to designated areas within the ROW (EP1 and ES 130.17.1) ▪ restrict equipment and vehicle use outside of cleared areas (ES 130.6.1) ▪ alignment selected so no work within 100 m of a waterbody (retained vegetated buffer) except at crossings (EP6 and ES 130.15.1) ▪ decommission and rehabilitate disturbed areas not required for Project maintenance and operation (EP22 and ES 130.8.7) ▪ bridges and culverts at watercourse crossings will accommodate 1:50 year flood events with regular culvert maintenance and cleanouts (EP11 and ES 130.15.9) to maintain wetland hydrologic regime

Following the application of mitigation measures, the residual Project–related effects remaining for reptiles and amphibians are as follows.

- The alteration, fragmentation and/or loss of amphibian habitat due to clearing of native vegetation within the ROW, temporary access roads, quarries, borrow pits, work areas and camps.
- An increase in winter mortality through compaction and freezing of soils in habitat where amphibians may be over wintering.

Alteration, fragmentation and/or loss of amphibian (ex: spring peeper) habitat from clearing of native vegetation within the ROW, temporary access roads, quarries, borrow pits, work areas and camps is anticipated to be long-term, for the life of the Project and occur infrequently. This effect is likely to occur at the individual level, not measurably affecting the population and will be limited to the Project Footprint (100-m ROW).

Increase in winter mortality through compaction and freezing of soils in habitat where amphibians (ex: spring peeper) may be over wintering from vehicle and equipment use during construction and maintenance is anticipated to be long-term, for the life of the Project and occur sporadically. This effect is likely to occur at the individual level, not measurably affecting the population and will be limited to the Project Footprint (60-m cleared area).

No significant adverse residual effects on reptiles and amphibians are anticipated to occur as a result of the Project following the implementation of mitigation measures.

5.3.6 Fish and Fish Habitat

5.3.6.1 Fish

Twenty-four species of fish are known to occur in the major waterbodies in the vicinity of the Project. A total of 12 fish species were recorded at crossings along the all-season road alignment during field surveys with the highest number of fish recorded at God's River and Magill Creek. Fish species encountered at the God's River crossing site include brook trout, longnose sucker, northern pike, white sucker and sculpin species. Species encountered at the Magill Creek crossing location include northern pike, shorthead redhorse and yellow perch. One or two forage fish species were identified at each of the 19 small low gradient boreal streams (unnamed tributaries) that the proposed all-season road crosses.

Workshops and interviews conducted with Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation community members identified fish species most commonly harvested for food, income and cultural purposes in the area are northern pike, walleye, lake trout and whitefish.

Field surveys also identified two species of mussels at the God's River and Magill Creek crossing locations (fat mucket and giant floater). No aquatic Species at Risk were recorded during field investigations. Lake sturgeon has been previously documented in God's River, God's Lake and Hayes River.

Potential effects to fish may be associated with Project construction, maintenance and operation effects such as spills of hazardous materials, compressive shock waves from blasting and construction of

watercourse crossings resulting in effects to fish passage and spawning. Improved access could also result in increased fishing opportunities in waterbodies at watercourse crossing sites along the proposed route where fishing currently occurs and in waterbodies not previously or conveniently accessible for fishing. **Table 17** provides a summary of potential environmental effects that may occur during Project construction, maintenance and operation, and proposed mitigation measures that will be used to reduce the potential for effects to fish.

Table 17: Summary of Potential Environmental Effects and Proposed Mitigation Measures during Construction, Maintenance and Operation Phases for Fish

Potential Environmental Effects	Mitigation Measures
▪ decrease in fish populations as result of reduced surface water quality from spills of fuel or hazardous materials from construction equipment or vehicles and vehicular accidents ▪ injury or death of fish from compressive shock waves close to blasting activities ▪ increased fishing pressures on local fish populations resulting from increased access to watercourses ▪ blockage or reduction in fish passage and disruption of spawning from temporary construction crossings and permanent watercourse crossings	▪ designated re-fuelling areas and fuel handling procedures (EP2 and ES 130.9.2.5 ex: at least 100 m from water bodies, secondary containment, approved storage tanks, maintain spill control and clean-up equipment, emergency response plan with spill containment/clean-up procedures) ▪ equipment and vehicles will be clean and free of leaks upon arrival to site and kept in good repair (EP6 and ES 130.15.3) ▪ improved road conditions, sight lines and approaches will reduce likelihood and frequency of accidents and improve access for spill response crews ▪ soil remediation to CCME guidelines (EP3 and ES 130.10) ▪ adhere to Manitoba Stream Crossing Guidelines for Protection of Fish and Fish Habitat, DFO Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters, EP12 and ES 130.15.11 and DFO's measures to avoid causing harm to fish and fish habitat including aquatic species at risk, EP7, EP9, ES 130.15.5 and ES 130.15.6 ▪ restrict fishing access of the construction crews ▪ alignment and temporary crossings located to avoid sensitive habitat ▪ decommission and reclaim temporary access roads and winter road access points following completion of construction ▪ restrict access to potential parking areas at watercourse crossings ▪ install large riprap/aggregate on slopes to limit access to streams at crossing sites where access did not exist prior to the Project ▪ bridges and culverts at watercourse crossings will accommodate 1:50 year flood events ▪ regular culvert maintenance and cleanouts (EP11 and ES 130.15.9)

Following the application of mitigation measures, the residual Project–related effects remaining for fish are as follows.

- A potential decrease in fish populations as result of reduced surface water quality from spills of fuel or hazardous materials from construction equipment or vehicles and vehicular accidents.
- Injury or death of fish from compressive shock waves close to blasting activities.
- An increase to fishing pressures on local fish populations resulting from increased access to watercourses.
- The blockage or reduction in fish passage and disruption of spawning from the construction of temporary construction crossings and permanent watercourse crossings.

Decrease in fish populations as result of reduced surface water quality from spills of fuel or hazardous materials from construction equipment or vehicles and vehicular accidents is anticipated to be short-term, associated with discrete events. Spills to soil would be remediated to CCME guidelines, preventing effect to fish. Spills are not expected to cause a measurable reduction to fish communities and populations, and water quality alterations will be limited to within the Project Footprint (100-m ROW).

Injury or death of fish during blasting activities resulting in compressive shock waves near blast site is anticipated to be short-term, associated with discrete activities and occur sporadically. Injury or death of fish during blasting is not expected to result in a measurable reduction to fish communities and populations and will be localised to blasting areas within the Project Footprint (100-m ROW).

Increased fishing pressures on local fish populations from increased access during clearing of ROW and construction of the all-season road near watercourses is anticipated to be long-term, for the life of the Project and occur infrequently. Increased fishing pressures are not expected to result in a measurable reduction to fish communities and populations and will be limited to the Project Footprint (100-m ROW).

Blockage or reduction in fish passage and disruption of spawning from temporary construction crossings and permanent watercourse crossings is anticipated to be long-term, for the life of the Project and occur infrequently. Blockage or reduction is fish passage and disruption of spawning is not expected to result in a measurable reduction to fish communities and populations and will be localized to crossings within the Project Footprint (100-m ROW).

No significant adverse residual effects on fish are anticipated to occur as a result of the Project following the implementation of mitigation measures.

5.3.6.2 Fish Habitat

The aquatic environment in the Aquatic LAA includes a range of ephemeral, intermittent and perennial watercourses that provide a variety of low to high quality fish habitat. To characterize and describe the existing aquatic environment, detailed aquatic environmental desktop and field studies were conducted to assess aquatic habitat potentially affected by the Project. In general, fish habitat quality and species diversity increase as the size of the watercourse and permanence of flow in the watercourse increases. Exceptions to this generality occur when there are barriers within the watercourse that affect flow patterns or fish movements (ex: beaver dams and waterfalls).

As previously noted there are 53 watercourse crossings along the all-season road. Crossings at fish-bearing watercourses include the bridges at God's River and Magill Creek as well as culverts at 23 streams. Fish habitat ranged from marginal habitat supporting only forage fish to sites with habitat supporting a greater diversity of fish species. Of the 25 sites with fish habitat, 18 were assessed as marginal fish habitat, typically located on small first or second order streams that are often poorly connected to downstream fish-bearing waters due to numerous ephemeral barriers. Seven stream crossing sites were assessed as important habitat. These streams have larger upstream watersheds and connectivity to downstream and

possibly upstream fish bearing waters. Habitat at these sites was suitable for a range of life requisites for a diversity of fish species, including both forage fish and large-bodied species. The remaining 28 crossings are non-fish bearing watercourses that would have equalization culverts to maintain existing water flow and drainage patterns.

Activities that may affect fish habitat include vehicle and machinery use near waterbodies that have the potential to result in increased sediment into the water, alteration and loss of in-stream and riparian habitat at crossings and the potential for introduction of aquatic invasive species. Erosion and sedimentation from construction, maintenance and operation activities causing suspension and deposition of sediments may decrease surface water quality, as described in **Section 5.3.4.1**. The Project would result in the alteration and loss of riparian and in-stream habitats at water crossings. The Project will result in a total estimated alteration of 1,008 m^2 of riparian habitat and 162 m^2 of in-stream habitat[9], as well as the loss of 864 m^2 of riparian habitat and 3,672 m^2 of in-stream habitat (North/South Consultants Inc. 2017a). The use of equipment in water during construction, maintenance and operation activities could increase the risk to introduce aquatic invasive species (ex: zebra mussels) which can reduce the diversity and populations of native species and can modify habitat (Manitoba Sustainable Development 2017a). **Table 18** summarizes the potential environmental effects on fish habitat that may occur over the course of the Project and the proposed mitigation measures that will be used to reduce potential effects.

Table 18: Summary of Potential Environmental Effects and Proposed Mitigation Measures during Construction, Maintenance and Operation Phases for Fish Habitat

Potential Environmental Effects	Key Mitigation Measures
▪ decreased quality of fish habitat and effects to fish as a result of previously identified effects (increased suspended solids) from disturbed banks, right-of-way runoff and in-stream works during construction ▪ alteration and loss of riparian habitat (shorelines) and fish habitat (in-stream) at water crossings ▪ increased risk during construction, maintenance and operation for introduction of aquatic invasive species (ex: zebra mussel) that can reduce diversity and populations of native species and modify habitat	▪ minimize vegetation clearing and soil disturbance (ES 130.15.3) ▪ install erosion and sediment control measures (EP16 and ES 130.16, ex: silt fencing, erosion control blanket, straw wattle, geotextile) ▪ preserve vegetation buffers at watercourses (ES 130.15.1) ▪ suspend construction activities during extreme weather events ▪ energy dissipation controls (ex: ditching, rip-rap, collection ponds) ▪ reclamation and re-vegetation of disturbed areas ▪ adhere to DFO timing windows for in-stream work (EP6, EP7, EP11 and ES 130.15.2) ▪ isolate in-stream construction areas with fish salvage in fish bearing water (EP10 and ES 130.15.7) ▪ follow Manitoba Stream Crossing Guidelines for Protection of Fish and Fish Habitat (EP6 and ES 130.15) ▪ implement DFO approved fish habitat offsetting plan for unavoidable habitat losses ▪ adhere to Manitoba Stream Crossing Guidelines for Protection of Fish and Fish Habitat, DFO's measures to avoid causing harm to fish and fish

[9] Estimate is for proposed bridge crossing at Magill Creek. In-stream alteration due to culvert armoring cannot be estimated until detailed design phase as armouring footprints are highly variable and subject to site specific substrate conditions.

