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Bipole III Expanded Outline:

A Coles Notes Version of the Bipole III Environmental Impact Statement (EIS)

Compiled by Manitoba Wildlands (MWL), January - September 2012

This is shorthand-condensed version of the Manitoba Hydro Bipole III Environmental Impact Statement (EIS). It could be understood as a Coles Notes version of the EIS.

Almost the entirety of the content is quotations from the EIS itself. At times some text is highlighted in yellow to draw attention to a particular quotation. If a comment is need to provide background context it will be placed in square brackets, highlighted purple, and will begin with "MWL:" See legend below.

All references to the Bipole III EIS are the materials filed by Manitoba Hydro in December 2011 for public review. We note that various reports, updates, maps, and technical documents have been provided by the utility since that time. Some of these are supplemental filings under the Environment Act. Other EIS materials are being provided during the Clean Environment Commission proceedings, which started as of May 2012.

LEGEND

Quote = "Quote from EIS, with some sections highlighted yellow."

Comment = [MWL: comment by Manitoba Wildlands (MWL)

It is important to recognize that this document does not replace the EIS, but rather aims to expand the table of contents of the EIS, to assist researchers, participants, and others locate EIS contents. At approximately one-quarter of the size of the original document it serves as a useful overview and reference to important parts of the EIS.

Also note that maps, graphs, charts, and other visual aides have largely been omitted, although at times they are referred to when appropriate.

There are sections of this expanded table of contents that are to be filed and/or updated. Watch for next version.

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Ch. 1 – Intro

"The Project includes:

- A new converter station, the Keewatinoow Converter Station, to be located near the site of the potential, future Conawapa Generating Station on the Nelson River northwest of Gillam, Manitoba (See Map 1-1);
- A ground electrode site connected by a low voltage feeder line to the Keewatinoow Converter Station;
- New 230 kV transmission lines linking the Keewatinoow Converter Station to the northern ac collector system at the existing 230 kV switchyards at the Henday Converter Station and Long Spruce Generating Station;
- Modifications to the Henday Converter Station and the Long Spruce Generating Station to accommodate the new collector lines;
- The development of a new +/-500 kV2 HVdc transmission line, approximately 1,384 km in length centred on a 66 m wide right-of-way, that will originate at the Keewatinoow Converter Station, follow a westerly route to southern Manitoba and terminate at a new converter station, the Riel Converter Station, immediately east of Winnipeg;
- The completion of the Riel Converter Station, development of the site for which is already underway pursuant to a separate license; and
- A ground electrode site connected by a low voltage feeder line to the Riel Converter Station."

"...construction is planned to commence in the fall of 2012 with a projected in-service date of October 2017."

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1.4.1 Introduction 1-10

1.4.2 Canada: Regulatory Review and Decision Making 1-10

"Manitoba Hydro is confident that there will be no interference to navigation on any of the rivers and streams which will be crossed by transmission lines and is in the process of reviewing that conclusion with the Canadian Transport Agency. The proposal for the treatment of waste from the construction and operation of the Keewatinoow Converter Station is the subject of a separate license application under the *Environment Act (Manitoba)*. Manitoba Hydro is confident that the provisions for treatment of this waste will result in neither the loss of any fish or fish habitat nor the release of any substance into a fish bearing river or stream that is deleterious to fish. Manitoba Hydro is in the process of reviewing those conclusions with the Department of Fisheries and Oceans."

1.4.3 Canada-Manitoba Environmental Assessment 1-11

"In the event that the federal government requires an environmental review of the Project, Manitoba will be the Lead Party in accordance with the Agreement [on Environmental Assessment Cooperation].... The Agreement obligates the Province and the federal government to share information at an early date regarding proposed projects that may be of interest to either party."

1.4.4 Manitoba: Regulatory Review and Decision Making 1-12

"The Scoping Document stipulates that the EIS is to include, at a minimum: a discussion of the regulatory and policy framework; determination of the scope of the project and assessment; the alternatives considered; a description of the environmental assessment consultation process; consideration of Aboriginal and local knowledge; a discussion of the environmental assessment process; discussion of the approach for cumulative effects assessment and sustainability assessment; the process for follow-up and monitoring; and the format for preparation of the EIS. Accordingly, this EIS includes consideration of the environmental effects of undertakings associated with site preparation, construction, operation and maintenance, and final decommissioning of the associated project components.

Not all Developments covered in the *Environment Act* (*Manitoba*) necessarily require an EIS, but the Project did, owing to its size and complexity."

"Consultations conducted pursuant to Section 35 must not be confused with those public consultations and discussions that many project proponents have with Aboriginal peoples who live in the vicinity of a proposed project. That said, many of the topics which a project proponent will discuss with Aboriginal peoples will be similar to those topics that representatives of Manitoba and/or Canada will discuss with the same communities and, hence, there is sometimes confusion and overlap between the two consultation processes."

"Manitoba Hydro does not participate directly in this process, but does provide the necessary background and technical information related to the Project to enable the parties to discuss the Project in an accurate and comprehensive fashion. This process is not yet complete, as it necessarily awaits the filing of this EIS."

1.5 OUTLINE OF THE ENVIRONMENTAL IMPACT STATEMENT 1-14
[MWL: outlines the topics and issues covered in each chapter.]

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Ch. 2 – Need & Alternatives

"Without improvement, Manitoba's system is extremely vulnerable to weather or other emergency events which could interrupt the use of either the existing Bipoles I and II high voltage direct current (HVdc) lines located on the Interlake corridor or the single southern converter station (Dorsey) .... chapter considers and analyzes the following questions:

- Why is the Project needed and what load serving requirements will it have to meet in order to sufficiently enhance system reliability?
- What options aside from new north-south transmission are available for addressing system reliability and what criteria were used to evaluate such options?
- Given that the construction of new north-south transmission has been determined to be the best reliability option, what alternative means of transmission can be built in order to carry power from the north to the south?"

"At present, the overall Manitoba Hydro system depends on two converter stations in the north (Radisson and Henday), two HVdc lines (Bipoles I and II) running south along the same Interlake corridor, and the single Dorsey converter station in the south. The single Interlake corridor carries about 70% of Manitoba's entire generation supply. Manitoba is the only system in the world with such a concentration (of percentage) of supply along one corridor and in one converter station. ... In the event of an extended HVdc outage, supply would be restricted to the generation connected to the ac system and the possible imports on the ac interconnections with the United States and neighbouring provinces. Such a restricted supply of power would be significantly inadequate to meet provincial demand, particularly in the winter, and could necessitate rotating blackouts for months. ... The types of events that could occur to put system reliability at risk in Manitoba include forest fires, fire at a converter station, weather events such as downburst/wide front winds, tornados and ice storms."

"Studies (Teshmont 2001) have shown that with respect to Dorsey Station, there is a 1 in 29 year probability of outage due to fire and a 1 in 200 year probability of outage due to wide front winds. While mitigation measures have been put in place, which partially address fire vulnerability at Dorsey, there is little that can reasonably be done to mitigate vulnerability to wind and other weather events. The same studies (Teshmont 2001) revealed that the probability of the loss of the Interlake corridor is 1 in 17 years from a tornado, 1 in 50 years from icing and 1 in 250 years from wide front winds. Several "near-miss" experiences in Manitoba have highlighted the need for a major system reliability enhancement. ... On September 5, 1996 a downburst wind event caused the failure of 19 Bipole I and II transmission towers just two km north of Dorsey Station. ... On June 22, 2007, a level 5 tornado (the

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strongest confirmed tornado in Canadian history) flattened buildings and the electrical infrastructure in the town of Elie just west of Winnipeg. "

2.2.3 Potential Load Shortfall and Required Size for Reliability Project 2-5

"...in the event of a catastrophic outage, the 2011/2012 system shortfall at winter peak is about 1400 MW, ... 1500 MW by 2017 and 2000 MW by 2025, even after the 300 MW improvement associated with Riel sectionalization. The supply which would be available under such outage conditions is based on existing thermal generating capacity, generation connected to the ac system and the ability to import 900 MW of power from outside of Manitoba. The 1500 MW shortfall would be equivalent to the power demand of over 300,000 average residences based on an average peak demand of 5 kVA/household. ...the system is not always operating at peak load requirement, ... Given that loads vary with both time of year and time of day, ... Figure 2.2-2 depicts this analysis showing that in 2017/18, if Bipoles I and II were unavailable, Manitoba Hydro would be unable to meet provincial demand for approximately one third of the time during that period. ... If an outage occurred in January 2017, be it at the Dorsey station or on the HVdc lines, as depicted on Figure 2.2-3, Manitoba Hydro would not be able to meet demand for 85% of the time during that month."

2.3 PROJECT ALTERNATIVES TO ADDRESS SYSTEM RELIABILITY 2-9

"Alternatives to the project are the functionally different ways to meet the need for the Project and to achieve the Project's purpose. The following three alternative project options for enhancing the reliability of the Manitoba Hydro system were identified and evaluated:

1. The addition of 2000 MW of north-south HVdc transmission to continue to supply power from existing hydraulic generating sources in the north.
2. The addition of up to 2000 MW of gas turbines in southern Manitoba.
3. The addition of up to 1500 MW of new import tie lines to the United States (USA) to provide access to firm US generation, which is assumed to be comprised mainly of natural gas-fired generation, plus the addition of another 500 MW of natural gas-fired generation in southern Manitoba."

2.3.1 Evaluation Criteria for Project Alternatives 2-9

"The main criteria by which the project options were assessed are as follows:

1. *Project Cost* – The overall capital cost of each project alternative is a consideration for Manitoba Hydro in assessing project viability. Project cost was the main factor in the alternative evaluation.

2. *Implications to Manitoba Hydro during an extended catastrophic HVdc outage* – Given the potentially long repair times associated with potential catastrophic outages, each project option was assessed having regard to the additional costs which would be incurred during such outages."

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2.3.2 Alternative 1 - Additional HVdc North-South Transmission 2-10
2.3.3 Alternative 2 - Building Natural Gas-Fired Generation in Southern Manitoba 2-11
2.3.4 Alternative 3 - Importing Power 2-12
2.3.5 Recommended Alternative 2-13

"...the Bipole III north-south transmission alternative is clearly the superior reliability solution at the least capital cost. In addition, it provides the greatest flexibility in operation and system expansion, with the least cost of emergency power during HVdc outages, catastrophic or otherwise. Furthermore, it is the only alternative that does not utilize energy generated from a non-renewable source and makes full utilization of the hydro-based generation system that Manitoba Hydro has developed over the past 50 years. [see Table 2.3 - 1]"

2.4 "ALTERNATIVE MEANS OF" CARRYING OUT THE PROJECT 2-15

"The alternative means identified included:

- ac versus dc transmission;
- Overhead lines versus underground option; and
- Overhead lines versus underwater option.

As discussed below, none of these alternative means were deemed to be viable options for this project. Alternative routes for the transmission line are reviewed in Chapter 7. "

2.4.1 HVdc versus HVac Transmission 2-15

"...HVdc transmission is most economical for distances exceeding on the average about 600 km ... The double circuit ac line requires a significantly wider right-of-way (ROW), about 15% more than for HVdc [requiring] a 75 m wide ROW [currently 60m ROW]. "

2.4.2 Overhead Transmission Lines versus Underground or Submarine Cable Transmission 2-17

"Underground ac cables require intermediate stations to control voltage along the line, which adds to the cost and operating complexity and reduces reliability. As a result, there is no bulk power transmission scheme in the world that uses underground ac cable technology for lines longer than 100 km in length. Underground or underwater HVdc cables are rarely used where overhead transmission is technically viable. In fact, worldwide, there is no high power, long distance cable transmission; ... five to six times more costly than overhead transmission. ... life expectancy of underground and submarine cables as half of that of overhead lines. The failure rates are high (failure every 3 to 17 years). Repair times would be longer and costs would be higher considering the long winter months in Manitoba when Lake Winnipeg is ice covered. ... it is premature to consider submarine or underground cables as a means of delivering this project at this time. "

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"HVdc transmission being the recommended means. This option is by far the least cost alternative, is technically feasible, and provides excellent reliability. The comparison of the various north-south transmission options is set out below in Table 2.4-1. "

"The eastern corridor had been under consideration early in the planning stages. However, a policy decision was made by the Provincial Government that the reliability project should not be routed within this corridor. A copy of the letter from the Minister responsible for Manitoba Hydro providing this policy direction to Manitoba Hydro is attached as Appendix 2A to this chapter. The Interlake corridor is the location of the existing Bipoles I and II and is unacceptable as a location for Bipole III. In order to meet reliability criteria, physical separation from the existing major HVdc transmission facilities is required."

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Ch. 3 – Project Description

3.0 PROJECT DESCRIPTION 3-1

3.1 INTRODUCTION 3-1

3.2 BASIC BIPOLE III TRANSMISSION CONCEPT 3-4

3.3 OVERVIEW OF PROJECT COMPONENTS AND ACTIVITIES 3-5

3.3.1 Bipole III HVdc Transmission Line 3-5

"From a land use and environmental planning perspective, the HVdc transmission line is the most significant component of the Bipole III Project. The preferred route, … has been selected on the basis of environmental, socio-economic and technical criteria and an extensive program of public and community consultation… the routing process has avoided the Interlake area, in order to provide substantial physical separation from the existing Bipole I and II transmission lines. For reasons of provincial policy, the routing process has also avoided the area east of Lake Winnipeg."

3.3.2 Connections to the Northern Collector System 3-6

"…the new Bipole III Keewatinoow Converter Station will require additional transmission lines and switchyard connections to the existing collector system, both to ensure that Bipole III is accessible from the various northern generating stations, and to enable its full capacity to be utilized to transmit power in a wide variety of potential outage conditions. "

"…the new Bipole III Keewatinoow Converter Station will require additional transmission lines and switchyard connections to the existing collector system, … The proposed connections include five high voltage three phase ac lines. One 230 kV transmission line will extend from the existing 230 kV switchyard at Long Spruce Switching Station to a new 230 kV switchyard to be developed at the site of the new Keewatinoow Converter Station. In addition, four 230 kV transmission lines will be constructed from the existing 230 kV switchyard at Henday Converter Station to the new 230 kV switchyard at the new Keewatinoow Converter Station."

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3.3.3 Keewatinoow Converter Station and Ground Electrode 3-9

"Precise details and layout of the Bipole III converter stations (Keewatinoow and Riel) are subject to ongoing design studies."

"The sites chosen for the Keewatinoow project components and the associated construction camps were reviewed and discussed with representatives of Fox Lake Cree Nation in a number of meetings. Discussions continue with a view to identifying and addressing the effects on members of Fox Lake Cree Nation of the Bipole III Project."

3.3.4 Riel Converter Station and Ground Electrode 3-11

"Although otherwise similar in concept to the Keewatinoow Converter Station, the Riel converter facilities may include synchronous compensators for strengthening of the system, supporting the Bipole III converters, controlling voltage, and adding system inertia for stability."

"The southern converter station will be developed at the Riel Station site, in the RM of Springfield immediately east of the Winnipeg Floodway and north of the City of Winnipeg Deacon Water Supply Reservoir. The site is currently under development for the Riel Reliability Improvement Initiative (Riel Sectionalization)."

"The Riel Sectionalization project includes development of 500 kV and 230 kV ac switchyards, and 230 kV connections to the southern receiver system serving Winnipeg and southern Manitoba."

"The final choice of the proposed site, and the route of its low voltage overhead line connection to the converter station, is being made through a site selection and environmental assessment (SSEA) process conducted in consultation with potentially affected community and public interests."

3.3.5 Connections to the Southern Receiver System 3-13

[MWL: Highlights interrelationships with the Riel Sectionalization Project.]

3.4 TRANSMISSION AND COLLECTOR LINES – TECHNICAL DESCRIPTION 3-13

"Project development will also adhere to applicable North American Reliability Council/Midwest Reliability Organization/Midwest Independent System Operator (NERC/MRO/MISO) criteria and Canadian Standard Association (CSA) standards."

3.4.1 Bipole III +/- 500 kV HVdc Transmission Line 3-14

"…C22.3 No. 1-10 "Overhead Systems" standard will be applied to determine all electrical and safety

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clearances… CAN/CSA-C22.3 No. 60826-10 "Design criteria of overhead transmission lines" standard will be used for structural and mechanical design, applying design loads based on a 150 year return period, in accordance with the Reliability Based Design (RBD) method … consistent with CSA standards for transmission lines … [and] reflect recommendations of International Electrotechnical Commission…"

3.4.1.1 Structure Design and Location 3-14

"In northern Manitoba, the line conductors will be suspended from guyed lattice steel structures … In the more intensively developed agricultural areas of southern Manitoba, self-supporting lattice steel structures will be used to minimize the potential impact on farming practice…"

"Apart from the weather loads, which are created by wind and ice conditions, the principal force affecting design of tangent suspension structures is the weight of the conductors. … Design for these more complex loading conditions (corners and dead-end structures) typically requires greater structural strength and heavier construction…"

[MWL: See structural design drawings 3-16, 3-17, 3-18, & 3-20.]

"The structures will generally be centred in a right-of-way 66 m (216.5 ft.) in width. …the average span between structures will be approximately 488 m (about 1,600 ft.)"

"The totals include 1,498 guyed towers (1441 suspension and 57 dead-end) for the 745 km (463 mi.) northern portion of the line; 425 guyed (418 suspension and 7 dead-end) and 304 self-supporting structures (288 suspension and 16 dead-end) for the 331 km (206 mi.) central portion; and 627 selfsupporting towers (576 suspension and 51 dead-end) for the 300 km (186 mi.) southern portion."

3.4.1.2 Conductors and Insulators 3-21

"Each pole conductor will comprise a bundle of three subconductors. Under normal operating circumstances, the positive pole will be energized at +500 kV and the negative pole at -500 kV. In the event of a conductor outage, or a partial outage of the converter facilities, the line may be operated in monopolar mode, with one conductor energized at up to +/-500 kV"

3.4.1.3 Optical Protection Overhead Ground Wire 3-22

"Apart from the two conductor bundles, the towers will also support an optical ground wire (OPGW), strung between and attached to the peaks of the towers. The OPGW will serve both to provide grounding and lightning protection, as well as to transmit communications for Bipole III control and protection. … Four repeater stations will be required at intervals of approximately 300 km (186 mi.) for regeneration of communications signals. … Repeater station sites will require an all-weather access road or a helicopter pad, an ac electric service pole line, and a property sufficiently large to develop a graded and gravel-surfaced area, approximately 33 m x 40 m in dimension, to accommodate parking

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and building areas. The building area will require a chain link perimeter fence and will house two structures, a back-up diesel generator (genset) building and a communications building.**"**

3.4.2 230 kV Connections to the Northern Collector System 3-24

3.4.2.1 Structure Design and Location 3-24

"…guyed lattice steel structures have been identified as the preliminary design standard for straight (tangent) sections … guyed structures provide flexibility for tower construction and maintenance in difficult foundation and terrain conditions. Self-supporting lattice steel structures will be used for all angle or dead-end tower locations. … The tangent structures will be approximately 29.2 m (95' 10") in height. [See Figure 3.4-6 at 3-25.] Taller structures with larger footprints will be used where warranted by land use or conditions."

"…a typical angle structure [Figure 3.4-7 at 3-26]… has four legs requiring individual foundations and a footprint approximately 13.7 m (45' 3") square. The typical structure height is approximately 30 m (98' 5"). The average span between structures will be approximately 420 m (1,380 ft.) resulting in approximately 2.4 structures per kilometre (about 3.8 structures per mile)."

3.4.2.2 Conductors and Insulators 3-27

"The conductors will be insulated from the structures…"

3.4.2.3 Overhead Ground Wires 3-27

"Two galvanized steel strand ground … will be strung between the two peaks of the structures to provide lightning protection. One of the Henday-Keewatinoow 230 kV collector lines will have an optical ground wire (OPGW) …to provide grounding and lightning protection, and to transmit communications for line control and protection."

3.4.2.4 Switchyard Terminations 3-27

"The Long Spruce-Keewatinoow 230 kV line will require the retrofit of one existing bay at the Long Spruce switching station. Termination of the four new 230 kV lines from Henday to Keewatinoow will necessitate expansion of an existing bay and development of one additional bay within … Henday 230 kV switchyard. … similar and incremental to the existing development … No significant new or additional environmental effects are anticipated."

3.4.3 Henday-Keewatinoow Construction Power Line 3-28

"Construction power requirements for the Keewatinoow Converter Station will require the extension of the existing 138 kV line KN36, which presently runs from Kelsey Generating Station to the Limestone Generating Station construction power station, to the proposed Keewatinoow construction power

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station"

3.4.3.1 Structure Design and Location 3-28

"Guyed lattice steel structures will be used for straight (tangent) sections. Self-supporting lattice steel structures will be used for angle or dead-end towers. Structure geometry will be similar to that of the structures proposed for the 230 kV collector lines."

3.4.3.2 Conductors and Insulators 3-28

"The structures for the construction power line will carry a three-phase 138 kV ac circuit… Conductors will be insulated from the structures by an insulator string…"

3.4.3.3 Overhead Ground Wires 3-28

"Two galvanized steel strand ground conductors… will be strung between the two peaks of the structures to provide lightning protection."

3.4.3.4 Station and Switchyard Terminations 3-28

"Termination… described in Section 3.5.4.3.**"**

3.4.4 230 kV Connections to the Southern Receiver System 3-29

"…injection of Bipole III power at Riel will require additional 230 kV connections to the southern receiver system. These will be provided by sectionalization… at Riel."

3.4.5 General Transmission Line Design Considerations 3-29

"Detailed engineering… will be undertaken after receipt of project environmental approvals, and following right-of-way acquisition and detailed field survey. Precise tower locations and required conductor-to-ground clearances will be established at that time."

3.4.5.1 Tower Spacing and Span Length 3-29

"Special crossing structures will be necessary in specific circumstances (e.g., long span crossings of major rivers or roadways, or crossings of other transmission lines… will typically require greater height, greater strength and heavier construction, but will otherwise be similar to other suspension structures on the line.

Final structure locations will be determined on the basis of field surveys, including input from affected landowners/stakeholders, and will reflect detailed engineering and economic analysis … tower location (tower "spotting") has been identified as a potential mitigative measure to reduce adverse

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environmental and aesthetic impacts. … more detailed pre-construction evaluation of the selected rights-of-way) will be included in the engineering analysis and, where technically and economically feasible, incorporated in the final structure placement decision during the pre-construction phase of the project."

3.4.5.2 Conductor Clearance 3-29

"…will be designed to the following minimum conductor-to ground clearances, which will meet or exceed C22.3 No. 1"Overhead Systems" values … [see Table 3.4-1 at 3-30]"

"…13.2 m clearance will be specified over navigable Class 0, 1, and 2 waterways (respectively described as minor non-navigable; shallow or fast moving, canoes and paddle boats only; and shallow or fast moving, motorboats, no masted vessels) and will exceed the clearances specified by the CSA standard. Greater clearances over Class 3-6 waterways will meet those specified by the CSA standard. Clearances over highways and railways will be 13.7 m (45 ft.)."

3.4.6 Right-of-Way Requirements and Acquisition Policy 3-32

"Choice of the proposed routes reflects a careful balance between the general technical (engineering), economic and environmental implications of increased line length and the reduction of adverse effects through the avoidance of sensitive environmental features and land use conflicts."

"Proposed right-of-way widths are based on operating considerations and related safety requirements and can vary … the right-of-way width must be sufficient, under severe wind conditions, to provide lateral separation between the conductors and any object located at the right-of-way edge. Right-of-way widths are also designed to avoid damage to adjacent property in the event of a structure failure and to reduce electric and magnetic field (EMF) effects, like radio interference and audible noise… parameters are based both on CSA standards, NERC/MRO/MISO reliability criteria, and internal Manitoba Hydro policy."

"[MWL: Maintenance] access is typically by surface vehicles and equipment but may also involve helicopters, particularly in the case of northern lines."

3.4.6.1 HVdc Transmission Line 3-32

"Bipole III HVdc transmission line route is 1,384km (860 mi.) in length.13 The proposed right-of-way will be 66 m (216.5 ft.) in width along the entire length from the new Keewatinoow Converter Station to the Riel Station."

"Some sections of the line, particularly in northern Manitoba, may require supplementary right-of-way area for marshalling or supply of construction materials (e.g., aggregate for tower foundations), or for construction and maintenance access. Such requirements … cannot be identified until post-approval field surveys, detailed design, and construction contract arrangements are finalized."

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3.4.6.2 230 kV Connections to the Northern Collector System and 138 kV Construction Power Line 3-35

"…the new 230 kV connections to the northern collector system will include one line, approximately 55 km in length, between the 230 kV switchyards at the existing Long Spruce Generating Station and the new Keewatinoow Converter Station; four lines, each approximately 27 km in length, between the 230 kV switchyards at the existing Henday Converter Station and the new Keewatinoow Station; and extension of the 138 kV line KN36 from Limestone Generating Station to the proposed Keewatinoow construction power station…. all six are proposed to share a common right-of-way, 310 m in width. … In the shorter section immediately north from Henday, the five collector lines are proposed to share a common 280 m
right-of-way … The rights-of-way for the six lines will variously traverse lands within the Town of Gillam and portions of the Split Lake and Fox Lake RMAs."

3.4.6.3 Henday-Keewatinoow 138 kV Construction Power Line 3-37

"In the area north of Limestone and Henday… the 138 kV construction power line KN36 is proposed to be centred in a separate 60 m right-of-way located east of the combined Henday-Keewatinoow 230 kV line right-ofway. The 60 m right-of-way is proposed to extend north to join the combined 230 kV right-of-way, at the point where the latter turns towards Keewatinoow Converter Station. … At the point where the 230 kV lines turn again to extend east into the 230 kV switchyard at Keewatinoow Converter Station, the construction power line will continue in a 60 m right-of-way to the proposed Keewatinoow construction power station."

3.4.6.4 Easement Procurement Procedures and Compensation 3-37

"For those portions of the transmission lines where Manitoba Hydro does not presently own the right-of-way, easements will be acquired from the landowners who have legal entitlement to the land. …through negotiation of an agreement with the property owner. In the event that an agreement with private and owners is not negotiable, Manitoba Hydro has the right of expropriation. In all cases, easement arrangements (whether on private or Crown land) are followed up by registration of an easement plan in the appropriate provincial land titles office."

"In agricultural areas, compensation for use of private property… one-time payment equivalent to 150% of fair market value for the land … lump sum payment for having to work around structures… Additional payment, up to 60% of fair market value depending on the specifics of each property, for ancillary impacts…"

3.4.7 Community Development Initiative 3-39

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"In association with the Bipole III Transmission Project, Manitoba Hydro has developed the Community Development Initiative (CDI). … The CDI will provide real and direct benefits to communities in the vicinity of the Bipole III Project. … approximately 60 communities will be eligible for the CDI, including First Nations, community councils, rural municipalities, and incorporated towns and villages. … Annual payments to eligible communities will begin upon receipt of regulatory approvals for the Bipole III Project and will continue for 10 years, with the potential for renewal. The benefits provided by the CDI program will total approximately four to five million dollars annually over the 10 year period."

3.4.7.1 Community Development Initiative Eligibility Criteria 3-39

"Those eligible to receive funds from the Community Development Initiative are as follows:"

Aboriginal and Northern Communities 3-39

"[MWL: Eligible if] …Resource Management Area (RMA) or Registered Trapline Area (RTL) associated with the community is traversed by the Bipole III facilities; or [if] …community is located within 25 km of the Bipole III facilities, for communities without a specifically associated RMA or RTL."

Municipal Act Communities 3-40

"[Eligible if a] … Rural municipalities … traversed by the Bipole III facilities ... , as well as incorporated towns and villages … located within 25 km of either side of Bipole III facilities."

3.4.8 Right-of-Way Clearing and Transmission Line Construction 3-40

"…clearing and construction of the Bipole III HVdc transmission line will require five years to complete. … Clearing and construction activity for these lines and for the northern portion of the HVdc line will be confined to winter months. Construction in southern Manitoba can occur at any time during the year, subject to avoidance of conflict with agricultural use or to payment of compensation for crop damage if conflict is unavoidable due to schedule constraints."

3.4.8.1 Right-of-Way Clearing 3-40

"…subject to standard environmental protection measures ….established in association with Manitoba Hydro transmission line construction practices, as well as the project-specific Environmental Protection Plan. … [Standard] cleared right-of-way width …in the northern portion of the lines will be 62 m (203 ft.) within the total 66 m (217 ft.) right-of-way. …southern portion … will generally be 45 m (148 ft.) (see Figure 3.4-10). Clearing will be modified in environmentally sensitive areas (e.g., river and stream crossings) … northern collector lines…will involve approximately 58 m of clearing within the 60 m (about 197 ft.) wide right-of way. … shared right-of-way corridors ….entire right-of-way will be

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cleared. … [Plus] selective clearing of "danger trees" beyond the right-of-way."

… conventional clearing done by "V" and KG" blades on tracked bulldozers, mulching by rotary drums, selective tree removal by feller bunchers … and hand clearing with chain saws in environmentally sensitive sites. Final clearing methods will be determined on the basis of detailed survey of the transmission line routes, and site-specific … Ground vegetation will not be "grubbed" except at tower sites, … Disposal of cleared vegetation typically involves a variety of options including piling and burning, mulching, collection and secondary use by local communities (e.g. firewood), or salvage and marketing of merchantable timber resources if feasible. The final decision for disposal of vegetation will be determined by the method of clearing used and the environmental license conditions applied to the project… Where access outside the right-of-way is necessary (e.g. by-pass trails) … supplementary approvals will be obtained from Manitoba Conservation (e.g., work permits and timber permits relating to activity on provincial Crown lands) or from individual land owners. … every effort will be made to identify related access requirements as soon as possible during the clearing process."

3.4.8.2 Transmission Line Construction 3-43

"Transmission line construction involves several stages: installing tower foundations and anchors, assembling and erecting structures, and stringing of the conductor and overhead ground wires. The different stages entail the use of various types of vehicles and heavy equipment, and involve a range of skills and trades. … The dimensions provided for the various structure and foundation types are subject to revision in the course of final design and confirmation of field construction conditions. … Different contractors may have different preferences as to structure assembly."

"Construction activity and access requirements will be subject to standard environmental protection measures associated with Manitoba Hydro's transmission line construction practices. These will be identified and cross-referenced in site-specific Environmental Protection Plans (to be submitted with the Environmental Impact Statement for review and approval), and adherence to them will be stipulated in related contract specifications."

"The exact number and location of marshalling yards will be determined during the course of developing detailed construction specifications and contract arrangements."

"Aggregates required for use in foundation construction will generally be transported from established and appropriately licensed sources off-site. Suitable material for backfill of excavated organic soils may be hauled from newly developed borrow areas along the right-of-way. Potential borrow locations have not been specifically identified at this time."

"Any use of explosives during transmission line construction (e.g., in borrow pit operations, foundation installation, conductor splicing, etc.) will be made in accordance with all applicable legislation and regulations, including acquisition of permits and compliance with all conditions set by Manitoba Conservation."

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"…site-specific mitigation measures, identified in the course of final survey and design. Such measures can include construction safety measures at infrastructure or waterway crossings, and provision for control of induced voltage and current effects within CSA and industry standards (e.g. in the case of railways, communications facilities, pipelines, metallic fences, etc.). Such measures will be coordinated with the appropriate government and corporate authorities, and with individual landowners."

3.4.8.3 Accommodations and Construction Camps 3-47

"Clearing and construction workers on the HVdc transmission line may be housed in mobile construction camps … 10 to as many as 200 workers … located in well-drained areas within the right-of-way. Additional clearing may be required … Specific field camp locations will be determined after final project planning and design are completed. … Potable water will generally be transported to the camps. "

3.4.8.4 Contract Procedures and Workforce Requirements 3-48

"Precise workforce numbers will be dictated by contract negotiations… Although the numbers of positions will fluctuate throughout the construction period, total positions per segment, for the northern portion of HVdc line, are expected to range from 10 to as many as many as 200 workers at peak periods. … Construction of the southern portions of the line is expected to involve smaller crews, peaking at 150 workers per segment. … Construction of the transmission line components of the Project will be subject to a collective bargaining agreement. … Total transmission line employment (project-direct in Manitoba), including both the HVdc line and the northern collector and construction power lines, has been estimated to total 1990 person-years during the construction phase.**"**

3.4.9 Transmission Line Operations and Maintenance 3-49

[MWL: Brief section about 24/7 operations.]

3.4.9.1 Electric and Magnetic Fields and Corona 3-49

"Operation of any transmission line involves the production of electric and magnetic fields (EMF) and corona discharges. Corona discharges, in turn, may result in audible noise and low frequency electrical interference. … background measurements were made of dc and ac EMF, air ions, and charged aerosols, both in everyday Manitoba environments and in the vicinity of the existing Bipole I and Bipole II HVdc transmission lines. … the studies found that "the levels of magnetic fields, electric fields, AN, RN, and small air ionsoutside the right-of-way of Bipole III are all below limits recommended by provincial, national and international agencies."

"Concerns respecting the potential for environmental effects (e.g., health effects, electrostatic and lectromagnetic induction effects, … were raised in the course of the public consultation... These concerns, … discussed in chapters five and eight of this Environmental Impact Statement."

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3.4.9.2 Line Maintenance Procedures 3-51

"Manitoba Hydro conducts inspection of all its transmission lines and electric transmission corridors on an annual basis. … Where maintenance tasks involve heavy equipment (such as brushing), winter roads must be built for access in remote areas. … Mobile work camps … Maintenance procedures are well established and are the subject of continuously updated corporate guidelines for maintenance and construction activities."

3.4.9.3 Work Force Requirements 3-52

"For the operations and maintenance activity associated with the HVdc line and the 230 kV northern collector lines, the average annual workforce requirement (average over the life expectancy of the project) is estimated to be 11.5 persons. … two to three would be internal Manitoba Hydro staff and the remainder would be contractor staff. The breakdown of the total average would be roughly two patrollers, two linemen, 0.5 helicopter pilots, and seven heavy equipment operators**"**

3.4.9.4 Vegetation Management 3-52

"Vegetation management is required on an ongoing basis to ensure that re-growth in the cleared rights-of-way does not interfere with transmission line operations. … Vegetation management involves a variety of methods, including hand cutting (e.g., utilizing chainsaws, brush saws, axes, or brush hooks), mechanical shear blading (using V" or "KG" blades), brush mowing with rotary and drum cutters (typically rubber-tired equipment), and herbicide treatment. These are typically conducted on foot, or by all terrain or flex-tracked vehicles. … The vegetation maintenance brushing cycle for transmission line rights-of-way typically ranges between 8 and 10 years. … integrated vegetation management and weed control approach … Herbicide treatments are formulated to target only broad-leafed plants (trees and weeds) leaving grasses unaffected. Foliar applications of herbicides are made in the summer months only; dormant stem applications are done when the plants are dormant, usually in the fall and winter. Permits for pesticide use are obtained on an annual basis. The process involves public notification as part of the formal permit application to Manitoba Conservation Pesticide Approvals Branch. All herbicide applications are completed and supervised by licensed applicators and in accordance with conditions specified in the Pesticide Use Permit. Herbicide application rates are established by Manitoba Hydro's Chief Forester in accordance with product label instructions. … Weed control on the rights-of-way is required for regulatory (i.e., The Noxious Weed Act), operational and safety reasons. In agricultural areas, continued cultivation will reduce the need for weed control."

3.4.10 Transmission Line Decommissioning 3-54

"Should transmission lines be decommissioned at some future date, Manitoba Hydro has tentatively identified acceptable means for environmentally restoring project sites and rights-of-way. … Bipole III HVdc transmission line is expected to be in service for at least fifty years."

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3.5 KEEWATINOOW CONVERTER STATION – TECHNICAL DESCRIPTION 3-55

"…the northern terminus of the Bipole III HVdc transmission line will be at the new Keewatinoow Converter Station, located near the site of the potential Conawapa Generating Station. Within the converter facilities, the conversion process from ac to dc will be accomplished using solid state power electronics. Generally, the solid state electronics are arranged in building block elements called valve groups. … The valve halls are contained in an HVdc converter building that also contains rooms for control, protection, communication, operation and maintenance, and other related ancillary equipment. … As in the case of the project transmission lines, the converter station and its ancillary facilities will be subject to CSA design standards. Planning and design will also be subject to National Building Code requirements, and will be guided by NERC/MRO/MISO reliability criteria (see Appendix 3A)."

3.5.1 Keewatinoow Site Selection Process 3-56

"…sited in proximity to the proposed site of the potential Conawapa Generating Station"

3.5.1.1 Converter Station Site Selection 3-56

"…has been planned to reflect related preliminary Conawapa development concepts. Other considerations
included site-specific criteria such as topography, hydrology, geology, and proximity to suitable quarry and granular material sources.