Potential Environmental Effects	Key Mitigation Measures
	habitat including aquatic species at risk, EP7, EP10, ES 130.15.5 and ES 130.15.7 ▪ clean construction equipment and vehicles prior to bringing them to site (EP25, ES 130.15.1.5 and ES 130.15.3)

Following the application of mitigation measures, the residual Project–related effects remaining for fish habitat are as follows.

- Decreased quality of fish habitat and effects to fish as a result of increased suspended solids from disturbed banks, ROW runoff and in-stream works during construction.
- Alteration and loss of riparian habitat (shorelines) and fish habitat (in-stream) at water crossings throughout the life of the Project.

Decreased quality of fish habitat and effects to fish as a result of previously identified effects (increased suspended solids from disturbed banks, right-of-way runoff and in-stream works) during construction and maintenance of watercourse crossings is anticipated to be short-term, associated with discrete activities and occur infrequently. This effect is expected to result in net loss of the productive capacity of fish habitat affecting local fish communities and population and effects may extend beyond the Project Footprint within the LAA (10-km buffer of ASR).

Alteration and loss of riparian habitat (shorelines) and fish habitat (in-stream) during construction and maintenance of watercourse crossings is anticipated to be long-term, for the life of the Project and occur infrequently. This effect is expected to result in net loss of the productive capacity of fish habitat affecting local fish communities and population and will be localized to crossings within the Project Footprint (100-m ROW).

Increased risk for introduction of aquatic invasive species (ex: zebra mussel) that can reduce diversity and populations of native species and modify habitat from in-water works during construction and maintenance and recreational vehicles during operation is anticipated to be short-term, associated with construction equipment and occur infrequently. This effect is not expected to result in any measurable reduction to fish communities and populations, as introduction of aquatic invasive species is not likely to occur.

The permanent destruction of riparian and instream fish habitat at the crossings is unavoidable due to the footprint of the in-water pier(s) and culverts. If required, fish habitat may be created or enhanced to offset these unavoidable losses. No significant adverse residual effects on fish habitat are anticipated to occur as a result of the Project following the implementation of mitigation measures, best management practices and environmental protection plans.

5.3.7 Migratory Birds

Migratory birds are protected under the *Migratory Birds Convention Act* and therefore were assessed. While raptors and upland game birds do not fall under federal jurisdiction, they have also been assessed because of their importance to local Indigenous communities. A total of 152 bird species, including waterfowl, raptors, upland game birds and songbirds may be found in the Wildlife RAA (Joro Consultants 2018b). Of these species, 114 may breed in the RAA, while the remaining 38 are transient species that may occur within the RAA.

A combination of ARUs, breeding bird point counts (done by Manitoba Breeding Bird Atlas) and aerial waterfowl surveys were used to collect information on the bird species present in the Wildlife LAA. Bird Species at Risk that were recorded, or may be present in the Wildlife RAA, include bank swallow, barn swallow, Canada Warbler, common nighthawk, eastern wood-pewee, olive-sided flycatcher, peregrine falcon, rusty blackbird, short-eared owl, horned grebe and yellow rail. Waterfowl hunting is an important activity for resource users. Other bird species which may be harvested include loons, bittern, tundra swan, blue heron and grouse (ruffed, spruce and sharp-tailed). Gull eggs are occasionally harvested and eaten by community members (Joro Consultants 2018b).

Birds may be affected by construction, maintenance and operation activities through habitat alteration and loss, sensory disturbance, changes to hunting pressure and vehicular collisions. Potential environmental effects of the Project that may occur and proposed mitigation measures that will be used to reduce the potential for effects to migratory birds are provided in **Table 19**.

Table 19: Summary of Potential Environmental Effects and Proposed Mitigation Measures during Construction, Maintenance and Operation Phases for Migratory Birds

Potential Environmental Effects	Mitigation Measures
▪ alteration, fragmentation and/or loss of migratory (ex: raptors, waterfowl, forest birds) and non-migratory (ex: upland game birds) bird habitat due to clearing of native vegetation within the ROW, temporary access roads, quarries, borrow pits, work areas and camps ▪ loss of nests and mortality to young migratory (ex: raptors, waterfowl, forest birds) and non-migratory (ex: upland game birds) birds during construction, maintenance and operation ▪ increased sensory disturbance to and displacement of migratory (ex: raptors, waterfowl, forest birds) and non-migratory (ex: upland game birds) birds due to vehicle and equipment noise and vibration during construction, maintenance and operation ▪ increased mortality of migratory (ex: waterfowl) and non-migratory (ex: upland game birds) birds due to increased hunting pressures during construction and with increased access in spring, summer and fall along the all-season road ▪ increased mortality of migratory (ex: waterfowl, forest birds) and non-migratory (ex: upland game birds) birds due to vehicular collisions during construction, maintenance and operation	▪ alignment selected so no work within 100 m of a waterbody (retained vegetated buffer) except at crossings (EP6 and ES 130.15.1) ▪ follow clearing and grubbing (EP1 and ES 130.17.1) and blasting (EP14 and ES 130.19) timelines and restrictions to avoid critical breeding and nesting times ▪ limit clearing to designated areas within the ROW using existing cutlines, routes and trails where they are present (EP1 and ES 130.17.1) ▪ restrict equipment and vehicle use outside of cleared areas (ES 130.6.1) ▪ decommission and reclaim temporary access roads and winter road access points following completion of construction (EP21, EP22 and ES 130.8.7) ▪ bridges and culverts at watercourse crossings will accommodate 1:50 year flood events with regular culvert maintenance and cleanouts (EP11 and ES 130.1.9) to maintain wetland hydrologic regime ▪ stage construction activities to limit the extent of noise disturbance at a given time to defined areas ▪ apply typical noise (EP4 and ES 130.12) and dust suppression (EP18 and ES 130.11) techniques ▪ prohibit hunting by MI employees and contractors working on the Project (EP14 and ES 130.19.1) ▪ firearm possession prohibited in construction camps ▪ restrict access to operation phase quarry areas (ES 130.8.8) ▪ design road with no pullouts or parking areas ▪ design road to optimize line of sight and reduce collisions ▪ wildlife awareness information provided to construction workers ▪ reduce speed limits at identified problem areas ▪ construction vehicle speeds adhere to posted limits and wildlife warning signs shall be installed at identified problem areas (EP14) ▪ remove trees and tall shrubs to maintain line of sight

Following the application of mitigation measures, the residual Project–related effects remaining for migratory birds are as follows.

- Alteration, fragmentation and/or loss of migratory (ex: raptors, waterfowl, forest birds) and non-migratory (ex: upland game birds) bird habitat due to clearing of native vegetation within the ROW, temporary access roads, quarries, borrow pits, work areas and camps.

- Loss of nests and mortality to young migratory (ex: raptors, waterfowl, forest birds) and non-migratory (ex: upland game birds) birds during construction, maintenance and operation.
- An increase in sensory disturbance to and displacement of migratory (ex: raptors, waterfowl, forest birds) and non-migratory (ex: upland game birds) birds due to vehicle and equipment noise and vibration during construction, maintenance and operation.
- An increase in mortality of migratory (ex: waterfowl) and non-migratory (ex: upland game birds) birds due to increased hunting pressures during construction and with increased access in spring, summer and fall along the all-season road throughout the life of the Project.
- A negligible increase in mortality of migratory (ex: waterfowl, forest birds) and non-migratory (ex: upland game birds) birds due to vehicular collisions during construction, maintenance and operation.

Alteration, fragmentation and/or loss of migratory (ex: raptors, waterfowl, forest birds) and non-migratory (ex: upland game birds) bird habitat from clearing of native vegetation within the ROW, temporary access roads, quarries, borrow pits, work areas and camps is anticipated to be long-term, for the life of the Project and occur infrequently. This residual effect is likely to occur at the individual level, not measurably affecting populations and will be limited to the Project Footprint (100-m ROW).

Loss of nests and mortality to young migratory (ex: raptors, waterfowl, forest birds) and non-migratory (ex: upland game birds) birds from clearing of native vegetation during construction and maintenance activities is anticipated to be long-term, for the life of the Project and occur infrequently. This residual effect list likely to occur at the individual level, not measurably affecting the population and is limited to the Project Footprint (60-m cleared area).

Increased sensory disturbance to and displacement of migratory (ex: raptors, waterfowl, forest birds) and non-migratory (ex: upland game birds) birds from vehicle and equipment noise and vibration during construction, maintenance and operation is anticipated to be long-term, for the life of the Project and occur continuously. This residual effect is likely to occur at the individual level, not measurably affecting the population and will be limited to the Project Footprint (100-m ROW).

Increased mortality of migratory (ex: waterfowl) and non-migratory (ex: upland game birds) birds due to increased hunting pressure from the all-season road providing increased access in spring, summer and fall to bird habitat during construction, maintenance and operation of the ROW, watercourse crossings, temporary access roads, quarries, borrow pits and work areas is anticipated to be long-term, for the life of the Project and occur continuously. This residual effect may measurably affect populations and effects may extend beyond the Project Footprint within the LAA (10-km buffer of ASR).

Increased mortality of migratory (ex: waterfowl, forest birds) and non-migratory (ex: upland game birds) birds due to vehicular collisions from vehicle and equipment use during construction, maintenance and operation is anticipated to be long-term, for the life of the Project and occur infrequently. This residual effect is likely to occur at the individual level, not measurably affecting the population and will be limited to the Project Footprint (60-m cleared area).

No significant adverse residual effects on migratory birds are anticipated to occur as a result of the Project following the implementation of mitigation measures.

5.3.8 Species at Risk

At the federal level, SARA is intended to protect wildlife species at risk in Canada. Within the Act, COSEWIC was established as an independent body of experts responsible for identifying and assessing wildlife species considered at risk. Wildlife species that have been designated by COSEWIC may then qualify for legal protection and recovery under SARA, if listed under the Act. At the provincial level, ESEA was enacted to protect and enhance the survival of threatened and endangered species in Manitoba, to enable reintroduction of extirpated species into the province and to designate species as threatened, endangered, extirpated, or extinct.

Species are evaluated and ranked by the MBCDC on the basis of their range-wide (global - G) status and their province-wide (sub-national - S) status according to a standardized procedure used by all Conservation Data Centres and Natural Heritage Programs. These ranks are used to determine protection and data collection priorities and are revised as new information becomes available. For each level of distribution - global and provincial - species are assigned a numeric rank ranging from 1 (very rare) to 5 (demonstrably secure). This reflects the species' relative endangerment and is based primarily on the number of occurrences of that species globally or within the province (Manitoba Conservation Data Centre 2017).

All provincially and federally listed wildlife species potentially occurring in the Wildlife RAA were assessed. Species accounts regarding habitat, life history and any potential issues relative to critical habitat (if identified) were developed for all SAR as listed below. Field assessments were undertaken for all SAR birds within the Wildlife RAA, using a combination of sources for data including ARUs, aerial waterfowl surveys and breeding bird point count surveys.

There are several general mitigation measures that would apply to each of the Species at Risk discussed within this section. These general mitigation measures are described as follows.

- The alignment was selected to use existing disturbed or cleared areas, where they exist and to avoid waterbodies (except at crossings) and sensitive habitat (ex: spawning sites, calving sites, raptor nests, multi-generational stick nests, nesting colonies).
- Existing water flow patterns, water levels and wetland hydrologic regimes would be maintained along with vegetated buffers between disturbed areas and waterbodies.
- Clearing and grubbing timelines and restrictions would be followed to avoid critical calving and nesting times (EP1 and ES 130.17.1).
- Disturbed areas not required for Project maintenance and operation would be decommissioned and rehabilitated (EP22).
- Contract administrators, inspectors and construction staff would receive training and handbooks to facilitate identification of potential Species at Risk that could be encountered and a member of the

Environmental Inspection team would be advised when encounters occur to document and report on species presence and management strategies applied, as required.

- Herbicide application would be prohibited near identified environmentally sensitive sites or beyond the all-season road ROW and applied by hand within 30 m of any waterbody.

5.3.8.1 Aquatic Environment

Lake sturgeon was the only Species at Risk identified as potentially present in the Aquatic LAA. Rare aquatic species known to be present upstream in the Lake Winnipeg East drainage area include the mapleleaf mussel (*Quadrula quadrula*) (ESEA - Endangered) and the shortjaw cisco (*Coregonus zenithicus*) (COSEWIC - Threatened). No records indicate that either species have been encountered near the Aquatic LAA (Stewart and Watkinson 2004).

While no lake sturgeon were encountered during field investigations, their distribution overlaps the Aquatic RAA and they have been previously documented in God's River, God's Lake and Hayes River. The Southern Hudson Bay-James Bay population is designated as Special Concern by COSEWIC (COSEWIC 2006b) and is currently under consideration for protection under SARA (North/South Consultants Inc. 2017a). The primary location where Project activities may overlap with potential lake sturgeon presence is at the God's River crossing site. The God's River crossing site provides moderate velocity run habitat with sand and rocky substrates (North/South Consultants Inc. 2017a). The immediate crossing area provides potential foraging habitat for adult lake sturgeon and potential spawning habitat is found at a set of large rapids 4 km downstream of the crossing (North/South Consultants Inc. 2017a).

Potential effects of the Project on aquatic Species at Risk are anticipated to be the same as those listed for fish and fish habitat as noted in **Section 5.3.6**. Mitigation measures that will be implemented to reduce potential effects on aquatic Species at Risk will be similar to those presented in **Section 5.3.6**, as well as general mitigation measures that would apply to all Species at Risk.

Following the application of mitigation measures, the residual Project–related effects remaining for aquatic Species at Risk is as follows.

- A potential decrease in the population and/or habitat of rare fish species (ex: lake sturgeon) as a result of previously identified effects (water quality, shock waves, fishing pressure, fish passage, habitat and invasive species) from construction, maintenance and operation activities.

Decrease in the population and/or habitat of rare fish species (ex: lake sturgeon) as a result of previously identified effects (water quality, shock waves, fishing pressure, fish passage, habitat and invasive species) during general construction, maintenance and operation activities is anticipated to be long-term, for the life of the Project and occur sporadically. This residual effect is minor, as habitat alteration/loss is restricted, habitat is non-limiting and it is localized to God's River crossing in the Project Footprint (100-m ROW).

No significant adverse residual effects on aquatic Species at Risk are anticipated to occur as a result of the Project following the implementation of mitigation measures.

5.3.8.2 Terrestrial Environment

5.3.8.2.1 Vegetation

There are an estimated 14 Species at Risk that occur within the Vegetation RAA (Szwaluk Environmental Consulting Ltd. *et al.* 2017a). None of these 14 Species at Risk are listed federally under the COSEWIC or SARA, or provincially protected under the ESEA. No plant Species at Risk were observed in the Vegetation RAA during field investigations (Szwaluk Environmental Consulting Ltd. *et al.* 2017a). None of plant Species at Risk potentially present in the Vegetation RAA were identified as being plants of sustenance or cultural value to local communities (Szwaluk Environmental Consulting Ltd. *et al.* 2017a).

Potential effects of the Project on vegetation Species at Risk are anticipated to be the same as those previously listed for vegetation in **Section 5.3.5.1**. Mitigation measures that will be implemented to reduce potential effects on vegetation Species at Risk will be similar to those presented in **Section 5.3.5.1**, as well as the general mitigation measures that would apply to all Species at Risk.

Following the application of mitigation measures, the residual Project–related effects remaining for vegetation Species at Risk is as follows.

- Disturbance or loss of vegetation Species at Risk resulting from clearing during construction and maintenance.

Disturbance or loss of vegetation Species at Risk from clearing during construction and maintenance is anticipated to be long-term, for the life of the Project and occur infrequently. This residual effect is not expected to have a measurable effect to rare or protected species and is limited to the Project Footprint (100-m ROW).

No significant adverse residual effects on vegetation Species at Risk are anticipated to occur as a result of the Project following the implementation of mitigation measures.

5.3.8.2.2 Mammals

Mammal Species at Risk identified in the Wildlife RAA include woodland caribou, wolverine and little brown bat (Joro Consultants 2018b).

<u>Woodland Caribou</u>

Two woodland caribou ecotype populations overlap the RAA including the Norway House (Boreal Woodland) and Pen Islands (Eastern Migratory) caribou ranges/populations. Caribou are known to be a culturally important species for a number of community members (HTFC Planning & Design 2017b).

Boreal Woodland caribou are ranked as "Threatened" under COSEWIC, Schedule 1 of SARA and the Manitoba ESEA. The Norway House population range is west and south-west of the Project area however overlaps slightly with the extreme western portion of the RAA. Norway House caribou show small scale seasonal movement patterns. Norway House caribou population numbers and trends are unknown, however the population was assessed to be self-sustaining (Environment Canada 2012). The total Boreal Woodland population is approximately 34,000 across Canada (Environment Canada 2012).

Eastern Migratory caribou are ranked as "Endangered" under COSEWIC, however have no status under SARA and are not listed by ESEA. The Pen Islands caribou range extends across Northeastern Manitoba along the Hudson Bay coastline to Northwestern Ontario and includes the Wildlife RAA. Due to the migratory nature of the Pen Islands population, they are primarily encountered in the Wildlife RAA on a seasonal basis (the winter months from November through to late April); though a very small number of female caribou may remain in the Wildlife RAA during the summer months. The Wildlife RAA is on the southern limit of the population's normal range. The Pen Islands population is estimated at 16,638 individuals in 2011 (COSEWIC 2017). The population of all Eastern Migratory caribou together is estimated to be 170,636 mature animals (COSEWIC 2017).

Potential effects of the Project on woodland caribou are the same as those previously listed for ungulates in **Section 5.3.5.2.1**. Mitigation measures that will be implemented to reduce potential effects on woodland caribou will be the same as those presented in **Section 5.3.5.2.1**, as well as the general mitigation measures that would apply to all Species at Risk.

Wolverine

Wolverine are globally abundant and apparently secure (G4) and provincially uncommon to widespread (S3S4). They are federally ranked as a species of Special Concern by the COSEWIC and Schedule 1 of SARA but are not listed provincially by ESEA. Wolverine were recorded in the RAA during field studies. Some participants of the Project wildlife workshops from Bunibonibee Cree Nation also indicated that wolverine populations are increasing in the area. Wolverines are regionally important as they are actively trapped (Joro Consultants 2018b).

Potential effects of the Project on wolverine are the same as those listed for furbearers as noted in **Section 5.3.5.2.2**. Mitigation measures that will be implemented to reduce potential effects on wolverine will be the same as those previously listed in **Section 5.3.5.2.2**, as well as the general mitigation measures that would apply to all Species at Risk.

Little Brown Bat

The little brown bat is globally apparently secure to vulnerable (G3G4). In Manitoba their non-breeding status is rare while their breeding status is demonstrably widespread (S2N, S5B). They are federally listed as Endangered by SARA and provincially listed as Endangered by Manitoba ESEA. No little brown bats were observed during field studies. Community members have reported sightings of brown bats (Joro Consultants 2018b).

Potential effects of the Project on little brown bat are the same as those listed for mammals as noted in **Section 5.3.5.2**. Mitigation measures that will be implemented to reduce potential effects on little brown bats will be the same as those previously listed in **Section 5.3.5.2**, as well as the general mitigation measures that would apply to all Species at Risk.

Following the application of mitigation measures, the residual Project–related effects remaining for mammal Species at Risk are as follows.

- A potential decrease in the population and/or disturbance to habitat of woodland caribou as a result of previously identified effects (clearing, sensory disturbance, hunting pressure, vehicle collisions, predation and disease) from construction, maintenance and operation activities.
- A potential decrease in the population and/or disturbance to habitat of wolverine as a result of previously identified effects (clearing, sensory disturbance and vehicle collisions) from construction, maintenance and operation activities.
- A potential decrease in the population and/or disturbance to habitat of little brown bat as a result of previously identified effects (clearing and sensory disturbance) from construction, maintenance and operation activities.

Decrease in the population and/or habitat of woodland caribou as a result of previously identified effects (clearing, sensory disturbance, hunting pressure, vehicle collisions, predation and disease) during General construction, maintenance and operation activities is anticipated to be long-term, for the life of the Project and occur infrequently. This effect is considered minor for alteration or loss of non-critical habitat and minor relative to habitat availability. Effect will extend beyond the Project Footprint into the LAA (20-km buffer of ASR)

Decrease in the population and/or habitat of wolverine as a result of previously identified effects (clearing, sensory disturbance and vehicle collisions) during general construction, maintenance and operation activities is anticipated to be long-term, for the life of the Project. The effect is considered minor for alteration or loss of non-critical habitat and effect is minor relative to habitat availability. Effects will extend beyond the Project Footprint within the LAA (10-km buffer of ASR).

Decrease in the population and/or habitat of little brown myotis as a result of previously identified effects (clearing and sensory disturbance) from clearing activities and sensory disturbances from general construction, maintenance and operation activities is anticipated to be long-term, for the life of the Project and occur infrequently. This residual effect is considered minor for alteration or loss of non-critical habitat and effect is minor relative to habitat availability. Effect would be limited to the Project Footprint (100-m ROW).

No significant adverse residual effects on mammal Species at Risk are anticipated to occur as a result of the Project following the implementation of mitigation measures.

5.3.8.2.3 Birds

Eleven bird Species at Risk may occur in the RAA (Joro Consultants 2018b). Each species and their federal and provincial status are provided in **Table 20**. None of these 11 bird Species at Risk were noted as being important to local communities for hunting.

Table 20: Bird Species at Risk That May Occur in the Regional Assessment Area

Species Common Name	Rare Species Listing Status (Federal and Provincial)			
	SARA	COSEWIC	MBCDC	ESEA
Bank swallow	Threatened - Schedule 1	Threatened	S5B	Not listed
Barn swallow	Threatened - Schedule 1	Threatened	S4B	Not listed
Canada warbler	Threatened - Schedule 1	Threatened	S3B	Threatened
Common nighthawk	Threatened - Schedule 1	Threatened	S3B	Threatened
Eastern wood-pewee	Special Concern - Schedule 1	Special Concern	S4B	Not listed
Olive-sided flycatcher	Threatened - Schedule 1	Threatened	S3B	Threatened
Peregrine falcon	Special Concern - Schedule 1	Special Concern	S1B	Endangered
Rusty blackbird	Special Concern - Schedule 1	Special Concern	S4B	Not listed
Short-eared owl	Special Concern - Schedule 1	Special Concern	S2S3B	Threatened
Horned grebe	Special Concern - Schedule 1	Special Concern	S4B	Not listed
Yellow rail	Special Concern - Schedule 1	Special Concern	S3B	Not listed

Source: Joro Consultants 2018b.

While potentially present in the RAA, the following species were not documented during field surveys: bank swallow, barn swallow, Canada warbler, eastern wood-pewee, horned grebe and peregrine falcon.