Ten candidate converter station sites were identified … five met the minimum criteria and were selected for further consideration … [and] evaluated on the basis of their technical merits: distance to potential Conawapa generating station; site size; topography; constructability; feasibility of ac transmission line and HVdc line connections and ease of line entry; flexibility; availability of suitable staging and laydown areas; avoidance of potential land use conflicts; access to construction material sources; availability of raw water source; feasibility of water treatment and wastewater disposal; feasibility of oil spill containment; related geotechnical characteristics; and general feasibility of operations. …(see Map 3-7)

All five potential sites were considered to be acceptable for development. In rank order of technical preference, the five are NCS4a, NCS4b, NCS3, NCS1a and NCS1b. The technically preferred site has been established as NCS4…

The Keewatinoow Converter Station site is estimated to require a footprint of approximately 640 m x 640 m in dimension for a total area of approximately 410,000 m2 (41 ha), including allowances for items such as road and transmission line approaches. The fenced area at the station is estimated to require a footprint of approximately 310,000 (31 ha).

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The chosen station site was reviewed and discussed with representatives of Fox Lake Cree Nation in a number of meetings. Discussions continue with a view to identifying and addressing the effects on members of Fox Lake Cree Nation of the Bipole III Project."

3.5.1.2 Ground Electrode Site Selection 3-57

"The Keewatinoow ground electrode site selection process … 23 candidate sites. Measurements and desktop studies of these sites … twenty of the 23 sites did not satisfy the desired technical requirements … three remaining potential sites were comparatively evaluated on the basis of their technical merits: topography, ground resistivity, water supply, ground potential rise, soil moisture, soil thermal conductivity
and heat capacity, land use, step potential (safety), proximity to existing infrastructure and facilities, and proximity to Keewatinoow Converter Station siting area. Two potential sites were considered acceptable for development. … (see Map 3-8)."

"The technically preferred site has been established as NES6, located within the Fox Lake Resource Management Area…"

"The chosen station site was reviewed and discussed with representatives of Fox Lake Cree Nation. Discussions continue with a view to identifying and addressing the effects on members of Fox Lake Cree Nation of the Bipole III Project.

"The Keewatinoow ground electrode site area requirement is estimated to be approximately 2,000 m x 2,000 m or 4,000,000 m2 (400 ha), only a portion of which will be cleared and affected by the electrode installation. This includes allowances for items such as access road and electrode line approaches. The Keewatinoow ground electrode will likely be a shallow ring electrode, estimated to be approximately 800 m in diameter, and situated within the specified site area identified."

3.5.2 Keewatinoow Converter Station Facilities and Infrastructure 3-59

"Keewatinoow Converter Station development will consist of infrastructure and buildings to support its operation: … details are further described … Sections 3.5.2.1 to 3.5.2.5.

3.5.2.1 Converter Station Site Infrastructure 3-61

"The Keewatinoow Converter Station site preparation and infrastructure will include…"

Site Grading and Drainage 3-61

"… constructed above the existing ground surface, taking into account both existing drainage … Subject to final design, … managed by a combination of surface and underground drainage systems… required to
ensure that there is no surface ponding around the electrical equipment. ... clean, free-draining rock will

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not impede the draining of storm water into an internal site ditch system and/or a buried pipe and catch basin drainage system… details … will be determined pending further site investigation studies … Surface drainage and storm water flows from the internal drainage system will be directed to the existing drainage ditch running parallel to the Conawapa access road. … [which] flows north for approximately 900 m until it discharges into Goose Creek. … design will ensure that potential oil contaminants … will be contained … and will not be discharged through storm water flows."

Internal Roadways 3-61

"…internal roadway network (no rail access is planned)… majority…gravel surfaced. … paved … to minimize dust production in the vicinity of key electrical components and the converter building. … will be determined pending further site investigation studies and detailed design…. will permit on-site tractor-trailer access … access for employees and smaller service vehicles. … Concrete pads may also be provided for the loading and unloading of equipment."

Site Security 3-62

"… single continuous perimeter fence. … remote controlled gate, operated by the site security staff… Additional manually-operated secondary access gates may be provided to facilitate major equipment delivery … [and] may also be used for emergency egress. … security building will be located at the primary access gate for security personnel, and will house closed circuit television monitoring equipment, computer equipment, and other systems needed to support site security operations."

Station Lighting 3-62

"…lighting along the internal roadway network and along the perimeter fence. The lighting system will be
designed to achieve an average maintained lighting level of approximately 10 lux (10 lumen per square metre)."

Oil Storage 3-63

"…storage of the insulating oil used in the operation and maintenance of high voltage apparatus … storage of up to a maximum of 300,000 litres."

Oil Containment 3-63

"A typical oil containment system consists of point source containment, non-point source containment , a fast drain system and oil-water separator facilities. The Keewatinoow Converter Station will conform to all applicable oil containment standards."

"Primary containment, … will involve the use of either a concrete, clay, or a membrane barrier, extending a minimum of 1.5 m beyond the edge of any such equipment. … oil [from the] containment

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system will be carried through a system of pipes called the fast drain system, to the oil-water separator facility… [which] will also collect rain, snow melt and water from the fire suppression systems. Water collected in the oil containment system will undergo a treatment process of separating the oil from the water. … using gravity separation and oil skimming techniques or, alternatively, large above-ground containment ponds with an oil interceptor."

"Water captured from the oil-water separator facilities will be discharged into … existing drainage ditch along the Conawapa access Road, and discharge into Goose Creek and ultimately into the Nelson River. … monitored to ensure that it meets environmental requirements. Oil recovered … storage … and removed from the site by a licensed carrier. …details … determined pending further site investigation studies and detailed design."

Water and Wastewater Systems 3-64

The Keewatinoow Converter Station will require a raw water supply, a water treatment/disinfection system, and potable water distribution throughout the site. Additionally, wastewater collection, treatment and disposal will be required. Preliminary studies indicate that a groundwater source is feasible…. will require a water treatment system in order to meet provincial regulations under The Drinking Water Safety Act (Manitoba). … treatment process will likely entail conventional chemical coagulation, clarification and membrane filtration to reduce turbidity and colour. Testing … to monitor chlorine and turbidity levels will be … on-site… to meet provincial standards for drinking water quality and aesthetics. Water storage … underground reservoirs or above-ground tanks. … maximum consumption of treated water … less than 10,000 litres per day. … water treatment plant will consist mainly of process filter backwash and settling chamber sludge, and will be discharged to the sewage collection system for further treatment. Subsequent discharge to the Nelson River will be made in accordance with Manitoba Conservation guidelines. … to meet the allowable concentrations under the Wastewater Systems Effluent Regulation, but currently this is not formally required as the volume of wastewater generated will be less than 10,000 L/day."

Fire Suppression Systems 3-66

"Water for fire suppression activities … drawn from a groundwater source and stored on-site in tanks … minimum of approximately 200,000 imperial gallons (approximately 909,000 litres) … electrically powered pumps will provide water circulation under normal operation, with a diesel powered pump providing backup capability … Diesel fuel will be stored outside the fire pumphouse building … Electric heat and ventilation equipment will be installed within each pumphouse. … Water for fire suppression will be distributed throughout the converter station site through underground pipe buried below the frost line. … The details of the fire suppression system will be determined pending further site investigation studies and detailed design."

Station Grounding System 3-67

"The Keewatinoow Converter Station site will include a subsurface ground grid for personnel and

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equipment safety, … placed under the insulating stone surface and will extend just beyond the perimeter fence …"

Communications Facilities 3-67

…communication pathways will generally be comprised of fibre optic networks. … [that] provide communication pathways for HVdc system control and operation. An additional fibre optic cable connecting the converter station to the existing Manitoba Hydro fibre optic network at Henday Converter Station will also be required for station data and telephone services. … communications antenna as a backup to transfer critical signals along Manitoba Hydro's existing microwave system."

Ancillary Buildings and Equipment 3-68

"Keewatinoow station site will include a number of ancillary buildings."

[MWL: See Table 3.5-1]

"All buildings are expected to be supported on piles due to the potential for permafrost melt and frost heave. … Pre-engineered metal building systems will likely be the most cost-effective building wall system and will meet the design requirements of the project."

"In addition to the ancillary buildings, there will be a requirement during operations and maintenance for temporary equipment, which may include bucket trucks, lift platforms, oil processing equipment, trailers, tanks, carts for handling of SF6 gas, and high voltage testing equipment.**"**

3.5.2.2 230 kV ac Switchyard 3-69

"Keewatinoow Converter Station 230 kV ac switchyard is required to provide flexible and reliable control and distribution of ac power from the northern generation system to the converter transformers and valve groups located within the converter building. … The proposed ac switchyard will require an area of approximately 90,000 m2 (9.0 ha) within the converter station fenced area. Detailed numbers and ratings … will not be known until final design is complete. Principal electrical components are described in the following subsections."

230 kV ac Circuit Breakers and Disconnect Switches 3-69

"High voltage circuit breakers … contain a hermetically sealed mixture of sulphur hexafluoride (SF6) and carbon tetraflouride (CF4) or nitrogen (N2) gases as the insulating medium inside the breaker. Approximately 24 three-phase 230 kV circuit breakers will be required for the Keewatinoow ac switchyard. Each breaker will contain approximately 75 kg of insulating gas, comprised of approximately 50% SF6 and 50% CF4 or N2."

Station Service Transformers 3-72

"Station service transformers … Three three-phase, two-winding, 230 kV- 12.47 kV MVA (mega volt-amperes) station service transformers will be required, each containing approximately 35,000 litres of insulating oil."

Instrument Transformers 3-72

"Instrument transformers measure currents (current transformers) and voltages (voltage transformers) … used for control, protection and monitoring purposes … 70 single phase voltage transformers, each containing approximately 100 litres of insulating oil …126 single phase current transformers, each containing approximately 200 litres of insulating oil."

ac Harmonic Filters 3-72

"Harmonic filters … required due to the ac current harmonics generated in the process of converting ac power to dc power. These harmonics could be harmful to equipment connected to the ac system, including generators, if allowed to flow out of the converter station. … Keewatinoow Station may require four three-phase ac harmonic filter banks, each of which may be comprised of up to three sub-banks. … Approximately 1,100 capacitors, each containing approximately 16 litres of insulating fluid, will be required for each ac harmonic filter bank."

Surge Arrestors 3-74

"Surge arrestors provide protection to ac switchyard components from abnormally high voltages induced from lightning. … similar in appearance to insulators."

Insulators 3-74

"Insulators … typically placed on the top of steel equipment support structures, but may also be placed directly on the equipment foundations."

Control Buildings 3-74

"Two to four control buildings will be required for the Keewatinoow 230 kV ac switchyard … typically contain battery banks to meet the power requirements for the electrical equipment installed within the building. Approximately 1,300 litres of battery acid will be contained within the batteries in each control building. … will also require heating and air handling equipment to control the building ambient temperature."

Switchgear Buildings and Auxiliary Power Distribution 3-75

"Two switchgear buildings will be required within the ac switchyard. … [to] house equipment for

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control of the 12.47 kV auxiliary power from the station service transformers to the converter station electric power loads. Each building will include approximately 15 circuit breakers … Each power centre will require two transformers approximately 2,500 kVA in size. Outdoor power centres may utilize oil-filled transformers, each containing approximately 2,200 litres of insulating oil. Indoor power centres, located within the converter building, typically utilize dry-type transformers which do not contain insulating oil. It is anticipated that four outdoor and four indoor power centres will be required for Keewatinoow Converter Station."

3.5.2.3 Converter Transformers 3-75

"The converter transformers provide an interface between the ac voltages in the ac switchyard and the dc voltages in the valve groups. Keewatinoow Converter Station will require up to fourteen converter transformers for the conversion of ac to dc power - three for each of the four valve groups, and two spares (for use during maintenance or outage). … Each converter transformer … will contain approximately 115,000 litres of insulating oil… design will incorporate primary oil containment"

3.5.2.4 Converter Building 3-78

"The Keewatinoow Converter Station will include a converter building …to house the solid state power electronics and ancillary systems used to support the conversion of ac power to dc power … layout modelled after the existing converter building at Henday Converter Station."

Valve Groups 3-80

"Bipole III will consist of two poles, one energized at +500 kV dc, and the other at -500 kV dc. … Two conversion technologies are presently being considered for Bipole III: conventional line-commutated conversion (LCC) technology, and newer voltage-source converter (VSC) technology.25 Selection of the conversion technology is expected in late 2011."

"The power electronics components are liquid-cooled using a closed-loop cooling system located outside the valve hall. … Each of the four valve group cooling systems will typically contain 14,000 litres of the coolant mixture."

Control Room and Ancillary Converter Building Facilities 3-82

"Operation of the electrical apparatus within the converter station will be monitored and controlled from a control room, … operating conditions of the station apparatus will be monitored and controlled from the desk, including status of the various components and systems, alarms, voltages, currents, temperatures, pressures, flows and levels. Other control room equipment and electronics will include computers, printers,
closed circuit television monitoring systems, and communication devices. … Specific sizes and locations of each area within the converter building will not be determined until final design is complete."

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3.5.2.5 dc Switchyard 3-82

"The Keewatinoow dc switchyard will be separated into two poles, referred to as Pole 5 and Pole 6. The high voltage side of Pole 5 will operate at -500 kV dc, while the high voltage side of Pole 6 will operate at +500 kV dc."

dc Wall Bushings 3-84

"The dc wall bushings provide a transition between the converter building valve halls and the dc switchyard area. Approximately eight dc solid composite wall bushings will be required."

Switchgear 3-84

"Switchgear is needed to control the flow of dc power within the dc switchyard. … similiar in operation and appearance to ac circuit breakers … use a hermetically sealed mixture of sulphur hexafluoride (SF6) and carbon tetraflouride (CF4) or nitrogen (N2) gases as the insulating medium inside the switch. Approximately 13 high speed switches will be required for the dc switchyard. Combined, these switches will contain approximately 400 kg of SF6 and 120 kg of CF4 or N2 gas."

dc Filter Banks 3-84

"A total of six dc filter banks are anticipated for the dc switchyard. Each bank will contain approximately 2,800 litres of insulating fluid."

dc Voltage and Current Measuring Devices 3-84

"Approximately 19 dc current transducers and eight dc voltage dividers will be required. Each voltage divider will contain approximately 66 kg of SF6 insulating gas."

dc Smoothing Reactors 3-84

"Smoothing reactors … are comprised of one or more air insulated copper coils. The reactors are required for attenuating dc voltage and current harmonics on the Bipole III HVdc transmission line."

Surge Arrestors 3-87

"Surge arrestors provide protection to ac switchyard components from abnormally high voltages induced from lightning. Surge arrestors are comprised of porcelain or composite materials, and are similar in appearance to insulators."

Insulators 3-87

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"Insulators are typically placed on the top of steel equipment support structures, but may also be placed directly on equipment foundations."

3.5.3 Keewatinoow Ground Electrode 3-87

"…neutral bus in the Keewatinoow Converter Station dc switchyard will be connected to the station ground electrode site by a low voltage overhead line."

3.5.3.1 Low Voltage Electrode Line 3-87

"The function of the low voltage electrode line is to provide a low resistance connection between the neutral bus in the Keewatinoow dc switchyard and the ground electrode site. … an overhead line supported either on guyed wood structures in a compressed H-frame configuration … or on guyed steel lattice structures … the most direct and preferred routing for the electrode line is along an existing cleared right-of way 30 m in width, … Alternatively, the electrode line could be routed along the right-of-way of the Conawapa access road ... this could necessitate use of additional guy wires…"

3.5.3.2 Ground Electrode 3-89

"The function of the ground electrode is to provide a return path for current between the Riel and Keewatinoow converter stations. … the ground electrode will be a shallow ring electrode—comprised of a four rod segments in a ring configuration… Underground cables will connect the electrode ring to a dead-end pole structure located centrally on the electrode site. … The ground electrode will require adequate soil moisture to function properly. …will be equipped with an underground irrigation system … vertical well electrodes in other HVdc systems around the world are most frequently built at depths of 40 m or more."

3.5.4 Keewatinoow Construction Activities and Materials 3-91

"The scope of the Keewatinoow Converter Station … includes design, procurement and installation of a construction power station and construction facilities, including a camp to support a workforce of up to 500 people. … The major equipment and electrical components to be installed in the station, … are highly specialized devices which will be designed and manufactured off-site and delivered for installation and/or final assembly by highly specialized workers. … Clean-up will occur throughout all phases of construction. Disposal of non-toxic materials produced as a result of construction activities will be made at existing, appropriately licensed local facilities. Material supply and waste handling will be subject to conventional Manitoba Hydro codes of practice and relevant provincial legislation."

3.5.4.1 Converter Station Construction Activities 3-91

"…removing existing vegetation and organic topsoil; adding fill material; and placing granular materials for foundations, roadways, and site surfacing. … drilling for wells and piles; riving pre-cast piles; placing concrete for cast-in-place piles, foundations, pads and structures; trenching for the

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placement of in-ground piping and cabling; placement of granular materials for surfacing; and erection and construction of ancillary buildings."

"All construction activities conclude with the filling of insulating oils, insulating gases, battery acids, refrigerants, and other cooling mediums prior to system commissioning."

3.5.4.2 Electrode Construction Activities 3-92

"… land clearing … excavation of the electrode trench to a depth of approximately three to four metres; placement of coke bedding material; assembly of steel electrode rods; compaction of the coke bed; installation of irrigation pipes; backfilling of electrode trench; installing feeder cables; constructing of the line termination structure; and the termination of the feeder cables and electrode line to the termination structure. Pending analysis … a shallow ring electrode may not prove feasible. An alternative design would be a vertical well ground electrode…would include land clearing; drilling of electrode wells to a depth of approximately 40 metres; assembly of piping and steel rods and cables; placement of the rods into the wellbores; pumping of water/coke slurry into the wellbore; and installing concrete covers over the wellbores."

3.5.4.3 Construction Power Station 3-92

"The total construction power load is expected to be approximately 10-15 mega voltamperes (MVA) inclusive of the Keewatinoow construction camp and converter station requirements, and a contingency allowance. … The additional construction power requirement will be provided by extending the existing 138 kV transmission line … The overall Keewatinoow construction power station site area will be approximately 150 m square."

3.5.4.4 Site Preparation 3-95

Clearing and Stripping 3-95
"Initial site preparation will generally consist of clearing, grubbing and disposal of vegetation; stripping and removal of organic soils; and grading and drainage for control of surface or near-surface water. …detailed requirements identified in the Environmental Protection Plan. … Cleared trees and brush will be stockpiled and burned, or otherwise disposed of … no merchantable timber in the immediate vicinity of the Keewatinoow site. Organic soils suitable for landscaping and site reclamation will be stockpiled for later use during decommissioning of the various construction support facilities…"

Site Access Roads 3-96

"Primary access to the Keewatinoow construction sites will be via an existing all-weather gravel road that was completed in 1992… Conawapa access road… extends approximately 22 km from the provincial highway system (the termination of PR290) at Limestone Generating Station. … rail access is not considered feasible, the road will provide the sole means of … access … Some road rehabilitation and maintenance activities will be undertaken … anticipated that the work will be

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confined between the shoulders of the existing road surface, which should not affect existing ditches, drainage culverts or stream crossings. … All-weather gravel-surfaced internal access and haul roads for the individual construction
sites within the Keewatinoow site will be extended from the Conawapa access road, … In permafrost affected areas, the roadways will be designed with an allowance for settlement. ... Any stream crossings required for access roads will be installed in accordance with stream crossing guidelines and Canada Fisheries and Oceans operation statements…. Precise layout and design requirements for the access and haul roads … [TBD]"

Site Grading and Drainage 3-97

"…remove unsuitable material prior to fill placement…logs and roots in the course of grubbing, or from removal of organic material and rocks, will be backfilled with suitable compacted material. … permafrost [of] concern will be excavated. Soft areas … broken up by disking or ploughing, and then compacted to acceptable density. … Grading will be based on roadway and structure development requirements, adjusted for local topography and drainage requirements, and designed to minimize the volume of excavated material and fill. Site drainage will be achieved by use of swales, culverts and ditches within and around
the roadways and structures. Ditch capacities will be sized to accommodate the extreme daily rainfall event. … Silt fences will be installed where necessary to prevent sediment from reaching natural waterways."

Disposal of Excavated Materials 3-97

"… a considerable amount of earth and rock materials will be excavated … At the close of the construction phase, the placement area will be covered with salvaged organics and soils to provide an erosion resistant surficial layer and to promote the regrowth of natural vegetation."

3.5.4.5 Construction Material Requirements 3-98

"… required materials will include concrete aggregates, random fill, sub base material, insulation stone, road-topping material, erosion control material, oil containment material, and pipe bedding. … selection and utilization of borrow areas will remain the responsibility of the contractors. … Environmental Protection Plans within the contract documents will clearly stipulate requirements for the protection of streams, ground water, wildlife habitat and adjacent vegetation during exploitation of material source deposits by the contractor. Contract documents will also clearly state the nature of and methods for rehabilitation of the areas after usage."

3.5.4.6 Supporting Construction Infrastructure and Activities 3-100

Aggregate Processing 3-100

"Processing of aggregates for Keewatinoow construction requirements will involve crushing,

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screening, washing and stockpiling of granular materials"

Concrete Batch Plant 3-100

"Keewatinoow Converter Station and supporting sites … require …15,000 to 45,000 m3 of concrete … Studies are currently underway to confirm the feasibility of drawing on ground water for the supply of water for concrete production. Cement will be supplied to the site … [and] held in temporary storage silos adjacent to the batch plant. Finished aggregate will also be stored adjacent to the batch plant. Concrete additives will be sourced and supplied based on technical and economic considerations, as proposed by the contractor. …during the winter months may require a heating system … during summer months may require a cooling system … Heated water will not be discharged directly to natural water courses. Aggregate wash water will flow into an appropriately sized settling pond with a minimum of two cells. The larger particles will settle out in the primary cell and the finer particles in the secondary cell; some filtering may also be provided. Total levels of suspended solids will be monitored to ensure conformance to provincial and federal regulations and the Environmental Protection Plans. The pond will be intermittently discharged through the local land drainage system …, which leads to Goose Creek and ultimately to the Nelson River. … water used to wash out concrete trucks and the concrete batch mixer) will be contained on-site and treated to meet turbidity and pH requirements prior to discharge.

Manitoba Hydro Work Area 3-103

"Work areas will be provided for both Manitoba Hydro and the contractors … small storage and field office facilities … at the various construction sites … Manitoba Hydro … engineering office, … warehouse storage building … fuel storage and vehicle refuelling facility, field offices, a soils and concrete laboratory, … maintenance building … helicopter landing area …Work area water and sewer services will … either be handled through direct connection to the camp systems, or will be transported between the camp facilities

Contractors' Work Areas 3-104

"… contractors' work area will generally contain portable modular buildings, storage facilities, maintenance shops, a fuel storage and vehicle refuelling facility, toilet facilities, a concrete batch plant, an aggregate processing area, a carpenters' shop, and a precast concrete yard. In the event that the use of explosives is necessary (e.g., for excavation of rock or large boulders or for splicing and terminating electrical conductors), a magazine for storage of explosives will be located away from the work and camp areas, in accordance with provincial blasting regulations. … The contractor will provide temporary portable toilet facilities, with holding tanks, at the various station construction sites. The waste will be regularly pumped out and transported for disposal via the construction camp wastewater system. The Environmental Protection Plans will identify special precautions to be taken within the work areas. Design and development … by the contractor, subject to Manitoba Hydro approval, and in accordance with the project Environment Act license and the Environmental Protection Plans."

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Construction Access Management 3-105

"… equipment and materials may be transported directly from point of origin to the Keewatinoow site by truck, or by a combination of air, rail and road. No direct rail access or airport/runway development is proposed at the site. Construction access ... will require development of local access extending from the Conawapa access road… the Conawapa access road will be closed to the general public for safety reasons…. A shuttle van service will be established to transfer workers and mail to and from Gillam and the main camp during the Keewatinoow construction phase. … The shuttle service will not be provided for the purpose of worker recreation."

Henday/Limestone Rail Access
"The existing rail spur at Limestone/Henday connects to the (Winnipeg-Churchill) … will require some upgrading and maintenance, the extent of which is under ongoing review. … Work will be confined to the railroad bed and will not affect existing ditches, drainage culverts or stream crossings."

Henday/Limestone Marshalling and Storage Areas
"Manitoba Hydro has also considered the feasibility of using off-site yards to promote more extensive use of rail shipments (e.g., for bulk materials like cement, reinforcing steel, etc.), as well as the prospect of using the yards in support of potential future Conawapa development.

Keewatinoow development
"Potable water supply will be supplied by either an extension of the existing Limestone and Henday systems, or by transport from Henday, Limestone or Gillam and storage in approved potable water containers located at the yards. All solid and liquid sewage wastes will be collected in holding tanks and removed from the site to licensed disposal/treatment facilities."

Construction Traffic
"Construction traffic on the Conawapa access road will include heavy truck traffic from Henday/Limestone and from borrow areas, as well as lighter vehicle traffic for transport of workers to and from the Keewatinoow construction camp and the various construction sites. … will likely involve both rubber tired and track-mounted vehicles. Traffic studies … [for][Keewatinoow … estimated daily workforce trips … up to 130 trips (AADT [average annual daily trips]) in year 3 on the Conawapa access road between the construction camp and the work site, and up to 116 trips in year 3 on PR 290 near Sundance. … daily truck trips (AADTT), for transport of materials and equipment, range up to 405 trips (in 2013) on the Conawapa access road, and up to 10 trips (in 2015) between Winnipeg and the access road. … Related findings are further discussed in subsequent sections of the Environmental Impact Statement. … noise generated during the construction phase will be temporary in nature … Details respecting construction staging and marshalling of construction materials (as between the Limestone and Henday yards and the Keewatinoow site) will be provided as studies are completed.

3.5.4.7 Construction Contract Procedures and Workforce Requirements 3-107

"Over the duration of its construction, employment associated with development of the Keewatinoow Converter Station is expected to total 922 person-years, inclusive of all specialized trades, construction management, general assembly and installation, maintenance, catering, labour, etc. (see Figure 3.5-15 and Figure 3.5-16). Environmental approval and licensing of the Project is expected to be completed by the Fall of 2012. Pre-licensing activities and related job opportunities will include environmental assessment and consultation activity, and on-site engineering field investigations (including soil sampling, resistivity and magneto-telluric testing, and installation of thermal monitoring wells). Related activities (e.g., clearing of sampling sites and access trails, drilling of sampling holes, etc.) are being reviewed with First Nations in the vicinity of the site in advance of application for and receipt of the necessary government work permits."

Contract Procedures 3-110

"Initial construction and related contracts are anticipated to follow conventional design and construction practice. This will involve direct participation by Manitoba Hydro staff and consultant personnel in the conduct of on-site investigations, and preparation of design documents and construction specifications. … All contracts and tender calls will include environmental information and stipulate adherence to related environmental protection requirements."

Employment Opportunities 3-110

"The conventional contract arrangements will include a substantial component of general labour and construction trades, and will offer a variety of employment opportunities. Contracts related to the assembly and installation of the HVdc and 230 kV ac switchyard equipment will substantially involve highly specialized workers, … Keewatinoow Converter Station employment opportunities will include:

- Catering for the camps and security …;
- Site and camp development …;
- Foundation preparation … ;
- Buildings and services development (labourers, carpenters, electricians and
- pipefitters for construction of camp).

The allocation of employment opportunities will generally be based on the hiring preferences defined in the Burntwood Nelson Agreement (BNA) Manitoba Hydro may also directly negotiate certain contracts or work packages with in-vicinity First Nations, who would then have ability to hire their members directly for such work. The Keewatinoow project work will be tightly scheduled."

Work Force Requirements and Schedule 3-111

"Figure 3.5-16 illustrates the estimated workforce requirements for Keewatinoow construction (i.e., exclusive of transmission line requirements), … The estimates are for the peak employment … exclude[s] senior contractor supervisory and management staff, Manitoba Hydro staff, camp operation staff, and positions related to transmission line construction. … The workforce (exclusive of Manitoba Hydro and contractor supervisory staff) will be in the order of 250 through mid-2013, until installation of the construction power station is complete—tentatively scheduled for October 2013. … The workforce during this period will peak in excess of 300 in late 2013 and early 2014, and taper gradually down to less than 100 by late 2016. … in late 2017, the total will decline to about 30, as the emphasis shifts from construction to commissioning. The construction workforce will wind down entirely by mid-2018."

3.5.4.8 Keewatinoow Construction Camp 3-113
Work Force Accommodation Alternatives 3-113

"The experience of past major Manitoba Hydro projects has shown that recruitment and retention of a quality workforce requires provision of clean, comfortable accommodation, good quality nutritious food, and a sense of community. … housing the workforce at the Keewatinoow site was determined to be the preferred alternative. … reduce concerns about the potential adverse social effects arising from an influx of project workers into neighbouring communities."

Workforce Accommodation Concepts and Site Selection 3-114

"… objective is to ensure that camp accommodations support a quality of life that is conducive to attracting and retaining the quantity and quality of workers required to construct a major project successfully. … requires careful attention to safety, construction and maintenance standards, appearance, comfort, amenities, operations and catering. … will include a start-up camp and a main camp, including a management subdivision. Camp layout has not been finalized… Discussions continue with a view to identifying and addressing the effects on members of Fox Lake Cree Nation of the Bipole III Project."

Start-up Camp 3-116

Site Selection and Location
"A temporary start-up camp will house workers constructing the larger main camp … will be approximately 250 m x 250 m(6.25 ha) in size. … The proposed site offers a number of advantages:

- Proximity and good access to work areas (i.e., converter station and proposed main camp site);
- Removed from existing communities (which will minimize worker interaction);
- Existing exploration camp provides an option for initial accommodations during the early stages of the project;
- Minimal clearing and site preparation requirements;
- Existing well provides a good quality and economical water source;
- Existing electric power and communications systems;
- Existing helicopter landing area; and
- Size and proximity provide option to utilize start-up camp as overflow

…The combination of these advantages will minimize adverse environmental effects."

Camp Capacity and Facilities
"The proposed site area is currently in use, on an as-needed basis, as a camp site for Manitoba Hydro pre-construction field exploration activities … is owned and operated by Fox Lake Cree Nation, and …

a capacity of approximately 75 persons. Development of the start-up camp will expand the capacity of the exploration camp to 350 persons. … will consist largely of relocatable modular buildings… Maximum use will be made of existing facilities and infrastructure. The camp will be installed and operated in accordance with all applicable regulations, codes and standards."

Main Camp 3-117

Site Selection and Location

"Main camp … to house workers constructing the converter station and ancillary facilities …sited approximately two km north of the converter station site, adjacent to the south side of the [Conawapa] access road. ... will be approximately 350 m x 700 m (24.5 ha) in size. The site is an old burn site with sparse tree cover and a surface layer of organic material overlying low plastic clays or poorly graded sands and gravel. It is located between two existing streams known as Creeks Fourteen and Fifteen. The site slopes downward… towards the Nelson River. Advantages of the proposed site include:

- Location adjacent to the access road provides good access to the Keewatinoow Converter Station construction areas, but is not so close as to be adversely affected by nuisance effects during construction (e.g., noise);
- Good natural drainage avoids the need for extensive terrain alteration, subject to cut and fill requirements, to provide level sites for the various camp components;
- Good potential source of well water;
- Limited suitability as a borrow area avoids construction material resource conflict;
- Former burn site has limited tree growth and minimizes clearing requirements;
- Proximity to the proposed Keewatinoow construction power station and existing 12 kV power distribution line;
- Basic communications systems in place; and
- Adequate area to accommodate potential future development without having to duplicate existing camp infrastructure features.

Development of the site should involve minimal adverse environmental effects. In addition, the site offers good potential for re-use and scalability in the event that development of the Conawapa Generating Station proceeds."

Camp Capacity and Facilities

"The main camp will be developed to house the expected peak of 500 single-status construction workers (converter station and transmission line workers combined). … capacity of the main camp will be approximately 550 rooms, to accommodate worker turn-around. … modular, portable buildings or pre-engineered steel buildings… in accordance with the most current edition of the National Building Code of Canada and the latest edition of the Manitoba Building Code. … will include a core complex (reception/offices/kitchen/diner/recreation); a chapel/meeting room; a beverage hall/cafeteria; a fire truck garage and training room for the volunteer fire department; a first aid building and ambulance garage; an uncontrolled helicopter landing area; communication systems; potable water and fire water storage buildings; a commissary; miscellaneous maintenance and storage buildings; vehicle parking areas and roadways; and outdoor recreation areas for sports [as well as living quarter]. … Two quality levels …one for general labour (craft) accommodations, and a second for supervisory/management

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staff. The craft accommodation will be single-status only, and will consist of dormitories with separate rooms for each worker. …

Management Subdivision

"… The management subdivision land parcel will be approximately 225 m x 300 m (6.75 ha) in size. The subdivision will provide serviced individual lots for installation of mobile homes to house senior management staff (married/couple-status) working on the project. … Vehicular access to the subdivision lots will be provided by an internal roadway system linked to the main access road. Pedestrian access to the main camp facilities will be provided by a foot path and bridge over Creek Fourteen."

Camp Infrastructure and Construction Activities 3-119

Start-up Camp

Water and Sewage Systems

"Water will likely continue to be obtained from an existing on-site well, treated with approved water treatment equipment, and stored in approved potable water containers. Alternatively, potable water may be hauled in from Gillam and stored in approved potable water containers located at the camp."

"Sewage … collected initially in holding tanks and removed … to licensed disposal/treatment facilities. … holding cells may be developed south of the start-up camp site. Sewage would be collected in these and
conveyed subsequently to the main camp lagoon. Subject to environmental approval, grey water (wash water from showers, etc.) may be routed into sullage pits. Final decisions respecting sewage treatment and disposal are being deferred to further study of the sewage treatment alternatives for the main construction camp, and will be the subject of a separate environmental license application.

Waste Collection and Disposal

"Solid waste will be hauled to a licensed waste disposal site with adequate capacity, subject to approval by the facility owner and Manitoba Conservation. Food refuse that is not disposed of through the kitchen garburators and sewage system, as well as other wastes destined for the waste disposal site, will be stored temporarily in approved containers maintained in a secure location to prevent intrusion by wildlife. Requirements for storage and haulage may be minimized through the use of garbage compactors. A recycling and waste management plan will be developed in relation to camp operations. The plan will: provide for appropriate separation of waste streams; optimize recycling; and ensure proper disposal of all solid wastes."

Main Camp and Management Subdivision

"Main camp service systems will generally be shared by the management subdivision, and are planned

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to include electrical power; water supply and distribution; wastewater collection and disposal; cable TV, internet, telephone and communication systems; and surface drainage management. … design of the camp infrastructure, wherever feasible and practical, will be scalable. … will provide flexibility … [and] will also facilitate incorporation of features designed to accommodate possible future redevelopment of the camp to accommodate the estimated 2,500 person workforce potentially required for future construction of the Conawapa Generating Station.… Facilities in the kitchen/recreation complex may be sized for the larger Conawapa camp requirements. … Underground water distribution and sewer systems will also be designed for the combined needs of the Keewatinoow camp and the potential future needs of a Conawapa construction camp."

Camp Construction Power

"The existing 12 kV distribution line, described in Section 3.5.4.3, will provide power for construction and operation of the start-up camp and main camp until such time as power is provided from the Keewatinoow construction power station."

Site Preparation

"Site preparation…similar to the Keewatinoow Converter Station works described in Section 3.5.4.4. … layout will take advantage of existing clearings and open areas to minimize clearing activities."

Marshalling and Work Storage Area

"A material marshalling and work storage area will be required within the main camp land parcel. … to store building components, equipment, and material related to the camp development. … a portion of the area will be used for camp resident parking."

Water Supply, Treatment and Distribution

"Test wells drilled in the Main Camp area (primary well OW7 and secondary well OW6) have been found to be capable of providing an adequate and dependable supply of potable and fire protection water for the camp and associated accommodations. Water treatment will be provided by … conventional chemical coagulation, clarification and membrane filtration to reduce turbidity and colour … subject to more detailed water analysis…. above-ground tanks … Storage capacity requirements will be governed by fire protection requirements and standards. Approximately 340,000 litres of fire water storage will be required. Total water storage … has not been finalized but may be in the same order of magnitude as that of the Wuskwatim water treatment plant… total capacity of 581,400 litres. … pumps will be used to deliver the raw well water to the water treatment … will consist of electric pumps and a diesel powered back-up fire pump system. … Wastewater from the water treatment plant will consist mainly of process filter backwash and settling chamber sludge, and will be discharged to the sewage collection system for further treatment. Based on an average consumption of 265 litres/person/day, the main camp requirements, including a design allowance, will be approximately 159,000 litres/day. In addition, an estimated 5,000 litres/day allowance has been made for Manitoba Hydro and contactor activities at the construction site, bringing the total daily consumption of treated water to an estimated 164,000 litres/day. Testing equipment to monitor chlorine and turbidity levels will be provided on-site. Potable water will be treated to meet provincial standards for drinking water quality and aesthetics. Water lines will likely consist of shallow buried, insulated and heat-traced high-density polyethylene pipe, installed using a backhoe or trencher. … Water for fire-fighting will be drawn from the same source as the potable water supply."