Potential effects of the Project on bird Species at Risk are the same as those listed for migratory birds as noted in **Section 5.3.7**. Mitigation measures that will be implemented to reduce potential effects on bird Species at Risk will be the same as those previously listed in **Section 5.3.7**, as well as the general mitigation measures that would apply to all Species at Risk.

Following the application of mitigation measures, the residual Project–related effects remaining for bird Species at Risk are as follows.

- A potential decrease in the population and/or disturbance to habitat of forest bird Species at Risk (bank swallow, barn swallow, Canada warbler, common nighthawk, eastern wood pewee, olive-side flycatcher, peregrine falcon, rusty blackbird and short-eared owl) as a result of previously identified effects (clearing, sensory disturbance, loss of nests and vehicle collisions) from construction, maintenance and operation activities.
- A potential decrease in the population and/or disturbance to habitat of waterbird Species a Risk (horned grebe and yellow rail) as a result of previously identified effects (drainage alteration, clearing, sensory disturbance, loss of nests, hunting pressure and vehicle collisions) from construction, maintenance and operation activities.

Decrease in the population and/or habitat of bank swallow as a result of previously identified effects (clearing, sensory disturbance, loss of nests and vehicle collisions) during general construction, maintenance and operation activities is anticipated to be long-term, for the life of the Project and occur infrequently. Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability. Effect will occur beyond the Project Footprint within the LAA (10-km buffer of ASR).

Decrease in the population and/or habitat of barn swallow as a result of previously identified effects (clearing, sensory disturbance, loss of nests and vehicle collisions) during general construction, maintenance and operation activities is anticipated to be long-term, for the life of the project and occur infrequently. Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability. Effect is limited to the Project Footprint (100-m ROW).

Decrease in the population and/or habitat of Canada warbler as a result of previously identified effects (clearing, sensory disturbance, loss of nests and vehicle collisions) during general construction, maintenance and operation activities is anticipated to be long-term, for the life of the Project and occur infrequently. Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability. Effect is limited to the Project Footprint (100-m ROW).

Decrease in the population and/or habitat of common nighthawk as a result of previously identified effects (clearing, sensory disturbance, loss of nests and vehicle collisions) during general construction, maintenance and operation activities is anticipated to be long-term, for the life of the Project and occur infrequently. Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability. Effect is llimited to the Project Footprint (100-m ROW).

Decrease in the population and/or habitat of eastern wood-pewee as a result of previously identified effects (clearing, sensory disturbance, loss of nests and vehicle collisions during general construction, maintenance and operation activities is anticipated to be long-term, for the life and the Project and occur infrequently. Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability. Effect is limited to the Project Footprint (100-m ROW).

Decrease in the population and/or habitat of olive-sided flycatcher as a result of previously identified effects (clearing, sensory disturbance, loss of nests and vehicle collisions) during general construction, maintenance and operation activities is anticipated to be long-term, for the life of the Project and occur infrequently. Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability. Effect is limited to the Project Footprint (100-m ROW).

Decrease in the population and/or habitat of peregrine falcon as a result of previously identified effects (clearing, sensory disturbance, loss of nests and vehicle collisions) during general construction, maintenance and operation activities is anticipated to be long-term, for the life of Project and occur

infrequently. Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability. Effect is limited to the Project Footprint (100-m ROW).

Decrease in the population and/or habitat of rusty blackbird as a result of previously identified effects (clearing, sensory disturbance, loss of nests and vehicle collisions) during general construction, maintenance and operation activities is anticipated to be long-term, for the life of the Project and infrequent. Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability. Effect is limited to the Project Footprint (100-m ROW).

Decrease in the population and/or habitat of short-eared owl as a result of previously identified effects (clearing, sensory disturbance, loss of nests and vehicle collisions) during general construction, maintenance and operation activities is anticipated to be long-term, for the life of the Project and infrequent. Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability. Effect is limited to the Project Footprint (100-m ROW).

Decrease in the population and/or habitat of horned grebe as a result of previously identified effects (clearing, sensory disturbance, loss of nests and vehicle collisions) during general construction, maintenance and operation activities is anticipated to be long-term, for the life of the Project and infrequent. Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability. Effect is limited to the Project Footprint (100-m ROW).

Decrease in the population and/or habitat of yellow rail as a result of previously identified effects (clearing, sensory disturbance, loss of nests and vehicle collisions) during general construction, maintenance and operation activities is anticipated to be long-term, for the life of the Project and infrequent. Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability. Effect is limited to the Project Footprint (100-m ROW).

No significant adverse residual effects on bird Species at Risk are anticipated to occur as a result of the Project following the implementation of mitigation measures.

5.3.9 Indigenous and Human Health

Information sources, such as local and community knowledge, TK studies with the local Indigenous communities, the IPEP and heritage and archaeological resources studies were used to identify potential effects on Indigenous Peoples and the human environment in the Indigenous LAA and RAA. Guidance was sought from the Agency's "Technical Guidance for Assessing the Current Use of Lands and Resources for Traditional Purposes under the *Canadian Environmental Assessment Act*, 2012" (Canadian Environmental Assessment Agency 2015b) and "Useful Information for Environmental Assessments" (Health Canada 2010).

5.3.9.1 Land and Resource Use

The current land use in the Indigenous RAA primarily includes hunting, fishing, trapping, gathering, outdoor recreation, uses of seasonal cabins and outfitters. Hunting, trapping, fishing and gathering are cultural and traditional activities widely practiced by community members in the RAA.

Game hunting areas are provincially-designated zones under which certain hunting conditions apply. Regulations are reviewed annually and include the establishment of season dates, bag limits and vehicle restrictions. These restrictions do not apply to Indigenous Peoples under their treaty and constitutional rights. Fishing is an important year-round traditional activity for the members of the local communities.

Fishing takes place on the lakes and rivers throughout the Indigenous RAA. There is currently no commercial fishing as summer fishing ended on God's Lake over 18 years ago and winter fishing ended 30 years ago (HTFC Planning & Design 2017d). In the past, commercial fishing occurred on Oxford Lake, Colon Lake, Chattaway Lake, Touchwood Lake, Bear Lake and Knee Lake (HFTC Planning & Design 2017b).

Trapping is a traditional activity that is actively practiced in the Indigenous RAA by many community members. In addition to the cultural connection that trapping provides to the land within the traditional territories of Indigenous Peoples, commercial trapping also occurs as a source of employment and income and, in some cases, country foods (traditional diets of Indigenous peoples).

Gathering of food (ex: berries) and medicinal plants is a traditional activity that provides a cultural connection to the land, which is practiced in the Indigenous RAA by many community members.

The proposed Project has the potential to affect traditional land and resource use (hunting, trapping, fishing and gathering activities) by members of the local communities. **Table 21** provides a summary of potential environmental effects that may occur during Project construction, maintenance and operation, and proposed mitigation measures that will be used to reduce the potential for effects to land and resource use.

Table 21: Summary of Potential Environmental Effects and Proposed Mitigation Measures during Construction, Maintenance and Operation Phases for Land and Resource Use

Potential Environmental Effects	Mitigation Measures
▪ reduction in food supply and culturally important species as a result of previously identified effects on ungulates (ex: moose, caribou) and their habitat (clearing, sensory disturbance, hunting pressure, vehicle collisions, predation and disease) from construction, maintenance and operation activities ▪ reduction in food supply as a result of previously identified effects on furbearers and birds and their habitat	▪ design and adjust alignment where there are equitable conditions in the immediate vicinity based on community input to avoid loss of valued habitat and hunting areas ▪ limit clearing to designated areas within the ROW using existing cutlines, routes and trails where they are present (EP1 and ES 130.17.1) ▪ limit access during construction and decommission and reclaim temporary access roads and winter road access points following completion of construction (EP21, EP22, ES 130.6.1 and ES 130.8.7) ▪ restrict access to operation phase quarry areas (ES 130.8.8) ▪ apply typical noise (EP4 and ES 130.12) and dust suppression (EP18 and ES 130.11) techniques

Potential Environmental Effects	Mitigation Measures
(clearing, sensory disturbance, hunting pressure, vehicle collisions and loss of nests) from construction, maintenance and operation activities ▪ reduction in food supply as a result of previously identified effects on fish and their habitat (water quality, shock waves, fishing pressure, fish passage, habitat and invasive species) from construction, maintenance and operation activities ▪ reduction in food supply as a result of previously identified effects on harvested vegetation (ex: berries) (clearing, drainage alterations, invasive species and wildfires) from construction, maintenance and operation activities ▪ improved year round connection and interaction among the local communities connected by the all-season road	▪ design road to optimize sightlines with reduced speed and signage to reduce the potential for accidental wildlife-vehicle collisions ▪ design road with no pullouts or parking areas ▪ prohibit hunting by MI employees and contractors working on the Project (EP14 and ES 130.19.1) ▪ firearm possession prohibited in construction camps ▪ schedule maintenance activities to avoid sensitive life stages unless required for safety reasons ▪ alignment selected so no work within 100 m of a waterbody (retained vegetated buffer) except at crossings (EP6 and ES 130.15.1) ▪ follow clearing and grubbing (EP1 and ES 130.17.1) and blasting (EP14 and ES 130.19.6) timelines and restrictions to avoid important nesting and breeding times ▪ restrict equipment and vehicle use outside of cleared areas (ES 130.6.1) ▪ install erosion and sediment control measures (EP16 and ES 130.16, ex: silt fencing, erosion control blanket, straw wattle, geotextile) ▪ adhere to DFO timing windows for in-stream work (EP6, EP7, EP11 and ES 130.15.2) ▪ bridges and culverts at watercourse crossings will accommodate 1:50 year flood events ▪ regular culvert maintenance and cleanouts (EP11 and ES 130.15.9) ▪ decommission and rehabilitate disturbed areas not required for Project maintenance and operation to prevent access (EP22 and ES 130.8.7)) ▪ restrict fishing access of the construction crews ▪ restrict access to potential parking areas at watercourse crossings ▪ install large riprap/aggregate on slopes to limit access to streams at crossing sites where access did not exist prior to the Project ▪ designated re-fuelling areas and fuel handling procedures (EP2, EP3, ES 130.9.2.5 and ES 130.10, ex: at least 100 m from water bodies, secondary containment, approved storage tanks, maintain spill control and clean-up equipment, emergency response plan with spill containment/clean-up procedures) ▪ equipment and vehicles will be clean and free of leaks upon arrival to site and kept in good repair (EP6 and ES 130.15.3) ▪ identify and map areas of cultural importance prior to clearing for Project planning and design (routing and setbacks) ▪ clean construction equipment and vehicles prior to bringing them to site to control spread of invasive species (EP25 and ES 130.15.1)

Following the application of mitigation measures, the residual Project–related effects remaining for land and resource use are as follows.

- A reduction in food supply and culturally important species as a result of previously identified effects on ungulates, furbearers and birds and their habitat (clearing, sensory disturbance, hunting pressure, vehicle collisions, predation and disease, loss of nests) from construction, maintenance and operation activities.

- A reduction in food supply as a result of previously identified effects on fish and their habitat (water quality, shock waves, fishing pressure, fish passage, habitat and invasive species) from construction, maintenance and operation activities.
- A reduction in food supply as a result of previously identified effects on harvested vegetation (ex: berries) (clearing, drainage alterations, invasive species and wildfires) from construction, maintenance and operation activities.

Reduction in food supply and culturally important species as a result of previously identified effects on ungulates (ex: moose, caribou) and their habitat (clearing, sensory disturbance, hunting pressure, vehicle collisions, predation and disease) during general construction, maintenance and operation activities is anticipated to be long-term, for the life of Project and occur sporadically. Indigenous people/communities in the Indigenous Land/Resource Use RAA are able to adapt with relative ease and maintain pre-development activities. Effects may extend beyond the Project Footprint within the LAA (10-km buffer of ASR).

Reduction in food supply as a result of previously identified effects on furbearers and birds and their habitat (clearing, sensory disturbance, hunting pressure, vehicle collisions and loss of nests) during general construction, maintenance and operation activities is expected to be long-term, for the life of the Project and occur sporadically. Indigenous people/communities in the Indigenous Land/Resource Use RAA are able to adapt with relative ease and maintain pre-development activities. Effects may extend beyond the Project Footprint within the LAA (10-km buffer of ASR).

Reduction in food supply as a result of previously identified effects on fish and their habitat (water quality, shock waves, fishing pressure, fish passage, habitat and invasive species) during general construction, maintenance and operation activities is expected to be long-term, for the life of the Project and occur sporadically. Indigenous people/communities in the Indigenous Land/Resource Use RAA are able to adapt with relative ease and maintain pre-development activities. Effects may extend beyond the Project Footprint within the LAA (10-km buffer of ASR).

Reduction in food supply as a result of previously identified effects on harvested vegetation (ex: berries) (clearing, drainage alterations, invasive species and wildfires) during general construction, maintenance and operation activities is anticipated to be long-term, for the life of the Project and occur sporadically. Indigenous people/communities in the Indigenous Land/Resource Use RAA are able to adapt with relative ease and maintain pre-development activities. Effect is limited to the Project Footprint (100-m ROW).

The all-season road may open up new harvesting areas which would be positive for the local Indigenous communities. No significant adverse residual effects on land and resource use are anticipated to occur as a result of the Project following the implementation of mitigation measures.

5.3.9.2 Travel Routes

Travel routes in the Indigenous LAA and RAA include ATV and snowmobile trails, as well as open-water and frozen waterways. These routes are important to local communities as they serve to connect people to lands and resources used for traditional purposes in recognition and exercise of aboriginal and treaty rights.

During construction and when in-service, the all-season road would bisect some travel routes and may result in reduced access for resource use and outdoor recreation. Construction of the all-season road would be completed in segments starting from Bunibonibee Cree Nation and extending south and eastwards. Disruption to travel routes that intersect the all-season road ROW would be greatest when a segment of the all-season road is under construction. When operational, the all-season road would provide an improved travel route among the communities. **Table 22** provides a summary of potential environmental effects that may occur over the course of the Project and proposed mitigation measures that will be used to reduce the potential for effects to travel routes.

Table 22: Summary of Potential Environmental Effects and Proposed Mitigation Measures during Construction, Maintenance and Operation Phases for Travel Routes

Potential Environmental Effects	Mitigation Measures
▪ decreased access to traditional travel routes used for resource use and recreation during construction, maintenance and operation	▪ crossing designs to maintain navigability of navigable watercourses ▪ provide an approach (ramps) for users (ex: boats, snowmobiles, ATVs) to cross the road and post warning signs showing the road crossings

The potential decreased access would be greatest when active construction is occurring in an area although the access would be modified throughout the life of the Project. Following the application of mitigation measures, the residual Project–related effects remaining for travel routes is as follows.

- Potential decreased access to traditional travel routes used for resource use and recreation during construction, maintenance and operation.

Decreased access to traditional travel routes used for resource use and recreation during general construction, maintenance and operation activities is anticipated to be long-term, for the life of the Project and occur infrequently. Indigenous people/communities in the Indigenous Land/Resource Use RAA are able to adapt with relative ease and maintain pre-development activities. Effects may extend beyond the Project Footprint within the LAA (10-km buffer of ASR).

No significant adverse residual effects on travel routes are anticipated to occur as a result of the Project following the implementation of mitigation measures.

5.3.9.3 Economy

In 2011, income levels in Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation were much lower than the Manitoba average. The local economy includes a mix of wage, cash and traditional economic activities. The wage economy is largely derived from public sector employment including health care, education, social services and band activities. The cash economy accounts for the delivery of goods and services outside of registered businesses or companies. The traditional economy includes subsistence activities such as non-commercial hunting, gathering and fishing, as well as other resource-based activities (Indigenous and Northern Affairs Canada 2017b).

Construction, maintenance and operation of the proposed Project is expected to generate overall positive economic effects for the local Indigenous communities. Construction would be carried out under contracts tendered and managed by MI. During the period of peak construction of the proposed Project, an estimated maximum workforce of 120 is anticipated. Commercial airline and air charter companies and local and regional suppliers of construction materials and supplies are expected to benefit during construction. As part of MI's commitment to local residents participating in and benefiting from the Project, MI specifically includes a requirement for a percentage of the construction tenders to be supplied locally through Manitoba's Indigenous Procurement Initiative (ex: equipment, services, employment). The percentage of local procurement is modified for each contract based on discussions with the community to identify and confirm its capacity to deliver equipment, services and/or manpower.

During operation the all-season road would increase access for trapping activities, resulting in an overall long-term positive effect on local incomes. However, there could be a decrease in trapping income for local trappers as a result of reduced trapping harvest during construction (ex: habitat loss, sensory disturbance, hunting pressure). **Table 23** provides a summary of potential environmental effects that may occur over the course of the Project and proposed mitigation measures that will be used to reduce the potential for effects to the local economy.

Table 23: Summary of Potential Environmental Effects and Proposed Mitigation Measures during Construction, Maintenance and Operation Phases for the Local Economy

Potential Environmental Effects	Mitigation Measures
▪ increase in economic conditions (ex: employment, services, improved access) for local communities during construction, maintenance and operation ▪ reduction in trapping income for local trappers as a result of reduced trapping harvest from previously identified effects (clearing, sensory disturbance, hunting pressure and vehicle-collision) during construction	▪ follow the mitigation measures to minimize effects to furbearers due to habitat loss, sensory disturbance and vehicle collisions ▪ TK interviews, workshops and studies were conducted to identify and minimize interaction with areas of importance to trappers ▪ provide current Project information to affected trappers to minimize potential for traps to be set in areas to be disturbed by construction ▪ maintain trapper access to traplines and trails during construction; design trail crossings to maintain trapper access and trails (EP1 and ES 130.17.3.3) ▪ if active traps are discovered during construction, work will stop and the trapper will be notified

Potential Environmental Effects	Mitigation Measures
▪ increase in trapping income for local trappers as a result of improved access along the all-season road during operation	▪ construction contracts will require Indigenous involvement to increase economic opportunities for local communities

As noted above, the overall effects to the local economy are expected to be positive with the exception of a potential negative effect to trapping income during construction. Following the application of mitigation measures, the residual Project–related effects remaining for the local economy is as follows.

- Potential reduction in trapping income for local trappers as a result of reduced trapping harvest from previously identified effects (clearing, sensory disturbance, hunting pressure and vehicle-collision) during construction.

Reduction in trapping income for local trappers as a result of reduced trapping harvest from previously identified effects (clearing, sensory disturbance, hunting pressure and vehicle-collision) ROW clearing and general construction activities is anticipated to be long-term, for the life of the Project and occur infrequently. Indigenous trappers in the Indigenous Land/Resource Use RAA are able to adapt with relative ease and maintain pre-development activities. Effects may extend beyond the Project Footprint within the LAA (10-km buffer of ASR).

No significant adverse residual effects on the local economy are anticipated to occur as a result of the Project following the implementation of mitigation measures.

5.3.9.4 Heritage and Archaeological Resources

A Heritage Resources Impact Assessment (HRIA) was conducted for the Project. A flyover of the alignment was conducted in May 2016, a baseline desktop study was completed in July 2016, further field assessments were conducted in July 2016 and a HRIA report was completed to identify archaeological sites potentially affected by the proposed road alignment (AMEC Foster Wheeler Environment and Infrastructure 2016 a; b; c). Based on a baseline desktop study, a flyover of the alignment and a HRIA of the proposed alignment, twelve previously unrecorded sites and a total of 149 artifacts were identified within the Heritage LAA, as described in **Chapter 6** of the Project 6 – All-Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation Environmental Impact Statement. Only four of these newly recorded sites are within the 100 m ROW for the all-season road and potentially affected.

The proposed Project may result in loss or disturbance to heritage, archaeological, cultural and/or sacred sites during ROW clearing and construction and as a result of increased access. A summary of potential environmental effects on heritage and archaeological resources that may occur and proposed mitigation measures that will be used to reduce potential effects is provided in **Table 24**.

Table 24: Summary of Potential Environmental Effects and Proposed Mitigation Measures during Construction, Maintenance and Operation Phases for Heritage and Archaeological Resources

Potential Environmental Effects	Mitigation Measures
▪ loss or disturbance to heritage, culture (sacred) or community use resources and sites during ROW clearing and construction activities ▪ loss or disturbance to heritage resources as a result of increased access	▪ field assessment of the alignment has identified areas for further investigation prior to construction (EP13 and ES 130.18) ▪ protection measures (ex: avoidance and maintaining buffers around heritage resources near the alignment) shall be employed in discussion with HRB and the local communities ▪ limit equipment and workers to construction areas (ES 130.6.1) ▪ in the event that artifacts are uncovered, work at the location will be stopped and a recovery or protection plan implemented by a qualified archaeologist in consultation with Manitoba Historic Resources Branch (HRB) and the local communities (EP13 and ES 130.18) ▪ conduct appropriate community and cultural activities prior to construction ▪ non-disclosure of heritage and archaeological sites to minimize potential for disturbance to sites ▪ limit access during construction and decommission and reclaim temporary access roads and winter road access points following completion of construction (EP21, EP22 and ES 130.8.7) ▪ restrict access to operation phase quarry areas (ES 130.8.8) ▪ as appropriate, implement access controls to adjacent heritage sites

Following the application of mitigation measures, the residual Project–related effects remaining for heritage and archaeological resources is as follows.

- The potential loss or disturbance to heritage, culture (sacred) or community use resources and sites during ROW clearing and construction activities and as a result of increased access.

Loss or disturbance to heritage, culture (sacred) or community use resources and sites during ROW clearing and general construction activities is anticipated to be short-term, associated with discrete activities and occur sporadically. Potential disturbance of resources that are of local importance and are not recoverable. Effect is limited to the Project Footprint (100-m ROW).

Loss or disturbance to heritage resources as a result of increased access during ROW clearing and general construction activities is anticipated to be long-term, for the life of Project and occur infrequently, or not at all. Potential disturbance of resources that are of local importance and are not recoverable. Effect is limited to the Project Footprint (100-m ROW).

No significant adverse residual effects on heritage and archaeological resources are anticipated to occur as a result of the Project following the implementation of mitigation measures.

5.3.9.5 Human Health and Safety

The Project has the potential to directly affect the health and safety of both community members and workers during the construction, maintenance and operation phases. As no construction or maintenance activities for the all-season road would take place within the boundaries of Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation, community members will be primarily subject to potential direct effects of Project construction and operations and maintenance activities when travelling outside of their communities.

There is a risk to community members and worker safety (ex: injury, death) during road construction and maintenance associated with use of heavy equipment, bridge construction and maintenance, quarry and borrow pit development, blasting, rock crushing, aggregate sorting and other related activities. Construction and maintenance worker health and safety may be at risk from vehicle accidents, noise, burns, explosions and the handling of hazard substances such as fuels and other materials. Local community members may also be at risk of injury and death from collisions with equipment, machinery and vehicles and to a much lesser extent fires and explosions.