Sewage Collection, Treatment, and Disposal

"A sewage lagoon will be constructed for treatment of main camp sewage … [based on] following reasons:

- Manitoba Hydro has had good experience with lagoons on past major project camps;
- Lagoon operation and maintenance requirements are well suited to the availability and qualifications of local labour;
- Requires less energy than most other wastewater treatment methods;
- Relatively low construction cost; and
- Scalability for potential future uses.

Final [lagoon] selection is subject to further geotechnical investigation. The lagoon will be designed and constructed to meet: the Keewatinoow camp capacity, … In addition, the lagoon will be designed both to enable its expansion to accommodate the anticipated peak camp capacity of a potential Conawapa camp, and to facilitate its eventual downsizing to accommodate permanent facilities following decommissioning of the camp. Sewage will be conveyed by gravity to a main sewage lift station or a series of lift stations, from where it will be pumped via force main to the lagoon. The treatment lagoon will be a multi-cell facility, constructed and lined from locally available clays. If local clays are found to be unsuitable for use as a liner, a synthetic liner will be installed. It is estimated that the total size of the lagoon to be built at this time will be approximately 200 m x 500 m. The lagoon will be operated as a controlled discharge facility, which may be discharged twice per year, once in the spring (June) and once in the fall (October), in accordance with provincial regulations. … Grease traps will be provided at the kitchen complex to reduce the loading on the treatment system. Water conversation methods under consideration include dual-flush toilets and flow-restricting shower heads. The lagoon will have a perimeter fence and a gated access road. …"

Solid Waste Management

"Solid wastes generated in the camp and ancillary facilities will be subject to waste management practices applicable to the Keewatinoow development (see Section 3.5.4.9). Animal proof garbage containers will be provided throughout the main camp, … Food refuse which is not disposed of through the kitchen garburators and sewage system… in approved containers maintained in a secure location to prevent intrusion by wildlife. … storage and haulage may be minimized through the use of garbage compactors.. … a recycling and waste management plan will be developed for camp operation. … will provide for appropriate separation of waste streams, optimize recycling, and ensure proper dispos``````al of all solid wastes."

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Camp Operations 3-124

"Fire preparedness equipment will be in place to the satisfaction of Manitoba Conservation.

- Smoking will be allowed only in designated areas;
- Although boat access to the Nelson River currently exists at the Conawapa site, there are no plans to make boat/watercraft access available for camp residents' recreation. … discussions with potentially affected resource users and First Nations, and their respective Resource Management Boards [requiring continuing boat access] as required;
- … snowmobiles and all-terrain vehicles will not be allowed on the project site
- "No Trespassing" - Private Property" and "No firearms/hunting" signage will be
- posted … Special access arrangements for resource users will be worked out in discussions with potentially affected resource users and First Nations, and their respective Resource Management Boards as required.
- All camp resident recreational activities will be required to comply with applicable provincial and federal regulations."

3.5.4.9 Solid Waste and Hazardous Materials Management 3-125

"Both hazardous and non-hazardous wastes will be generated through the course of construction… Wastes will be managed, collected and disposed of in accordance with current provincial and/or federal regulations. Management procedures for specific hazardous materials are detailed in the Hazardous Material Management Handbook (Manitoba Hydro 2003). The Environmental Protection Plans will contain general guidelines for non-hazardous and hazardous waste management. Opportunities to reduce, reuse, and recycle the wastes will be taken whenever possible, and identified in a waste management and recycling plan. Wastes will be stored in designated areas (i.e., transfer stations) and disposed of regularly to reduce potential for unsafe conditions and adverse impacts. It is likely that scrap wood and paper products will be disposed of by burning in a designated area at the construction site, under a permit from Manitoba Conservation. Other waste will be disposed of either by creating a new permanent waste disposal site or by haulage from a transfer station to an existing permitted waste disposal site. The preferred option will be selected on the basis of discussions with the Town of Gillam, Manitoba Conservation, and the in-vicinity First Nation(s) and their respective Resource Management Boards, as required."

3.5.4.10 Keewatinoow Site Area Requirements 3-125

"The converter station and supporting construction facilities are located within the Fox Lake Resource Management Area. The access road, rail spur, material marshalling areas and granular deposits are located variously within in the Split Lake and Fox Lake Resource Management Areas. All of the required site area is Provincial Crown Land. Most is within Manitoba Hydro's Churchill River Diversion license area and the Province of Manitoba's Water Power Reserve area. Exceptions include portions of the access road, construction power transmission line right-of-way, and granular borrow areas. … Following construction, the land required for permanent facilities will be retained for ongoing operations and maintenance. The remaining areas used during construction, will be

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rehabilitated as discussed in Section 3.5.4.11, or maintained pending future requirements associated with the potential Conawapa Generating Station development."

3.5.4.11 Construction Clean-up and Rehabilitation 3-126

"Construction clean-up will occur throughout all phases of construction. As soon as possible after completion of construction, the permanent converter station sites will be cleaned up and left in standard operating condition. All non-toxic materials will be disposed of using existing, appropriately licensed local facilities. As with construction activity, material supply and waste handling will be subject to conventional Manitoba Hydro codes of practice and relevant provincial legislation. Decommissioning and clean-up of temporary facilities (i.e., those required only for the Keewatinoow development) will occur after construction is complete and the converter station and associated facilities are in service. As indicated previously, the timing of decommissioning and clean-up of some temporary facilities (e.g., construction camp, construction power station, borrow areas, etc.) may be subject to future development requirements (e.g., potential development of Conawapa Generating Station). Decommissioning of the temporary facilities will involve removal of supporting infrastructure including specific roads and buildings; collection and disposal of wastes, recyclables and hazardous materials and, in the case of the construction camp, removal of water distribution and sewage collection facilities. If no longer required, the construction power station and the local distribution system will be decommissioned and salvaged. The conductors will be removed from the poles and the poles will be pulled from the ground. All electrical distribution equipment will be salvaged and returned to Manitoba Hydro for re-use. Reclamation and re-vegetation programs will be initiated for the vacated sites and borrow areas to control/prevent erosion, re-establish wildlife habitat, and/or create buffer zones. Reclamation measures and vegetation species will be selected on the basis of regulatory requirements, site conditions, and management objectives. Manitoba Hydro will monitor site reclamation/re-vegetation programs, in consultation with the appropriate authorities and stakeholders.
All clean-up and rehabilitation activity will be subject to the requirements of the Environmental Protection Plans."

3.5.4.12 Construction Safety, Security and Emergency Response Plans 3-128

"Manitoba Hydro's vision is "to be the best utility in North America with respect to safety, rates, reliability, customer satisfaction, and environmental leadership, and to always be considerate of the needs of customers, employees, and stakeholders." …safety and well-being of its employees … provincial occupational health and safety regulations… emergency response plans and programs … helicopter landing area … Spill response programs and equipment … Transportation and handling of dangerous … on-site Safety Supervisor will be employed during the construction period … security personnel will operate access gates … on a 24-hour basis. No firearms … Special arrangements will be made for resource users wanting to use the access road to gain access to harvest areas in the region (excluding the no hunting areas defined for construction safety). These arrangements will be developed, prior to construction…"

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3.5.4.13 Environmental Protection Plans and Monitoring 3-129

"… Keewatinoow construction activity and access requirements will be subject to standard environmental protection measures… A general project EnvPP will be submitted with the Environmental Impact Statement for review and approval. … Three separate EnvPPs are being prepared for the Keewatinoow project:

- Keewatinoow Converter Station Access Road Upgrade Environmental Protection Plan & Monitoring Program;
- Keewatinoow Converter Station Construction Camp Environmental Protection Plan & Monitoring Program; and
- Keewatinoow Converter Station Environmental Protection Plan & Monitoring Program."

3.5.5 Station and Electrode Operation and Maintenance 3-129

"… Keewatinoow Converter Station will be operated 24 hours a day, year round, and will have Manitoba Hydro personnel on-site performing regular operation, maintenance and inspection duties. … Total operations and maintenance workforce has been estimated at 42 workers, exclusive of the periodic presence of contractor staff."

3.5.5.1 Station Operations 3-130

"The Keewatinoow Converter Station control room… will provide the human/machine interface equipment for the operators to control critical functions in the station and power flow in the system. These critical functions will also be monitored and controlled remotely by Manitoba Hydro's System Control Center. Routine and emergency maintenance [will be performed]… subject to standard Manitoba Hydro procedures."

Environmental Emissions and Discharges during Station Operation 3-130

Electric and Magnetic Fields and Corona

"… operation of the converter station electrical equipment will involve the production of electric and magnetic fields (EMF) and corona discharges. The level of these will vary with time, subject to: operating mode and loading conditions; final station design and equipment selection; and external considerations such as meteorological conditions. Estimated levels … based on mathematical modeling and on comparison to corresponding levels associated with other similar facilities in the Manitoba Hydro system. Concerns … arising from EMF and corona emissions were raised in the course of the public consultation … discussed in later sections of the Environmental Impact Statement. Studies have been conducted to model the electric and magnetic fields associated with operation of the ground electrode and its connecting low voltage line, as well as the prospect of audible or radio/television frequency noise arising from operation of the electrode line. … Detailed study results are provided in the associated technical reports, and are discussed … in the chapters addressing public consultation and environmental effects."

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Other Emissions and Discharges

"… operation will involve a variety of other emissions, discharges and activities. …"

Audible Equipment Noise

"Audible noise levels arising from station equipment operation will be subject to final design and equipment selection, but will comply with applicable provincial regulations and guidelines."

Solid Waste and Hazardous Materials Management

"… in particular ethylene glycol, refrigerants, and battery acid."

Ethylene Glycol

"The valve groups within the valve halls generate heat during operation. … cooling system which circulates a de-ionized water-glycol solution through a system of manifolds and pipes. Although the probability of leaks in the system is low, the system is closely monitored to ensure proper operation."

Refrigerants

"Mechanical cooling, if required, will include a conventional HVAC … All refrigerants will be subject to environmental specifications in accordance with ASHRAE (American Society of Heating, Refrigerating and Air Conditioning Engineers) guidelines. "

Battery Acid

"Batteries are required to power critical communications, and control and protection systems in the station. The batteries are arranged in groups called battery banks. The banks are housed in separate rooms designed to minimize risks associated with fire and to contain any potential leaks."

Sulphur Hexaflouride (SF6) and Carbon Tetraflouride (CF4)

"High voltage electrical apparatus such as circuit breakers and bushings typically use Sulphur Hexafluoride (SF6) as an internal insulating medium between energized and non-energized components. A blend of SF6 and Carbon Tetraflouride (CF4) or Nitrogen (N2) gas is typically utilized to prevent condensation of the SF6 gas within the apparatus and maintain adequate electrical insulation at ambient temperatures as low as -50 degrees Celsius."

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Insulating Oil

"Insulating oil is used in power transformers and other high voltage electrical apparatus as an electrical insulator and heat transfer medium. In the case of power transformers, the insulating oil is circulated through a radiator in order to transfer heat generated from the transformer to the atmosphere."

3.5.5.2 Ground Electrode and Ground Electrode Line Operation 3-132

"The ground electrode site will not normally be staffed. Inspection and maintenance …will be performed by Manitoba Hydro staff based on frequencies and procedures to be established. … During normal operation (i.e., bipolar mode), the low voltage electrode line and ground electrode will conduct very low levels of dc current. … Ground electrode current during bipolar operation will typically be less than 110 amperes. Occasionally… the HVdc transmission line current be conducted through the low voltage electrode line and ground electrode (i.e., monopolar mode). Ground electrode current during monopolar operation is dependent on the dc power being transmitted on the HVdc transmission line. At full load, it would be approximately 2,000 amperes, but the design will provide for up to 2,200 amperes for extra margin during a contingency. … Metallic infrastructure such as underground cables, transmission line tower footings, and buried pipelines (gas, water, sewer, etc.) may be affected by the stray current, which can lead to corrosion. In addition, stray current flowing through large substation power transformers can result in excessive heating. Studies using computer models have been used to calculate stray current distribution, to analyze potential interference on buried infrastructure and substation transformers and to guide electrode site selection and design. Related findings are further discussed in later sections of the Environmental Impact Statement."

3.5.5.3 Work Force Requirements 3-133

"It is currently estimated that 42 Manitoba Hydro staff will be employed at the station with approximately 30 staff on-site on a daily basis. In addition, there may be approximately 30 contractor staff present on-site during station maintenance periods. … Manitoba Hydro has established initiatives to provide Aboriginal people with the opportunity to enter training programs related to such careers and gain employment with Manitoba Hydro, such as the Keeyask Working Group on Operational Jobs, established with Tataskweyak Cree Nation, War Lake First Nation, Fox Lake Cree Nation and York Factory First Nation, and the Southern and Northern Aboriginal Pre-Placement Programs. … Expected employee trips were calculated for the morning (AM) and evening (PM) peak hours as well as total weekday trips:

- AM Peak trips = 46 (based on ITE Land Use 170 Utilities rate of 0.76 trips per employee).
- PM Peak trips = 46 (based on ITE Land Use 170 Utilities rate of 0.76 trips per employee).
- Total Weekday trips = 181 (based on ITE Land Use 110 Light Industrial rate of 3.02 trips per employee)."

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3.5.6 Keewatinoow Decommissioning 3-134

"The life span of converter station facilities is normally considered to be in the order of 50 years. However, converter station facilities are not sited and designed with a view to decommissioning. As individual station components fail, replacement will normally be made with equivalent new equipment or facilities. … facilities … are considered to be effectively permanent. In the extremely unlikely event that the Keewatinoow Converter Station was to be decommissioned, … subject to …applicable regulatory requirements … objective of any decommissioning plans would be to restore the station site to a condition consistent with the future intended use of that site. … A careful investigation of containment parameters, future land use, site risks, and remedial technologies would be conducted as part of the development and implementation of a remedial action plan."

3.6 RIEL CONVERTER STATION – TECHNICAL DESCRIPTION 3-134

"…southern terminus of the Bipole III HVdc transmission line … is presently under development for the previously approved and licensed Riel Reliability Improvement Initiative (Riel Sectionalization). … will share the site infrastructure and certain other elements being developed for the Riel Reliability Improvement Initiative. The Bipole III development at Riel will include expansion of the 230 kV ac switchyard, as well as new …, a new Riel ground electrode will be developed at a separate site and will be connected to the station by a new, low voltage overhead line. … The 230 kV ac switchyard expansion will include additional incoming ac transmission line re-terminations, buswork and overhead connections. Other major elements will include circuit breakers, a station service transformer, and ac filters. … the conversion process from dc back to ac will be accomplished using solid state power electronics. … planning and design of the converter station and its ancillary facilities will be subject to CSA design standards and National Building Code requirements, and will be guided by ERC/MRO/MISO reliability criteria."

3.6.1 Riel Station Site and Ground Electrode Site Selection Process 3-136

"The Riel Converter Station will be developed on the existing site of the Riel Reliability Improvement Initiative, and will not require the purchase of any new lands. The Riel ground electrode site will require purchase of privately-held lands. Pending final decisions respecting design and route selection, the low voltage electrode line will occupy existing road allowances or other rights-of-way."

3.6.1.1 Converter Station Site 3-136

"The Riel Converter Station site will be located at the existing Riel Station, situated immediately west of PR 207 land in the east half of Section 26, Township 10, Range 4 E.P.M. (see Figure 3.6-1). A portion of the station site (and related transmission rights-of-way) was first purchased by Manitoba Hydro at the time of development of the 500 kV Dorsey-Forbes export transmission line D602F in the late 1970s. The site was later enlarged to reflect earlier plans for Bipole III development and ongoing conceptual planning for Development of the Riel station. To avoid conflict with neighbouring land uses, additional properties adjacent to the site were subsequently acquired during the period 2007 to

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2009, in the course of planning and development for the Riel Sectionalization project. At the present time, all abutting properties are owned by Manitoba Hydro or are subject to its first right of refusal in the event of sale. … [see:] Figure 3.6-2. … footprint of approximately 110 ha. … fenced area … 82 ha of land."

3.6.1.2 Ground Electrode Site 3-140

"Proposed siting of the Riel ground electrode…. ground electrode site selection process was a three phase program. Phase one of the selection process identified 11 candidate sites. … Only one site, SES1c, a variation of SES1, was considered to be acceptable for development (see Map 3-10)… located in Section 21, Township 11, Range 6 E.P.M. … The basis of the technical preference for this site is summarized in the following points:

- Relatively flat site with minor topographical variation;
- Good surface ground resistivity;
- Ground water availability;
- Predominantly lower ground potential rise (GPR) than other sites evaluated;
- Acceptably wet site with a good back-up water supply;
- Promising thermal conductivity and heat capacity soil characteristics;
- Farmland with no major land use conflicts;
- Low step potential, safe for humans and animals to walk across the site during operation;
- Located in rural area with separation from pipelines, transformers, transmission lines, rail lines, etc; and
- Located within the siting area on the east side of the City of Winnipeg, and requires the shortest electrode line of all sites evaluated.

The electrode site land requirement will include the entire section (i.e., approximately 1,600 m x 1,600 m or 2,560,000 m2 [256 ha… ground electrode will likely be a shallow ring electrode, estimated to be approximately 400 m in diameter, and situated centrally within the site. The site will be purchased by Manitoba Hydro. The excess land will be leased back to the former owners or others for ongoing non-intensive agricultural use. … low voltage connecting line … located either on easements acquired by Manitoba Hydro, predominantly on or adjacent to existing municipal roadway rights-of-way. … Map 3-4."

3.6.2 Riel Converter Station Facilities and Infrastructure 3-141

Site infrastructure and facilities being developed for the Riel Reliability Improvement Initiative will be utilized by the Riel Converter Station … additional buildings to support the operation of the converter station, a 230 kV ac switchyard expansion, converter transformers, a converter building and conversion equipment, a dc switchyard, and synchronous condenser machines …

3.6.2.1 Converter Station Site Infrastructure 3-141

… majority of the infrastructure required for the Riel Converter Station has been or is being completed in the course of the Riel Reliability Improvement Initiative. … Necessary expansion of the Riel site

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infrastructure to accommodate the Bipole III facilities will include: localized site grading, drainage, and grounding; additional oil storage and oil containment facilities; additions and/or extensions to the internal roadway system, station lighting, water and wastewater systems, and fire suppression systems; additional communication facilities; and additional ancillary buildings and equipment.

Site Grading and Drainage 3-142

… Further development of the Riel station site for the Bipole III Project will include additional localized drainage (including land drainage sewers) in the 230 kV ac switchyard, and in the proposed converter building, dc switchyard and synchronous condenser areas. These areas will be covered with an insulation stone course, approximately 150 mm in thickness, and typically consisting of 20-40 mm diameter clean stone aggregate. …drainage network, the design of which includes containment ponds, and oil/water separation facilities. These facilities ensure that potential oil contaminants will be contained on-site and will not be discharged through off-site storm water flows or runoff.

Internal Roadways 3-142

"Additional internal roadways will require development in order to provide on-site access to the Bipole III converter building, synchronous condensers and switchyard areas. … majority … will be gravel surfaced. Some portions may be paved with asphalt to minimize dust production in the vicinity of key electrical components and the converter building. … details …will be determined during final design. …will permit on-site tractor-trailer access for equipment installation and maintenance, as well as access for employees and smaller service vehicles. … will include additional gravel surfaced parking areas for employees, as well as staging and parking areas for contractor use. Concrete pads may also be provided for loading and unloading of equipment."

Site Security 3-143

"…Riel Reliability Improvement Initiative includes installation of station security infrastructure… welded wire perimeter fence and a security building located at the primary entrance … remote controlled gate … vehicle barriers …Video cameras will be used to monitor site activity."

Station Lighting 3-143

"… site perimeter lighting as well as roadway lighting for the associated internal roadway network. … designed to achieve an average maintained lighting level of approximately 10 lux (10 lumen per square metre)."

Oil Storage 3-143

"The Riel Converter Station will include provision for storage of … up to a maximum of 300,000 litres of insulating oil."

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Oil Containment 3-143

"The current Riel Reliability Improvement Initiative includes all principal components of the station oil containment system. These include a combination of point source containment and non-point source containment … Primary containment … for equipment containing greater than 5,000 litres of oil. … containment will utilize a concrete, clay or synthetic membrane barrier, extending a minimum of 1.5 m beyond the edge of any the equipment. The majority of the primary containment facilities will be connected to the oil-water separator building using fast drain piping. Any exceptions will involve local containment …Water collected in the oil containment system … will undergo oil/water separation … "

Water and Wastewater Systems 3-144

"Riel Reliability Improvement Initiative includes on-site water distribution and wastewater collection systems, as well as connections to the City of Winnipeg systems for water supply and waste water disposal."

Fire Suppression Systems 3-144

"Riel … fire suppression system required for the site … includes 200,000 gallons (approximately 909,000 litres) of water storage, two fire pumphouses, fire deluge facilities, and a fire water distribution system complete with fire hydrants. … Subject to final design studies, additional fire pumphouses may be required in the dc switchyard and in the 230 kV ac switchyard expansion. … The buildings are electrically heated for freeze protection. … Water for fire suppression will be distributed throughout the converter station site via underground pipe buried below the frost line. Piping is typically fabricated of polyvinyl chloride (PVC) or high density polyethylene (HDPE). The details … will be finalized in the course of detailed design.

Station Grounding 3-145

"The current Riel Reliability Improvement Initiative includes installation of a station ground grid throughout most of the larger station area, but not extending to the sites of the proposed Bipole III facilities..."

Communications Facilities 3-145

"…communication infrastructure… facilitates reliable integration of the Riel station into the existing Manitoba Hydro power system, and is generally comprised of fibre optic networks. …"

Ancillary Buildings 3-146

"The current Riel Reliability Improvement Initiative includes such ancillary buildings as a security building, control buildings, switchgear buildings, an oil-water separator building, fire pumphouses, deluge buildings, and an emergency response building. The Bipole III facilities at Riel will require

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additional ancillary buildings to support the new infrastructure for the converter station development. ... All buildings are expected to be supported on piles due to the potential for movement. Based on geotechnical investigations performed on the Riel site, pile foundations are estimated to be approximately 24 m in depth. … In addition to the ancillary buildings, there will be a requirement during operations and maintenance for temporary equipment, which may include bucket trucks, lift platforms, oil processing equipment, trailers, tanks, carts for handling of SF6 gas, and high voltage testing equipment."

3.6.2.2 230 kV ac Switchyard Expansion 3-147

"The majority of the infrastructure required for the 230 kV ac switchyard is included in the current Riel Reliability Improvement Initiative. However, expansion of the switchyard will be required as part of the Bipole III Project. … The expansion will also include installation of additional equipment within the control and switchgear buildings, and additions to the auxiliary power distribution system within the station site. … Additional equipment, including ac circuit breakers and instrument transformers, will also be installed in the existing switchyard bays to allow connection of the HVdc converter equipment, ac filters, synchronous condensers, and transmission line terminations. Switchyard expansion will include concrete foundations, steel structures, equipment supports, cable trenches and cable ducts. Equipment foundations will range from concrete slab-on-grade to deep-piled foundations, depending on equipment weight and geotechnical conditions. Steel structures will be placed on the foundations and will support electrical apparatus and electrical conductors and hardware associated with the switchyard and transformer functions. Station service transformers and other equipment supports will also be located on concrete foundations…. Detailed numbers and ratings of the electrical apparatus located within the expanded switchyard are subject to final design. Principal electrical components are described in the following subsections:"

230 kV ac Circuit Breakers and Disconnect Switches 3-148

"Approximately 22 three-phase 230 kV circuit breakers are required for the ac switchyard expansion. Each breaker will contain approximately 75 kg of insulating gas, comprised of approximately 50% SF6 and 50% CF4 or N2."

Station Service Transformer 3-148

"Station service transformers are required to serve the auxiliary power requirements of the converter … Auxiliary power requirements include electrical loads such as building heating and cooling, process cooling systems, lighting, and various other support systems …The station service transformer will contain approximately 35,000 litres of insulating oil."

Instrument Transformers 3-148

"… The 230 kV ac switchyard expansion will require approximately 60 single phase voltage transformers, each containing roughly 100 litres of insulating oil, and approximately 114 single phase

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current transformers, each containing roughly 200 litres of insulating oil."

ac Harmonic Filters 3-148

"Harmonic filters (see Figure 3.5-3) are required due to the ac current harmonics generated in the process of converting dc power to ac power. These harmonics could be harmful to equipment connected to the ac system if allowed to flow out of the converter station. Depending upon the conversion technology selected for Bipole III31, the ac switchyard expansion will require four three-phase ac harmonic filter banks, each of which may be comprised of up to three sub-banks. … Approximately 1100 capacitors, each containing approximately 16 litres of insulating fluid, will be required for each ac harmonic filter bank."

Surge Arrestors 3-149

"Surge arrestors provide protection to ac switchyard components from abnormally high voltages induced from lightning. Surge arrestors are comprised of porcelain or composite materials, and are similar in appearance to insulators (see Section 3.6.2.2)."

Insulators 3-149

"Insulators are non-conducting posts (porcelain or composite) used to support energized equipment and hardware in the switchyard. Insulators are typically placed on the top of steel equipment support structures, but may also be placed directly on equipment foundations."

Control Buildings 3-149

"… the four control buildings, developed for the 230 kV ac switchyard as part of the Riel Reliability Improvement Initiative, will require installation of additional control, protection and communications equipment for the operation of the additional switchyard facilities. Additional cabling will also be required …"

Switchgear Buildings and Auxiliary Power Distribution 3-150

"Although no additional switchgear buildings will be required for the Bipole III Project, the two switchgear buildings developed for the Riel Reliability Improvement Initiative will require the installation of additional circuit breakers and control and protection electronics in order to provide auxiliary power from the new station service transformer to the converter station and synchronous condenser electric power loads. … The transformers may be oil-filled, each containing approximately 2,200 litres of insulating oil. Indoor power centers …, typically utilize dry type transformers which do not contain insulating oil. It is anticipated that up to four outdoor and eight indoor power centers will be required for Riel Converter Station."

3.6.2.3 Converter Transformers 3-150

"The 230 kV ac switchyard will be electrically connected to the converter transformers. …converter transformers provide an interface between the dc voltages in the valve groups and the ac voltages in the 230 kV switchyard. The Riel Converter Station will require up to 14 new converter transformers for the conversion of dc to ac power, … Similar to the Keewatinoow Converter Station, the final design of the Riel converter transformers will depend on such factors as the HVdc system configuration, converter building size and layout, ac filtering and reactive power compensation requirements. … The principal components of individual converter transformers are the tank, which includes the transformer core and copper windings, transformer bushings, and oil cooling radiators and fans. The converter transformers are filled with insulating oil for electrical insulation and heat transfer purposes. Insulating oil is circulated between the tank and the cooling radiators, where excess heat is transferred to the air. Each converter transformer (see Figure 3.5-4) will contain approximately 115,000 litres of insulating oil. Due to the volume of insulating oil in each transformer, the design will incorporate primary oil containment (see Section 3.6.2.1)."

3.6.2.4 Converter Building 3-151

"The layout of the converter building at the Riel site will be consistent with the design of the Keewatinoow converter building. The building will comprise four valve halls; … Each valve hall will be approximately 20 metres high and, depending on the conversion technology selected for Bipole III32, be between approximately 1,200 and 5,000 m2 in size. The valve hall environment is closely monitored and controlled for air quality, operating temperatures, and fire detection. The valve halls are electrically shielded to prevent high frequency signals (also called noise) from either entering or leaving the room. In addition to the valve halls, the converter building will also include one or more service areas and auxiliary equipment areas."

Valve Groups 3-152

"Bipole III will consist of two poles, one energized at +500 kV dc, and the other at - 500kV dc. Each pole will be energized by two valve groups, … The valve groups convert dc power into ac power though high speed coordinated switching of solid state power electronic devices. Two HVdc conversion technologies are presently being considered for Bipole III; conventional line-commutated (LCC) technology, and newer voltage-source converter (VSC) technology." [MWL: See footnote 33].

"The power electronics components are liquid cooled using a closed-loop cooling system located outside the valve hall. …The cooling systems typically use an ethylene glycol/water mixture as the cooling medium. Each of the four valve group cooling systems will typically contain 14,000 litres of the coolant mixture."

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Control Room and Ancillary Converter Building Facilities 3-152

"Operation of the electrical apparatus within the converter station will be monitored and controlled from a control room …"

3.6.2.5 dc Switchyard 3-153

"The Riel dc switchyard will provide a controlled path for dc power to pass from the Bipole III HVdc transmission line to the valve groups located within the converter building. A typical dc switchyard is illustrated in Figure 3.5-7. …."

dc Wall Bushings 3-153

"The dc wall bushings provide a transition between the converter building valve halls and the dc switchyard area. Approximately eight solid composite dc wall bushings will be required."

Switchgear 3-154

"Switchgear is needed to control the flow of dc power within the dc switchyard. Modern high speed dc switches, similar in operation and appearance to ac circuit breakers (as described in Section 3.6.2.2) use a hermetically sealed mixture of sulphur hexafluoride (SF6) and carbon tetraflouride (CF4) or nitrogen (N2) gases as the insulating medium inside the switch. Approximately 13 high speed switches will be required for the dc switchyard. Combined, these switches will contain a total of approximately 400 kg of SF6 and 120 kg of CF4 or N2 gas."

dc Filter Banks 3-154

"Filter banks, as illustrated in Figure 3.5-8, are comprised primarily of capacitors and reactors, and provide attenuation of voltage harmonics generated by the valve groups. A total of six dc filter banks are anticipated for the dc switchyard. Each filter bank will contain approximately 2,800 litres of insulating fluid within the filter capacitors."

dc Voltage and Current Measuring Devices 3-154

"Monitoring and control of the Bipole III HVdc system will require dc voltage and current measurement devices to be installed within the dc switchyard. Approximately 19 dc current measuring devices and eight dc voltage measurement devices will be required. Each voltage divider will contain approximately 66 kg of SF6 insulating gas."

dc Smoothing Reactors 3-154

"Smoothing reactors, as illustrated in Figure 3.5-9, are comprised of one or more air insulated copper coils. The reactors are required for attenuating voltage and current harmonics on the Bipole III HVdc

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transmission line."

Surge Arrestors 3-154

"Surge arrestors provide protection to ac switchyard components from abnormally high voltages induced from lightning. Surge arrestors are comprised of porcelain or composite materials, and are similar in appearance to insulators (see Section 3.6.2.2)."

Insulators 3-154

"Insulators are non-conducting posts (porcelain or composite) used to support energized equipment and hardware in the switchyard. Insulators are typically placed on the top of steel equipment support structures, but may also be placed directly on equipment foundations."

3.6.2.6 Synchronous Condensers 3-155

"Planning studies have identified that, subject to further study and final selection of the technology for the conversion process35, four 250 MVAr synchronous condensers may be required for the Riel converter station. If required, the synchronous condensers would serve to provide reactive power compensation, to control the 230 kV ac switchyard bus voltage, and to enhance performance of the Bipole III HVdc system. … A hydrogen gas storage and distribution system common to all the synchronous condenser machines will be required to support operation and maintenance activities."

Synchronous Machines 3-157

"Each synchronous machine will be comprised of a stationary body, referred to as the stator, and a rotating body, referred to as the rotor. … The stator and rotor assembly will operate in a pressurized gas environment. Hydrogen gas is utilized as it provides superior cooling capabilities and reduces power losses. A near pure hydrogen gas concentration is maintained during normal operation in order to minimize the risk of explosion. For maintenance, a two stage gas evacuation process is required. Hydrogen is first displaced from within the machine using carbon dioxide; air is then used to displace the carbon dioxide gas. The process is reversed to ready the machine for operation. Each synchronous machine will require concrete piles and a concrete foundation to support the static and dynamic loading. The machine foundation will likely be integrated with foundation design of the associated buildings. Each synchronous machine will weigh approximately 355 tonnes and be approximately seven metres in height, seven metres in width, and 11 metres in length."

Mechanical Support Systems 3-157

"Each synchronous condenser will require its own mechanical support system to provide cooling, lubrication, and control of the hydrogen gas. The mechanical support system is typically comprised of a water/ethylene glycol cooling system, a lubricating and jacking oil system, a hydrogen seal oil system, and a hydrogen gas system. The water-glycol cooling system provides cooling for the synchronous

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condenser machine and the oil-filled mechanical support systems. … Each machine will contain approximately 14,000 U.S. gallons of waterglycol mixture (approximately 53,000 litres). … The oil is contained in an oil storage tank, where it is circulated by the electric pumps to the bearings inside the machine. Oil from the bearings is returned to the oil storage tank through the lubricating oil heat exchanger. Each lubricating and jacking oil system will contain approximately 2,500 litres of oil. The hydrogen seal oil system provides a gas-tight environment within the stator enclosure, by creating a seal consisting of a highly pressurized oil film between the rotor shaft and stator frame. The system consists of high pressure pumps, pressure regulating valves, an accumulator tank, an oil storage tank, valves, piping and fittings. A typical hydrogen seal system will contain 600 litres of oil. Continuous monitoring and control of the hydrogen system will ensure gas purity, leak detection, and containment. Any high gas concentrations detected by the system sensors are used to annunciate alarms and to start the ventilation system."

Electrical Support Systems 3-158

"…The excitation transformer will contain approximately 500 litres of insulating oil. The auxiliary power supply system controls and distributes the ac and dc power needed to support synchronous condenser operation. The ac power is provided from the converter station switchgear building to each machine's medium voltage switchgear through a step-down transformer and on to the various support systems. The dc power is provided from battery banks located within each machine's control building. Approximately 1,300 litres of battery acid will be contained within the battery banks."

Synchronous Condenser Unit Transformers and Switchgear ………………... 3-159

"Each synchronous condenser will require a unit transformer to connect the synchronous machine to the 230 kV ac switchyard. … The unit transformers are filled with insulating oil for electrical insulation and heat transfer. Each will contain approximately 68,000 litres of insulating oil. A point source spill containment system, as described in section 3.6.2.1, will provide protection against leaks and spills."

Synchronous Condenser Buildings 3-159

"Each synchronous condenser will have a separate single storey building or buildings to house its electrical and mechanical support systems. Buildings will be designed to comply with all local and National Building Code requirements. Building systems will include fire detection and water based fire suppression, hydrogen detection and ventilation systems, lighting, heating and cooling, security and communications."

Auxiliary Systems 3-159

"As indicated previously, each synchronous condenser is expected to use hydrogen gas for cooling during normal operation, and carbon dioxide as a purging gas for maintenance requirements. … Hydrogen gas will be stored at a central location in the dc switchyard at the Riel Converter Station. The hydrogen gas will be delivered to the site in a mobile storage tanker. The capacity of the two storage

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vessels proposed at site the will be approximately 2,400 mÑ. The gas will be distributed through a piping system to each synchronous condenser at a pressure of approximately 100 psig. The supply pressure is reduced to approximately 30 psig at each synchronous machine. The hydrogen gas distribution system will be designed to conform to NFPA-55, Compressed Gases and Cryogenic Fluids Code. …The carbon dioxide gas is stored in liquid form. The gas storage vessel will be located in the dc switchyard adjacent to the hydrogen gas storage vessels. The distribution of carbon dioxide will be through a piping system. The carbon dioxide will be delivered to site in tanker truck."

3.6.3 Riel Ground Electrode 3-160

"As outlined in previous sections, the neutral bus in the Riel Converter Station dc switchyard will be connected to the station ground electrode site by a low voltage overhead line."

3.6.3.1 Low Voltage Electrode Line 3-160

"The function of the low voltage electrode line is to provide a low resistance connection between the neutral bus in the dc switchyard and the ground electrode site. During normal operation (i.e., bipolar operation) of the converter station, the electrode line will carry very low levels of current between the station and the ground electrode. However, during maintenance or emergency outages, the electrode line will carry current equal to the amount of current on the HVdc transmission line (monopolar operation). The low voltage electrode line between the dc switchyard at the converter station and the Riel electrode site will be an overhead line. The design of the electrode line will closely resemble that of the existing Bipole I and II electrode lines at Dorsey Station. The structures will be similar in size to those on the distribution power lines common along roadsides in rural Manitoba. It is anticipated that it can be routed on existing road or other rights-of-way. The preferred route for this line is currently being determined. Adjacent land owners and the RM of Springfield will be notified of its proposed location prior to route finalization."

3.6.3.2 Ground Electrode 3-162

"The function of the ground electrode is to provide a return path for current between the Riel and Keewatinoow converter stations. During normal operation (bipolar operation) of the Riel Converter Station, the ground electrode will conduct very low levels of current. However, during some maintenance or emergency outages at either converter station, the ground electrode will conduct current equal to the amount of current on the HVdc transmission line (monopolar operation). Pending confirmation of detailed design criteria, the ground electrode will be a shallow electrode—comprised of four rod segments in a ring configuration, … embedded in a highly conductive coke bed (see Figure 3.5-11). … Although the preferred site has promising soil moisture attributes, the electrode will be equipped with an underground irrigation system to provide for significant change in soil moisture or drought events. The underground irrigation system will be installed in or above the coke bed and will be fed from wells located on site. … Alternatively, a vertical well electrode could be selected for the electrode design if, during the detailed resistivity surveys phase, it is recognized that lower resistivity soil is found at deeper depths."

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3.6.4 Riel Converter Station and Ground Electrode Construction 3-163

"Originally scheduled for completion in spring, 2014, the current Riel Reliability Improvement Initiative is now anticipated to be in service in 2015. With its completion, and prior to licensing and construction of the Bipole III Project, the Riel site will generally have been graded, fenced, aesthetically bermed, and provided with lighting and security systems, and will include extensive electrical apparatus in both the 230 kV and 500 kV ac switchyards. … site preparation and infrastructure construction will have been completed in the course of the Riel Reliability Improvement Initiative, construction activities for the Riel Converter Station development will principally involve: final site preparation at the specific sites of the Bipole III facilities; construction of building and equipment foundations; and erection of buildings and structures. Assembly and installation of station apparatus and equipment, including the synchronous condensers, will follow, and will include filling of equipment with insulating oil, construction clean-up and commissioning. Development of the ground electrode and its connecting line will entail more conventional procedures, including site preparation and installation of the electrode and ancillary infrastructure. Construction of the connecting low voltage line will be largely confined to existing roadway rights-of way. Material required for station construction (e.g., concrete and granular fill) will generally be obtained from local suppliers (providing specific material specifications can be met) and transported to the site. Construction clean-up will occur throughout all phases of construction. … The major equipment and electrical components to be installed in the station, such as the converter transformers, valve groups and ancillary facilities, are highly specialized devices which will be designed and manufactured off-site and delivered for installation and/or final assembly by highly specialized workers. Expansion of the 230 kV switchyard is likely to be undertaken by Manitoba Hydro staff or qualified contractors with experience working in an energized yard."

3.6.4.1 Converter Station Construction Activity 3-164

"To the extent that the specific sites of the Bipole III facilities at Riel will require preparation and extension of station infrastructure systems to service the related buildings and equipment installations, the construction activity will be similar to that currently underway for the Riel Reliability Improvement Initiative. … All construction activities will conclude with the filling of insulating oils, insulating gases, battery acids, refrigerants, and other cooling mediums prior to system commissioning."

3.6.4.2 Electrode Assembly and Installation 3-165

"… shallow ring ground electrode will include land clearing; excavation of the electrode trench to a depth of approximately three metres; placement of coke bedding material; assembly of steel electrode rods; compaction of the coke bed; installation of irrigation pipes; backfilling of electrode trench; installation of feeder cables; construction of the line termination structure; and the termination of the feeder cables and electrode line to the termination structure. … An alternative design would be a vertical well ground electrode. … activities would include land clearing; drilling of electrode wells to a depth of approximately 40 m; assembly of piping and steel rods and cables; placement of the rods into

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the wellbores; pumping of water/coke slurry into the wellbore; and installation of concrete covers over the wellbores."

3.6.4.3 Construction Power 3-166

"Construction power to the Riel site, as developed during the course of the Riel Reliability Improvement Initiative, will be provided via a 5 MVA Distribution Supply Centre, fed from a tap of the existing 66 kV line running along PR207. …"

3.6.4.4 Construction Staging and Marshalling 3-166

"… a marshalling yard for tower steel will be developed on Manitoba Hydro lands in the immediate vicinity of the Riel site for support of transmission line construction requirements. … immediately north and east of the station site, in the northeast quadrant of the intersection of PR 207 and Suthwyn Road (see Figure 3.6-2). … It will occupy two former private properties acquired by Manitoba Hydro in the course of preparation for the Riel Reliability Improvement Initiative. … An existing home on that property will be redeveloped as an office; … Yard development will otherwise involve stripping of the topsoil and replacement with clay fill and a gravel surface."

3.6.4.5 Construction Access and Traffic 3-167

"Construction access and traffic arrangements will carry on from the arrangements established for development of the Riel Reliability Improvement Initiative. This will include use of the existing rail spur between the station site and the CN main line north of the site, running adjacent to the north side of PTH 15. PR 207 was upgraded by Manitoba Hydro and Manitoba Infrastructure and Transportation for the reliability Improvement Initiative to support construction traffic loads and year-round construction. Traffic studies36 have included estimates of workforce travel and shipping, by rail and road, for both Keewatinoow and Riel converter stations, as well as the HVdc transmission line. … estimated daily workforce trips during the construction period are estimated to range up to a peak during the third year of construction at 287 trips (AADT [average annual daily trips]) on PR 207 north of the site access road, and 123 trips (AADT) south of the station site access road. Corresponding estimates for daily truck trips (AADTT), for transport of materials and equipment, range up to a peak of 32 trips on PR 207 to the Riel site in 2014. …. Rail deliveries will be subject to the same operating protocols and restrictions applicable to the Riel Reliability Improvement Initiative."

3.6.4.6 Construction Camp 3-168

"A residential camp will not be required for the converter station project. Workers will travel to and from the site from their residences or normal work places on a daily basis. Storage and marshalling of equipment and materials, together with offices and support facilities for Manitoba Hydro and contractor staff, will continue to be provided using Manitoba Hydro property on and adjacent to the site in arrangements similar to those used in the course of the Riel Sectionalization project."

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3.6.4.7 Construction Contract Procedures and Workforce Requirements 3-168

"Environmental approval and licensing of the Project is expected to be completed by the Fall of 2012. …on-site engineering field investigations relating primarily to the proposed ground electrode (including soil sampling, resistivity and magneto-telluric testing, and installation of thermal monitoring wells)."

Contract Procedures 3-168

"… expected to follow conventional design and construction practice."

Employment Opportunities 3-168

"The conventional contract arrangements will generally involve a relatively small component of general labour and construction trades and related employment opportunities. The contracts related to the assembly and installation of the HVdc and synchronous condenser equipment will involve a more substantial component of highly specialized workers, many of whom will be involved in both the off-site manufacture of equipment and its on-site assembly and installation."

Workforce Requirements and Schedule 3-169

"… provided in Figure 3.6-6 and Figure 3.6-7respectively. … commencement in the Fall of 2012… workforce will increase gradually from about 50 people in late 2012, to peak at approximately 260 people in the first quarter of 2014. It will continue at a relatively high level, tapering down to about 150 people by the end of 2015, and to less than 100 by the beginning of 2016. … will continue to decrease gradually, tapering off to approximately 15 people by mid-2017 as the emphasis shifts from construction to commissioning."

3.6.4.8 Solid Waste and Hazardous Materials Management 3-172

"Both hazardous and non-hazardous wastes will be generated through the course of …Wastes will be managed, collected and disposed of in accordance with current provincial and/or federal regulations. Management procedures for specific hazardous materials are detailed in the Hazardous Material Management Handbook (Manitoba Hydro 2003)."

3.6.4.9 Riel Site Area Requirements 3-172

"The proposed Bipole III development at Riel will occupy station lands which are being graded and provided with basic development infrastructure as part of the Riel Reliability Improvement Initiative. Manitoba Hydro lands adjacent to the station, where surplus to the ongoing site requirements, will be cleaned up after completion of construction and generally restored to agricultural use. …"

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3.6.4.10 Construction Clean-up and Rehabilitation 3-172

"Construction clean-up will occur throughout all phases of construction. … All non-toxic materials will be disposed of using existing, appropriately licensed local facilities. … subject to conventional Manitoba Hydro codes of practice and relevant provincial and federal legislation. All clean-up and rehabilitation activity will be subject to the requirements of the Environmental Protection Plan."

3.6.4.11 Construction Safety, Security and Emergency Response Plans 3-173

"Specific safety requirements will be stipulated in the contract packages for all construction activities. Contractors will be required to comply with current provincial occupational health and safety regulations. Development of emergency response plans and programs will include procedures to address all foreseeable situations that may occur during construction (and subsequently during station operation and maintenance). Management of environmental issues such as spills will be addressed in the Environmental Protection Plan. Spill response programs and equipment will be in place for spillage or leakage of any oils or contaminants. All materials will be stored and handled in accordance with established policies and regulations. During construction, on-site emergency response teams will receive training with respect to fuel spill containment, clean-up and other emergency measures. Transportation and handling of dangerous goods will comply with applicable legislation and regulations. Road transportation of dangerous goods will be undertaken only by appropriately licensed carriers."

3.6.4.12 Environmental Protection Plans and Monitoring 3-173

"… Riel station and electrode construction activity and operations requirements will be subject to standard environmental protection measures. … identified and cross-referenced in an Environmental Protection Plan … Adherence to the Environmental Protection Plan will be stipulated in related contract specifications."

3.6.5 Station and Electrode Operation and Maintenance 3-173

"Once completed and fully commissioned, the Riel Converter Station will be operated 24 hours a day, year round, and will have permanent Manitoba Hydro personnel on-site performing regular operation, maintenance and inspection duties. Qualified operators and maintenance personnel will routinely inspect and maintain the sites and, in the case of contingencies, correct any problems or related environmental effects. Total operations and maintenance staff has been estimated at 45 persons."

3.6.5.1 Station Operations 3-174

"The Riel Converter Station control room… provide the human/machine interface equipment for the operators to control critical functions in the station and power flow in the system. … will also be monitored and controlled remotely by Manitoba Hydro's System Control Center. …construction, maintenance and repair routines are subject to standard Manitoba Hydro procedures."

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Environmental Emissions and Discharges during Station Operation 3-174

Electric and Magnetic Fields and Corona

"As in the case of the connecting transmission lines, operation of the converter station electrical equipment will involve the production of electric and magnetic fields (EMF) and corona discharges. The level of these will vary with time, subject to operating mode and loading conditions and, as well, to final station design and equipment selection, and such external considerations as meteorological conditions. Estimated levels of these emissions are generally based on mathematical modeling and on comparison to corresponding levels associated with other similar facilities in the Manitoba Hydro system. Concerns respecting potential environmental effects (e.g., health effects, electrostatic and electromagnetic induction effects, etc.) arising from EMF and corona emissions were raised in the course of the public consultation program for the project. These concerns, together with assessment of any potential effects and related mitigation measures, are discussed in later sections of the Environmental Impact Statement. Studies have been conducted to model the electric and magnetic fields associated with operation of the ground electrode and its connecting low voltage line, as well as the prospect of audible or radio/television frequency noise arising from operation of the electrode line. … Detailed study results are provided in the associated technical reports, and are discussed elsewhere."

Other Emissions and Discharges

"Apart from EMF and corona-related emissions, station operation will involve a variety of other emissions, discharges and activities. Most have been previously discussed in descriptions of the station components."

Audible Equipment Noise

"Audible noise levels arising from station equipment operation will be subject to final design and equipment selection, but will comply with applicable provincial regulations and guidelines."

Solid Waste and Hazardous Materials Management

"Station operation will entail the use of several controlled materials, in particular ethylene glycol, refrigerants, battery acid and, depending on the selected converter technology and the requirement of synchronous condensers, hydrogen."

Ethylene Glycol

"The valve groups within the valve halls generate heat during operation. This heat must be dissipated quickly and efficiently in order to protect the critical electronic components. The removal of heat is performed by a cooling system which circulates a de-ionized water-glycol solution through a system of manifolds and pipes. Although the probability of leaks in the system is low, the system is closely

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monitored to ensure proper operation."

Refrigerants

"Mechanical cooling, where required, will involve conventional HVAC design with a compressor and refrigerants. All refrigerants will be subject to environmental specifications in accordance with ASHRAE guidelines."

Battery Acid

"Batteries are required to power critical communications, control and protection systems in the station. … banks are housed in separate rooms designed to minimize risks associated with fire and to contain any potential leaks. Sulphur Hexaflouride (SF6) and Carbon Tetraflouride (CF4) High voltage electrical apparatus such as circuit breakers and bushings typically use Sulphur Hexafluoride (SF6) as an internal insulating medium between energized and non-energized components. A blend of SF6 and Carbon Tetraflouride (CF4) or Nitrogen (N2) gas is typically utilized to prevent condensation of the SF6 gas within the apparatus and maintain adequate electrical insulation at ambient temperatures as low as -50 degrees Celsius, …"

Insulating Oil

"Insulating oil is used in power transformers and other high voltage electrical apparatus as an electrical insulator and heat transfer medium. In the case of power transformers, the insulating oil is circulated through a radiator in order to transfer heat generated from the transformer to the atmosphere."

Hydrogen

"All transportation, handling and storage of hydrogen for use in the synchronous condensers will comply with relevant regulations and guidelines."

Carbon Dioxide

"All transportation, handling and storage of carbon dioxide for use in the synchronous condensers will comply with relevant regulations and guidelines."

3.6.5.2 Ground Electrode and Ground Electrode Line Operation 3-176

"The ground electrode site will not normally be staffed. Inspection and maintenance of the electrode and the electrode line will be performed by Manitoba Hydro staff based on established frequencies and procedures. … At full load, it would be approximately 2,000 amperes, but the design will provide for up to 2,200 amperes for extra margin during contingency. … Metallic infrastructure such as underground cables, transmission line tower footings, and buried pipelines (gas, water, sewer, etc.) may be affected by the stray current, which can lead to corrosion. In addition, stray current flowing through large substation power transformers can result in excessive heating. Studies using computer models have been used to calculate stray current distribution, to analyze potential interference on buried

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infrastructure and substation transformers and to guide electrode site selection and design. Related findings are further discussed in later sections of the Environmental Impact Statement."

3.6.5.3 Workforce Requirements 3-177

"It is currently estimated that a total of 45 Manitoba Hydro staff will be employed at the Riel Converter Station. Related employment opportunities will include staff positions for power supply workers (multi-skilled), operators, electrical and mechanical technicians, and maintenance utility workers."

3.6.6 Riel Decommissioning 3-177

"The life span of converter station facilities is normally considered to be in the order of 50 years. However, converter station facilities are not sited and designed with a view to decommissioning. As individual station components fail, replacement will normally be made with equivalent new equipment or facilities. … The station facilities, given their role and function, are considered to be effectively permanent. In the extremely unlikely event that the facility was to be decommissioned, the process would be subject to development and approval of appropriate procedures … The overall objective of any decommissioning plans would be to restore the station site to a condition consistent with the future intended use of that site."

3.6.6.1 Project Schedule 3-178

"… proposed to be in-service by October 2017. To achieve this, construction will need to commence in the Fall of 2012 at the Keewatinoow site to provide construction power and enable related station work. … Crown land reservations, easement agreements and any other project-related property arrangements, permits, etc. are targeted to be secured prior to construction commencement in the Fall of 2012, contingent upon license receipt. Clearing for the HVdc transmission line in the northern portion of the project is proposed to occur generally between November/December and March/April of each of the winters between 2012 and 2016. Line Construction in the north and central line segments would take place in the winter periods of 2013-2014 through 2016-2017. Clearing and construction in the southern portion of the line (central and southern segments) will not be restricted to winter months. Clearing will be undertaken in 2013 through 2016; construction will occur in the period 2014 to 2016. The four years of northern HVdc line construction are expected to involve sections of approximately 200 km in length, more than one of which could be under construction in a given year. … "

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"The purpose of this chapter is to describe the approach, direction and methods used for the assessment process for the Project. This includes a description of the Site Selection and Environmental Assessment process (Section 4.2), as well as descriptions of the approach used to assess cumulative effects (Section 4.3), and the proposed environmental monitoring and protection measures (Section 4.4)."

"At this time, there is no timetable for ultimate decommissioning of the Project. If project components were to be decommissioned, the earliest timeframe would be approximately 50 years from now. For this amount of time into the future it is not feasible to provide meaningful assessment of the likely decommissioning plans or their effects. "

"The SSEA study for the Project began with the definition of a general regional study area (the Project Study Area) that reflected the basic functional requirements of the Project HVdc transmission line and converter stations (see Chapter 3), and was sufficiently broad and representative to allow identification of several alternative routes and sites (see Chapter 1, Map 1-1)."

"In order to describe the various Project components and their spatial and environmental context, several spatial scales of study area were developed. … Following delineation of the Project Study Area, environmental information about its physical and biological characteristics such as atmosphere, soils and terrain, vegetation, wildlife and aquatic species/habitat, and socio-economic characteristics such as the locations of communities, heritage resources, etc. were assembled from existing information in order to develop an understanding of the area. … Due to the spatial scope of the Project Study Area, the majority of research at this phase was done by remote sensing or "desktop" studies (maps, literature studies, etc.). … Manitoba Hydro has established an understanding of the environmental issues and concerns associated with development of transmission facilities, as well as from the EACP, Aboriginal Traditional Knowledge (ATK) and Key Person Interviews (KPIs) respecting possible environmental issues—constituting both constraints and opportunities. … Environmental/socioeconomic issues were examined in the context of technical (engineering) constraints such as, where feasible, minimizing routing through major waterbodies, extensive areas of deep peat and widespread permafrost areas, or minimizing the line length, maximizing separation from the existing Bipole I and II HVdc transmission lines, and minimizing the use of heavy angle structures."

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4.2.3.2 Local Study Area & Project Footprint 4-7

"The Local Study Area is used to describe the 4.8 km (three-mile) wide band centred on the alternative routes for the Project HVdc transmission line (i.e., 1.5 miles on either side of the centreline of the right of way) and the area immediately surrounding the Project components, including the ac collector transmission line rights-of-way, the converter stations and ground electrodes, and the electrode lines between the stations and the electrodes. The right-of-way is used to describe the Project Footprint for the transmission lines and electrode lines. The Project Footprint is also used to describe the physical space occupied by the Keewatinoow and Riel converter stations and ground electrodes, and associated Project components (e.g., the Keewatinoow construction camp and construction power station)."

4.2.4 Consultation 4-7

"Four rounds of public consultation were held for the Project (see Figure 4.2-1). Rounds 1 and 2 focused on providing an introduction to the Project, and identifying potential features/constraints, and opportunities to assist in identifying alternative routes for the Bipole III HVdc transmission line. Round 3 activities focused on presenting a comparison of the alternative routes for the HVdc transmission line, and receiving input on these alternatives to assist in identifying a preliminary preferred route for the line. Round 4 provided an opportunity to review the alternative route evaluation findings, and the preliminary preferred route, and to provide input on potential effects and mitigation measures for the route. … From the outset of the Project planning process, Manitoba Hydro identified meaningful engagement with Aboriginal communities and incorporation of Aboriginal perspectives, including ATK, as important components of Project planning and the SSEA process. To recognize and address the unique rights and interests of Aboriginal communities, potentially affected publics in the Project Study Area were divided into Aboriginal and non-Aboriginal groupings. The EACPs for both were carried out separately, but coordinated over the same time frames, which allowed consultation activities to recognize the diversity and unique nature of various stakeholders from both a cultural and physical geographic perspective."

4.2.5 Route and Site Selection 4-8

"The alternative routes and sites selected avoided sensitivities where possible, and sought to minimize potential effects where avoidance was not possible or practical."

4.2.6 Selection of Valued Environmental Components 4-9

"The following list explains the relationship between the broadest environmental components (biophysical and socio-economic), their subcomponents, and how the VECs (shown in parentheses) are organized for the assessments described in Chapter 8:

Biophysical Environmental Components

- Terrain and Soils (soil productivity, stable terrain)

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- Air Quality and Climate
- Groundwater (aquifer productivity, groundwater quality)
- Aquatics (surface water, fish habitat)
- Terrestrial ecosystems and vegetation (plant species and communities of conservation concern, grasslands/prairie areas, plant species)
- Mammals and habitat:
    - Ungulates – (Coastal and barren ground caribou, boreal caribou, moose, elk)
    - Furbearers – (American marten, beaver, wolverine)
- Birds and habitat:
    - Waterfowl and waterbirds (mallard, sandhill crane, yellow rail)
    - Colonial waterbirds (great blue heron, least bittern)
    - Birds of prey (bald eagle, ferruginous hawk, burrowing owl, short-eared owl)
    - Upland game birds (sharp-tailed grouse, ruffed grouse)
    - Woodpeckers (pileated woodpecker, red-headed woodpecker)
    - Songbirds and other birds (olive-sided flycatcher, loggerhead shrike, Sprague's pipit, golden-winged warbler, Canada warbler, rusty blackbird)
- Amphibians, Reptiles:
    - Amphibians (plain's spadefoot toad, wood frog, northern leopard frog)
    - Reptiles (red-sided garter snake, northern prairie skink)
- Terrestrial invertebrates:
    - Invertebrates (Dakota skipper, ottoe skipper, uncas skipper)
- Socio-economic Environmental Components:
    - Land Use
        - (Land Tenure and Residential Development)
        - (Private forestlands)
        - (Aboriginal lands) [meaning Reserve Lands, Treaty Land Entitlements])
        - (Designated Protected Areas and Protected Areas Initiative)
        - (Infrastructure)
        - (Agricultural land use/productivity)
    - Resource Use
        - (Commercial Forestry)
        - (Commercial Fishing)
        - (Mining/Aggregates)
        - (Trapping)
        - (Recreation and Tourism)
        - (Domestic resource use)
    - Economy
        - (Economic Opportunities)
    - Services
        - (Community Services)
        - (Travel and Transportation)
    - Personal, Family and Community Life
    - Public Safety

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- (Human Health)
- (Aesthetics)
- Culture and Heritage Resources (Culture and Heritage Resources)"

4.2.7 Data Gathering 4-11

"Three primary sources of information have been used to conduct the environmental assessment of the proposed Project. These are as follows:

- Existing published literature and unpublished information (biophysical and socio-economic) collected and synthesized during the study area characterization phase of the process;

- Information provided through Project-specific research activities, including field studies conducted to address known or expected gaps in the data. In some cases, additional research and monitoring activity will follow Project approval and securing of rights-of-way (e.g., detailed field reconnaissance and identification of site-specific avoidance or mitigation measures as part of the subsequent EnvPPs prepared for the Project); and
- ATK and local knowledge provided by residents, resource harvesters and other users, and by members of First Nations and representatives from other potentially affected communities. "

4.2.7.1 Biophysical Data 4-12

"After the initial study area delineation and characterization process using primarily desktop information, field studies were initiated, as required, on various biophysical components, as details on the route and site selection became available."

Soils and Terrain

"Field investigations, including aerial reconnaissance and ground truthing of select portions of the Local Study Area, were conducted to supplement existing soil resource information limitations…"

Air Quality and Climate

"Life Cycle Assessment (LCA) was used to estimate the greenhouse gas emissions (GHG) generated from the construction, land use change, operation, and decommissioning of the Project (The Pembina Institute 2011). The analysis followed the ISO 14040 life cycle standard (International Standards Organization, 2006). The results of the analysis established the life cycle GHG emissions as associated with the Project, including a summary of emissions by life cycle stage (Chapter 8, Effects Assessment)."

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Groundwater

"The approach taken to understand the current groundwater regime in the Local Study Area involved the collection, review, and synthesis of available geological and hydrological information. No field activities were conducted. … It is noted that the large scale resolution of the Project Study Area means that some small aquifers may not have been represented and assessed. Where possible, supplemental information for detailed evaluations (e.g., of Environmentally Sensitive Sites) was obtained. Despite this effort, however, there may still be some unidentified small aquifers in the Local Study Area or Project Footprint (e.g., in areas where groundwater is not presently relied upon), which will be addressed, if/where necessary, during pre-construction activities."

Aquatics

"… an assessment of fish habitat was conducted for each water course occurring within the Project area. Fish habitat quality was assessed for each water course within the Local Study Area using aerial photographs, aerial video, Google Earth imagery, existing published and unpublished information, and field studies."

Terrestrial Ecosystems and Vegetation

"The Land Cover Classification Enhanced for Bipole (LCCEB) was the primary data source used in the assessment of vegetation … Additional data sources included Forest Resource Inventory (FRI) … These data were examined in a Geographical Information System (GIS to identify vegetation types and determine ecologically important areas, locations for species of concern and calculations of vegetation cover types existing in the Local Study Area, transmission line rights-of-way, and footprints for other Project components. … Interpretation of orthoimagery and aerial reconnaissance was used for the selection of field assessment sites. The native vegetation survey consisted of establishing temporary sample plots on sites with relatively homogeneous vegetation. Data collected from the botanical field assessments were recorded. To describe the vegetation communities more succinctly all plots were classified into community types based on their plant species composition and abundances. … The search for species of conservation concern initially involved the review of a comprehensive plant list that was compiled by Manitoba Conservation for the Project Study Area as well as review of the department's online database for species listed in the province by ecoregion. Species of conservation concern included plants and communities that have special designation by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), species listed under the federal Species at Risk Act (SARA) and Manitoba Endangered Species Act (MESA), or those that are very rare to uncommon throughout their range in Manitoba, listed by the Manitoba Conservation Data Centre (MCDC). Prior to field surveys, interpretation of aerial photography assisted in identifying areas with high potential for species of concern and areas with high diversity of species, … Surveys were conducted using patterned and meander searches. Patterned searches involved walking roughly parallel transects in a search unit, while meander searches involved walking randomly through a site."

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Mammals and Habitat

"…radio-collaring of wolves and caribou, aerial transect surveys, and total counts, including both animal observation and track records, data from provincial government archives and files, historical documentation in the public record, published records in books, technical reports and the peer reviewed literature, traditional and local knowledge, direct field observations and ground transects, and photographic records obtained from both portable digital photography and fixed trail camera records. …data provided a basis for assessing species distribution and abundance within the Project Study Area. ***Particular attention was given to boreal woodland caribou due to their status and sensitivity to resource development***. …Manitoba Hydro has developed a draft internal corporate strategy that directs research and monitoring activities to address issues on the potential effects of transmission development on boreal woodland caribou. The main elements of the strategy are based on an identification and evaluation of potential threats to boreal caribou conservation. The approach undertaken was based on Environment Canada's threat assessment process used in recovery planning for species at risk. … The main elements of this strategy focused on the planning and routing of transmission lines to avoid calving and calf-rearing areas, core winter use areas, and/or other potential critical habitat. The routing of major transmission lines (including those in the Bipole III Project) includes emphasis on pre-project monitoring of specific caribou ranges to identify "critical habitat". This provides opportunities to mitigate impacts through selecting a preferred route that avoids critical habitat and sensitive areas. Specific issues addressed in this strategy include loss of forage (both direct and functional loss due to sensory disturbance), range fragmentation, increased predation, northward encroachment of white-tailed deer, and increased mortality (hunting). … This process resulted in a preferred route that avoided the majority of core winter areas and important calving and calf-rearing habitats for boreal caribou ranges found across the Project Study Area."

Birds and Habitat

"Bird studies began with desktop exercises, including a review of peer-reviewed literature, other reports, discussions with government and non-government organizations, and field surveys. … A moderate sample effort was undertaken in habitats adjacent to the Local Study Area. … A number of bird surveys were conducted in the Project Study Area, including owl surveys, raptor migration surveys, colonial waterbird surveys, water staging reconnaissance surveys, and breeding bird surveys. … Models were developed to identify the location of high quality habitat in the Local Study Area for each VEC."

Amphibians and Reptiles

"Effects of the Project on amphibians and reptiles were assessed on the basis of information obtained from published literature, government online databases, field studies, and habitat models. … The review identified and described species with distribution ranges overlapping the Project Study Area. Select amphibian and reptile species were identified as Valued Environmental Components (or VECs) in order to better assess potential impacts of the Project. … information on distribution range and habitat requirements and were used to select field sample sites, … Field work consisted of two rounds

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of anuran call surveys during peak breeding activity periods, northern prairie skink surveys using coverboards at selected sandy-soil habitat, and visual encounter surveys at selected suitable garter snake hibernacula habitat. … incidental observations were recorded from other disciplines during the course of their field studies on an opportunistic basis, and local knowledge was obtained at survey sites where available. ATK interviews were also used in further identifying sensitive areas within the Local Study Area."

Terrestrial Invertebrates

"Habitat models were developed for selected VEC species in order to aid in the identification of possible sensitive areas within the Local Study Area. These models were based on information respecting distribution range and habitat requirements, and were used to aid in the selection of field sample sites, as well as predicting habitat availability within the Project Footprint. Field investigations included sweep-net surveys and visual encounter surveys. Incidental observations were also recorded during the course of amphibian and reptile studies as well as obtained from other disciplines on an opportunistic basis."

4.2.7.2 Socio-economic Data 4-19

Land Use

"Review of land use included land tenure and residential development, private forestlands, Aboriginal lands (meaning Reserve Lands and Treaty Land Entitlements), designated Protected Areas and Protected Areas Initiative (PAI), infrastructure (aerodromes, communications facilities, rail, pipelines, roads, drains, culverts) and agricultural land use/productivity. Additional information is provided for designated protected areas and PAI, Aboriginal Lands, and agricultural land/use productivity below. Private forestlands are discussed under commercial forestry.
…
The land use data collection process involved contact with a variety of local and provincial government agencies, as well as institutional and private organizations, and searches of both published and unpublished reports and land use data sets."

Designated Protected Areas/ Protected Areas Initiative and Aboriginal Lands

"Research relating to the Designated Protected Areas and Protected Areas Initiative (PAI)1 included areas in the Project Study Area that are either currently permanently protected by legislation or under consideration for protection under the PAI. In terms of Aboriginal lands, Reserve Lands and lands identified for potential transfer or purchase under the TLE process were considered."

Agricultural Land Use/Productivity

"The agricultural component of the Project research involved identifying the types of agricultural use and prioritizing them to assist in the selection of the preferred route for the Bipole III HVdc

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transmission line. … a comprehensive study of the routing area east of the Riel site to PTH 12, south to Steinbach, west to Carman and on to Holland and PTH 34 was conducted. Thirty-four categories of routing issues/constraints were identified… Between the Riel Converter Station site and Mafeking, agriculture is the primary land use. There is also some agricultural use in the vicinity of The Pas. … The following are the general guidelines for routing transmission lines through agricultural lands: route on or adjacent to the road allowance; follow linear features where possible; route along the half mile to avoid farm yards, livestock barns, irrigation pivots and other higher priority obstacles; avoid in-field placement in cultivated lands under annual crop production. Route placement parallel to the section-township-range survey system is preferred to diagonal placement from an agricultural perspective."

Resource Use

"Resource use studies were undertaken on commercial forestry, commercial fishing mining/aggregates, wild rice harvesting, trapping, recreation and tourism, and domestic resource use. Information on mining/aggregates, wild rice harvesting, trapping and recreation/tourism was gathered as part of the land use research as described above."

Commercial Forestry

"The effects of the Project were quantified for the commercial forestry VEC. Manitoba Conservations' Forest Damage Appraisal and Valuation guide was used to estimate compensation for productive forestland loss, dues on standing timber affected and effects on forest management investments. Environmentally sensitive sites that may be at risk of being damaged during the construction, operation and maintenance phases of the project have been identified and mitigation measures prescribed."

Commercial Fishing

"The assessment of commercial and recreational fishing within the Project Study Area was based upon existing information on resource use within water bodies in the Project Study Area. … This included a review of commercial fishing quotas and bait fishing licenses from Manitoba Water Stewardship Fisheries Branch. The Manitoba Fisheries Inventory and Habitat Classification System (FIHCS) … The data sources focused on larger water bodies with fish populations capable of supporting significant commercial and recreational fisheries."

Domestic Resource Use

"Information on domestic resource use, which includes hunting, fishing and gathering, was collected from a variety of sources including published and unpublished literature. This included information for the Project Study Area compiled from an analysis of the ATK studies (Project workshops and self-directed) through the Bipole III ATK process, Key Person Interviews (KPIs) and the EACP for the Project. Trapping was addressed separately as a component of Resource Use as noted above. The various sources also provided information on the potential effects from the Project specifically, as well as other potential effects identified through other similar projects. Information on domestic resource

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use was compiled and mapped in terms of polygons (areas where domestic resource use activities occur) and lines (trails, etc. used to access the resource)…"

Economy

"… an economic impact report was prepared for the Project which involved assessing the economic impacts of the construction and operations of the Project in terms of direct expenditures that would be made, and secondary impacts that would be expected from the direct expenditures. The economic modelling framework used for estimating these economic impacts is the Manitoba Bureau of Statistics' Input-Output model. …the model provided estimates of direct, indirect, and induced impacts of the Project on the economy of Manitoba and Canada. In determining the economic impact, there were two major purchasing categories considered: local purchases and non-local purchases, the latter of which would represent a loss to the local economy."

Services

"In order to assess the transportation and travel impacts associated with the Project, an understanding of existing conditions and base data was required. This included obtaining the most recent traffic data on the provincial network, reviewing historical collision data on the roads most likely to be affected by the project, reviewing existing roadway constraints such as truck weight limitations and critical bridge dimensions, and highlighting any infrastructure improvements that are currently underway or identified on the transportation network. Identifying all existing roadway, air and railway infrastructure likely to be impact by the additional demand was also a key component of understanding the study area and the scale of the Project. … The next was to estimate the traffic and travel demand likely to be generated by the Project. … By using this information and road weight restrictions for the provincial road network, anticipated truck and rail car (for the heavier electrical items) volumes for the duration of the Project were estimated. The anticipated workforce traffic volumes were estimated by adopting travel patterns and characteristics relevant to each Project component and considered possible worker origin, place of residence, mode choice, duration of stay, and trip purpose. …recommendations for mitigating its impact on the operation, safety and efficiency of the transportation network were made."

Personal, Family and Community Life

"Socio-economic baseline data including statistical data on population and demographics, dwellings, education, labour force, income, and industry and occupations, were collected … Information relating to community services and local infrastructure including hospitals, hotels, and community services was obtained from Government of Manitoba departmental websites for the Project Study Area. … the information was also used to generate population projections for communities near the Final Preferred Route."

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4.2.7.3 Culture and Heritage 4-26

"Assessment of culture and heritage within the Project Study Area was conducted using a variety of anthropological and archaeological data collection methods. The cultural assessment was conducted partially through the ATK workshop studies where standard anthropological techniques of interviewing and memory mapping were applied; and content analysis of the results of the interview process using Ethnography. Particular attention was paid to nine cultural indicators based on universal values established by United Nations Education Scientific and Cultural Organization (UNESCO). … In addition to the above, reports of the self-directed studies conducted by six First Nations and the Manitoba Metis Federation were used where possible to add to the interpretation of culture."

4.2.8 Identification and Assessment of Environmental Effects 4-27

"Various categories of environmental effects are identified in the environmental assessment, including adverse and beneficial, direct and indirect, and cumulative effects of the Project. … [MWL: Footnote 3] According to the Canadian Environmental Assessment Agency (1994) an environmental effect is a change in the environment caused by a project, or a change to a project caused by the environment. [MWL: Footnote 4] Direct effects are caused by a project itself (e.g., by transmission line construction activities such as land consumption, removal of vegetation, and severance of farmland). The removal of granular material from a borrow pit for use in access roads is an obvious direct effect. In this case, the land area in which the borrow site is located has been directly affected by activities associated with the project. [MWL: Footnote 5] Indirect effects (also known as secondary, tertiary and chain effects) may also be associated with a project. Examples include degradation of surface water quality by the erosion of land cleared as a result of a new right-of-way, or changes in the pattern of resource harvest activities arising from increased access opportunities along newly cleared rights-of-way. … Once all the effects on VECs were identified, their characteristics were described, relative importance determined and potential magnitude estimated. … Both adverse environmental effects and potential beneficial effects were assessed on VECs. Environmental effects were expressed quantitatively to the extent possible. … Environmental effects are discussed by VEC and Project component (Chapter 8). Environmental effects on each VEC are described to the extent feasible according to the following:

- Characteristics that are subject to change by the Project component activities;
- Measurable parameters/variables (i.e., changes in environmental indicators expressed in quantitative terms to the extent possible);
- Environmental effects (i.e., predicted change in the environment caused by the Project); and
- Proposed mitigation measures (i.e., measures to avoid, minimize or sometimes compensate for adverse environmental effects), residual environmental effects (i.e., resultant changes in the environment after application of mitigation measures) caused by the Project, significance evaluation of such residual effects, and cumulative effects assessment, are discussed in the following sections.