During the operational phase of the all-season road, there is a number of road or traffic-related safety risks to road users and users of trails that intersect the all-season road. These include vehicle accidents and collisions with vehicles, maintenance equipment and wildlife.

The potential environmental effects on human health and safety associated with Project construction, maintenance and operation activities are also linked to the potential direct and indirect effects on the environmental components that those activities interact with. Therefore, potential adverse effects of Project construction on human health and safety are, in part, determined through the assessment of Project construction effects on the VCs linked to those activities. For human health, associated environmental effects assessment determinations and mitigation measures for other VCs are found in the effects assessment sections for air quality, surface water and land and resource use (**Sections 5.3.1.1, 5.3.4.1** and **5.3.9.1,** respectively).

A summary of potential environmental effects of the Project on human health and safety that may occur over the course of the Project and proposed mitigation measures that will be used to avoid or minimize potential effects is provided in **Table 25**.

Table 25: Summary of Potential Environmental Effects and Proposed Mitigation Measures during Construction, Maintenance and Operation Phases for Health and Safety

Potential Environmental Effects	Mitigation Measures
▪ community member and worker safety risk during construction, maintenance and operation activities	▪ post "no entry" warning signs and restrict access around active construction sites ▪ provide safe access for trappers and other traditional users

Potential Environmental Effects	Mitigation Measures
▪ loss of medicinal plant harvest areas used by community members for therapeutic or healing purposes due to clearing of native vegetation within the ROW, temporary access roads, quarries, borrow pits, work areas and camps ▪ risk to human health from decreased quality of the community water supply as a result of previously identified effects (surface and/or ground water quality) during construction, maintenance and operation ▪ risk to human health and disturbance to local communities as a result of reduced air quality during construction, maintenance and operation ▪ disturbance to local communities as a result of increased noise levels during construction, maintenance and operation	▪ provide updates to local communities regarding location and timing of construction and maintenance activities ▪ workers to be educated regarding safe construction practices including use of personal protective equipment ▪ develop and implement Health and Safety Plans prior to construction and conduct regular site safety meetings and inspections ▪ blasting crews to be trained and certified ▪ blasting locations secured prior to blasting and warning sirens activated prior to detonation of explosives ▪ equip and maintain equipment, machinery and vehicles with appropriate safety features (ex: back-up warning devices) ▪ road geometric design standard based on recognized safety standards ▪ warning signs of reduced speed limits at wildlife hazard locations ▪ ramps for snowmobiles/ATVs to be placed at road/trail crossing intersections with warning signs marking crossing locations ▪ remove trees and tall shrubs to maintain line of sight ▪ dust control product application in key problem areas (EP18 and ES 130.11) ▪ identify and map important medicinal and cultural plants and harvesting areas prior to clearing for Project planning and design (routing and setbacks) ▪ adjust alignment where possible to avoid the loss of important harvesting areas ▪ limit clearing to designated areas within the ROW (EP1 and ES 130.17.1) ▪ restrict equipment and vehicle use outside of cleared areas (ES 130.6.1) ▪ clean construction equipment and vehicles prior to bringing them to site to control spread of invasive species (EP25 and ES 130.15.1) ▪ alignment selected so no work within 100 m of a waterbody (retained vegetated buffer) except at crossings where in-stream work will be conducted during winter months or low flow conditions (EP6, ES 130.15.1 and ES 130.15.2) to the extent possible ▪ equipment and vehicles will be clean and free of leaks upon arrival to site and kept in good repair (EP6 and ES 130.15.3) ▪ minimize clearing and soil disturbance and limit vehicle/equipment use to ROW (ES 130.6.1) ▪ install erosion and sediment control measures (EP16 and ES 130.16, ex: silt fencing, erosion control blanket, straw wattle, geotextile) ▪ maintain natural drainage and re-grade disturbed areas to limit erosion ▪ conduct clearing during winter months (EP1 and ES 130.17.1) ▪ suspend construction activities during extreme weather events (EP6 and ES 130.16) ▪ energy dissipation controls (ex: ditching, rip-rap, collection ponds) ▪ decommission and rehabilitate disturbed areas not required for Project maintenance and operation (EP22 and ES 130.8.7) ▪ designated re-fuelling areas and fuel handling procedures (EP2 and ES 130.9.2.5, ex: at least 100 m from water bodies and away from existing wells, secondary containment, approved storage tanks, maintain spill

Potential Environmental Effects	Mitigation Measures
	control and clean-up equipment, emergency response plan with spill containment/clean-up procedures) ▪ improved road conditions, sight lines and approaches will reduce likelihood and frequency of accidents and improve access for spill response crews ▪ soil and groundwater remediation to CCME guidelines (EP3 and ES 130.10) ▪ dust suppression (EP18 and ES 130.11) ▪ activities that generate dust or smoke (ex: blasting, burning) will not take place during high wind conditions ▪ vehicle speed limits at construction sites and quarries within close proximity to local communities when dust problems occur ▪ use low sulphur fuels ▪ require a high standard of maintenance of equipment and vehicles ▪ limit unnecessary long-term idling ▪ control aggregate size and use of granitic material to reduce dust generation from roadbed ▪ apply typical noise suppression techniques (EP4 and ES 130.12) ▪ locate quarry activities as far away from local communities as reasonably possible ▪ forest buffers will be retained, unless clearing is required for safety reasons, around quarries to reduce noise from quarry operations ▪ limit quarrying and blasting to daytime hours when working close to local communities

Following the application of mitigation measures, the residual Project–related effects remaining for human health and safety are as follows.

- Safety risk to community members and workers during construction, maintenance and operation activities.
- Potential loss of medicinal plant harvest areas used by community members for therapeutic or healing purposes due to clearing of native vegetation within the ROW, temporary access roads, quarries, borrow pits, work areas and camps.
- Risk to human health from decreased quality of the community water supplies as a result of previously identified effects (surface and/or ground water quality) during construction, maintenance and operation.
- Risk to human health and disturbance to local communities as a result of reduced air quality (ex: dust, emissions) during construction, maintenance and operation.
- Potential disturbance to local communities as a result of increased noise levels during construction, maintenance and operation.

Community member and worker safety risk during general construction, maintenance and operation activities is anticipated to be long-term, for the life of Project and occur infrequently during operation and likely sporadically during construction. Community member and worker safety risk is expected to have potential for injuries, but will be limited to the Project Footprint (60-m cleared area).

Loss of medicinal plant harvest areas used by community members for therapeutic or healing purposes during clearing of native vegetation for the all-season road, quarries, borrow pits, access roads, watercourse crossings and associated work areas and camps is anticipated to be long-term, for the life of Project and occur sporadically. This residual effect is likely to measurably affect plants important to local communities, but will be limited to the Project Footprint (100-m ROW).

Risk to human health from decreased quality of the community water supply as a result of previously identified effects (surface and/or ground water quality) during general construction, maintenance and operation activities is anticipated to be long-term, for the life of Project. Spills to soil would be remediated preventing effects to groundwater and surface water. As contaminant concentrations will be within applicable regulations, there are no anticipated adverse effects. Water quality may be altered within the Project Footprint (100-m ROW).

Risk to human health and disturbance to local communities as a result of reduce air quality from use of equipment and vehicles during general construction, maintenance and operation activities is anticipated to be long-term, for the life of the Project and occur sporadically during construction and maintenance and frequently during operation in summer. This residual effect could cause a Potential change in air quality <10% of baseline conditions and will be limited to the Project Footprint (100-m ROW).

Disturbance to local communities as a result of increased noise levels from use of equipment and vehicles during general construction, maintenance and operation activities is anticipated to be long-term, for the life of the Project and occur sporadically during construction and maintenance. Potential change in noise <10% of baseline conditions Limited to the Project Footprint

No significant adverse residual effects on human health and safety are anticipated to occur as a result of the Project following the implementation of mitigation measures.

5.4 Transboundary Effects and Effects Resulting From a Federal Decision

There are no expected changes to the environment on federal lands and lands in another province or outside of Canada. If DFO determines that Authorization is required under the *Fisheries Act*, there is the potential that the required offsetting plan may have an effect on the environment. The potential effects and associated mitigation measures, however, would be the same as those already identified throughout **Section 5.3.1** to **Section 5.3.9**. Therefore, no significant residual transboundary effects or effects to the environment arising as a result of a federal decision on the Project are anticipated.

5.5 Accidents and Malfunctions

During Project construction, maintenance and operation activities there is a risk that accidents and malfunctions may occur that could potentially affect the environment and human health and safety. This could be the result of human error or natural events. Events may include the accidental spills and releases

of hazardous materials on land and water, fires and explosions, accidents or collisions involving construction equipment, vehicles and wildlife and accidental encroachments on sensitive sites/areas. Potential accidents and malfunctions have been identified based on the Project components, activities, equipment and materials (ex: type and quantity) associated with each Project phase and include:

- accidental release of hazardous substances
- fire or explosion
- vehicle collisions

With the application of MI's EPs and ES 130s, best management practices and application of the contractor's Emergency Response Plan, the probability of accidents and malfunctions occurring and, risk to the environment should they occur, is low. Additional details regarding the preventative/contingency mitigation measures that will be implemented to avoid or minimize adverse effects of accidents and malfunctions are provided in **Chapter 6** of the Project 6 – All-Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation Environmental Impact Statement.

5.6 Effects of the Environment on the Project

The determination of potential effects of the environment on the proposed Project is based on the ability of the Project to withstand normal and potential extreme environmental events. Normal and potential extreme environmental events that have the highest risk of occurring within the Project region include but are not limited to weather conditions, forest fires and climate change. The potential effects of the environment on the Project are assessed in consideration of the following:

- the risk of extreme environmental events occurring
- mitigation inherent in the road design and related components (ex: bridges) to withstand normal environmental conditions and atypical natural hazard events
- environmental protection plans and emergency response procedures for the Project

The proposed Project would be subject to occasional severe or extreme weather events such as heavy snow falls, blizzards, extreme winds and intense rain storms. During construction, severe weather events could adversely affect the Project resulting in cost overruns, Project completion delays and adverse effects to the environment in the LAAs. During maintenance and operation, severe weather events could force closure of the road for extended periods of time due to heavy snow accumulations during winter and stream washouts during the high-risk spring and summer seasons. Severe weather events can also lead to vehicle accidents which may result in fuel and other hazardous liquid releases and temporary road closures.

There is some potential for the proposed Project to be affected by flooding due to seasonal flood events resulting from the rapid melting of high snow volumes and/or heavy rain events. Flooding may be caused by ice jams or beaver dams blocking natural flows. The large diameter of culverts proposed for the Project are intended to minimize the probability of ice jams at culverts. The use of beaver cones in the road design

and regular culvert clean outs during maintenance would minimize culvert blockage due to beaver activity. The Project design has incorporated standard design measures (ex: design standard of 1:50 year flood event for stream crossings) that are expected to mitigate potential effects of typical and predictable weather events and severe/extreme weather events expected to occur in the LAAs.