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4.2.9 Identification of Mitigation Measures 4-29

"…mitigation measures were identified as an integral part of the Project design, site and alternatives routes selection and evaluation process … Mitigation measures for the Project derive as well from established standards and practices for transmission design and construction and from corresponding Manitoba Hydro corporate policies and procedures. ... The objectives of mitigation is related to the Project includes the following:

- Find better alternatives and ways of doing things;
- Enhance the environmental and social benefits of a proposal;
- Avoid, minimize or remedy adverse effects; and
- Confirm that residual effects are kept within acceptable levels.

Mitigation measures were applied throughout the SSEA process (including the design, route and site selection and evaluation process) and later when assessing the final routes and sites. Their application included the following:

- Effect Avoidance - This is most effective when applied at an early stage of project planning. For the Project, this was primarily achieved during the route selection and evaluation process, and through Project design measures.
- Effect Minimization - This is usually taken during effect identification and prediction to limit or reduce the degree, extent, magnitude, or duration of adverse effects. For the Project, this was an ongoing process through all phases of the planning process.
- Effect Compensation - This is usually applied to remedy unavoidable residual adverse effects. This resulted in development of landowner compensation policy and trapper compensation policy to compensate for unavoidable effects.

Mitigation measures were identified where feasible for all adverse environmental effects. Generally, mitigative measures have been identified to reduce negative effects during all phases of Project development. … A detailed description of the potential impacts and mitigative measures is provided detailed in Chapter 8. … Based on previous project experience, Manitoba Hydro has developed a well-established set of standard mitigation measures that has been developed over time through input from engineers, contractors, environmental specialists, regulators and the general public. This EIS builds on this experience and extends to identification and commitment to an ongoing program of environmental protection during the various phases of project development. … Unavoidable effects that cannot otherwise be mitigated may require the implementation of compensation measures."

4.2.10 Residual Effects Significance Evaluation 4-31

"Residual environmental effects are environmental effects remaining or predicted to remain after mitigation measures have been applied. The assessment approach for the Project describes both positive and adverse predicted residual environmental effects and evaluates their significance. A more detailed discussion on the effects on the environment as a result of the Project is included in Chapter 8.

…

In discussing significance of environmental effects, the EIS Scoping Document specifies that "the significance of the residual environmental effects of the proposed Project will be evaluated based on best and current practices, and will use a pre-determined significance evaluation framework…" … the

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significance approach framework adopted for the SSEA was guided by the *Canadian Environmental Assessment Agency Practioners Guide* (1994). …

VEC using one overall significance evaluation framework that included the following factors:

- **Direction or Nature of the Effect** …
- **Magnitude -** …
- **Geographic Extent** - …
- **Duration -** …
- **Frequency** - …
- **Reversibility** - …
- **Ecological Importance** - …
- **Societal Importance** - …

The assessment of environmental effects also includes consideration of uncertainty. The level of uncertainty is a condition resulting from the adequacy of scientific information. Certain effects are easily predicted with a high level of certainty while other effects are unknown until they occur. … Although both positive and negative environmental effects of the Project are assessed, the SSEA focuses on assessing the significance of potential negative or adverse environmental effects of the Project on VECs. … For "potentially significant" and "significant" effects, initially ranked on the above basis, it is relevant to consider other significance criteria such as frequency, reversibility, and ecological/socio-economic importance or resilience. … Conversely, thresholds or guides may identify highly vulnerable environmental VECs where the loss of even a few individuals may affect the long-term status of the population. For socio-economic VECs, additional factors that may need to be considered include concurrent effects on other socio-economic VECs affecting the same group of people or others in the same community or region, effectiveness of mitigation measures and the degree to which the affected people have any control over mitigation (which may affect "vulnerability" in socio-economic terms), the extent to which the socio-economic component is affected by the Project (magnitude, frequency, reversibility of the effects), and overall confidence in the assessment after consideration of proposed mitigation measures. In the event that significant adverse effects are predicted for residual effects on VECs, the likelihood is discussed in terms of both the probability of occurrence of the significant adverse effect and the degree of "scientific uncertainty". Based on this, a conclusion is made as to whether a significant adverse environmental effect is likely. … Proposed monitoring and follow up activities as reviewed in Chapter 11 address, among other matters, management plans to address issues of uncertainty, including uncertainty that affects determinations in the SSEA that adverse environmental effects are not expected to be significant."

4.3 CUMULATIVE EFFECTS ASSESSMENT 4-37

"Cumulative effects assessment is integral to the Project assessment approach … based on the Scoping Document, Canadian Environmental Assessment Agency (CEAA) guidance (Cumulative Effects Assessment Practitioner's Guide 1999) as well as current best practices. The approach considers those adverse residual effects of the Project on VECs … that have the potential to act in concert with the effects of other past, existing or potential future projects or human activities. VECs with no residual

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effect or a positive residual effect from the Project…, are not included in the cumulative effects assessment. Further, the cumulative effect assessment only includes VEC's with an adverse effect of the Project that overlaps both temporally and spatially with the effects of other identified projects and human activities. The full list of past, existing and future projects and human activities considered is provided in Chapter 9. … Future projects or human activities are included in the cumulative effects assessment as being reasonably foresseable where such projects or activities have already been approved and are being constructed or are planned to be constructed/carried out, or are in a planning and/or approvals process to be constructed/carried out. In addition, to be included, an identified project or human activity had to be currently defined in sufficient detail to allow effects to be characterized for cumulative effects assessment. The environmental effects of future projects not meeting these criteria were not considered."

4.4 ENVIRONMENTAL PROTECTION PROGRAM 4-38

"The EIS describes proposed monitoring activities for the effects on the physical, biological and socio-economic environments arising from project pre-construction (i.e., site preparation), construction, operation and maintenance, and eventual decommissioning (Chapter 11). The EIS also describes the process for environmental protection and identifies mitigation measures, monitoring and other follow-up actions to be implemented through an Environmental Protection Program. Manitoba Hydro's program consists of a framework for implementing, managing, monitoring and evaluating environmental protection measures in a consistent and responsible manner with regulatory requirements, corporate commitments, best practices and public expectations. Manitoba Hydro's Environmental Protection Program involves the development and implementation of Project-specific Environmental Protection Plans (EnvPPs). … A preliminary EnvPP has been prepared for the Project as part of this EIS submission … Following receipt of the required environmental license, the required content tentatively identified in the preliminary EnvPP will be finalized… The EnvPP will generally be implemented to accomplish the following goals:

- To address the terms and conditions outlined in the Environment Act License (Manitoba);
- To facilitate the mitigation of environmental effects throughout the life cycle of the Project by providing clear reporting protocols for field construction and operating personnel;
- To incorporate issues and concerns identified during the environmental assessment consultation process;
- To identify modifications to construction methods or schedules, summarize environmental sensitivities and mitigation actions;
- To provide specific information on practices to be utilized during the clearing, construction and operation and maintenance phases of the Project; and
- To monitor and where required modify clearing, construction and operation and maintenance activities to ensure that work proceeds in accordance with the EnvPP(s).

Upon final approval and completion of Project development, follow-up activities are used to verify the accuracy of the environmental assessment of a project or to determine
the effectiveness of measures taken to mitigate adverse effects. The main components of environmental protection implementation and follow-up include the following:

- **Inspection –** To oversee adherence to and implementation of the terms and conditions of

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Project approval during Project construction and operation;

- **Effects monitoring** – To measure the environmental changes that can be attributed to Project construction and/or operation and check the effectiveness of mitigation measures;
- **Compliance monitoring –** To ensure that applicable regulatory standards and requirements are being met (e.g., for waste discharge and pollutant emissions);
- **Management –** Prepare plans to address important management issues, regulatory requirements and corporate commitments (e.g., access management, emergency response, waste management);
- **Environmental auditing –** To verify the implementation of terms and conditions, the accuracy of the predictions, the effectiveness of mitigation measures, and the compliance with regulatory requirements and standards; and
- **Updating and review –** Update and finalize the draft EnvPP to include stipulated license terms, conditions and other regulatory requirements, prepare construction phase EnvPPs and operational phase EnvPPs (one for each separate project component by phase), and to annually review and update the EnvPPs to ensure their continued effectiveness."

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5.0 ENVIRONMENTAL ASSESSMENT CONSULTATION PROGRAM 5-1

5.1 PURPOSE AND OBJECTIVES 5-1

"Manitoba Hydro developed an Environmental Assessment Consultation Process (EACP) to guide the approach to consultation for the Project… The overall purpose of the EACP is to provide the public, and particularly those who may be potentially affected by the Project, with meaningful opportunities to receive information on, and provide their input into, the SSEA for the project… "

- **"Opportunities at various stages:** This includes opportunities to provide inputs: (a) when issues are being initially identified, (b) when alternative routes/sites are being considered, (c) when initial effects assessments are reviewed and ways to mitigate or enhance identified effects are considered, (d) when the EIS has been filed with regulators for review and comment, and (e) when supplemental EIS information may be filed with regulatory authorities."

"In order to fully address potential issues that may arise as a result of the large Project Study Area for the project, two broad groups were identified:

- Potentially affected communities and segments of the public in the Project Study Area; and
- Other interested groups and individuals who may be interested in the Project.

Early stage activities focused on elected officials in First Nations, Northern Affairs Communities (NACs) and municipalities in the Project Study Area. To recognize and address the unique rights and interests of Aboriginal communities, potentially affected publics in the project study area were divided into Aboriginal and non-Aboriginal groupings. The EACPs for both were carried out separately, but coordinated over the same time frames, which allowed consultation activities to recognize the diversity and unique nature of various stakeholders from both a cultural and physical geographic perspective. Listings of First Nations, NACs and incorporated communities in the Project Study Area are found in Chapter 6."

"The specific goals for the EACP for the Project were to:

- Share project information as it became available;
- Obtain Aboriginal Traditional Knowledge (ATK) and local knowledge which might assist in project planning;
- Obtain input from communities in the Project Study Area on the best way to involve the public and get their feedback into the decision-making process;
- Understand local and regional issues pertinent to the proposed project;
- Integrate issues and concerns identified by interested parties in the decision-making process; and
- Discuss appropriate mitigation measures to reduce potential negative environmental effects and maximize potential benefits of the project.

The input of government agencies was sought throughout the process…"

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5.2 METHODS 5-3

"Four rounds of public consultation were held for the Project…

[From Figure 5.2-1: Four Round SSEA Consultation Approach]
Round 1 (2008): Introduction to the Project
Round 2 (2009): Site Selection Process
Round 3 (2009/2010): Alternative Route Selection
Round 4 (2010): Preliminarily Preferred Route Selection

…Rounds 1 and 2 focused on providing an introduction to the Project, and identifying potential features/constraints, and opportunities to assist in identifying alternative routes for the Bipole III line.

Round 3 activities… focused on presenting a comparison of the alternative routes for the Bipole III line, and receiving input on these alternatives to assist in identifying a preliminary preferred route for the line. Round 4… provided an opportunity to review the alternative route evaluation findings, and the preliminary preferred route, and to provide input on potential effects and mitigation measures for the route.

The Keewatinoow Converter Station, construction power station, northern ground electrode and feeder line, as well as portions of the collector and construction power lines are located in the Fox Lake Resource Management Area (RMA) and the Fox Lake Traditional Territory. Manitoba Hydro established a Working Group process with the Fox Lake Cree Nation, based on Article 8.5 of the 2004 Impact Settlement Agreement (ISA) Between Fox Lake Cree Nation, Manitoba Hydro, and Manitoba as the means for dialogue to address the respective needs and interests of Manitoba Hydro and Fox Lake Cree Nation as they relate to the Keewatinoow Converter Station and other Project components...

It should also be noted that the Keewatinoow Converter Station and related facilities, as well as approximately 15 km of the Bipole III transmission line, are located in the Split Lake Resource Area, just outside the designated Split Lake Resource Management Area.4 A portion of the "related facilities" is located within the Split Lake Resource Management Area (along with approximately 226 km of the Bipole III transmission line). The 1992 NFA Implementation Agreement sets out processes for addressing TCN‟s rights and interests with respect to future developments. Since September 2009, Manitoba Hydro and Tataskweyak Cree Nation have been engaged in a process to reach shared understandings of the impacts of the Bipole III Project on the rights and interests of Tataskweyak Cree Nation and are currently working towards an Agreement in Principle to address a range of issues associated with the Bipole III Project. Further information is provided in Section 5.4.3.6."

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5.3 CONSULTATION ACTIVITIES 5-8
5.3.1 Meetings 5-8

"Each of the four rounds of consultation included meetings in both the Aboriginal and non-Aboriginal communities. The focus of stakeholder meetings evolved through each round of consultation, becoming increasingly site-specific… With the identification of the preliminary preferred route for the Bipole III line, the focus shifted to incorporated cities, towns, and villages, First Nations leadership, and NAC councils within 25 km (15.5 mile) of the preliminary preferred route, and to those RMs that the route traversed.

Invitations to meet with stakeholders became more narrowly focused as the SSEA process progressed through the four rounds of the EACP. However, all interested parties were presented with the project information even if they were not potentially affected by the project…"

5.3.2 Open Houses 5-9

"Open Houses were held in both the non-Aboriginal communities (Regional Open Houses) and Aboriginal communities (Community Open Houses). A total of 137 Regional and Community Open Houses were held at locations within the Project Study Area and included a Southern Ground Electrode Open House undertaken as a part of Round 4 following ground electrode site determination."
…
"At the beginning and end of each round (including the Southern Ground Electrode Open House), Manitoba Hydro assessed the status of available project information, and the type of feedback from the previous round. This assessment helped determine the type of information and the most effective means of presenting it for the upcoming round. For example, between the end of Round 3 (alternative routes) and the beginning of Round 4 (preliminary preferred route) it was thought that landowners and other stakeholders would benefit from a location map of the preliminary preferred route. Accordingly, localized topographic maps (1:50,000 scale) were sent as a part of the information packages."

5.3.3 Landowner Information Centres 5-12

"After the preliminary preferred route for the Bipole III line was identified, 40 Landowner Information Centres were held during Round 4 at locations in each RM crossed by the route. All landowners within 0.8 km (0.5 mile) of the preliminary preferred route received an informational package including a Round 4 newsletter, a preliminary preferred route map in relation to their land holdings, and a letter inviting individual landowners to attend any of the 40 Landowner Information Centres.

Landowner booklets were available at each station. The Landowner Map Booklet consisted of 130 individual maps with orthographic imagery, topographic imagery, and recent flyover imagery within 4.0 km (2.5 miles) on either side of the route."

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5.3.4 Key Person Interviews 5-13

"Key Person Interviews (KPIs) were conducted with stakeholder representatives in conjunction with Round 4 of the EACP. A total of 53 KPIs were conducted with 83 participants from RMs, towns, and villages, as well as trappers and industry representatives.

…Industry representatives that participated were predominantly those that had been involved in the EACP to date. Registered Trapline Holders were selected based on traplines in the vicinity of the preliminary preferred route."

5.3.5 Project Information Phone Line 5-13

5.4 ABORIGINAL ENGAGEMENT IN BIPOLE III PLANNING PROCESS.................. 5-14

"…From the outset of the Bipole III planning process, Manitoba Hydro identified meaningful engagement with Aboriginal communities and incorporation of Aboriginal perspectives, including Aboriginal Traditional Knowledge (ATK), as important components of the Bipole III project planning and SSEA process."

…

"Given the unique rights, interests and perspectives of Aboriginal peoples as well the logistical challenges associated with travel and engagement activities in more isolated communities, the potentially affected publics in the Bipole III project study area were split between Aboriginal and non-Aboriginal stakeholders. The EACPs for Aboriginal and non-Aboriginal stakeholders were carried out separately, but activities were coordinated over the same timeframe and stakeholder engagement activities were tracked in the same way. The Aboriginal-specific process included First Nations and NACs."

…

"In addition to use of the engagement tools described in the Bipole III Environmental Assessment Public Consultation Technical Report (letters, project website, information packages, etc.), the mechanisms used to facilitate Aboriginal engagement included: community and leadership meetings; ATK workshops conducted by the Manitoba Hydro ATK Study Team; self-directed studies; discussions with potentially affected resource users in the vicinity of the alternative and preferred routes; bilateral discussions with certain communities and organizations with an interest in the project; and discussions with regional Aboriginal organizations with an interest in the project. As described in Section 5.3.4, KPIs were also conducted with a number of stakeholders, including Aboriginal resource users (Registered Trapline holders) (see also Resource Use, Chapter 8)."

…

"…the focus of the EACP shifted to those communities nearer to the preliminary preferred route. That being said, Manitoba Hydro recognizes that Aboriginal communities located outside of the Project Study Area might also have an interest in the Project and the Corporation has been and continues to be available to provide project information to communities outside of the Project Study Area."

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5.4.1 Community and Leadership Meetings 5-15

"… A number of Aboriginal and regional organizations were also invited to participate in the EACP (Appendix 5B). Manitoba Keewatinowi Okimakanak (MKO); Swampy Cree Tribal Council; Keewatin Tribal Council; Northern Association of Community Councils; Manitoba Trappers Association and representatives from the Treaty One First Nations participated in discussions with Manitoba Hydro. Additionally, funding was provided to the Southern Chiefs Organization to host a two day Bipole III workshop on behalf of the Treaty 2 and Treaty 4 First Nations. Five additional Aboriginal and regional organizations were invited to participate in the process including the Aboriginal Chamber of Commerce, Assembly of Manitoba Chiefs, Dakota Ojibway Tribal Council, Southeast Resource Development Council and the West Region Tribal Council. The main issues of interest and concern which were raised in discussions with Aboriginal and regional organizations included:

· Jobs and businesses opportunities and whether there would be an Aboriginal preference;
· Long-term benefits of the Project and the Community Development Initiative;
· Impacts on trapping;
· Herbicide use to maintain the Right-of-Way;
· Purpose of the Project; and
· Whether the line should be located on the east or the west side of the Province.

Twenty-six First Nations and 23 NAC councils participated in the multi-round EACP… In some instances, Project information was shared with interested First Nations through already established channels of communication, for example, Article 9 of the Northern Flood Agreement."

5.4.2 Aboriginal Traditional Knowledge Study Process 5-16

"A process was undertaken to incorporate ATK into the SSEA process for the Project. The Bipole III ATK process involved community participation in ATK workshops conducted by the Bipole III study team, as well as self-directed or community-led studies. The following NACs participated in the ATK workshop process: Barrows and surrounding communities (Powell, Westgate, Red Deer River, National Mills and Baden), Camperville, Cormorant, Dawson Bay, Duck Bay, Herb Lake Landing, Pikwitonei, Pelican Rapids and Thicket Portage. The following First Nations participated in the ATK workshops: Chemawawin Cree Nation, Dakota Plains First Nation, Dakota Tipi First Nation, Pine Creek First Nation and Waywayseecappo First Nation. Community-led ATK studies for the Project were completed by Fox Lake Cree Nation, Tataskweyak Cree Nation, the Manitoba Metis Federation, Wuskwi Sipihk First Nation, Opaskwayak Cree Nation, Long Plain First Nation and Swan Lake First Nation.

The main issues of interest and concern which were raised through the ATK workshops included:
· Effects of Electric and magnetic fields (EMF) on people, animals and plants;
· Impacts on waterways;
· Impacts on plants, wildlife, and their habitats;
· Chemical usage and resulting impacts on aquatic and terrestrial environments;

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· Access management;
· Protection of important sites including key cultural areas, burial grounds, harvesting sites and unidentified sensitive sites; and
· Employment, training and business opportunities.

…As a general observation and concern, communities noted that taken together, numerous unrelated activities on the land base over time can have a cumulative impact on communities. For example, changes in physical and cultural landscapes can potentially affect cultural practices, either by adaptation, abandonment or relocation of activities…"

5.4.3 Community Specific Processes 5-17

"While Manitoba Hydro offered Aboriginal Traditional Knowledge (ATK) Workshops to communities, some communities as well as the Manitoba Metis Federation indicated a desire to conduct their own Traditional Knowledge studies. Manitoba Hydro provided funding to the following to undertake self-directed studies: Fox Lake Cree Nation (FLCN), Long Plain First Nation (LPFN), the Manitoba Metis Federation (MMF), Opaskwayak Cree Nation (OCN), Swan Lake First Nation (SLFN), Tataskweyak Cree Nation (TCN), and Wuskwi Sipihk First Nation (WSFN). The self-directed studies were conducted separately from the ATK workshop process; though where requested, some assistance regarding methodology was provided at the outset of three of these projects. From Manitoba Hydro's perspective, the purpose of these studies was to engage communities about the Project in the hope of developing a greater understanding of the study area and the potential impacts of the project, from the perspective of Aboriginal communities. However, the MMF and the six communities that conducted their own study completed this work using the objectives, methods, and study topics that they each deemed appropriate. The self-directed studies are summarized below with additional detail provided in the Bipole III Aboriginal Traditional Knowledge Technical Report."

5.4.3.1 Fox Lake Cree Nation 5-18

"The Keewatinoow Converter Station and other components of the Bipole III Project will be located within the Fox Lake RMA and Fox Lake Traditional Territory, as defined in Section 1.2.1 of the 2004 Fox Lake Impact Settlement Agreement (ISA), an area that is used intensively by Fox Lake members for a variety of activities. The Keewatinoow Converter Station site is located approximately 35 km from the Fox Lake Cree Nation community of Bird and approximately 91 km from the Town of Gillam, the historic and present-day home of the Fox Lake Cree Nation (FLCN). The ISA, which was signed by Manitoba Hydro, Manitoba, and FLCN in 2004, addressed the impacts of past Manitoba Hydro developments on the community. The agreement also outlines a process to address the adverse effects of certain types of future developments in the area, including a new converter station. FLCN and Manitoba Hydro interact across a range of projects and processes and have been in discussions in relation to the Project since late 2009."

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ISA Keewatinoow Consultation Process

"… discussion and follow up regarding archaeological findings at the Keewatinoow preferred site… …Two background papers summarizing the parties" perspectives on these issues were developed and are included with the Aboriginal Traditional Knowledge Technical Report – one is a summary paper which was drafted by Manitoba Hydro with FLCN"s participation, input, and review, the other is a paper summarizing only Fox Lake"s perspective.

In addition to the ISA Converter Station process, FLCN"s experiences are also informed by its *Fox Lake Cree Nation Bipole III Traditional Knowledge (TK) Project*, which gathered and documented FLCN TK about the areas which are in the vicinity of, and which will be affected by, the construction of the Project…

The FLCN TK report describes FLCN's areas of use and their community's connection to these lands. The report notes that their lands are now used by a number of Manitoba Hydro generating stations and that the developments have impacted FLCN in a number of ways. For example, the report describes environmental impacts such as the population decline of a number of species, as well as impacts on community well-being due to increased separation from the land. The Project will add to Manitoba Hydro"s presence in FLCN"s territories. The objective of FLCN"s report was to communicate the perspectives of FLCN Elders and resource users about the impacts of the Project. To achieve this objective, FLCN employed three different research methods: map biography interviews, group interviews, and ground truthing. Specifically, 27 map biography interviews, four community mapping sessions, and five ground truthing activities were completed. Research participants included resource users and Elders.

…Extensive information was provided about the three herds of caribou hunted by FLCN [MWL: Fox Lake Cree Nation] members: woodland, barren ground, and Pen Island. It was noted that, in the past, there were a lot more caribou observed in the area. More recently, following the construction of the Conawapa road, FLCN [MWL: Fox Lake Cree Nation] members have observed that local caribou movement has shifted. Concerns regarding the potential impact of the Keewatinoow Converter Station on caribou were expressed as the preferred site is to be located in an area caribou are known to occupy. Another point of discussion was the difference in perspectives between Manitoba Hydro and Fox Lake regarding the different caribou species. Fox Lake would like to ensure that their knowledge regarding these species is respected and acknowledged in Manitoba Hydro reports.

… Fox Lake has noted changes in the quality of certain fish species and a decline in moose populations since the start of hydroelectric development in the area. With regards to potential impacts on goose populations, the report identifies concerns that the Keewatinoow Converter Station will displace geese from the area. The importance of these resources as a healthy food source is noted.

The recent discovery by Manitoba Hydro"s Project Archaeologist of two archaeological sites, one containing possible ancient burials at Keewatinoow Converter Station has led to development of a heritage resource protection plan (HRPP) by MH"s Project Archaeologist on the advice of the FLCN

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Elders and with support of Manitoba Hydro. Another concern identified by FLCN is the potential for the construction component of the project to impact community trapping activities. In addition to the actual construction activities themselves, FLCN has expressed concerns regarding the influx of workers into the region and the access these workers may have to FLCN territories and resources, which could lead to the over-harvesting of some species. These issues are considered and addressed further in Chapter 8.

The report offers some suggestions for mitigation measures, which include: ensuring that FLCN is involved in deciding the research topics when Manitoba Hydro is planning projects and field studies, as well as the development of a FLCN heritage policy protocol. Additionally, the importance for ongoing communication between FLCN and Manitoba Hydro was emphasized.

…Manitoba Hydro has entered into a series of process funding agreements with FLCN, which have provided funding for FLCN‟s participation in this process since its inception."

5.4.3.2 Long Plain First Nation 5-22

"… The objective of Long Plain First Nation's (LPFN) study was to document their community's traditional and current land use within the Project Study Area and their concerns regarding the Project… A total of 125 interviews were conducted, all following the same interview guide.

A number of local environmental issues and concerns were noted in LPFN‟s report. One of LPFN‟s major concerns is the declining water quality in the area. The Assiniboine River, which used to be the main source of water for the community, can no longer be used in the same way due to increased pollution… The report also identifies a number of historical, cultural, and burial sites that the community would like to see protected.

…LPFN provided four maps showing the southern portion of the preliminary preferred route for the Project; LPFN‟s traditional land areas, LPFN traditional land use initiative, and traditional buffalo chase areas."

5.4.3.3 Manitoba Metis Federation (MMF) 5-23

"… Engagement with the MMF on the Project has included providing support for the development of an MMF-led community engagement process and support for a Metis Traditional Land Use and Knowledge Study (submitted September 2011- Appendix to Bipole III Aboriginal Traditional Knowledge Technical Report).

… The MMF asserts that the Project Study Area includes portions of the province which are of historical and present-day interest to the Metis Nation as represented by the MMF. … Interviews were conducted with the use of an interview guide and included a mapping component, in order to identify specific areas of interest and/or use. In total, forty-nine interviews were completed.

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The findings of the screening survey provided information regarding the extent to which respondents engaged in traditional activities in the Project Study Area, and the demographic information associated with those respondents.

…With regards to cultural sites, the report identifies a number of ceremonial, burial or other sacred and spiritual places. However, the majority of these sites were located outside the Project Study Area.

The maps provided illustrate 419 food harvesting and 82 trapping areas as well as transportation routes. The maps also provide information about harvesting practices associated with large animals… Detailed information regarding fishing, and food and medicinal gathering activities was also presented.

The MMF report concluded that "...the information provided by the sample of 49 Manitoba Metis suggests extensive traditional use in the Project Study Area, particularly in the Porcupine and Duck Mountain areas of the province" (MMF: 44).

5.4.3.4 Opaskwayak Cree Nation 5-25

"Opaskwayak Cree Nation undertook to complete a Bipole III Aboriginal Ecological Knowledge study, in addition to their participation in the SSEA process.

Opaskwayak Cree Nation‟s (OCN) report (submitted July 2011 - Appendix to Bipole III Aboriginal Traditional Knowledge Technical Report) indicates that approximately 83 km of the transmission line would traverse lands used by the community, including the intersection of five Registered Trap Lines of OCN members…

OCN‟s report includes a description of their areas of use, which are identified as extending into Saskatchewan. In addition, the report outlines OCN`s rights and responsibilities in the Agreement for Joint Management of Natural Resources executed between OCN and the Province of Manitoba.

…In total, 28 Elders and resource users were interviewed. Interviews, which included a mapping component, were recorded and translated.

… The Elk Zone has recently been disturbed by the Wuskwatim Transmission Line, a disturbance which resource users and Elders linked to a decline in marten and fisher population in the area. Within this context, the report identifies a concern that the Project might further impact this area as well as marten and fisher populations.

Additional areas of concern were also identified in the report. The Ravensnest Zone, which includes the northern portion of Kelsey Lake, and is in close proximity of important spawning grounds, was noted as being susceptible to impacts of the Project. This area was also noted to be of cultural importance because of its birch forests from which canoes were constructed. The Kelsey Lake Zone was another culturally important area for OCN, and concerns were raised about the potential for the project to affect caribou herds found in the area.

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The extent of industrial land use, including forestry and mining activities as well as Manitoba Hydro development, was noted as a source of apprehension for the OCN trappers. Trappers have observed changes resulting from these activities, such as a decrease in animal populations, an increase in outsider access to areas used by OCN, and the contamination of food sources. There are concerns that such disturbances have further cultural and socio-economic effects, as OCN sees the land as a source of cultural identity and economic stability. These existing concerns extend to the Project, which is anticipated to impact their areas of use. Conversely, the report acknowledges that the Project may bring benefits in the way of employment opportunities for community members.

The report concludes by offering a number of recommendations and socio-economic considerations:

- Ensure that OCN's AEK is considered in Manitoba Hydro‟s Bipole III Environmental Impact Statement and associated mitigation measures;
- Conduct a longitudinal biophysical study to evaluate potential environmental impacts;
- Compensate for impacts on the Elk Zone and for any adverse effects that cannot be mitigated;
- Establish mitigation measures to address the disturbance of subsistence use practices in the named areas;
- Develop environmental protection plans in partnership with OCN;
- Conduct monitoring and maintenance in partnership with OCN;
- Allocate timber generated as a result of clearing the right-of-way to OCN;
- Wherever possible, discourage the burning of forest related debris;
- Consider the negotiation of Impact Benefit Agreements and Purchase of Services Agreement between the successful contractor and OCN;
- Ensure that 10%, of the workforce within OCN lands and is comprised of OCN members; and
- Provide training and certification relevant to transmission line site development, installation and monitoring."

5.4.3.5 Swan Lake First Nation 5-27

"…The purpose of Swan Lake First Nation‟s (SLFN) Traditional Knowledge Project was to identify their community's traditional land use in the Project Study Area as well as identify the potential impacts of the Project on SLFN. To fulfill this objective, SLFN‟s History and Treaty Research Department conducted historical research and site visits to areas of concern. In addition, interviews with community Elders and local landowners were completed.

SLFN‟s report (submitted July 2011 - Appendix to Bipole III Aboriginal Traditional Knowledge Technical Report) identifies a number of important community sites located in the vicinity of the Project. These include the areas known as: Long Plain, Round Plain, Halfway Bank, Eagle‟s Nest, Indian Garden, Backfat Lake, Indian Springs, Hamilton Crossing, and Indian Ford. These sites carry historical relevance to SLFN and, in some cases, other Treaty 1 First Nations. For example, the Indian Garden Site is described as the area occupied by Chief Yellow Quill prior to Treaty 1 and subject to an outstanding land issue with the federal government. Another significant site is the Round Plain Site,

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which is considered a sacred ceremonial ground, and also the site where the Portage Band split into three bands. SLFN would like to ensure that sacred and ceremonial sites remain undisturbed.

The protection of burial grounds, noted to occur across the study area, is an area of great concern for SLFN. Although the locations of some burial sites have been identified, the lack of burial site markers makes identification of these sensitive sites problematic. It is extremely important that burial sites remain undisturbed and that any mitigation measures related to burial sites reflect the traditional practices of SLFN. The *Heritage Resources Act* provides relevant regulations. SLFN wants to ensure that these are properly enforced.

…SLFN had at the time the report was submitted to Manitoba Hydro SLFN developed the following recommendations:

- That the Round Plain Site be left undisturbed;
- That SLFN undertake research regarding the Indian Garden Site and initiate further discussions regarding this land with the federal government;
- Should a licence be granted for the project, that Manitoba Hydro allow for a SLFN monitor to be on-site for construction activities occurring between NW 35-9-9W1 to SW 26-9-9W1 to NE 8-9-8W1 east to SE 15-9-8W1;
- That a formal protocol be established and agreed to regarding the enforcement of the regulations under the Heritage Resources Act prior to construction; and
- That Manitoba Hydro continues to work with SLFN to address the community‟s concerns with the Project.

Subsequent to Swan Lake‟s Traditional Knowledge report and upon request from the community, Manitoba Hydro provided funding for Swan Lake to complete additional botanical and archaeological work within the study area, in areas of concern to the community. Both studies were conducted with the purpose of further identifying potential impacts of the Project on the areas of historical significance and current use for SLFN.

… The botanical survey identified more than 200 plant species, more than 95% of which are known medicinal plants. Of these, nine species are currently considered rare in Manitoba. Two sections, Sections 1 and 4 were identified as highly vulnerable to disturbance as a result of unique species compositions. The report proposed the following recommendations:

- Consider adjustments to the Bipole III route;
- Once the final route is chosen, conduct detailed site surveys prior to disturbance to allow for additional mitigation measures;
- Adjust the placement of towers to minimize any negative impacts;
- Conduct construction activities in the wintertime; and
- Avoid using herbicides in areas where there are rare species and/or where community members harvest medicinal plants.

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The archaeological study set out to locate known sites as well as assess the potential for undiscovered or unreported sites within the area. The archaeological study area was limited to the 7 km of the proposed preferred route where it crosses the Assiniboine River and was not systematically studied but examined at irregular intervals. Field work was conducted in August 2011. The Historic Resources Branch inventory identified over 90 sites within a 30 km radius of the study area and provided coordinates for six known sites within, or just outside, the preliminary preferred route within the study area….The report provided an overview of the rich cultural history of the area and concluded that there is high potential for undiscovered archaeological sites within the study area given that nine of ten archaeology potential indicators were directly observed….the following recommendations were proposed:

- Once the final route has been identified, a comprehensive archaeological assessment of the route and its right-of-way should take place…"

5.4.3.6 Tataskweyak Cree Nation.. 5-30

"…TCN‟s perspective is that is has been severely impacted by major Manitoba Hydro developments. The developments, which began in the 1950‟s and continue in operation today, include the Churchill River Diversion, Lake Winnipeg Regulation, and the construction and operation of four generating stations and transmission facilities in the lower Nelson River area… In 1992, TCN, Manitoba Hydro, Manitoba and Canada signed the 1992 NFA Implementation Agreement to guide the implementation of the Northern Flood Agreement with TCN… In 2009, Manitoba Hydro and Tataskweyak Cree Nation signed the Tataskweyak Cree Nation Keeyask Adverse Effects Agreement, which sets out a range of programs to offset adverse effects of Keeyask, and the Joint Keeyask Development Agreement, which outlines the arrangement for TCN to become an equity partner in the Keeyask Generating Station (along with three other First Nations in the area).

Approximately 226 km of the Bipole III transmission line as well as a portion of the related facilities is located within the SLRMA. The Keewatinoow Converter Station and related facilities as well as approximately 15 km of the Bipole III transmission line are also located in the broader Split Lake Resource Area, just outside the SLRMA. As is TCN‟s preference, Manitoba Hydro provided the community with funding to consult with its own members regarding the Project.

… the *TCN Bipole III Preferred Route Selection Report…* Consultations with members were conducted through community meetings and through 49 interviews with Elders and resource harvesters. The Report concluded that Tataskweyak was prepared to enter further discussions with Manitoba Hydro and conduct further examinations with a focus on Route B within the SLRMA and identified three potential adjustments to locate Bipole III as close as reasonably possible to PR 280 to reduce intrusions into otherwise pristine areas…

…A second report, the *TCN Report on Bipole III Right-of-Way and Expected Impacts* (submitted March 2011 - Appendix to Bipole III Aboriginal Traditional Knowledge Technical Report) … includes a number of maps which depict their community's areas of use, much of which are in the Project Study Area…

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… TCN has experienced various impacts from previous Manitoba Hydro projects. There are ongoing concerns regarding further loss of natural habitat, displacement of animal populations, and loss of access trails within the Resource Area and the consequent negative effects on TCN‟s cultural practices and identity. With regard to future developments, there was an identified interest in seeing the Keeyask Generating Station built. Without assurances that the Keeyask Generating Station and the associated benefits will be realized, members were hesitant to support the Project.

The report concluded by identifying the following conditions associated with TCN‟s continued support of the Project:

- Conduct negotiations with the goal of reaching an agreement regarding compensation for potential project impacts on the collective rights and interests of TCN;
- Conduct negotiations and reach an agreement regarding business, training and employment opportunities associated with the construction, operation and maintenance of the project;
- Participate in and contribute to Manitoba Hydro‟s Environmental Impact Statement; and
- Conduct a consultation process regarding the Keewatinoow converter station and electrode site."

5.4.3.7 Wuskwi Sipihk First Nation 5-34

"In addition to participation in the EACP, Wuskwi Sipihk First Nation (WSFN) undertook a traditional knowledge study to achieve the following objectives:

- Gather information related to gathering, hunting, fishing, burial sites and traditional ceremonies; and
- Document concerns regarding the placement of the Project.

…A final WSFN report is pending."

5.4.4 Summary of Feedback from Aboriginal Communities 5-35

5.4.5 Discussions with Resource Users 5-35

"Trapping is an important activity for many Aboriginal communities. Manitoba Hydro has implemented a "Trappers Notification/Compensation Policy" to guide its interactions with trappers and provide a framework for compensation for project-related impacts on trapping activities….

Manitoba Hydro‟s policy is to engage with potentially affected trappers prior to the construction of a new project, in order to discuss potential employment and other opportunities, and provide disturbance allowances to those individuals whose trapping activities will be affected by transmission line construction activities. In the case of Bipole III, the implementation of this Policy will include discussions with some 120 individual registered trappers, four Open Trapping Zones, and 12 Manitoba Local Fur Councils. Manitoba Hydro is aiming to have agreements in place with trappers in the vicinity of the project, in order to compensate them for the potential commercial losses associated with project construction, prior to the start of construction."

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5.5 ENGAGEMENT PROCESS FEEDBACK 5-36
5.5.1 OVERVIEW 5-36

"… Throughout the EACP:
- 244 meetings were held;
- 137 Regional and Community Open Houses were held, with 510 comment sheets completed;
- 42 Landowner Information Centres/Meetings were held with 319 Landowner Information Centre forms (Round 4 and Ground Electrode) completed;
- Over 200 phone calls were answered on the project phone line; and
- Over 140 emails/letters were received."

5.5.2 Feedback and Responses 5-37

5.5.2.1 East Side versus West Side location for Bipole III line 5-37

"Questions around the rationale for locating the Bipole III line on the west side of Manitoba rather than on the east side were among the most frequent and common throughout all four rounds of consultation. The majority of participants indicated a preference for the line to be routed to the east side of Lake Winnipeg. Key concerns regarding a west side routing included: additional construction cost, additional line losses, impact to agricultural lands, and impact to residential properties. Some participants cited the planned east side all-weather road as a routing opportunity for the Bipole III line in eastern Manitoba. Numerous participants noted that the longer the route, the more costly and less efficient it would be. Greater length was also associated with greater exposure to weather risks, more maintenance, impacts on agriculture and greater environmental impacts. A few participants offered a contrary position on this topic – namely that greater length (when comparing an eastern alternative to the western alternatives) was justified in order to protect the eastern Manitoba boreal forest.

Manitoba Hydro responded to these concerns by indicating that following an assessment of system reliability options and review by the Manitoba Hydro Electric Board and the Province of Manitoba, a decision was made to develop the Bipole III line on the west side of the Province. Fundamental to this decision was concern for protection of a proposed UNESCO World Heritage Site on the east side of Lake Winnipeg, and a desire to avoid potential negative impacts on Manitoba Hydro‟s United States export revenues. Participants were also referred to the report Bipole III Transmission Routing Study (CMC Consultants Inc., 2007) which presents rationale for the selection of the western routing for the Project. This study was made available on Manitoba Hydro‟s project website. Manitoba Hydro also responded by acknowledging that consideration was given to the various factors identified when ultimately assessing west side alternatives (cost, impact, etc.). For example, line length was considered in comparing the alternative routes."

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5.5.2.2 Need for and alternatives to the Project 5-38

"The concept of constructing the Bipole III HVdc line either underground or under Lake Winnipeg was noted on several occasions… It was noted that these options have significant cost implications, as well as reliability, technical and maintenance implications."

5.5.2.3 Public Participation Processes 5-38

"… A number of First Nation representatives were concerned that the Community Open Houses might be construed as "Crown consultation", which has legal ramifications that they felt could impinge on the rights of the First Nation. Community members requested that the Open Houses not be considered formal consultation. Manitoba Hydro noted the concern, and confirmed that Manitoba and Canada have the responsibility to consult with the First Nations (consistent with interpretation of Section 35 of the Canadian Constitution Act (1982)), and that this duty has not been delegated to Manitoba Hydro by the Crown.

Some Aboriginal community representatives indicated that Manitoba Hydro should be obtaining the approval of local people whose territory is being crossed by a new line before securing Provincial and Federal approvals. Some favoured having a negotiated agreement with Manitoba Hydro that clarified how their community would be involved in, and benefit from, transmission projects passing through their traditional areas. Manitoba Hydro has been committed to Aboriginal participation in the planning and assessment process and will continue to work with Aboriginal communities to minimize negative impacts, identify employment and business opportunities and address any other concerns related to the project."

"Some questions were raised about whether Manitoba Hydro would provide Aboriginal communities with financial support to participate in the environmental assessment of the Project. Manitoba Hydro indicated that it would be willing to provide support to Aboriginal communities for the purposes of assistance with open house planning in their community. Manitoba Hydro also offered funding for community coordinators and considered requests for funding for self-directed ATK studies, some of which have included an ongoing consultation component."

5.5.2.4 Routing of the Line 5-39

"Some participants asked about routing through Provincial and National Parks, and First Nation Reserve Lands and were advised that, through the SSEA process, Provincial and National Parks will be avoided if possible, and that Reserve Lands will be avoided completely…A number of participants felt that the Bipole III route should not bisect Provincial Forest Reserves. Some participants expressed specific concerns about impeding access to mineral deposits in various areas on or near the alternative routes.

A number of participants offered perspectives about the proximity of alternative routes to their treaty land entitlement (TLE) selections. Manitoba Hydro has taken into consideration all available TLE

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information and will continue to monitor new or pending TLE selections. Through the site selection process, all existing TLE sites were avoided…

As outlined in Chapter 7, during Round 3 of the EACP, participants were provided with an opportunity to comment on the three alternative routes. Many participants in the Public Open Houses did not offer a preference for the alternative routes presented (over 60% of respondents). Among those who did offer a preference, the majority indicated a preference for Alternative Route B (Figure 5.5-1).

In terms of the Regional Open Houses, the main reasons cited for Route B preference were: shortest line length, least disruption to agricultural lands, and least disruption to populated areas…"

5.5.2.5 Project Benefits 5-42

"Some participants expressed concern that a new transmission line would pass through their traditional areas without providing ongoing benefits to their communities, particularly in the case of a project such as Bipole III, where the power could not be used locally. Similarly, some felt that the benefits of a project like Bipole III would only accrue to southern and export customers. A number of participants expressed an interest in the concept of enduring financial benefits from transmission lines that pass through traditional areas as a means of income to remote communities.

Some participants expressed an interest in community ownership of the line and/or revenue sharing for new Manitoba Hydro developments. A number of suggestions for community benefits were provided, including:

- Reducing electricity rates or providing exemptions;
- Revenue and profit sharing on an annual basis (rather than on a „one-time" basis); and
- Introduction of a development fund (such as the one created for the Wuskwatim Transmission Project).

A few communities expressed a desire to be partners in the Project. They felt an annual financial payment through a development fund or trust was insufficient compensation for the use of local lands and potential depletion of resources. They also wished to have a direct role in project decision-making. Manitoba Hydro indicated that it is not prepared to share in ownership of the Project because the line will be a key part of its integrated power system and must be managed and operated in conjunction with the system.

…Manitoba Hydro continues to review and refine the Community Development Initiative (CDI) program having regard to community feedback received during the EACP. Manitoba Hydro will be providing information to eligible communities following submission of the EIS.

…Participants asked how Manitoba Hydro engages Aboriginal communities in terms of employment and business opportunities…Manitoba Hydro has employment policies/collective bargaining agreements that will be relevant to the various components of the Project. While contracts will generally be of an open tender type, inviting competitive bids, Manitoba Hydro will have opportunities to apply its Northern Purchasing Policy. Manitoba Hydro"s Northern Purchasing Policy allows for evaluation of Aboriginal content in tender packages, restricted tenders and in appropriate situations, negotiated contracts."

5.5.2.6 Effects on Agricultural Operations on the Transmission Line Right-of-way and Compensation Practice 5-44

"Numerous participants were concerned about the potential effects of the Project on agricultural operations in the southern portions of the Project Study Area. Participants expressed concerns regarding diagonal placement of the line across agricultural lands… The effects of transmission towers and lines on aerial spraying operations, pivot irrigation systems, and GPS systems were noted as concerns. The potential loss of prime agricultural lands, due to placement of transmission towers in farming areas, was also noted as a concern by some participants. A few participants expressed concerns regarding the potential effect of transmission towers on the ability to conduct organic farming operations on or near proposed transmission lines. Some participants expressed concerns regarding the potential effects of DC lines on livestock."

5.5.2.7 Health Effects of Electric and Magnetic Fields (EMFs) 5-48

"Numerous participants had questions concerning the potential health effects on humans and animals as a result of proximity to the Bipole III line (i.e., EMFs). Some communities were concerned about the link between EMFs or the existence of lines to the quality of medicinal plants and other culturally important plants. Specifically, some participants indicated that they would not harvest plants near a transmission line… There are no known health effects associated with static (DC) electric and magnetic fields in the range of levels that would be produced by the proposed Bipole III transmission line. This issue is considered in detail in chapter 8 and in the Bipole III Environmental and Health Assessment of the DC Electrical Environment Technical Report. "

5.5.2.8 Effect on Residences and Property 5-48

"Several participants expressed concerns regarding possible effects that the Bipole III line may have on properties and residences near the line (e.g. property values, aesthetics)… Manitoba Hydro monitors property values in the vicinity of its facilities, and based on research conducted to date, has determined that property values will not be significantly affected. … There were some questions regarding who pays for property taxes on the right-of way. If a property is acquired by easement, the property owner will continue to pay property taxes."

5.5.2.9 Effects on Wildlife and Resource Use Activities 5-49

"Impacts on local water, land, wildlife (including caribou), migratory birds, plants, and soil were noted as particular concerns during the EACP. Participants expressed concerns that the Project would inhibit their ability to practice land use activities (hunting, trapping, fishing, harvesting) that were identified as being important to community culture, learning and well-being… These concerns were particularly

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prevalent in the discussions held through the Aboriginal Engagement process, as well as through the ATK study process, and are documented more fully in the Bipole III Aboriginal Traditional Knowledge Technical Report. … These potential effects and associated mitigation measures are considered more fully in Chapter 8."

5.5.2.10 Effects on Heritage Resources 5-50

"…Manitoba Hydro will deal with all heritage resources in accordance with the *Heritage Resources Protection Act* and will ensure that all sensitive sites are identified in its Environmental Protection Plans…"

5.5.2.11 Effects on Access 5-50

"Some participants felt that transmission lines would provide opportunities for increased access for recreation and hunting. This was viewed both positively and negatively."

5.5.2.12 Effects of Vegetation Management 5-50

"Some participants shared concerns about vegetation management and stated that they do not want chemicals used for vegetation management for the Project. Participants mentioned that they thought chemical management was problematic for the animals and berries…"

5.5.2.13 Relationship of the Bipole III Project to Wuskwatim 5-51

5.5.2.14 Effects on Mining Industry 5-51

"Representatives of the mining industry expressed concerns regarding the potential impact of the Project to mining operations and/or mining claims… the preliminary preferred route for the HVdc line was modified to be located outside of the Thompson Nickel Belt area."

5.5.3 Landowner Information Centre Feedback 5-51

5.5.4 Round 4 Route Feedback Adjustments to Determine the Final Preferred Route 5-54

"… During Landowner Information Centre discussions, landowners were encouraged to provide Manitoba Hydro representatives with potential route adjustments to the preliminary preferred route. These adjustments were considered by Manitoba Hydro and, in certain circumstances, adjustments were made to the route…"

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6.0 EXISTING ENVIRONMENT 6-1
6.1 INTRODUCTION 6-1

"…description of the existing environment in the Project Study Area which is shown in Map 6-1…representing two broad environmental components: biophysical and socio-economic…further subdivided into valued environmental components (VECs). Chapter 8 (Effects Assessment) describes the VECs and their use in the assessment."

6.2 BIOPHYSICAL ENVIRONMENT.. 6-3
6.2.1 Terrain and Soils 6-3

6.2.1.1 Overview 6-3

"…includes a discussion of bedrock geology, surficial geology, terrain and soils components….summary of ecozones, VECs and Existing Environment at Project Components…"

6.2.1.2 Summary of Components 6-3

Bedrock Geology

"…Bedrock Geology…The Project Study Area traverses the Precambrian Shield bedrock and two large sedimentary basins – the Western Canada Sedimentary Basin (WCSB) and the Hudson Bay Basin (HBB) (Map 6-4) … The WCSB and HBB are respectively located in the southwestern and northwestern portions of the Project Study Area… general description of the soil environment… characterized primarily by wetland and forested land-uses, predominantly consists of Cryosolic and Organic orders in the lowlying and wetland areas, and the Brunisolic order in the upland, mineral soil areas. These soils are generally considered to have relatively low productivity. The Cryosolic soils are… influenced by permafrost. Agricultural Manitoba predominantly consists of Chernozemic and Vertisolic orders, which are generally considered productive soils for agricultural…"

Surficial Geology

"The surficial geological materials … consists mainly of glacial tills, glaciofluvial, glaciolacustrine sediments and glaciomarine deposits (Matile and Keller, 2007)… these surficial geologic materials are highly variable in thickness… thin in the Precambrian Shield to deposits over 100 m thick… found in southern and western Manitoba (Betcher et al., 1995). Surficial geology… mainly clay, silt and fine sand in the southern portion; poorly sorted/unsorted calcareous silty till with rare occurrences of younger organic (peat); and alluvial sediments in the west and offshore glaciofluvial clays and recent organic deposits common in the north…"

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Soils

"The Regosolic, Gleysolic and Luvisolic soil orders, and Non-Soil …Soil drainage… very poor to poor in the northern portion… and well drained in the southern portion (Table 6.2-1). Imperfectly drained soils occupy a major portion of the PSA…surficial soil horizons are… a key consideration in the maintenance of soil productivity. Organic surface textures in the PSA were found to be mesic and fibric in nature (Table 6.2-1). A large portion of the PSA was found to have medium and very fine textured mineral surfaces (Table 6.2-1). Very fine and fine textured soils… tend to be prone to compaction effects under trafficking. Coarse textured surface materials, particularly when they occur on poorly developed soils, as they have little resistance to wind erosion. These surface textures occupy a minor portion of the PSA (Table 6.2-1), and are distributed throughout the PSA."

Unique Terrain/Soils

"Unique terrain/soil features are important… have special physical, aesthetic, social, cultural or inherent terrain/soil diversity value. They are discussed under Designated Protected Areas and Protected Areas Initiative (PAI) Enduring Features."

6.2.1.3 Summary by Ecozones 6-5

"The PSA traverses the following ecoregions, grouped by ecozone (Maps 6-2 and 6-3)… Hudson Plain Ecozone: Hudson Bay Lowland Ecoregion; Taiga Shield Ecozone: Selwyn Lake Upland Ecoregion; Boreal Shield Ecozone: Churchill River Upland Ecoregion and Hayes River Upland Ecoregion; Boreal Plain Ecozone: Mid-Boreal Lowland Ecoregion and Interlake Plain Ecoregion; and Prairie Ecozone: Lake Manitoba Plain Ecoregion and Aspen Parkland Ecoregion."

Hudson Plain Ecozone: Hudson Bay Lowland

"The bedrock… is primarily flat Paleozoic limestone with low relief (AAFC 1998). The area is dominated by organic deposits overlying marine sediments underlain by glacial till, which surfaces in some locations… Approximately half of the Project Study Area in this ecoregion occupies an area dominated by Organic Cryosols, while the second half occupies an area largely dominated by Eutric Brunisols (Centre for Land and Biological Resources Research 1996)."

Taiga Shield Ecozone: Selwyn Lake Upland

"The bedrock… is composed of crystalline Archean massive rocks tilted to the northeast (AAFC 1998). Surficial deposits range greatly with ridged hummocky bedrock outcrops with veneers and blankets of acidic till in the west to extensive loamy calcareous till often overlain by lacustrine and peat deposits in the east... The portion of the PSA in this ecoregion traverses an area dominated by Organic Cryosols (Centre for Land and Biological Resources Research 1996)."

Boreal Shield Ecozone: Churchill River Upland

The ecoregion occupies part of the Kazan Upland and sits on massive crystalline Precambrian rocks (Precambrian Shield). Landforms in the western part of the ecoregion are dominated by ridged and hummocky bedrock outcrops covered with veneers and blankets of sandy tills. The eastern portion is characterized by depressed to hummocky lacustrine sediments, commonly covered by peat deposits of varying depths…Permafrost is common in the north of this ecoregion, but diminishes to sporadic in the south (AAFC 1998)…. The portion of the Project Study Area in the northern part of this ecoregion traverses large extents of Organic Cryosols and Gray Luvisols with minor occurrences of Eutric Brunisols (Centre for Land and Biological Resources Research 1996). In the southern portion of the ecoregion, the Project Study Area traverses considerable extents of Mesisols, Fibrisols, Eutric Brunisols and exposed bedrock."

Hayes River Upland

"The ecoregion occupies part of the Severn Upland and sits on crystalline Archaen massive rocks. This ecoregion was strongly glaciated and exhibits ridged to hummocky bedrock outcrops with discontinuous veneers and blankets of acidic sandy till in the south, and calcareous, sandy to loamy till in the north. Large areas are also covered with glaciolacustrine clay veneers and blankets, veneer bogs and flat bogs… The PSA follows the northern edge of the ecoregion, characterized dominantly by Gray Luvisols developed on lacustrine sediments, with large extents of Organic Cryosols in the extreme northeast of the ecoregion (Centre for Land and Biological Resources Research 1996)."

Boreal Plain Ecozone: Mid Boreal Lowland

"This ecoregion occupies the northern part of the Manitoba Plain and extends from the west shore of Lake Winnipeg to the Saskatchewan border. The area is underlain by low relief Paleozoic limestone bedrock that is extensively covered by glacial deposits of varying thickness (AAFC 1998)… Clay, silt and sand deposits originating from glacial Lake Agassiz have smoothed the plain, and were subsequently covered by extensive organic deposits forming flat bogs and horizontal fens… The PSA traverses through the northwest and west portions of the ecoregion (Centre for Land and Biological Resources Research 1996). The dominant soils of importance are organic Mesisols and Fibrisols. A smaller component of Eutric Brunisols is traversed in the northern portion of the ecoregion."

Interlake Plain

"This ecoregion forms a broad arc from the United States-Canada, border extending northwest across the Interlake region and ending at Red Deer Lake along the Saskatchewan border. This ecoregion also marks the southern limit of the boreal forest and the northern limit of commercial agriculture (AAFC 1998). Low relief, flat, Paleozoic limestone bedrock underlies the Interlake Plain. The Interlake and Westlake sections… deposits are extremely calcareous, very stony water-worked tills over bedrock ranging from <20 m to >30 m thick. East and southeast of these sections… veneers and blankets of sandy to clayey glaciolacustrine deposits and sandy to gravelly beach deposits and bouldery near-shore deposits (AAFC 1998)… The Project Study Area traverses Regosols, Mesisols, Fibrisols and Eutric

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Brunisols north and south of the Swan River Valley, and Black Chernozems through the Swan River Valley (Centre for Land and Biological Resources Research 1996)."

Prairie Ecozone

Lake Manitoba Plain

"This ecoregion occupies a large portion of southern Manitoba, extending from the International Border northward to Lake Dauphin, with the Manitoba Escarpment as its western boundary. It is located within the lowest level of the prairies, the Manitoba Plain. The Lake Manitoba Plain is a mixture of glacial till and glaciolacustrine silts and clays from glacial Lake Agassiz, all underlain by flat Paleozoic limestone bedrock (AAFC 1998)… The PSA is dominated by Black Chernozems, with small areas of Gleysols and Vertisols in the glaciolacustrine sediments and Regosols associated with drainage channels (Centre for Land and Biological Resources Research 1996)."

Aspen Parkland

"In Manitoba, the Aspen Parkland ecoregion occupies the southwest corner of the province and forms the transitional area between the boreal forest to the north and east and the grasslands to the west. The eastern boundary of the ecoregion is marked by the Manitoba Escarpment, which marks the step down to the Manitoba Plain from the Saskatchewan Plain. This ecoregion is characterized by… kettled to undulating loamy glacial till…sandy glaciofluvial and glaciolacustrine and eolian dunes…(AAFC 1998)… The PSA skirts the northern edge of the ecoregion, mostly traversing Black Chernozems, but also Regosols associated with the Assiniboine River valley and the glacial Assiniboine Delta (Centre for Land and Biological Resources Research 1996)."

6.2.1.4 Valued Environmental Components 6-9

"The environmental assessment has been focused on VECs selected for the terrain, soils and geology environment. Regions and sites of environmental sensitivity generally associated with the selected VECs have been determined, mapped and described in the Bipole III Terrain and Soils Technical Report, to aid in the development of site-specific environmental protection measures. Two VECs have been identified for the terrain and soils environment: soil productivity and stable terrain, as described below."

Soil Productivity

"Agricultural production is of general benefit to society and in agro-Manitoba, the productivity of soils for arable agriculture is… a primary source of income... The primary environmental indicator of change to agricultural capability… is the Agricultural Capability Rating (i.e., class) of soils… provides a numeric class rating between 1 and 7… as determined by: soil moisture holding capacity, topography, soil structure and permeability, salinity, sodicity, erosion, stoniness, drainage and organic matter

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content. Class 1 has the least limitation to support agriculture, with Class 7 having the greatest limitation."

Topsoil Quality

"Outside of agricultural-Manitoba, primarily in the northern portion of the PSA, soil productivity is necessary to support natural ecosystems (e.g., vegetation, wildlife) and is therefore of value to people and resource users. The primary indicator of soil productivity… is the quality of mineral topsoil and organic soils. Mineral soil quality… is indicated by surface horizon thickness, bulk density, and carbon content of organic enriched surface horizons, whereas organic soil quality is indicated by the thickness and nature of surface horizons. Additional parameters…to evaluate topsoil quality include… topsoil colour, soil texture, salinity, pH, nutrient/fertility status, and soil temperature."

Stable Terrain

"Stable terrain… is unaffected or unmoved by… Project-related activity. Features of the terrain environment that are susceptible to human-induced instability include sloped terrain (e.g., slope creep, slope failure) and permafrost terrain (e.g., subsidence, thermokarst). The maintenance of stable terrain has ecological and socioeconomic value as a function of its role in supporting existing ecosystems and human infrastructure (Duan and Naterer 2009)… indicators of unstable sloped terrain can be assessed by visual identification… [and] geotechnical-based calculations… Indicators of change to permafrost stability include visual identification and active layer thickness… Disturbed permafrost terrain results in… retrogressive thaw slumps (bowl or horseshoe-shaped), active layer detachments (material accumulates at toe), and thermokast terrain (depressions that may collect water) (Kotler 2003). An increase in the thickness of the active layer can indicate thawing of permafrost as a result of disturbance; however, changes may not be evident until late in the season (Bronson et al. N.D.)."

6.2.1.5 Existing Environment at Project Components 6-11

HVdc Transmission Line: Soil Productivity

"Soil orders have a relatively even areal distribution along the HVdc transmission line right-of-way (Table 6.2-1); however, these soil orders are not evenly distributed spatially. [See Table 6.2.1 Soil Properties within the Local Study Area and Project Footprint for a breakdown of the area of all soil orders and the percentage of both the Local Study Area and the HVdc Footprint.]

Within agricultural Manitoba, approximately 42% of the right-of-way is rated as Agricultural Capability Classes 1 to 3 with no to moderate limitations for arable agriculture, while 38% is rated as Classes 4 and 5, with severe to very severe limitations. The remaining land has no capability for arable agriculture (9%) or is limited to perennial forage production (Class 6 - 7)…A detailed summary of Agricultural Capability classes within the right-of-way within agricultural Manitoba is found in Table 6.2-2.

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For the transmission line right-of-way, the largest extent of arable agricultural soils (Class 1-3) occurs between PTH 13 and the Riel Converter Station, east of the Portage la Prairie Area (Map Series 6-3100). The second largest extent occurs between the Whitemud River area east of Gladstone to where the right-of-way crosses PTH 1 west of Portage la Prairie. The area between PTH 1 and PTH 13 contains soils (Class 3-4) with moderate to severe restrictions for arable agriculture, where special conservation practices are required.

Potential access routes are primarily located along existing access opportunities (e.g., other linear disturbances) within the Local Study Area… The majority of access routes are located on lands with severe limitations to no capability for arable agriculture (i.e., Class 4 or higher), with a minority of access routes located on lands with moderate limitations (i.e., Class 3). The majority of access routes within agro-Manitoba are located on the existing road network."

Stable Terrain

"A total of four occurrences of unstable or steep slopes were identified in the northern portion of the Local Study Area… these are located within the vicinity of Limestone River… the Odei River and the Overflowing River. [A portion of] the unstable/steep slopes identified… are located within the right-of-way[s]…[and] potential access routes are identified along existing trails and a road and cutline… A summary of the data for these steep and unstable slopes is found in Table 6.2-3.

Based on the Manitoba Wetlands data, a total of 0.1 % of both the Local Study Area and right-of-way was found to be classed as continuous permafrost (Table 6.2-4). A total of 3.9 % of the Local Study Area and 3.4 % of the right-of-way was classed as extensive discontinuous permafrost, while 24.3% of the Local Study Area and 25.3 % of the right-of-way was classed as sporadic discontinuous permafrost… Potential access routes in the northern portion of the Local Study Area in areas of permafrost-affected soils primarily traverse sporadic discontinuous and extensive discontinuous permafrost."

Keewatinoow Converter Station & Associated Facilities

"The Keewatinoow Converter Station site… permafrost-affected Organic soils (56%) and non-frozen Organic soils (6%), and well-drained, mineral Brunisolic soils (41%).

The Keewatinoow construction camp site… well-drained, medium textured, mineral Brunisolic soils (89%), with minor inclusions of poorly to very poorly drained, permafrost-affected Organic soils.

The soils at the Keewatinoow construction power site… well-drained, medium-textured mineral Brunisolic soils (50%), very poorly drained, permafrost-affected Organic soil underlain by mineral soil (30%), and poorly drained, permafrost-affected Organic soil (20%)… inspections completed at the site confirmed an absence of permafrost…a gravel pad exists at the site."

AC Collector Lines and Construction Power Lines

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"The 310 m right-of-way for the northern collector lines is dominated (58%) by permafrost-affected Organic soils… non-frozen Organic soils (31%) and mineral Brunisolic soils (10%)… The right-of-way is dominantly very poorly to poorly drained (89%), corresponding to Organic soil occurrences, while areas of mineral soils are well to rapidly drained. Mineral soil textures along the right-of-way are medium to coarse."

Borrow Sites and Excavated Material

"…in the vicinity of Keewatinoow Converter Station and construction camp….borrow sites and the lagoon siting area are located on primarily well drained Brunisolic soils, whereas the excavated material placement areas are located on both very poor and well drained permafrost-affected (discontinuous) and Brunisolic soils.

The preferred Keewatinoow ground electrode site… very-poorly drained permafrost-affected Organic soils (47%) and nonfrozen Organic soils (19.7%), and well-drained, mineral Brunisolic soils (33%).

The Keewatinoow ground electrode line right-of-way runs from Keewatinoow Converter Station to Keewatinoow Ground electrode site… dominant occurrence of well drained, mineral Brunisolic soils (69%), and large occurrences of poorly to very poorly drained permafrost-affected Organic soils (31%)."

Riel Converter Station

"The Riel Converter Station site is located within an existing developed site. The site was developed on very fine to fine textured, poorly to imperfectly drained, Vertisolic and Chernozemic soils that had good agricultural capability (Class 2-3). The preferred Riel ground electrode site… imperfectly drained, very fine textured Vertisolic soils, with good agricultural capability (Class 2-3)."

6.2.2 Air Quality and Climate 6-20

6.2.2.1 Overview 6-20

"…the climate and atmospheric variables relevant to the PSA…Air quality; Climate; and Summary of climate by ecozones…"

6.2.2.2 Air Quality 6-20

"…Air quality concerns in Manitoba tend to be local in nature… include the presence of odours, noise and other pollutants. The main sources of these pollutants are industrial and agricultural operations, and vehicle emissions. In northern Manitoba, emissions from base metallurgic smelters in Flin Flon and Thompson, and smoke from forest fires, tend to be the primary sources of air pollution.

…Sulphur dioxide has been a common air pollutant in Manitoba and in portions of the PSA… resulting acid precipitation… In the mid-1990's, [The Hudson Bay Mining and Smelting Co. Limited (HMB&S) zinc and copper smelter in Flin Flon and the VALE (INCO) Limited nickel smelter in Thompson] both within the Boreal Shield ecozone, accounted for over 95% of the human-caused emissions of sulphur dioxide in Manitoba (Manitoba Conservation 1997)… Acid rain is not a problem in the Province… and most of the soils and surface waters have a buffering capacity to neutralize such deposition."

6.2.2.3 Climate 6-21

"The PSA ecoregions comprise six major ecoclimates. Map 6-2 shows ecozones and Map 6-3 shows ecoregions in the PSA."

6.2.2.4 Summary of Climate by Ecozone 6-22

Hudson Plain Ecozone

"…strongly influenced by cold and moisture laden Hudson Bay and Polar High air masses… short, cool summers with long, very cold winters. Mean annual temperatures… –7°C. Precipitation… 400 to 800 mm annually… the Hudson Bay Lowland Ecoregion is part of the… High Subarctic Ecoclimatic Region…"

Taiga Shield Ecozone

"…a subarctic climate with short summers and long, very cold winters. The mean annual temperature… –9°C… 200 to 500 mm of precipitation annually… a Low Subarctic Ecoclimate…"

Boreal Shield Ecozone

"…a continental climate of long, cold winters and summers that are short and cool. The mean annual temperature is near –4°C…approximately 400 mm of precipitation annually. The average number of growing degree days over 5°C ranges from 1038 to 1079. The frost free period ranges from 59 to 115 days… High Boreal Ecoclimatic Region…"

Boreal Plain Ecozone

"…a continental climate that consists of cold winters and moderately warm summers. The mean annual temperature ranges from –2°C to 2.5°C with approximately 600 mm of precipitation annually. The average number of growing degree days over 5°C is 1395. The frost free period is approximately 114 days… Subhumid Mid-Boreal Ecoclimatic Region… [and] Subhumid Low Boreal Ecoclimatic Region…"

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Prairie Ecozone

"…a continental climate with long, cold winters and short, warm summers. Mean annual temperature ranges from 1.5°C to 3.5°C. Mean annual precipitation… 550 mm. The average number of growing degree days over 5°C ranges from 1631 to 1802. The frost free period ranges from 106 to 121 days… Transitional Grassland Ecoclimatic Region…"

6.2.3 Groundwater 6-23
6.2.3.1 Overview 6-23

"…This section provides information on the following groundwater topics: Summary by groundwater regions; VECs; and Existing environment at Project Components."

6.2.3.2 Summary by Groundwater Regions 6-23

Western Canada Sedimentary Basin

"The Western Canada Sedimentary Basin occupies the southwestern part of Manitoba and consists of Paleozoic, Mesozoic and Cenozoic deposits (Map 6-6). Paleozoic rocks are generally carbonates with minor clastics and evaporites, while Mesozoic rocks are dominantly shales with lesser amounts of sandstones, carbonates and evaporites…"

Precambrian Bedrock

"Groundwater resources and aquifer definition in the Precambrian Shield portions of the Local Study Area (Map 6-6) remain largely unexplored due to a sparse population and the abundance of surface water resources. Groundwater exploration in the southeast portion of the Province, however, can serve as a model for the northern reaches of this geologic unit. Sand deposits encountered in the overburden are not well explored for the same reason as Precambrian bedrock, but the presence of local sand and gravel aquifers is expected in coarse glacial deposits such as eskers and moraines."

Hudson Bay Basin

"The Hudson Bay Basin is located in the northeastern part of Manitoba and is comprised of primarily Paleozoic carbonates (Map 6-6)… Groundwater supply potential of these deposits is not well explored."

6.2.3.3 Valued Environmental Components 6-24

"Sustainability of aquifers is important to provide a safe water supply for multiple uses, including: human consumption, agricultural production, recreational uses, and surface water recharge. The maintenance of productivity and quality of groundwater is important to the sustainability of aquifers.

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Therefore, aquifer quality and aquifer productivity have been identified as VECs and are described below."

Aquifer Quality

"Aquifer quality can be measured through many physical and chemical parameters of groundwater, such as turbidity, pH, redox conditions, and concentrations of major ions, trace elements, and organic contaminants. Aquifer quality can be compromised by a potential entry of contaminants."

Sites Vulnerable to Shallow Subsurface Contamination

"The most sensitive areas of the Local Study Area route to potential groundwater contamination from any contingency event [e.g., surface spill] are located along the southern portion of the route (east of the Red River) and immediately north of The Pas. The sensitivity in these locations is related to the connection between the potable carbonate aquifer and the overlying shallow sand and gravel aquifers wherein the shallow aquifer is the recharge zone for the deeper aquifer."

Areas with Artesian Conditions

"Artesian groundwater conditions have been identified as environmentally sensitive areas because of the risk of potential interconnection between artesian aquifers and the surficial environment due to interception during drilling or foundation installations… The highest risk of interception is expected in the areas of artesian saline aquifers"

Aquifer Productivity

"Measurable parameters of aquifer productivity include, but are not limited to, groundwater levels, hydraulic conductivity, aquifer extents and specific yield."

6.2.3.4 Existing Environment at Project Components 6-26

Keewatinoow Converter Station & Associated Facilities

"…Ongoing investigations will confirm expected hydrogeological conditions prior to construction. Surficial soils at the Ground Electrode Site are characterized as a mix of medium-textured fluvial mineral deposits and organic deposits overlying medium textured till materials.

At the borrow sources and excavated material placement sites… the major bedrock aquifer is separated from the surface by approximately 60 m of overburden… small aquifers (less than 0.5 km2) might associate with the granular deposits.

…Groundwater investigations in the vicinity of the [construction] camp indicate that the carbonate bedrock beneath this area contains a potable aquifer which could serve as the main source of

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groundwater supply for the construction camp and the Keewatinoow Converter Station. The bedrock aquifer has a high permeability but is also hydraulically connected to the Nelson River.

The local conditions at the northern AC collector and construction power lines are expected to be similar to conditions at the Keewatinoow construction camp site due to proximity of these components of the Project…"

Riel Converter Station & Associated Facilities

"The Winnipeg Formation sandstone and carbonate aquifers are encountered beneath the sites for the Riel Converter Station and preferred site for the ground electrode. The upper carbonate aquifer used for local groundwater supply for domestic and agricultural/livestock supply. The carbonate aquifer is overlain by 10-20 m of clay at the ground electrode site and 20-30 m of clay at the Riel Converter Station site (Rutulis 1990). Flowing wells were documented at the Ground Electrode site indicating artesian conditions. It is noted that the existing infrastructure at the Riel Station site currently relies on surface water resources provided by Deacon Reservoir and it is understood that this will not change with the proposed addition of the Converter Station infrastructure at this location."

6.2.4 Aquatic Environment 6-27
6.2.4.1 Overview 6-27

"This section focuses on the existing aquatic environment in the Project Study Area. This includes surface water flows (hydrology) and quality, as well as the aquatic biota that use surface waters."

6.2.4.2 Hydrology 6-28

"The Project Study Area crosses portions of eight Manitoba drainage basins (Map 6-9), including 34 sub-basins (Table 6.2-5; Fedoruk 1970). In order from north to south, these include the Hudson Bay, Churchill River, Nelson River (then the Churchill River basin again), Saskatchewan River, Lake Manitoba, Assiniboine River, Red River, and Lake Winnipeg basins. An inventory of the, larger water bodies within the Project Study Area is shown in Appendix 6A, Table 6A-1 as listed in Fish Inventory Habitat Classification System (FIHCS)."

Hudson Bay Basin

"… Approximately 1% of the Project Study Area is within [the Hudson Bay] drainage basin (Table 6.2-5). … Water courses in this part of the Project Study Area are generally low gradient bog/fen with limited surface drainage…"

Churchill River Basin

"The Project Study Area includes two separate portions of the Churchill River drainage Basin… the Upper Churchill River sub-basin and… the Lower Churchill River sub-basin (separated by the Nelson

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River basin). Approximately 10% of the total Project Study Area is within this basin (Table 6.2-5). Both sub-basins lie entirely in the Canadian Shield. Riparian vegetation… consisting of a combination of alders, birch, larch, peat, poplar, sedge, spruce or willow (Mills et al. 1976)."

Nelson River Basin

"The Nelson River basin comprises the largest proportion of the Project Study Area (31%; Table 6.2-5)… this basin is on the Canadian Shield… [and] Hudson Bay coastal plain (Mills et al. 1976). Marsh and bog areas are common … Riparian vegetation …consisting of a combination of alders, birch, larch, peat, poplar, sedge, spruce or willow (Mills et al. 1976).