The greatest forest fire activity in this area occurred during the 1950s with 12.7% of the land within the Vegetation RAA burned between 1950 and 1959. Comparatively less fire activity has been documented since the 1960s with fires affecting between 0 to 2% of the Project Footprint, LAA and RAA. Approximately 28% of the road ROW occurs within low-lying fen and bog complexes, exposed land or sparsely-forested areas and is therefore less susceptible to forest fires. There is a potential for more densely forested portions of the all-season road ROW to be subject to forest fire events during the operational phase of the Project. In the event of a forest fire in the vicinity of the Project, mitigation procedures outlined in the Contractor's Emergency Response Plan would be implemented. This may include temporary closure of the all-season road, as required, to minimize the potential for vehicle collisions due to reduced visibility caused by smoke. Substantial damage to Project components as a result of forest fires is not anticipated considering most Project components are made from materials that are not easily affected by fire (ex: rock/gravel road fill; steel and concrete bridge structures).

The risk of ground subsidence in the LAA may result from washout (erosion) events, changes to soil moisture content due to removal of vegetation and variations in seasonal and annual precipitation. Installation of stream crossing and equalization culverts and the use of geosynthetic material (geotextile) as required would minimize the potential for erosion and scouring that can compromise the integrity of the road base and embankment and result in potential ground subsidence and road damage. Geotextile would be used to separate the road structure from areas with unsuitable soils to protect road structure integrity and provide for road and culvert reinforcement by containing road fill material at fen and bog crossing locations in consideration of the latest effective techniques for road construction in boreal wetland areas.

Potential geological hazards include seismic activity, isostatic rebound and landslides/slope erosion and ground instability. The Project is located within a low seismic hazard area. Therefore, potential effects of earthquakes on the Project are not anticipated. Isostatic rebound is the slow natural mechanical rebound (rise) of land masses that were depressed by the weight of ice sheets during glaciation. This natural rebound would be consistent throughout the Project Footprint with no differential shifting and therefore there would be no effect on the Project.

Landslides can pose a risk to people and infrastructure by slope failures and the downward movement of rock and sediment. The topography in the vicinity of the Project is relatively flat and there are no records of major landslides. Small scale slope erosion can occur along watercourses depending on sediment composition and water conditions. While the all-season road has 53 crossings, most are flat well-vegetated wetland areas with little to no flow. Erosion mitigation is a standard construction best management practice. Ground stability would be addressed as part of the geotechnical investigations to

be completed during detailed design to confirm the geotechnical characteristics along the all-season road alignment and of the construction materials.

Climate change can put northern road systems at risk by affecting road structures that overlie permafrost and by shortening the duration of winter roads built on ice or seasonally frozen ground (McGregor *et al.* 2008). The Project would provide all-season road access among the communities rather than the communities having to rely on temporary and less predictable winter road access and costly air transportation. It is possible that without the Project and if future climate change trends continue to adversely affect the reliability of the winter road, there would be a greater reliance on air transportation resulting in increased GHGs and higher goods and services costs.

The Project is within an area which consists of sporadic discontinuous permafrost (10% to 50%) and low (less than 10%) ground ice content (Heginbottom *et al*. 1995) with the permafrost most widespread in peatlands and poorly drained clayey soils. It has been predicted that climate change may result in the complete thawing of discontinuous permafrost (University of Manitoba Transport Institute 2003). In regions of discontinuous permafrost, thawing may produce thickening of the active layer, settlement and terrain instability (Batenipour 2012). Further geotechnical investigations would be completed as part of detailed design of the road to identify areas, degree and the extent of permafrost along the proposed alignment. The road through these areas would be designed to minimize the disturbance to the sub-grade soils/peat moss to protect the frozen soils from permafrost degradation. Additional construction strategies would be implemented to minimize the potential for ground thawing as appropriate (**Chapter 6** of the Project 6 – All-Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation Environmental Impact Statement).

The all-season road design standards incorporate mitigation into the Project design to avoid or minimize adverse effects of normal environmental conditions of the area. Taking into consideration the possibility and risk of weather events and the implementation of mitigation measures and follow-up actions, no residual adverse effects of the environment on the Project are anticipated.

5.7 Cumulative Effects

The purpose of the Cumulative Effects Assessment (CEA) is to identify and assess adverse residual Project effects on VCs that may become significant when they interact with potential effects of past, present and future physical activities in the region. The proposed Project's cumulative effects were identified and assessed following the most recent Agency guidance on scoping and assessment methods for cumulative effects. Scoping of the cumulative effects assessment included:

- identifying VCs for which adverse residual environmental effects from the proposed Project are expected
- determining and justifying the spatial and temporal boundaries to capture potential cumulative effects on VCs that may experience adverse residual effects

- identifying sources of potential cumulative effects, which includes past, present and future physical activities that are anticipated to contribute to the residual environmental effects of the Project on VCs

As per the Agency's guidelines for the proposed Project (Canadian Environmental Assessment Agency 2017a), the CEA includes consideration of cumulative effects for the following VCs:

- fish and fish habitat, including valued fish species
- Species at Risk
- migratory birds
- Indigenous people
- VCs associated with sub-section 5(2) of CEAA, 2012 (ex: health and socioeconomic conditions, physical and cultural heritage, or any structure, site or thing that is of historical, archaeological, paleontological or architectural significance)

The Indigenous RAA was selected as the spatial boundary to assess VCs identified for the CEA. The CEA spatial boundary encompasses the Traditional Territories of Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation. This CEA spatial boundary considers changes to the environment that cumulatively may indirectly affect the health and socio-economic conditions and traditional use areas and resources of the local Indigenous communities and people in the region and it also contains the smaller Wildlife RAA, addressing Species at Risk and migratory birds.

The CEA focuses on potential adverse cumulative effects on VCs that are expected to experience adverse residual environmental effects caused by the proposed Project (Canadian Environmental Assessment Agency 2017a) regardless of whether those residual environmental effects are predicted to be significant (Canadian Environmental Assessment Agency 2014). To determine if there is the potential for adverse cumulative effects to VCs that would warrant further assessment, scoping criteria were applied. For a VC to be carried forward for further cumulative effects analysis the VC must be:

- affected by adverse residual effects of the proposed Project
- likely to be adversely affected by other past, present or future physical activities within the spatial and temporal boundaries defined below
- warranted by one or more screening criteria such as the potential for significant adverse cumulative effects to the VC, feedback from the IPEP, level of uncertainty in predictions of cumulative effects and/or the need for mitigation measures or follow-up

All VCs identified for the proposed Project are expected to have some residual environmental effects. However, not all of the VCs are likely to be affected by the past, present or future physical activities within the spatial and temporal boundaries. The remote nature of the region has resulted in the limitation of past and present physical activities. The past and present physical activities that are anticipated to potentially contribute to cumulative effects on VCs carried forward for assessment include:

- existing infrastructure on and immediately adjacent to the local Indigenous communities
- existing winter road use and maintenance

- mineral dispositions (ex: quarries)
- Manitoba Hydro transmission and sub-transmission lines
- traditional land and resource use activities including hunting and trapping, fishing and gathering

The future physical activities that are certain and reasonably foreseeable and that are anticipated to potentially contribute to cumulative effects on VCs carried forward for assessment include:

- construction of on-reserve community access roads (Manto Sipi Cree Nation, 210m; God's Lake First Nation, 685 m) to connect the Project to existing community roads
- Bell/MTS commitment to provide wireless and wireline broadband services to God's River and God's Lake Narrows
- ISC plans to construct new schools in Bunibonibee Cree Nation and Manto Sipi Cree Nation
- ISC plans to develop a landfill site for Bunibonibee Cree Nation
- exploration of diamond claims in the Oxford House area as a result of a partnership between Bunibonibee Cree Nation and Altius Resources Inc.
- continued traditional land and resource use activities (ex: hunting, trapping, fishing, gathering)

The CEA for each VC having the potential to combine with Project effects and potential effects of those past, present and future physical activities were assessed using criteria defined in **Chapter 4** of the Project 6 – All-Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation Environmental Impact Statement. Physical activities that are certain and reasonably foreseeable would not overlap temporally with effects of the proposed Project given that construction of the all-season road would not begin until 2030. Likewise the physical activities associated with other projects/activities are anticipated to be in-service prior to the construction of the road. The exceptions would be potential diamond exploration as a result of an agreement between Bunibonibee Cree Nation and Altius Resource Inc. and on-reserve community access roads to connect to connect the Project to existing community roads in Manto Sipi Cree Nation and God's Lake First Nation. The extent and timing of potential diamond mining exploration is unknown and is an uncertainty in the CEA. Canada has not made an official commitment for the construction of the two community access roads but it is reasonably foreseeable that these will be constructed, and in the general timeframe of Project construction.

Fish and Fish Habitat

The residual effects of the proposed Project on aquatic resources are expected to be minor given the limited potential for and short-term duration of Project aquatic environment interactions. Under the *Fisheries Act*, DFO requires fish habitat offsetting for the proposed Project and other present and future physical activities that result in "serious harm" (ex: permanent alteration to, or destruction of) fish habitat. Therefore, the potential for adverse cumulative effects to fish and fish habitat would be prevented through habitat offsetting plans, if required.

There are no plans to incorporate boat ramps, docks or other structures or modifications to the all-season road to facilitate access to fish-bearing watercourses. Hence, convenient fishing opportunities at fish-

bearing water crossings along the all-season road would be limited by the design of the all-season road. The decommissioning of the winter road as the new all-season road is completed would reduce potential damage to the fish habitat and harvested fish species where winter roads cross watercourses. MSD is responsible for the management and enforcement of fishing and control of invasive aquatic species in Manitoba.

Other activities or projects that could overlap with the proposed Project do not indicate the potential to result in cumulative adverse effects that would require further mitigation other than those identified in **Chapter 6** of the Project 6 – All-Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation Environmental Impact Statement.

Migratory Birds

Cumulative effects are not anticipated to result in environmental effects where the habitat for migratory birds and bird mortality would result in a change in the migratory bird populations. The proposed Project in combination with past, current and reasonably foreseeable future projects is not likely to have a definable, detectable or measurable potential effect above baseline (ex: potential effect is within a normal range of variation). Other activities or projects that could overlap with the proposed Project do not indicate the potential to result in cumulative adverse effects that would require further mitigation other than those identified in **Chapter 6** of the Project 6 – All-Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation Environmental Impact Statement.

Species at Risk

The all-season road is anticipated to have predictable and mitigatable effects on Species at Risk. The Southern Hudson Bay-James Bay population of Lake Sturgeon, whose distribution overlaps with the Project, is designated as Special Concern by COSEWIC (COSEWIC 2006b). The population is currently under consideration for protection under SARA, however critical habitat has not been identified for the species. There are an estimated 14 vegetation Species at Risk that occur within the Vegetation RAA and surroundings (Szwaluk Environmental Consulting Ltd. *et al.* 2017a). None of these 14 Species at Risk are listed federally under the COSEWIC or SARA, or provincially protected under the ESEA.

Mammal Species at Risk identified in the project area include woodland caribou (Boreal Woodland and Eastern Migratory ecotypes), wolverine and little brown bat (Joro Consultants 2018b). There are Recovery Strategy Plans in place for Boreal Woodland caribou and little brown bat. At present, there is only a COSEWIC assessment for the Eastern Migratory woodland caribou. By the time the Project is built, the Eastern Migratory caribou may be listed under SARA.

Critical habitat for Boreal Woodland caribou is found within a small portion of the Wildlife RAA (outside of the LAA) where the RAA overlaps with the Molson Boreal Caribou Management Unit and the Norway House range. There is no critical habitat currently defined for the Eastern Migratory caribou. Eastern Migratory caribou are known to use to the Wildlife RAA during the winter months, with a few females

remaining during the summer months. No critical habitat for little brown bat was identified in the Wildlife RAA; the closest is concentrated in the northwest of Lake Winnipeg, north of Grand Rapids. Adverse cumulative effects on wildlife Species at Risk (ex: caribou) are expected to be primarily mitigated through monitoring and employment of adaptive measures.