Within the Project Study Area, the Lower Nelson River sub-basin begins at Split Lake and flows northeast ending at the potential future Conawapa Generating Station site. This sub-basin includes the Nelson River mainstem and Split Lake as well as numerous headwater lakes and tributaries of these water bodies….tributaries of the Nelson River mainstem… support fall spawning runs and resident populations of brook trout.…

The Burntwood River sub-basin is the largest sub-basin within the Project Study Area… The predominant water course… is the Churchill River Diversion (CRD), which enters the Project Study Area from the north via the Rat River. The diversion was constructed during the early 1970s to divert water from the Churchill River system into the Nelson River system for hydroelectric generation. Flows in the Rat River are augmented with flows from the Churchill River through a diversion channel that was excavated from South Bay on Southern Indian Lake to Issett Lake in the upper reaches of the Rat River system. Flows in the diversion channel are controlled by the Notigi Control Structure located at the outflow of Notigi Lake adjacent to Provincial Road (PR) 391. Water released through Notigi flows through Wapisu Lake and into Threepoint Lake where it converges with the Burntwood River. Diversion flows continue down the Burntwood River through Wuskwatim, Opegano, Birch Tree, and Apussigamasi lakes before converging with the Nelson River at Split Lake. High clay banks that are treed to the shoreline characterize river shorelines from Notigi Control Structure to Threepoint Lake. Flooded standing dead trees occur in low areas, near tributary confluences and in backwater bays. Bedrock banks occur in constricted areas, there current is higher. The Grass River sub-basin lies south of the Burntwood River sub-basin and is similar in size to the Lower Nelson sub-basin (Table 6.2-5). This system begins in the west near Cranberry Portage and, similar to the Burntwood River basin, flows northeast converging with the Nelson River at Split Lake. Water bodies in this sub-basin include numerous lakes and rivers; notably, the Grass, Missipisew and Wuskatasko rivers and Wekusko, Herblet, Snow and Tramping lakes."

Saskatchewan River Basin

"The Saskatchewan River basin has the third largest drainage area in the Project Study Area (approximately 15%; Table 6.2-5). This basin begins near Flin Flon along the Saskatchewan border and flows southeast to Cedar Lake. Water bodies… shallow depth, soft substrate, higher turbidity and marsh or bog shorelines. …Flows in the Saskatchewan River are controlled by the E.B. Campbell

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Generating Station at Iskwao Rapids in Saskatchewan and by the Grand Rapids Generating Station in Manitoba. A typical water course in the southern portion of the PSA drains low boggy areas... low water velocities. Shoreline vegetation… birch, dogwood, grass/sedge, peat, poplar, or willow (Benke and Cushing 2010)."

Lake Manitoba Basin

"The Lake Manitoba basin is the second largest drainage basin in the PSA comprising 26% of its area (Table 6.2-5). This basin extends from the Lake Winnipegosis sub-basin in the north, south through the escarpment region of Manitoba to the Whitemud River sub-basin. … a diverse range of fish habitat features… Characteristic of the escarpment streams are elevated water velocity and coarse stream substrate. Once on the lowland areas adjacent to lakes Winnipegosis and Manitoba or to Swan Lake, water velocity slows and substrates shift to fine silts and organics. Shoreline vegetation is generally a combination of birch, dogwood, grass/sedge, poplar, or willow."

Assiniboine River Basin

"The Assiniboine River basin comprises 11% of the Project Study Area (Table 6.2-5). Its catchment area begins with the Shell River and Lake of the Prairies sub-basins in the northwest, flows southeast including the southwestern drainages of the Duck and Riding mountains in the Little Saskatchewan River and Birdtail Creek sub-basins, and then flows east through the sand hills region of Spruce Woods before joining the Red River at Winnipeg… Shoreline vegetation is generally a combination of Manitoba maple, ash, basswood, cattail, cottonwood, dogwood, elm… grass/sedge, or poplar (Benke and Cushing 2010). Major features of this basin include Lake of the Prairies, created on the Assiniboine River by the Shellmouth Dam, three impoundment lakes on the Little Saskatchewan River system…. Flows in the Assiniboine River are controlled by the dam at Lake of the Prairies and through the Assiniboine River Diversion at Portage la Prairie… higher elevation streams of the escarpment area in the Assiniboine River basin have higher water velocity and coarse stream substrates compared to streams in more southern lowland areas that have slower water velocity and substrates composed of fine silts and organics."

Red River Basin

"The Red River basin comprises approximately 4% of the Project Study Area and generally surrounds Winnipeg (Table 6.2-5). It is characterized by a low gradient landscape dominated by row-crop agriculture where many of the smaller water courses have been severely altered or eliminated. Major water courses… undergone shoreline modifications and flow management. Even so, water courses in this basin… are highly productive supporting a high diversity of fish. Shoreline vegetation… Manitoba maple, ash, basswood, cottonwood, elm (limited to sites where managed, due to disease), oak or willow (Benke and Cushing 2010)."

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Lake Winnipeg Basin

"The Lake Winnipeg basin comprises the smallest portion of the Project Study Area, comprising less than 1% (Table 6.2-5). The PSA… contains the small headwater streams of the Brokenhead River sub-basin… low gradient area dominated by agriculture with water courses altered for field drainage… Shoreline vegetation in this small area is generally a combination of ash, basswood, cottonwood, elm (limited due to disease), oak, spruce or willow."

6.2.4.3 Surface Water Quality 6-34

"…Given the expanse of the PSA, a large range of natural and artificially altered surface water conditions are experienced throughout the region.

..the northern half of the PSA is comprised of the Churchill and Nelson River basins, which lie within the Canadian Shield….the water is somewhat harder, more nutrient rich, and more turbid than typical Shield lakes, primarily due to the presence of the glacio-lacustrine deposits (Hecky and Ayles 1974).

…the northeast part of the Project Study Area lies within the Nelson River basin, where flows have been altered by water regulation for hydroelectric development, i.e., Churchill River Diversion (CRD) and Lake Winnipeg Regulation…. notable increases in turbidity, dissolved minerals, and phosphorous have been observed since hydroelectric development (Baker and Davies 1991; Williamson 1993).

The Burntwood River sub-basin covers the majority of the north-central region of the PSA. Water bodies within this sub-basin (includes the Rat River watershed) have well documented water quality information developed in anticipation of and/or resulting from the CRD project. The primary effects of CRD development on this system were: increased turbidity, higher concentrations of sodium, potassium, chloride, fluoride, and total phosphorous, as well as decreased conductivity, alkalinity, and concentrations of calcium and magnesium (Ramsey 1991; Williamson and Ralley 1993). These effects primarily resulted from the addition of softer Churchill River water to the system and from shoreline erosion caused by elevated water levels and increased discharge through the system. Lakes within the northern region are generally similar in chemical composition…. shallow average depths and turbulent flows…. relatively high water turbidity (Cleugh 1974).

The Burntwood River upstream of Threepoint Lake is generally the most turbid region of this system, with somewhat less turbid water in Footprint Lake (on the Footprint River). Notigi and Wapisu lakes tend to be less turbid than lakes downstream of the Burntwood River influence, such as Threepoint and Wuskwatim lakes (Bezte and Kroeker 2000).

… Because of the exceptionally high water quality within the upper Grass and upper Burntwood River systems, the CEC (1981) proposed that these waters come under a "non-degradation" objective for water quality control. Water bodies under this designation include the Grass River, Reed Lake, Simonhouse Lake, Cranberry Lakes, Tramping Lakes, and others (CEC 1982).

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The central portion of the PSA includes the eastern tip of the Saskatchewan River basin….. Lake water in this area is typically well aerated and rich in dissolved minerals (Williamson 1988). Both Clearwater and Cormorant Lakes … excellent clarity and pristine conditions. Clearwater Lake received the "High Quality Surface Water" designation from the CEC in 1989 which implies strict regulations on discharges into and development involving Clearwater Lake.

The south-central section of the PSA lies within the Lake Manitoba basin… includes Dauphin Lake, a large, shallow (mean depth 2.1 m) water body with mostly silty-clay substrates (Schaap 1987). Complete mixing caused by wind action results in elevated turbidity and water temperatures, which in turn create favourable conditions for algal blooms.

The southern extent of the PSA encompasses the eastern edge of the Assiniboine River basin and a portion of the northern tip of the Red River basin to the south... Surface water quality within the Assiniboine River and its tributaries is directly impacted by discharges from industrial, municipal, and agricultural sources. Bourne *et al.* (2002)… These activities, along with other natural processes, have resulted in excessive nutrient loading (nitrogen and phosphorous) within this system… can result in algal blooms…. agricultural development has eliminated the majority of wetlands and created an artificial drainage network that diverts most surface waters into the Red River and its larger tributaries. Water quality within the Red River… include high turbidity, varying levels of dissolved oxygen, periodic algal blooms and, in some areas, a noticeable odour (CEC 1981). Downstream of Winnipeg, detectable levels of pesticide and fertilizer residues… non-degradable chemical compounds from wastewater treatment effluents…. microbial and pathenogenic organisms…

Both the Assiniboine and Red River basin areas… water bodies are typically high in nutrient concentrations and host rich algal communities… prone to outbreaks of blue-green algae (cyanobacteria)… In Manitoba, water quality is monitored using a Water Quality Index (WQI)… Based on this index, water quality in three Manitoba ecozones was… determined to be good in the Boreal Shield and Boreal Plains ecozones and generally fair in the Prairie ecozone…"

6.2.4.4 Lower Trophic Levels 6-37

"…Aquatic invertebrates [microinvertebrates and macroinvertebrates] occupy valuable ecological roles; serving as food sources for higher trophic levels (including fish species), recycling organic materials and nutrients, and removing toxic substances from the water column… bio-indicators of environmental change….

… The southern reach of the Project Study Area encompasses the geographic range of the endangered Saskatchewan-Nelson population of the mapleleaf mussel as designated by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC)… Historic distribution of this species within the Project Study Area includes the lower reaches of the Assiniboine River as well as the Red River and its tributaries (COSEWIC 2006)."

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6.2.4.5 Fish Species and Distribution 6-38

"At least 82 species of fish representing 19 families are found within, or are likely to be found within, the Project Study Area. A list of these species by their scientific names, common names, and abbreviations is provided in Appendix 6A, Table 6A-1)… Some fish species are distributed throughout the Project Study Area, including brook stickleback,…. northern pike,… and white sucker… burbot (*Lota lota*), walleye,… troutperch,… yellow perch,… emerald shiner,… longnose dace,… and johnny darter…"

6.2.4.6 Fish Habitat and Water Courses 6-39

"…Any place that fish depend on for food, shelter, reproduction (i.e., spawning and larval rearing), growth or migration is considered fish habitat (see Section 34(1) of the *Fisheries Act*)…"

Intermittent Streams

"…Intermittent streams have well-defined banks and scoured channels, but typically have flowing water for only a portion of the year. Intermittent streams in the Project Study Area generally drain local, low-lying areas (e.g., bogs, fens, wetlands) into larger water courses. Water levels and discharge are reliant on runoff from precipitation events…. Fish habitat is generally only provided for a brief period of time during spring when these streams have water. During this time, northern pike and suckers might utilize these streams as spawning and nursery areas. Smaller forage species such as minnows and stickleback might utilize these streams whenever water is available. …an example of this type of stream is Canada Creek, a tributary to Snow Lake… used by pike and suckers for spawning during the spring. Similarly Fifty-five Mile Creek, a tributary to Wapisu Lake that crosses PR 391, is an important walleye spawning location during spring, but has little flow throughout the rest of the year… Rat Creek…provides excellent spawning habitat for white suckers and northern pike…"

Perennial Streams

"Perennial streams have well-defined channels and continuously flowing water most years… year-round fish habitat… are characterized by discrete water flow habitat types (i.e., riffle/pool/run sequences), diversified substrates (generally coarser with less organic material than intermittent streams), and beaver activity… In the Project Study Area, these streams potentially supply spawning (spring) and nursery habitat (spring to fall) for larger fish species such as northern pike and suckers. Various species of darters, minnows, sculpin, and stickleback potentially utilize these streams for all life cycle stages… include ones named as a 'creek', e.g., Bell, Brannigan, Cooks, Fetterly, Goose, Kiski, McMillan, and Moose creeks. Wachistoon Creek, a tributary to Wapisu Lake, is known to be an important spawning location for walleye.

…creeks throughout the Manitoba escarpment… potentially supply spawning and nursery habitat for brook (*Salvelinus fontinalis*), rainbow (*Oncorhychus mykiss*), and brown trout (*Salmo trutta*)…"

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Small to Moderate Sized Rivers

"In general, small to moderate sized… more diverse water flow habitat types (e.g., riffle, pool, run, falls, rapids, etc.),… provide migratory routes and habitat for a variety of large and small fish… offer spawning, nursery, foraging, and overwintering areas; however, low flows during summer, fall, and winter can limit the abundance of larger fish... Rapids and riffle habitat… spawning habitat for suckers and walleye during spring and lake whitefish (*Coregonus clupeaformis*) during fall… include: File, Hunting, Grass, La Salle, Morris, Sinclair, Taylor, Winnapedi, and Valley rivers. Manitoba escarpment small rivers potentially supply spawning and nursery habitat for brook, rainbow, and brown trout that have been introduced into the area… include the Steeprock, Garland, North Duck, and Pine rivers."

Large Rivers

"Large rivers in the Project Study Area provide migratory routes and habitat for a variety of large and small fish. Similar to smaller rivers, rapids and riffle habitat in large rivers can provide important spawning habitat for sucker and walleye during spring and lake whitefish during fall… important lake sturgeon (*Acipenser fulvescens*) habitat… important overwintering habitat for large fish… include the Assiniboine, Burntwood, Nelson, Red and Saskatchewan rivers."

Lakes and Reservoirs

"There are numerous small lakes within the Project Study Area with surface areas of 1 to 2 km2… shallow (less than 2 m), and often freeze to the bottom… precludes fish overwintering in these small water bodies and may lead to winter fish die-offs for fish that remain (known as winterkills). Fish species such as brook stickleback and pearl dace are tolerant of low oxygen conditions and are common in small Project Study Area lakes…

Moderate sized lakes that can provide life history requirements for some larger fish species year-round are generally deeper than 2 m or have inflows that prevent ice from forming to the bottom and replenish oxygen levels… Minnow species, perch, pike, stickleback, and sucker frequently inhabit these lakes… can offer superior fish foraging habitat throughout the year…

Lakes larger than 5 km2 in the Project Study Area generally provide a diversity of habitats that support all life history requirements for lake-dwelling fish species… Fish species such as burbot, goldeye, (*Hiodon alosoides)*, lake whitefish, northern pike, lake cisco (*Coregonus artedii)*, and walleye are common in lakes of this type. Some larger lakes in the Project Study Area are sufficiently deep and cold to provide habitat for cold-water fish species such as lake trout."

6.2.4.7 Aquatic Invasive Species 6-42

"The introduction of non-native species (i.e., invasive species)… The effects can be devastating on an ecosystem scale… Invasive species within the Project Study Area include two fish species (rainbow smelt and carp) and two plants (purple loosestrife, *Lythrum salicaria* and Eurasian watermilfoil, *Myriophyllum spicatum*). Table 6.2-6 lists the distribution of invasive species existing in Manitoba and also lists species on the Invasive Species Council of Manitoba's (ISCM) watch list…"

6.2.4.8 Protected Species 6-43

"There are six fish species and one mollusk species within the Project Study Area that are listed under the federal *Species at Risk Act* (SARA) or have designation via COSEWIC (SARPR 2010, COSEWIC 2010)… identified in Table 6.2-7. Most of these species (e.g., the chestnut lamprey, silver chub, bigmouth shiner, and mapleleaf mussel) are found within the southern portion of the Project Study Area (i.e., Red River and Assiniboine River basins). The shortjaw cisco is only found in Lake Athapapuskow, which is situated in the Saskatchewan River basin. Lake sturgeon has a broad distribution across the Project Study Area; however, they have a limited distribution within the Red and Assiniboine River basins (Stewart and Watkinson 2004)."

6.2.4.9 Valued Environmental Components (VECs) 6-45

"Two VECs were chosen for the aquatic environment component: surface water quality and fish habitat… -Potential Project-related effects on surface water quality include the introduction of sediments and other contaminants from right-of-way surface runoff or the release of contaminants from equipment or accidental spills… Maintaining fish habitat is best assured by minimizing short-term and avoiding long-term degradation of instream and riparian habitats."

6.2.4.10 Existing Environment at Project Components 6-45

HVdc Transmission Line

"The HVdc transmission line spans portions of five major watersheds and 18 sub-basins, including the Nelson River, Saskatchewan River, Lake Manitoba, Assiniboine River, and Red River major drainage basins (Map 6-9)… In total 317 water courses are intersected by the HVdc transmission line and include water courses that do not support fish (57), those considered to support marginal fish habitat (182) and important fish habitat (78). A detailed description of fish habitat within each water course intersected by the HVdc Transmission Line is available in the *Bipole III Aquatic Environmental Technical Report.*

The Nelson River basin… Within this watershed, the HVdc Transmission Line intersects four sub-basins (Lower Nelson River, Burntwood River, Grass River, and Upper Nelson River) and includes 155 water course crossings… A number of large a notable rivers are intersected by the transmission line, including Limestone River, Burntwood River and Partridge Crop Lake.

The Saskatchewan River basin… The transmission line intersects two sub-basins (Clearwater Lake/Moose Lake and Cedar Lake) and includes 30 water course crossings… The Clearwater Lake/Moose Lake sub-basin includes tributaries such as Frog Creek and Little Frog Creek… The Cedar

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Lake sub-basin includes the Saskatchewan River… also includes significant feeder streams such as Rall's and Iskwayanikakespeetik creeks…

The Lake Manitoba basin… the HVdc transmission line intersects five sub-basins (Lake Winnipegosis, Swan Lake, Duck Mountain, Lake Manitoba West, and Whitemud River) and includes a total of 93 water course crossings.

The northern portion of the Lake Winnipegosis sub-basin includes crossings of the Overflowing River, and Red Deer River. Further south, stream flowing off the Porcupine and Duck Mountains are intersected including the Steeprock River, Woody River and Pine River. The Whitemud River sub-basin includes a crossing of the Whitemud River… Within the Assiniboine River catchment, the HVdc transmission line crosses one subbasin (Central Assiniboine) and three water courses; notably the Assiniboine River…

The Red River drainage basin… many of the smaller water courses have been severely altered or eliminated. Within the Red River basin, six subbasins (La Salle River, Morris River, Red River South, Rat River, Seine River, and Cooks Creek/Devils Creek) are intersected and include a total of 36 water course crossings…"

Keewatinoow Converter Station & Associated Facilities

"The Keewatinoow Converter Station and associated facilities are located in proximity to the Nelson River within the Lower Nelson River sub-basin. Most of the infrastructure is located on the northwest side of the Nelson River, with only the collector lines crossing the Nelson River to the southeast shoreline.

North shore tributaries of the Nelson River between Limestone Generating Station and the Keewatinoow area… Smaller tributaries… typically do not support fish in the upper reaches if at all… Fish use of [moderate sized] streams includes migrations of large bodied species such as suckers and pike and, in many cases, the lower reaches of these moderate sized streams are used by brook trout as spawning and nursery habitat. Such streams include Goose, Tiny and Swift creeks.

The Limestone River is the largest un-impounded tributary of the lower Nelson River. It is 150 km long, has 35 tributaries (Gaboury 1978), and drains an area of approximately 3,160 km2 (MacDonell 1991). The mouth of the river enters the Nelson River immediately below the Limestone Generating Station… supports a diversity of fish including spawning migrations of lake cisco and brook trout.

The northern collector lines extend to the southeast side of the Nelson River, an area where the river is impounded by the Limestone GS. Wilson Creek, which flows into the upstream end of the Limestone Forebay is the largest tributary is this area. However, since impoundment, habitat in the lower reaches of this creek as for others has been affected."

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Keewatinoow Construction Camp

“The Keewatinoow construction camp site is situated adjacent to four watercourses: Creek Fifteen, Creek Fourteen, an unnamed tributary to the Nelson River, and the Nelson River proper. However, the camp does not overlap or encroach on any creek.

Creek Fifteen… provides important fish habitat including nursery habitat for brook trout…

Creek Fourteen… rated as marginal fish habitat and does not support fish directly.

The Nelson River is a major river system that drains into the Hudson Bay. The river is a perennial watercourse that supports a diverse fish community, providing spawning, rearing, feeding and overwintering habitat.

The unnamed tributary of Nelson River… rated as marginal fish habitat and does not support fish directly.”

AC Collector and Construction Power Lines

“There are 43 water course crossings on the rights-of-way of the northern AC collector and construction power lines, all within the Lower Nelson River sub-basin. Four water course crossings were considered to provide no fish habitat. These crossings were of wetlands, with no connection to other waterbodies. Marginal fish habitat occurred at 31 of the crossings and these were characterized as headwater wetland habitat of Nelson River tributaries. The remaining eight water course crossings support important fish habitat and include major rivers such as the Nelson and Limestone River, with known indicator and forage fish populations, as well as the lower reaches of moderate sized streams.”

Keewatinoow Converter Station and Ground Electrode

“The Keewatinoow Converter Station site is located south of Goose Creek and overlaps the saturated headwater area of an unnamed tributary of the Nelson River. Goose Creek, in this area was rated as important fish habitat,… the unnamed tributary was rated as marginal fish habitat consisting of wetland habitat with an undefined channel and no clear connection to the Nelson River…

One watercourse lies within the Keewatinoow ground electrode site. The small tributary of the Nelson River provides marginal fish habitat and is not expected to support fish within the site. The Keewatinoow ground electrode line right-of-way crosses five water courses, all of which are tributaries of the Nelson River. Three of the water courses are small wetland headwaters supporting marginal fish habitat and the remaining two, Swift Creek and Goose Creek, support important fish habitat.”

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Borrow Sites and Excavated Material Placement Areas

"Five of the Keewatinoow area borrow site locations overlap water bodies. Three sites overlap Swift Creek, and two sites overlap unnamed creeks. In addition one site is near Goose Creek, and another is near two unnamed creeks.

Fish habitat in Swift Creek differs between the borrow sites with the downstream sites overlapping higher quality habitat. These two sites on Swift Creek are approximately 1.4 and 1.7 km upstream from the confluence with the Nelson River… Fish habitat in this section of Swift Creek was rated as important and includes clusters of ground water upwelling's in the creek. In contrast the third borrow site overlaps Swift Creek approximately 2.2 km upstream from… the confluence with the Nelson River… Fish habitat was rated as Marginal in this portion of Swift Creek.

The unnamed tributaries are intermittent streams with faint channel development and were rated as marginal fish habitat.

Goose Creek in the area of the borrow sites supports important fish habitat and the two nearby intermittent unnamed creeks support marginal fish habitat.

The six excavated material placement areas do not overlap any waterbodies. The areas lie adjacent to a number of small streams and pond…

In the small streams and in areas upstream of the Conawapa access road… generally support Marginal fish habitat and fish use is limited to species such as brook stickleback and fathead minnow, if any. Creek Eighteen and the unnamed creeks would be considered Marginal fish habitat. Habitat in Creek Fifteen, and Tiny Creek is considered Important."

Riel Converter Station & Associated Facilities

"The Riel Converter Station and ground electrode lie within the Red River basin. Most of the smaller tributaries have been straightened and channelized into roadside ditches. Fish habitat is often simple with little cover or diversity and fish use is limited by access to overwintering areas…."

6.2.5 Terrestrial Ecosystems and Vegetation 6-50

6.2.5.1 Overview 6-50

6.2.5.2 Summary by Ecozone 6-50

"Descriptions of the ecozones and ecoregions of the Project Study Area (Maps 6-2 and 6-3)… Vegetation descriptions are provided in the *Bipole III Terrestrial Ecosystems and Vegetation Technical Report*. Map Series 6-1000 provides an overview of forest cover and distribution in the Project Study Area."

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Hudson Plain Ecozone

"In Manitoba, The Hudson Plain Ecozone is located in the north east corner of the Province. Within it, only the Hudson Bay Lowland Ecoregion is overlain by the Project Study Area… The ecozone is largely characterized with wetlands of bogs and fens."

Hudson Bay Lowland Ecoregion

"The Hudson Bay Lowland Ecoregion is part of the Hudson Plain Ecozone. It occurs in the northeastern portion of the Project Study Area. This ecoregion forms part of the transition between the boreal forest to the south and the tundra to the north…"

Taiga Shield Ecozone

"The Taiga Shield is a large ecozone covering the northwest corner of Manitoba with rolling uplands and lowlands. Only the Selwyn Lake Upland Ecoregion is included within the Project Study Area… this ecozone is a transition from the extensively forested Boreal Shield Ecozone to the south and the Southern Arctic Ecozone to the north…"

Selwyn Lake Upland Ecoregion

"The Selwyn Lake Upland Ecoregion is part of a broad area of coniferous forest transition, present in the northeastern portion of the Project Study Area. Typically this ecoregion ranges from closed coniferous boreal forest to open stands of low black spruce with an understory of dwarf birch…"

Boreal Shield Ecozone

"In Manitoba, the Boreal Shield Ecozone extends along the east side of Lake Winnipeg, and north of the lake from the Ontario border west to the Saskatchewan border north of The Pas. It is the largest ecozone in the Province. The Project Study Area includes portions of the Churchill River Upland and the Hayes River Upland Ecoregions…"

Churchill River Upland Ecoregion

"The Churchill River Upland Ecoregion is located along the southern edge of the Precambrian Shield and extends westward from the Grass River to the Saskatchewan border. As indicated in Map 6-3, this ecoregion includes much of the northern portion of the Project Study Area…"

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Hayes River Upland Ecoregion

"The Hayes River Upland Ecoregion is located northeast of Lake Winnipeg and extends east into northwestern Ontario. The Hayes River Upland Ecoregion, together with the Churchill River Upland Ecoregion, includes much of the northern portion of the Project Study Area."

Lake of the Woods Ecoregion

"The Lake of the Woods Ecoregion is part of the Boreal Shield Ecozone. Small portions of the extreme southeastern section of the Project Study Area east of Winnipeg lie within this ecoregion. The region is forested with mixed forests… "

Boreal Plain Ecozone

"The Boreal Plain ecozone has four distinct ecoregions in Manitoba that include much of the west-central portion of the Project Study Area. These include the Mid-Boreal Lowland, the Boreal Transition, the Mid-Boreal Upland and the Interlake Plain Ecoregions, which are overlaid by the study area. A smaller portion of the southeast portion of the Project Study Area, east of Winnipeg, overlaps the Interlake Plain Ecoregion of the ecozone…"

Mid-boreal Lowland Ecoregion

"The Mid-Boreal Lowland Ecoregion is the northernmost ecoregion within the Boreal Plains Ecozone in Manitoba. The ecoregion skirts the west side of Lake Winnipeg from Riverton north and includes the northern two thirds of Lake Winnipegosis and areas north of the Porcupine Mountain to the southern boundary of the Boreal Shield Ecozone…"

Boreal Transition Ecoregion

"The Boreal Transition Ecoregion is part of the Boreal Plain Ecozone and consists of a narrow belt of wooded upland bordering Riding Mountain, Duck Mountain and part of the gap between Duck Mountain and Porcupine Hills. This ecoregion is present in the central and very southern portion of the Project Study Area…"

Mid-Boreal Uplands Ecoregion

"The Mid Boreal Uplands Ecoregion occurs as three separate elevated uplands along the Manitoba Escarpment known as the Porcupine Hills, Duck Mountain and Riding Mountain. This mixed forest ecoregion…"

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Interlake Plain Ecoregion

"The Interlake Plain Ecoregion extends in a broad arc from the United States-Canada border at the southeastern edge of the Manitoba Plain, northwestward across the southern Interlake/Westlake region to the Saskatchewan border at Red Deer Lake. It is a mosaic of farmland and forest marking the southern limit of closed, mixed boreal forest and northern and eastern extent of commercial agriculture."

Prairie Ecozone

"The Prairie Ecozone extends from the United States border to the Red River in eastern Manitoba. This ecozone includes three ecoregions in Manitoba that are overlain by the study area. The Aspen Parkland Ecoregion includes the western portion of the Project Study Area, the Lake Manitoba Plain Ecoregion covers most of the southeastern study area, and the Southwest Manitoba Uplands Ecoregion overlaps a smaller section of the central portion of the southern study area. The landscape is characterized by level to rolling or gently undulating terrain. Agricultural crops dominantly represent the vegetation…"

Aspen Parkland Ecoregion

"The Aspen Parkland Ecoregion is dominant in the south-central and southwestern portion of the province and occupies a small area between the Riding and Duck Mountains…"

Lake Manitoba Plain Ecoregion

"The Lake Manitoba Plain Ecoregion stretches northwestward from the International Boundary to Lake Dauphin in southern Manitoba. The Manitoba Escarpment marks its western boundary…"

Southwest Manitoba Uplands Ecoregion

"The Project Study Area overlays the Southwest Manitoba Uplands Ecoregion, located in south-central Manitoba. It represents a mosaic of farmland and forest stands…"

6.2.5.3 Important Communities and Habitats 6-55

Manitoba Conservation Listed Communities

"Terrestrial communities of conservation concern in the Province are listed by the Manitoba Conservation Data Centre (MCDC). In the Project Study Area, six ecoregions support vegetation communities of concern listed by the MCDC. These ecoregions include the Lake Manitoba Plain, Interlake Plain, Boreal Transition, Aspen Parkland, Mid-Boreal Lowland and Mid-Boreal Upland (Map 6-11). Twelve communities of concern are listed in the six ecoregions and all have the potential to occur in the Project Study Area. These include: two very rare communities (S1), two rare communities

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(S2), five uncommon communities (S3), and three communities ranked as uncommon to widespread (S3S4). These communities are either forest, wetland or grassland types and include the following:

- Big Bluestem-Prairie Dropseed-Little Bluestem herbaceous vegetation (S1) – Grassland;
- Plains Rough Fescue-(Spear Grass) herbaceous vegetation (S1) – Grassland;
- Alkali Grass-Wild Barley-Nuttall's Salt Meadow Grass-Seaside Plantain saline herbaceous vegetation (S2) – Wetland Herb;
- Green Ash-American Elm-(Hackberry, Basswood) forest (S2) – Broadleaf;
- Little Bluestem-Grama Grass (Blue, Side-oats)-Thread-leaved Sedge herbaceous vegetation (S3) – Grassland;
- Green Ash-(American Elm)-Manitoba maple forest (S3) – Broadleaf;
- Needle-and-thread-Blue Grama-Thread-leaved Sedge herbaceous vegetation (S3) – Grassland;
- Common Reed herbaceous vegetation (S3?) – Wetland Herb;
- Bur Oak-Saskatoon Serviceberry-Sarsaparilla-Assiniboia Sedge forest (S3?) – Broadleaf;
- Trembling Aspen-Bur Oak-Sarsaparilla forest (S3S4) – Broadleaf;
- Sandbar Willow shrubland (S3S4) – Wetland Shrub; and
- Sprangletop herbaceous vegetation (S3S4) – Grassland."

Grasslands and Prairie Areas

"Grassland and prairie areas represent an important cover type in the Project Study Area as they have the potential to support federally and provincially protected species. Thirteen plant species that are listed as protected have the potential to occur in the southern portion of the Project Study Area and include rough purple false-foxglove… Gattinger's agalinis… buffalo grass… hackberry … smooth goosefoot… small white lady's-slipper… hairy prairie-clover… western prairie fringed orchid… Riddell's goldenrod… great plains ladies'-tresses… western silvery aster… western spiderwort… and Culver's-root...

Preferred habitat for these species generally ranges from dry sandy areas to moist prairies… only a few undisturbed natural areas remain today… Figure 6.2-1 illustrates locations of native grassland and cultivated sites included with the mixed-grass prairies in southern Manitoba."

Salt Marshes

"Salt marshes are areas with high salt concentrations. These areas are important habitats as they may support a unique community of invertebrates or epiphytic algae adapted to these conditions (Londry *et al.* 2005)… Saline areas are found within the Project study area…"

Wetland Communities

"In Manitoba… wetlands cover 233,340 km2 or 43% of the terrestrial landscape, with peatlands representing 90% of all wetlands… There are several threats to wetlands that include agricultural runoff, drainage, forestry activities, off-road vehicles, peat extraction, and right-of-way activities

(Foster *et al.* 2004). Four wetland classes… occur within the Project Study Area including bog, fen, marsh and swamp."

6.2.5.4 Species of Conservation Concern 6-59

"The term "species of conservation concern" includes species that are rare, disjunct, or at risk throughout their range in Manitoba and require further research... Two hundred and three species of conservation concern are known to occur in the Project Study Area (Appendix 6A, Table 6A- 2). These include 125 species ranked by the MCDC as very rare to rare (S1, S1S2, or S2)… Forty-eight species are listed as rare to uncommon (S2S3 to S3); eight are listed as uncommon to widespread (S3S4); and 22 are listed as either historical, possibly in peril, or with a rank of "not applicable". Map 6-12 illustrates the locations of plants of conservation concern in the Project Study Area.

One-hundred and seven vascular plants of concern have been recorded in the Aspen Parkland Ecoregion (Map 6-13)… The Interlake Plain and the Lake Manitoba Plain Ecoregions each have 89 species of concern… large portions of these ecoregions are located in the Project Study Area...

A brief description of these species is found below."

Rough Purple False-foxglove

"Rough purple false-foxglove is listed as endangered by SARA and COSEWIC, and is ranked as very rare to rare throughout its range by the MCDC… In Manitoba, populations have been previously recorded in the south Interlake, Brandon area, and south of Bird's Hill Provincial Park which was the first known occurrence east of the Red River (Friesen and Murray 2010)."

Small White Lady's-slipper

"Small white lady's-slipper is listed as endangered by SARA, MESA, and by COSEWIC. The MCDC ranks the conservation status of this orchid as very rare throughout its range or in the province… Populations have been recorded at Brandon, in the Interlake near St. Laurent, near Steinbach and at the Tall Grass Prairie Preserve in the Stuartburn-Vita area."

Smooth Goosefoot

"Smooth goosefoot is listed as threatened by SARA, endangered by COSEWIC, and the MCDC conservation status for this plant is very rare throughout its range… In Manitoba, the species is known to occur in the area of the Routledge Sandhills (Hamel and Foster 2005)."

Hackberry

"Hackberry is listed as threatened by MESA and is listed as very rare by the MCDC… In Manitoba, hackberry is found on beach ridges at the south end of Lake Manitoba and in dry prairie habitats in the southwestern portion of the province (Reimer and Hamel 2003)."

Hairy prairie-clover

"Hairy prairie clover is listed as threatened by the SARA, MESA, and COSEWIC. The MCDC ranks the conservation status of this plant as rare throughout its range or in the province… In Manitoba, this plant has been observed south of Portage la Prairie, southwest of Carberry and west of Souris (Reimer and Hamel 2002)."

Riddell's Goldenrod

"Riddell's Goldenrod is listed as threatened by MESA, and is listed as a species of concern by SARA and COSEWIC. The MCDC ranks this plant as rare in the province… In Manitoba, populations occur in the southeastern portion of the province at Kleefeld, Gardenton and Green Ridge (Reimer and Hamel 2003)."

Culver's-root

"Culver's-root is listed as threatened under MESA and is ranked as very rare by the MCDC… In Manitoba, populations of Culver's-root occur around the Tall Grass Prairie Preserve and in the RM of Franklin in southern Manitoba. One disjunct population was known to occur along the southern portion of the Project Study Area near Kleefeld (Hamel and Foster 2005).

One non-vascular species (a fungus) is also known to occur in the Project Study Area, that being flooded jellyskin (*Leptogium rivulare*). Three ecoregions, the Aspen Parkland, Lake Manitoba Plait and Interlake Plain, have recorded protected species (SARA and MESA) in the Project Study Area."

6.2.5.5 Plants and Resource Use 6-62

"There are approximately 1,075 plant species that have the potential to occur in the Project Study Area. Many of these plant species are considered botanical resources and are used by Aboriginal and local people (see Domestic Resource Use)."

6.2.5.6 Fire in the Boreal Forest 6-62

"In Canada, the forest fire season generally starts in April and can continue until mid-October (Stocks *et al.* 2003)… lightning fires represent 45% of all fires and 81% of the area burned. The majority of human-caused fires are in southern regions of Canada that are heavily populated…

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In the Boreal Shield Ecozone, wildfire is a frequent event that has a large effect on the vegetation composition and age distribution of forest stands. Due to the common occurrence of fire, the landscape of the ecozone consists of a mosaic of stands of varying ages, wetlands and bedrock outcrops. Upland forests are often younger than 150 years (Smith *et al.* 1998). Map 6-14 shows the Forest Fire Histroy for fires over 900 hectares in the Project Study Area."

6.2.5.7 Valued Environmental Components 6-63

"Two VECs were identified and include species of conservation concern, and native grassland/prairie areas, and are briefly discussed below."