Cumulative effects are not likely to have a definable, detectable or measurable potential effect above baseline (ex: potential effect is within a normal range of variation). Other activities or projects that could overlap with the proposed Project do not indicate the potential to result in cumulative adverse effects that would require further mitigation other than those identified in **Chapter 6** of the Project 6 – All-Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation Environmental Impact Statement.

Indigenous Peoples

The all-season road is anticipated to have predictable and mitigatable effects on local Indigenous communities. Changes to community life, traditional lifestyles and individual well-being are not expected to dramatically change with the all-season road given the mitigation measures and because the road only connects the four local Indigenous communities that already have access to each other by winter roads and waterways. Traditional land and resource use patterns may be altered due to increased access, which could be a benefit. The all-season road is anticipated to benefit local community members by increasing access for resource users and providing improved year round interaction among the local communities connected by the road.

Heritage and Archaeological Resources

Loss and impairment of heritage and archaeological resources and areas of cultural importance are unlikely due to the avoidance of the all-season road alignment through TK studies, the HRIA and implementation of mitigation measures and the unlikely potential to overlap with other physical activities.

Adverse cumulative effects are not expected to be significant based on the CEA criteria, the analyses and descriptions of expected cumulative effects and the mitigation measures applied for each of the VCs assessed. Although there may be some overlap in spatial boundaries, there is no overlap in temporal boundaries (with the potential exception of exploration for diamonds in the Bunibonibee Cree Nation traditional territory) between the proposed Project and physical activities anticipated to occur in the CEA RAA. Considering no significant adverse cumulative effects are anticipated from past, present and reasonably foreseeable future physical activities, it is not expected that additional follow-up studies would be required other than follow-up studies proposed in **Section 6** to verify the accuracy of the EA for the proposed Project and to determine the effectiveness of mitigation measures incorporated into the design, construction, maintenance and operation phases of the Project. If unexpected adverse cumulative effects are identified in the future, then additional measures can be discussed with MSD.

6.0 MONITORING AND FOLLOW-UP

An EA is a planning tool that attempts to predict adverse environmental effects and identify mitigation measures to avoid them or minimize them if avoidance is not possible. As there is a degree of uncertainty about potential effects and the ability of mitigation measures to address those effects, a follow-up program is used to verify the accuracy of the effects assessment and to determine the effectiveness of mitigation measures. The goal of a monitoring program is to ensure that appropriate measures and controls are in place to decrease the potential for adverse environmental degradation during construction, maintenance and operation of projects and to provide clearly defined action plans and emergency response procedures to account for human health and environmental safety. Follow-up and monitoring programs also ensure that a project is proceeding in accordance with conditions as stipulated in regulatory permits and authorizations.

6.1 Follow-Up Program

MI will implement a follow-up program to verify the accuracy of the EA and to determine the effectiveness of the mitigation measures. The objectives of the follow-up program are as follows:

- verify predictions of environmental effects identified in the EA
- determine the effectiveness of mitigation measures in order to modify or implement new measures where required
- support the implementation of adaptive management measures to address previously unanticipated adverse environmental effects
- provide information on environmental effects and mitigation measures that can be used to improve and/or support future EAs including Cumulative Effects Assessments
- support environmental management systems used to manage the environmental effects of projects

Follow-up monitoring programs targeting VCs will be implemented, where and when appropriate, to demonstrate the accuracy of the predicted Project effects and mitigation on VCs where uncertainty exists. Mitigation measures identified in **Chapter 6** of the Project 6 – All-Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation Environmental Impact Statement will be implemented and the effectiveness will be verified through inspection and monitoring. Based on the effects assessment and as noted in **Chapter 8** of the Project 6 – All-Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation Environmental Impact Statement, a strategic plan for monitoring the aquatic and terrestrial environments will be developed in association with local liaison committees and appropriate federal and provincial departments to meet MI's commitments and regulatory requirements. The monitoring programs will be outlined in an Aquatic Environment Monitoring Plan and a Terrestrial Environment Monitoring Plan. Monitoring plans will be developed as part of the Construction Phase EMP.

6.2 Compliance Monitoring Program

The environmental compliance monitoring program will monitor the application of action plans and emergency response procedures for environmental protection and human health and safety. Environmental monitoring components are included in MI contracts through ES 130s and further described in EPs. Contractors will be responsible for the preparation and implementation of environmental protection plans, health and safety plans, emergency response plans, erosion and sediment control plans, hazardous materials management plans and the completion of and reporting on applicable monitoring programs. An adaptive management approach will be implemented whereby lessons learned and improvements identified during inspection and monitoring will be applied to continually improve subsequent environmental protection activities. MI will also monitor the application of action plans and emergency response procedures for environmental protection and human health and safety.

The first implementation of monitoring activity will occur through oversight of design and construction plans to confirm that measures to protect the environment are incorporated. This occurs during the Project Planning and Construction Planning phases. Contractors will also be required to submit their Environmental Protection Plans and Water Quality and Fish Protection Plans in accordance with EPs to the proponent for review and approval, prior to initiating work on the Project.

During construction, contractor activities will be inspected and monitored daily to verify that environmental protection requirements identified in contract specifications, the ES 130s and EPs are being met. Monitoring will also be used to observe if there are environmental effects resulting from sensitive activities (ex: in water works). The activities will include inspections to construction and environmental mitigation measures, ensuring environmental mitigations are installed correctly and are effective during project construction and maintenance activities. The contractor will be responsible for ensuring that construction proceeds as required by law and prescribed in the Acts, regulations, authorizations and permits that apply to the Project. Inspections during construction will include fuel storage containers, tank vehicles, dangerous goods and hazardous wastes storage facilities/sites for releases of fuel, dangerous goods or hazardous waste, sediment and erosion controls, clearing and grubbing debris, clean-up and litter controls. The contractor will be required to maintain records such as the dates that inspections took place, the name of the inspector, length of silt fence cleaned and, in the event of debris or deleterious substance releases, the corrective actions that were taken.

Construction activities have the potential to introduce sediment and other deleterious substances into watercourses. Water quality will be monitored during in-water works and/or other construction activities conducted near water, as appropriate. Water quality monitoring will include a turbidity monitoring program to be conducted during in-stream construction activities. Other sampling may be undertaken to monitor for other water quality properties that may be affected from release of deleterious substances, as appropriate. Data collected at downstream sites will be compared to upstream reference sites (ex:

background conditions) to monitor the effects of construction in relation to Manitoba Water Quality Standards, Objectives and Guidelines for protection of Aquatic Life.

6.3 Post-Construction Monitoring

Post-construction monitoring (maintenance and operation) will be conducted to verify that permanent measures are working as planned (ex: erosion control measures, revegetation, fish passage at key crossing locations) and to allow implementation of adaptive measures if needed. VCs requiring post-construction monitoring will have specific follow-up and monitoring programs developed in consultation with appropriate regulatory bodies and will be based on the results of the pre-construction and construction monitoring programs, specific site situations and requirements of licences, authorizations, permits or legislation. Post-construction monitoring will be conducted for durations appropriate to the conditions being monitored.

6.4 Reporting

Results from the follow-up and monitoring programs will be provided as appropriate to community liaison and advisory committees, stakeholders, local Indigenous communities and federal and provincial authorities. The content, format, number and frequency of monitoring program reports for regulatory authorities will be determined in accordance with guidance received from regulatory authorities. If the monitoring programs identify any unforeseen environmental effects or the environmental protection measures are not performing as intended, the Manager of Environmental Services will bring such occurrences to the attention of the MI senior leadership and recommend amendments. MI, with its consultants will consider the results from the follow-up and monitoring programs and input received from community liaison committees, regulators and others in its review of the status of the environmental protection activities on an on-going basis and amend programs as necessary. As the proponent/owner of the Project, MI will make final decisions on adjustments to environmental activities.

7.0 SUMMARY AND CONCLUSIONS OF THE EIS

7.1 Summary

The ESRA was established as a provincial Crown Agency to manage the East Side Transportation Initiative to increase transportation opportunities for communities on the east side of Lake Winnipeg. ESRA has been absorbed into MI, which is a provincial government department. MI is the proponent and will continue to manage the proposed Project. Linking the communities will provide economic and social benefits. The proposed alignment for the Project consists of a total 141 km of all-season road on a new ROW on provincial Crown land. Construction and operation of the proposed two-lane gravel all-season road requires federal and provincial regulatory approval.

The proposed Project is located on the east side of Lake Winnipeg in a remote and largely unsettled and undeveloped area of the Province. The landscape is generally characterized by broad sloping uplands and lowlands comprised predominantly of coniferous forest (primarily black spruce), with abundant wetland areas. Surface waters in the area drain to the north-east as part of the Hayes River Drainage Basin. Mammal, bird, fish, amphibians and reptile species, including some of conservation concern inhabit the area.

Manto Sipi Cree Nation, Bunibonibee Cree Nation, God's Lake First Nation and God's Lake Narrows Northern Affairs Community are the only communities in the Indigenous Land/Resource Use LAA. They are connected by winter road through Norway House to the all-season road network for a brief period each year. Transportation to and from these communities is otherwise primarily by aircraft. Land use in the LAA is mainly traditional activities by local community members such as hunting, trapping, fishing, camping, timber harvest for firewood, recreation activities, sacred/ceremonial uses and food and medicinal plant gathering.

The IPEP was undertaken to provide meaningful opportunities to engage in dialogue and exchange information about the proposed Project and other proposed transportation initiatives on the east side of Lake Winnipeg. Engagement activities were focused on interaction with and obtaining feedback from interested and affected communities and community members, as well as other stakeholders and the general public. The engagement program included meetings and discussions with community leadership, community members, registered trapline holders, lodge owners, outfitters, members of the general public and regulatory authorities.

An EA of the Project was completed using a values-based framework through the consideration of linkages between VCs of the environment and anticipated Project activities. Information provided through the engagement program, workshops, published literature, baseline studies and professional perspectives was relied upon for the EA. Mitigation measures and procedures for their effective implementation were identified from regulatory and industry standards, environmental guidance documents and MI developed EP and ES 130s to avoid, minimize or offset potential adverse environmental effects of the Project. The

effects of accidents and malfunctions and potential effects of the environment on the Project were also assessed, as were sustainability, climate change and cumulative effects. Follow-up actions, such as construction and post-construction monitoring programs, were identified where required by legislation and/or guidance documents and to address uncertainty arising in the identification of environmental effects or the ability to mitigate those effects. Residual environmental effects were evaluated based on a significance evaluation framework as per the Guidelines for the Project (Canadian Environmental Assessment Agency 2017a).

Potential environmental effects of the Project that may influence human health and safety were assessed and indicate that no significant adverse direct or indirect effects of construction, maintenance and operations activities or changes in air quality, noise and water quality or the availability or quality of country foods are anticipated. Therefore, no significant adverse effects to human health and safety are expected that are linked to changes to the environment as a result of the Project.

MI is committed to implementing a broad suite of mitigation measures and follow-up actions identified by the EA through MI's comprehensive Environmental Program. As the Project proponent, MI will be responsible for implementing, inspecting and reporting on this program through the construction and operations and maintenance phases of the Project.

7.2 Conclusion

Based on the information and analysis provided in this EIS, it is concluded that the proposed all-season road linking Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation is not likely to cause significant adverse environmental effects. The EIS also concludes that Project benefits (positive effects such as employment and business opportunities) are expected.