Plant species/communities of conservation concern

"… Plants species of conservation concern were identified as a VEC and utilized in the assessment due to the low abundance of these species and the need to protect them either provincially, federally or as a result of them being listed by the MCDC as very rare to uncommon."

Native Grassland/Prairie Areas

"Native grasslands are important sites, as these ecosystems once existed over large areas, but only remnant prairie areas remain today. Grasslands and prairie areas were identified as a VEC and utilized in this assessment because these areas are known to support species of conservation concern and because this ecosystem is among the most threatened in North America. A loss in the amount of native grasslands could result in a reduction of species found in these areas."

6.2.5.8 Existing Environment at Project Components 6-64

"The following sections describe the specific existing environment for the Project components…"

HVdc Transmission Line

"The local study area and preferred route ROW both intersect five ecozones and eight ecoregions. The Boreal Plains and Prairies Ecozones represent the greatest area for the Local Study Area and preferred route ROW. The ecoregions (division of ecozones) include the Hudson Bay Lowland, Selwyn Lake Upland, Churchill River Upland, Hayes River Upland, Mid-Boreal Lowland, Interlake Plain, Aspen Parkland, and Lake Manitoba Plain."

Vegetation Cover Types

"Twenty-one cover types from the Land Cover Classification Enhancement for the Bipole III line (LCCEB) occur within the Local Study Area of the preferred route… Within the Local Study Area, the annual cropland cover type occupies the greatest area, with 112,563 ha, and represents 16% of the total land area… Nine other extensive cover types (less than 3%) that occur within the Local Study Area

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include wetland shrub (72,978 ha), coniferous dense (68,954 ha), coniferous open (62,409 ha), grassland (55,179 ha), shrub tall (53,676 ha), wetland herb (49,452 ha), wetland treed (47,387 ha), broadleaf open (40,350 ha) and broadleaf dense (26,552 ha). Within the preferred route ROW, the greatest land area was occupied by the annual cropland cover type with 1,492 ha and a total land area proportion of 16%. The eight extensive cover types (>3%) within the ROW include coniferous dense (1,021 ha), coniferous open (913 ha), shrub tall (807 ha), wetland shrub (789 ha), grassland (756 ha), wetland treed (670 ha), wetland herb (604 ha) and broadleaf open (559 ha)."

Vegetation Community Types

"One hundred and nineteen plots were sampled along the preliminary preferred route to describe the vegetation community types… The community types are listed below for each ecoregion, with detailed descriptions for each provided in the *Bipole III Terrestrial Ecosystems and Vegetation Technical Report*."

Hudson Bay Lowland Ecoregion:

"*Coniferous Forest*: Open Black Spruce—Coniferous/ Schreber's Moss; Open Black Spruce—Coniferous/ Reindeer Lichen—Peat Moss; Regenerating Open Jack Pine— Black Spruce/ Labrador Tea
Wetland: Treed Black Spruce Bog"

Selwyn Lake Upland Ecoregion:

"Coniferous Forest: Open Black Spruce—Coniferous/ Splendid Feather Moss; Regenerating Jack Pine/ Tall Shrub
Wetland: Sedge Fen"

Churchill River Upland Ecoregion:

"Coniferous Forest: Open Black Spruce/ Schreber's Moss; Open Jack Pine –Black Spruce/ Splendid Feather Moss; Sparse Black Spruce/ Labrador Tea
Mixed Forest: Open Trembling Aspen Mixed/ Green Reindeer Lichen
Wetland: Treed Black Spruce Bog; Willow Riparian; Sedge Fen"

Hayes River Upland Ecoregion:

"Coniferous Forest: Open Black Spruce/ Labrador Tea/ Schreber's Moss; Open Black Spruce/ Labrador Tea/ Reindeer Lichen; Sparse Black Spruce/ Reindeer Lichen; Sparse Black Spruce—Jack Pine/ Green Reindeer Lichen; Open Tamarack—Black Spruce/ Peat Moss; Regenerating Open Conifer
Mixed Forest: Closed Trembling Aspen Mixed; Trembling Aspen Mixed/ Green Alder; Closed White Spruce—Balsam Poplar; Treeless Regenerating Jack Pine Mixed
Deciduous Forest: Closed White Birch; Graminoid Wetland; Treed Black Spruce/ Peat Moss Bog"

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Mid-Boreal Lowland Ecoregion:

"Coniferous Forest: Jack Pine/ Green Reindeer Lichen; Regenerating Jack Pine; Black Spruce-Tamarack/Labrador Tea-Common Horsetail/Feathermoss; Black Spruce/Splendid Feathermoss; Tamarack/Speckled Alder/Peat Moss
Mixed Forest: Jack Pine-White Spruce-Trembling Aspen/Common Juniper/Feathermoss
Wetland: Wet Sedge Meadow; Treed Black Spruce-Tamarack/Peat Moss Bog; Sparse Black Spruce/Labrador Tea/Peat Moss-Feathermoss"

Interlake Plain Ecoregion:

"Coniferous Forest: Closed Black Spruce-Coniferous
Mixed Forest: Open Trembling Aspen-Mixed /Tall Shrub; Closed Deciduous-Mixed
Deciduous Forest: Closed Deciduous/Tall Shrub
Wetland Type: Salt Marsh"

Lake Manitoba Plain Ecoregion:

"Deciduous Forest: Sparse Trembling Aspen-Balsam Poplar; Closed Trembling Aspen/Bluegrass; Open Trembling Aspen-Bur Oak/Tall Shrub; Closed Bur Oak
Grassland: Mixed Grass
Wetland: Sedge Wetland; Cattail or Reed Canary Wetland Riparian Habitat and Wetlands

The total amount of riparian habitat found along the Local Study Area is approximately 103,463 ha… Along the ROW, the total area of riparian habitat is 957 ha…

The total area of all wetlands along the Local Study Area is approximately 137,701 ha… bog wetlands… is 36,358 ha… Fen wetlands… 90,135 ha… Marsh wetlands… 11,207 ha. The total area of all wetlands along the preferred route is approximately 1,456 ha with 272 ha represented by bog wetlands, 1,046 ha by fen wetlands, and 138 ha by marsh wetlands."

Plants and Distribution of Species

"A total of 457 plant taxa were observed in the Local Study Area (Appendix 6A, Table 6A-3). All plants were grouped by primitive vasculars (eg. ferns and horsetails), gymnosperms (conifers), angiosperms (flowering plants) and non-vascular plants…
Twenty-seven species of the flora observed in the Local Study Area were introduced… Invasive plant species included Canada thistle (*Cirsium arvense*), white sweetclover (*Melilotus alba*), yellow sweetclover (*Melilotus officinalis*), purple loosestrife (*Lythrum salicaria*), and reed canarygrass (*Phalaris arundinacea*)."

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Species of Conservation Concern

"Twenty nine records of species of conservation concern (two point and 27 polygon) were previously known to occur in the Local Study Area and 15 records were previously known to occur along the ROW… Eleven of the 15 records occurring along the ROW are listed historical by the MCDC. Map 6-12 shows the locations for species of conservation concern along the preferred route. No species listed by COSEWIC, SARA or MESA were known to occur along the route. No previously known communities of conservation concern listed by the MCDC were identified along the preferred route.

In 2010, botanical surveys identified 14 species of conservation concern (26 locations) within the local study area of the preferred route…Map 6-13 shows the location for these species. Hairy prairie-clover is also listed as threatened by COSEWIC and is protected by SARA and MESA. Hairy prairie-clover was observed at one location in the Local Study Area… No communities of conservation concern (listed by the MCDC) were identified during the 2010 field assessments.

Nine species of conservation concern were observed in the vicinity of the preferred route during surveys conducted for Swan Lake First Nation (Reeves 2011)… "

Fire History

"The fire history along the preferred route has been assessed by ecoregion using available data from 1928 to 2010 (Map 6-14)…"

[MWL: Adapted text]
Summary of forest fires by Ecoregion with amount of land burnt that intersected the ROW:

- Three fires in the Hudson Bay Lowland burnt 237 of the 350 ha of land (67%)
- One fire in the Sewlyn Lake Upland Ecoregion burnt 52 ha of land (100%)
- Five fires in the Churchill River Upland Ecoregion burnt 322 of the 746 ha of land (43%)
- Nine fires in the Hayes River Upland burnt 693 ha of land (35%)
- Nine fires in the Mid Boreal Lowland Ecoregion burnt 344 ha (19%)
- Thirteen fires in the Interlake Plain Ecoregion burnt 574 of 1,252 ha of land (45%)
- Eight fires in the Lake Manitoba Plain Ecoregion burnt 384 of 2,994 ha of land (12%)]

Environmentally Sensitive Sites

"Environmentally sensitive sites identified from the assessment of the HVdc transmission line include dry upland prairies, salt marshes/flats, patterned fen wetlands, areas that support species of conservation concern, and areas of botanical importance identified through ATK. These sites were identified as being environmentally sensitive as they have greater potential for occupying species of concern (i.e., dry upland prairies, and patterned fens), may contain unique species (i.e., salt marshes/flats), and support plants of medicinal and cultural value (i.e., ATK sites).

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All grassland sites visited during the 2010 fieldwork season are considered agricultural pastureland… A drier mixed grass prairie was also identified through Forest Resource Inventory Mapping… several plant species of conservation concern observed (American bugseed, linear-leaved pucoon, Schweinitz's flatsedge). One site supported hairy prairie-clover, a species protected by SARA and MESA... The dry upland prairie ridge sites have the best variety of native prairie observed along the preferred route… The total area of the dry upland prairie ridge sites within the local study area was 428 ha with 348 (81%) occurring in the Lake Manitoba Plain Ecoregion. Within the ROW, only the Lake Manitoba Plain includes dry upland prairies and these sites occupy an area of 9 ha.

…The total area of salt marshes within the Local Study Area covers 712 ha. Along the ROW, salt marshes… cover an area of 6 ha. Salt flats (FRI data source) … within the Local Study Area covers 212 ha. Along the ROW, salt flats… cover an area of 1 ha.

Patterned fen complexes are composed of narrow ridges of peat that have wet depressions between the ridges… The total area occupied by primary patterned fen classes within the local study area is 45,967 ha while 535 ha occurred within the ROW. The Mid-Boreal Lowland has the largest area of patterned fens in the ROW with 396 ha. This ecoregion represents 74% of the patterned fens within the ROW…. Oblong-leaved sundew (*Drosera anglica*) and slender-leaved sundew (*Drosera linearis*) were two species of concern observed in patterned fen wetlands."

Keewatinoow Converter Station & Associated Facilities

"The Keewatinoow Converter Station occurs in the Hudson Bay Lowland Ecoregion and occupies an area of approximately 120 ha. Five cover types occur in the footprint with shrub tall being dominant (103 ha). The other types include exposed land, coniferous open, coniferous sparse, and wetland shrub. The area of riparian habitat found within the Project Footprint is approximately 15 ha.

The proposed Keewatinoow Converter Station site consists dominantly of black spruce (*Picea mariana*) with Labrador tea (*Rhododendron groenlandicum*) as the major understory shrub. Several open bog areas with surface water also occur in the area. The northern part of the site is a regenerating burn, with standing dead trees. Based on fire history records, 94% (113 ha) of the area was previously burned…. No species of conservation concern were observed at the Keewatinoow Converter Station site."

Construction Power Station

"The Keewatinoow construction power station occupies an area of approximately 2 ha and occurs in the Hudson Bay Lowland Ecoregion. The two cover types that are represented include exposed land (1.4 ha) and shrub tall (0.8 ha). A substantial portion of the proposed site for the construction power station has already been degraded of vegetation… The western part of site is a regenerating burn area… Snow willow (*Salix vestita*) was the only species of conservation concern observed at the proposed construction power station site. This species is ranked as uncommon (S3) by the MCDC."

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AC Collector and Construction Power Lines

"The northern ac collector lines and the construction power line are in the Hudson Bay Lowland Ecoregion. The northern collector lines occupy an area of approximately 822 ha, 160 ha for the Long Spruce to Henday and 24 ha for the construction power line… For the northern collector lines, the dominant cover types are coniferous sparse (280 ha) and wetland shrub (218 ha) while wetland shrub is the dominant cover type for the Long Spruce to Henday transmission line (80 ha) and construction power line (12 ha). The total riparian habitat found along the AC collector lines and construction power line ROWs is 193 ha with the largest area found along the northern collector lines (193 ha)… Both bog and fen wetlands occur along the Long Spruce to Henday transmission line with 54 ha and 37 ha respectively, while only bogs wetlands are found in the northern collector (544 ha) and construction power line (6 ha) ROWs.

Fire history records for the area identified that 228 ha (28%) has burned for the northern collector lines, 15 ha (61%) for the construction power line and 32 ha (20%) for the Long Spruce to Henday transmission line. Along the northern collector lines ROW, blue-grass (*Poa arctica* ssp. *caespitans*) was previously known to occur, which is ranked as a species that is possibly in peril, but the status is uncertain (SU) and more information is needed. As the location of the AC collector lines and construction power line ROWs were not finalized until the winter of 2011, field assessments for these components were not completed and pre-construction surveys for species of conservation concern will be conducted for these ROWs."

Northern Ground Electrode

"The Keewatinoow ground electrode site (NES6) and distribution line right-of-way occupy approximately 401 ha and 44 ha respectively, and both occur in the Hudson Bay Lowland Ecoregion… The dominant cover types for the northern ground electrode site are wetland shrub (142 ha) and coniferous open (127 ha) while expose land (15 ha) and shrub tall (14 ha) were dominant for the distribution line. The total area of riparian habitat for the ground electrode site is 49 ha and 12 ha for the distribution line. Only bog wetlands were known to occur within the project footprint and occupy an area of 137 ha. Fire history records identified that 147 ha (37%) and 0.4 ha (1%) have been burned for the ground electrode and distribution line, respectively… Several small bogs and a large pond are present at this site. No species of concern were observed at this site."

Keewatinoow Construction Camp

"The construction camp occurs in the Hudson Bay Lowland Ecoregion and will occupy an area of approximately 28 ha… shrub tall as the dominant type with an area of 18 ha. The construction camp also includes 7 ha of riparian habitat. Fire history records show that 12 ha (42% of the area) of land was burned from fires occurring in 1976 and 1994."

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Borrow Sites

"Borrow source locations will be located along the ROW wherever possible in order to minimize environmental effects, haul distances and cost. The potential northern borrow and excavated material placement sites occur in the Hudson Bay Lowland Ecoregion… The cover types and combined area of borrow sites include exposed land (30 ha), shrub tall (63 ha), wetland treed (10 ha), wetland shrub (29 ha),… coniferous dense (98 ha)… The cover types and combined area for the excavated material placement sites include exposed land (9 ha), shrub tall (77 ha), wetland treed (24 ha), wetland shrub (5 ha)…"

Riel Converter Station & Associated Facilities

"The Riel Converter Station is located in the Lake Manitoba Plain Ecoregion… In the spring and summer of 2008, surveys for rare vascular plants were conducted around the area proposed for development… No species of conservation concern were identified during the surveys.

The southern ground electrode is located in the Interlake Plain and Lake Manitoba Plain Ecoregions, and occupies areas of 44 ha and 227 ha, respectively… annual cropland as the dominant cover (257 ha) followed by developed land, grassland, and broadleaf dense. As a result of this site being identified and selected in the winter of 2010, a field assessment at this site was not completed and therefore a pre-construction survey for species of conservation concern will be conducted for the southern ground electrode site."

6.2.6 Mammals and Habitat 6-73

6.2.6.1 Overview 6-73

"Mammal species are important components of the biophysical and socio-economic environments… The sustainability of habitat is an important consideration to maintain mammal species on the landscape for future generations.

… In the southern portion of the Project Study Area, approximately half of all naturally occurring wildlife habitat has been converted from tree and native grass cover to agricultural landscapes… The remaining habitat is dominated by forest with scattered concentrations of wetlands (Prairie Pothole Region), shrub lands and small remnant grasslands. The western portion of the Project Study Area is a transition zone, where habitats range from agricultural landscapes, wetlands, and shrub lands to boreal forest. The northern portion of the Project Study Area is dominated by Precambrian granitic outcrops, boreal forest, lakes, wetlands, and the boreal-tundra transition zone.

This section provides information on the following:

- Mammal groups in the Project Study Area;
- Summary by ecozones;
- Species at risk;

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- VECs; and
- Existing environment at Project Components."

"A total of sixty-eight mammal species have been documented within the Project Study Area (Appendix 6A, Table 6A-4). Mammals are organized in one of three major mammal groupings: Ungulates; Furbearers; and Small mammals.

Large predator species such as the grey wolf play an important role in the overall mammal ecology in the Project Study Area, and as such are discussed separately from the three aforementioned mammal groupings."

Ungulates

"Ungulates are important game and prey species for a variety of predators. In the Project Study Area, they include migratory caribou, including boreal woodland and coastal (forest tundra ecotype) caribou…, barren ground caribou…, moose…, elk…, and white tailed deer. Mule deer… occur in the south west portion of the Project Study Area in low densities as the Project Study Area is on the fringe of known range. For the purpose for the Project EIS, ungulate VECs include boreal woodland caribou, coastal and barren ground caribou, moose and elk.

The primary ungulate species found in the northern portion of the Project Study Area include caribou and moose. Caribou are generally identified by two major sub-species and three ecotypes. These include sedentary boreal woodland caribou and migratory caribou which groups coastal or forest/tundra ecotype with barren-ground caribou. Migratory caribou are identified loosely as two major ecotypes; the forest/tundra caribou ecotype (Pen Islands and Cape Churchill herds) and the barren ground caribou ecotype (Beverly-Qamanirjuaq) (Map 6-15). The Manitoba barren ground and coastal caribou populations are located above the northern extent of the boreal woodland caribou range and are not protected under the Manitoba *Endangered Species Act*.

Moose are widespread across the northern and southern coniferous forest areas found in the Project Study Area (Map 6-16). Common ungulates found in the south portion of the Project Study Area extending towards the central portion of the area include whitetailed deer and elk; (Map 6-17)… White-tailed deer are found throughout the Project Study Area south of Red Deer Lake and likely occur at low to moderate densities near Red Deer Lake and at high densities near agricultural areas in the southern portion of the Project Study Area. … their persistence is both temporally and spatially sporadic across northern landscapes."

Furbearers

"Examples of mammals in the furbearer group are American marten…, beaver…, fisher…, otter…, mink…, short tailed weasel…, red fox…, coyote…, and grey wolf.... There are also many species of

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small mammals (shrews, mice, voles, lemmings, ground squirrels, hares, and bats). The distribution and relative abundance of furbearers in the province has been well documented through fur harvest statistics… Densities of species such as badger and long-tailed weasel… have declined in southern Manitoba… species such as beaver and raccoon are present in much higher densities than they were 50 years ago (Stardom, 1986).

Trapping records obtained from Manitoba Conservation (Manitoba Conservation unpublished data 2009) identify a total of 22 furbearing species harvested in the Project Study Area. Between 1996 and 2008 the most common species trapped included beaver, marten, and muskrat… The species of greatest economic importance for the fur industry include American marten, wolverine…, otter and lynx... Based on the VEC selection criteria), America marten, beaver and wolverine were selected as VECs for the purpose of the Project."

Small Mammals

"Small mammals serve as a main food source for furbearer species, including VEC and VEC linkage species outlined in this report (marten, wolverine and wolf). The abundance and distribution of small mammals influences the distribution and utilization of habitat by VEC and VEC linkage species. The small mammal community consists of a variety of species of bats, mice, voles, shrews, squirrels, chipmunks, hares and rabbits. In all, a total of 41 species or roughly half of all mammals expected to occur within the Project Study Area are small mammals… No small mammals in the Project Study Area are listed in protection legislation or rely on rare or endangered habitats… Bats such as the little brown bat… occur in the Project Study Area… Snowshoe hare… are common throughout and woodchuck… is more dominant in the northern portion where ground squirrels such as the thirteen-lined ground squirrel… are commonly found (Banfield 1974)."

6.2.6.3 Summary by Ecozone 6-76

"The following provides detailed habitat descriptions for the various ecological regions and common mammal species found throughout the Project Study Area."

Taiga Shield Ecozone

"…Common mammals found in the Taiga Shield Ecozone include arctic fox, barren-ground caribou, black bear, brown lemming (*Lemmus sibiricus*), grey wolf, moose, polar bear, and weasel (Smith *et al.* 1998)."

Hudson Plain Ecozone

"…Common mammals of the Hudson Plains Ecozone include American marten, arctic fox (*Alopex lagopus*), black bear, coastal caribou, grey wolf, lynx, moose, and muskrat. Polar bears (*Ursus maritimus*) are common along the coast of the Hudson Bay (Smith *et al.* 1998; Natural Resources Canada 2007)."

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Boreal Shield Ecozone

"…Common mammals found in this ecozone include American marten, beaver, black bear, fisher, grey wolf, lynx, mink, moose, muskrat, snowshoe hare (*Lepus americanus*), striped skunk (*Mephitis mephitis*), white-tailed deer, and woodland caribou (Smith *et al.* 1998; Environment Canada 2000)."

Boreal Plain Ecozone

"…Mammals common to the Boreal Plains Ecozone in Manitoba are beaver, snowshoe hare, white-tailed deer, moose, elk, red fox, coyote, black bear, American marten, fisher, and lynx (Pattie and Hoffman 1990; Smith *et al.* 1998)."

Prairie Ecozone

"…Common mammals found in this Manitoba ecozone include: elk, white-tailed deer, coyote, red fox, badger, white-tailed jack rabbit (*Lepus townsendii*), eastern cottontail rabbit (*Sylvilagus floridanus*), striped skunk, Richardson's ground squirrel (*Spermophilus richardsonii*), red-backed vole, deer mouse (*Peromyscus maniculatus*), and northern pocket gopher (*Thomomys talpoides*) (Pattie and Hoffman 1990; Smith *et al.* 1998)."

6.2.6.4 Species at Risk 6-78

"Of the 68 mammal species that have been documented within the Project Study Area, seven species are provincially or federally listed (Appendix 6A Table 6A-4) (Burt 1980; Jones *et al.* 1985). Of the seven listed species, three have been extirpated (grizzly bear [*Ursus arctos*], swift fox [*Vulpes velox*] and pronghorn [*Antilocapra Americana*]) (MESA 2010; SARA 2002). However, it is important to note that these three species have been observed and are rare or occasional visitors to the Project Study Area (Pattie and Hoffmann 1990). Of the remaining listed species, two species are reviewed as VECs for the purpose of the Project: boreal woodland caribou and wolverine. Boreal woodland caribou are currently listed as threatened both federally under the *Species at Risk Act* (SARA) and provincially under MESA (*The Endangered Species Act* [Manitoba])… Wolverine are currently listed as a species of Special Concern in Manitoba and are listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), with population considered stable to increasing (COSEWIC 2003)."

6.2.6.5 Valued Environmental Components 6-78

"The environmental assessment investigated Project effects on the following VECs:

- Ungulates: Coastal and barren ground caribou; boreal caribou, moose, and elk.
- Furbearers: American marten, beaver; and wolverine.

Grey wolves were also included in the environmental assessment process as a VEC Linkage Species due to their potential effects on VEC species through increased predation impacts potentially associated

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with linear development. The *Bipole III Mammals Technical Report* and the *Bipole III Caribou Technical Report* contain detailed information and analysis on all VECs discussed herein."

Ungulates

Coastal and Barren Ground Caribou

"In the far northern extent of the Project Study Area, migratory caribou (coastal and barren ground) are occasional migrants and occupants. These include the coastal populations, which are the Pen Island and Cape Churchill herds, and the Beverley Qamanirjuaq barren ground caribou. Both exhibit irregular migratory behaviour into the Project Study Area during winter, with summer occupancy being observed and documented in the area. The extent of summer occupancy of caribou in the area is relatively unknown at this time."

Beverly-Qamanirjuaq

"Barren ground caribou are an occasional winter resident known to migrate temporarily into the northern portion of the Project Study Area… exhibit a large, multijurisdictional migration south during winter into the northern taiga. This population is considered to be in major decline (Beverley-Qamanirjuaq Caribou Management Board 2010)… there is potential for this population to be present during the construction or operation of the Bipole III line and Project infrastructure in northern Manitoba."

Cape Churchill

"During winter, the Cape Churchill animals migrate south into the Project Study Area (Manitoba Conservation 2011)… this herd does not typically cross the Nelson River to the south (D.Hedman pers. comm.). In December of 2010, a major migration event occurred into the northern portion of the Project Study Area and included hundreds of caribou migrating into the areas around Stephens Lake, Gull Rapids and Limestone Lake (Map 6-15). A large number of these animals were harvested by Aboriginal and licensed hunters."

Pen Island

"The Pen Island population is found south of the Nelson River. Their summer range extends along the coast of Hudson Bay from the Nelson River outlet, south and east into Ontario and Pen Island area, inland across the tundra/forest ecosystem transition area. They amalgamate in fall and move north from summering areas along the Hudson Bay coast during early winter and often stage in areas south of the Nelson River, near Gillam, and west near Stephens Lake. This population… has decreased in recent years based on summer aerial surveys of known calving grounds… research suggest that summer range use is variable and has changed significantly… Incidental observations of Pen Island caribou have seen a decline since 2000…

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Interim results of collaring studies being conducted for both the Cape Churchill and Pen Island herds illustrate irregular movements in and out of the Project Study Area. Summer use in the Local Study Area has been documented, suggesting sedentary behavior; however, collared animals have remained on the Hudson Bay coast during the same period, suggesting lack of site fidelity and yearly variation within the Project Study Area. Similarly, many of the Cape Churchill animals that migrated into the northern Project Study Area during the winter of 2010- 2011 may have remained in these areas and were documented during reconnaissance flights conducted during the winter of 2010/2011."

Boreal Woodland Caribou

"In May 2000, boreal woodland caribou were designated as Threatened by COSEWIC and… Threatened under SARA in 2003. In 2006, Manitoba also listed this species as Threatened under MESA… boreal woodland caribou are experiencing range recession across the southern limits of the Canadian boreal woodland caribou zone due to land use, linear development and other human disturbance (Schaefer 2003; Vors *et al.* 2007). Though climate may be contributing to range recession, the relatively high speed of range shift suggests that climate change is unlikely to explain the observed changes (Vors *et al.* 2007).

Manitoba's Conservation and Recovery Strategy for Boreal Woodland Caribou (*Manitoba Conservation 2006*)) will be updated by January 1, 2012 and is likely to include revised strategies for boreal woodland caribou management and conservation, new population estimates, and updated conservation risk assessments for all Manitoba caribou ranges.

… In Manitoba, there are several boreal woodland caribou ranges that are considered to be at risk to decline and are considered to be borderline sustainable (Crichton *et al.* 2006; Environment Canada 2008)… Manitoba Conservation has identified the northern extent of boreal woodland caribou range that extends from the north shore of God's Lake in eastern Manitoba to Reindeer Lake in western Manitoba. Although this "line" is likely better defined as a general transition zone… based on boreal woodland caribou collaring studies, a notable and definable range exists near the Harding Lake area northwest of Thompson… There are six identified boreal woodland caribou ranges contained within the Project Study Area and Table 6.2-9 provides a summary of these ranges. Map 6-18 illustrates these ranges and the northern extent of sustainable boreal woodland caribou range as defined by the Manitoba Strategy. Ranges found within the Project Area… Results of major telemetry studies will be of considerable value in refining boreal woodland caribou range boundaries.

Table 6.2-9: Manitoba Conservation Risk Assessment Ranking for Woodland Caribou Ranges in the Project Study Area

Range	**Risk Rank**	**Intersected by transmission route**
Naosap	High	No
Reed Lake	Medium	Yes
Wabowden	Medium	Yes
Wapisu	Medium	No

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The Bog	Low	Yes

Based on new data acquired through specific caribou studies [telemetry studies and aerial surveys] conducted for the Project Environmental Assessment… The range boundary for the Wapisu now includes animals associated withthe WiMapedi Lake as there is considerable overlap of animals within these areas. The northern portion of the Wapisu range appears to be utilized by a well-defined grouping of animals around the Harding Lake area with little movement into the Wapisu range. The known range boundaries for The Bog and Reed Lake have also been expanded based on the current data. The ranges and their associated boundaries used for assessment purposes in this EIS are illustrated in Map 6-19.

Boreal woodland caribou are typically found in large, un-fragmented tracts of mature coniferous dominated boreal forest… [Boreal caribou] occur at very low densities across landscapes, congregate during winter in traditional wintering areas, and disperse during the spring, exhibiting solitary behavior during the calving and calfrearing season, which is thought to be a predator avoidance strategy…. Woodland caribou are typically not associated with [disturbed forests ie. Forest harvest, fire and insect infestation]; their strategy to avoid predators results in their spacing away from the primary prey of wolves and black bear…

…The dynamics of habitat alteration from human development, including forestry and transmission line development in boreal caribou range, can result in increased forage (due to the lush and succulent growth that follows tree removal) for primary prey species (such as deer, moose, hare and rodents). This increases the biomass availability for high-end predators such as wolves and bears (Peek *et al.* 1976; Monthey 1984; Clarke *et al.* 2006; Zwolak 2009).”

Moose

“… Moose are associated with riparian habitat [willow]… stands that originated after fire or logging, which feature early successional vegetation (Doerr 1983). Moose are commonly found in forest, shrub and wetland habitats from Red Deer Lake, north of the Porcupine Mountain area, south to areas adjacent to the Duck Mountains and Riding Mountain (Pattie and Hoffmann 1990)… Moose populations in the western portion of the Project Study Area are in decline ... Game hunting areas (GHAs) which have been closed to allow for moose populations to recover from decline include GHAs 13, 13a, 14, 14A, 26, 18, 18A, 18B and 18C. Additionally, sections of GHA 2A, 4, 7A and 17A… Other moose management options being undertaken by Manitoba Conservation include the implementation of wolf trapping/management strategies… Aboriginal people have identified the moose harvest as an important component of personal and community sustenance.”

Elk

“Elk populations are mainly found in the western portion of the Project Study Area and are limited to several areas of upland forest in close proximity to prairie habitat (Pattie and Hoffmann 1990; Jones *et al.* 1985) (Map 6-17). Major populations occur near Riding Mountain National Park, Duck Mountain Provincial Park and Forest, the Porcupine Provincial Forest and Red Deer Lake (Dan Chranowski pers.

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comm. 2009; Manitoba Conservation 2010)… Spruce Woods-Shilo area. Although these populations may be limited to several areas, where they do occur they are numerous…Province-wide, the elk population is estimated at 7,350 animals (Manitoba Conservation n.d.). Known movement corridors are generally located in a north-south orientation along the Manitoba Escarpment, outside of the Local Study Area.

Elk distribution in the Local Study Area is affected by… habitat availability for calving and winter ranges, the avoidance and attraction to human features, predators, and potentially, disease (Toweill and Thomas 2002)… elk are thought to select for deciduous forests stands [during calving season], although they avoid open deciduous forest areas and roads (Chranowski 2009). Elk have also been documented to take advantage of browse along disturbed areas in forestry cut-blocks and along roadsides (Pattie and Hoffman 1990)… Another habitat feature that is important to elk is the availability of mineral licks… Notable predators to elk that may limit elk populations in Manitoba include bears, wolves and potentially cougar (Toweill and Thomas 2002; Chranowski 2009). The general use of farmlands by elk is becoming of increasing concern to agricultural operations…

Elk harvesting in Manitoba is ongoing and regulated… A total of 3,798 elk were harvested in Manitoba from 1993-2007 (*Bipole III Resource Use Technical Report*)… In southern and western Manitoba, Aboriginal communities have reported harvesting of elk and white-tailed deer and, in at least one case, nearly as often as moose (*Bipole III Aboriginal Traditional Knowledge Technical Report*). One elk harvest area is located northeast of Swan River and may intersect with the Local Study Area. Affiliated with this location was the sighting of elk in the Local Study Area during summer and fall tracking, and trail camera studies. This area that contained a small group of elk (*Bipole III Mammals Technical Report*). ATK and local knowledge gathered in interviews discuss migration areas, wintering habitat and summer and calving habitats that are located in or adjacent to Riding Mountain National Park and Duck Mountain Provincial Park."

Furbearers

American Marten

"American marten is a species associated with upland habitats… Marten are an ecological indicator of late-succession forests featuring such structural complexity, including abundant woody debris, and thus are most abundant in undisturbed older forests with large intact core areas (Webb and Boyce 2009)… In the Local Study Area, marten sign were observed most commonly in pure black spruce habitats and in broadleaf habitats. The *Bipole III Mammals Technical Report* contains additional detail concerning marten habitat in Manitoba…in Manitoba levels of harvesting have been in decline since the 1970s (Hodgman *et al.* 1994). ATK gathered in interviews reported that marten is actively trapped in the Red Deer Lake and Wintering Lake areas."

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Beaver

"Beavers are semi-aquatic rodents associated with systems such as lakes, creeks, rivers, and other water bodies. Beavers are a keystone species known to increase habitat heterogeneity and the richness of herbaceous plants at the landscape level (Wright *et al.* 2002), largely through their dam building and water impoundment activity… They have few predators and can reach high densities in preferred areas… The species is generally abundant in western and northern areas of Manitoba wherever water systems… are present but they are less common in southern agricultural regions. In the Project Study Area, beaver are abundant and habitat is not limiting. ATK that was shared, reported that beaver are actively trapped in the Project Study Area."

Wolverine

"The wolverine… are generally associated with upland habitats and wolverines typically occupy vast areas and exist at very low densities (Dalerum *et al.* 2008). The wolverine is an important game and cultural species that is provincially regulated under *The Wildlife Act* and federally listed by COSEWIC as a species of Special Concern (COSEWIC 2003)… habitat preference and distribution in the boreal plain and shield, Hudson plain, and taiga shield ecozones… Solitary and aggressive, wolverines are most abundant where large ungulates are common and carrion readily available. Because of their wide ranging habits and requirements for reasonably diverse and abundant mammal prey, wolverines are considered reliable indicators of ecosystem health (COSEWIC 2003).

…Given their naturally low birth rates and sparse distributions wolverines characteristically exhibit low population resiliency… Wolverines are preyed upon by bears, wolves, cougars, golden eagles, and other wolverines, and are often killed when competing for food at carrion sites. Human-caused mortality occurs from trapping, hunting, and road/railway kills (COSEWIC 2003) all of which may increase with settlement of remote areas… limited capacity for repopulating areas once they are extirpated.

While the historic range of wolverine in Manitoba included the entire province, this species currently occupies the northern boreal forest (COSEWIC 2003), mostly north of 53 degrees latitude. The species remains listed by the Committee on the Status of Endangered Wildlife in Canada as a species of Special Concern in Manitoba, but with populations considered stable to increasing (COSEWIC 2003)… There may be some indication that wolverine distribution is expanding in Manitoba. ATK gathered in interviews did not report any current interactions between wolverine and interviewed community members.

In the Project Study Area, 107 locations of wolverine tracks and one wolverine observation were recorded during January 2010 aerial transect surveys. In addition, during the 2011 multi-species surveys in four caribou ranges along the Local Study Area route, 43 wolverine tracks were recorded. Given that this species is a wide ranging species with a large home range with few predictable habitat-use types, no habitat modeling was conducted on this VEC (*Bipole III Mammals Technical Report*)."

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Grey Wolf

"Grey wolves have historically occupied most of Manitoba, remaining widely distributed today where available prey exists (Map 6-20). Thus, wolves are common throughout forested and tundra habitats and are becoming increasingly common along the fringes of agricultural areas (Manitoba Conservation 2010)... large ungulates constitute their main prey in North America, wolves are opportunistic predators and can feed on a considerable range of species (Mech 1970; Gese and Mech 1991). However,… for Manitoba wolves; ungulates supply 90% of the diet.

Grey wolves are the largest frequently occurring carnivores in the northern part of the Project Study Area. In 2010 and 2011, wolf census data from aerial surveys was combined with telemetry data and used to identify pack sizes and home ranges where collared animals were observed with a pack (see wolf collaring and telemetry sections in *Bipole III Mammals Technical Report*). Pack sizes and number of collared animals per pack are shown in Table 6.2-10. In the census area (17,000 km2), 83 wolves were observed amongst 20 packs or as lone animals. An approximate density of five wolves per 1,000 km2 was estimated. Twenty-seven collared wolves were observed among eight of these packs during aerial surveys conducted in January 2011 and pack associations were determined for the collared animals based on these results. Wolf pack home range was delineated for these eight packs by mapping the collars associated with each pack (Map 6-21). Pack size ranged from 2 to 12, with as many as five collared wolves in a single pack."

6.2.6.6 Existing Environment at Project Components 6-88

"The following sections provide an overview of methods used to gather data, and an overview of Project components overlaping with VEC home ranges and available habitat."

HVdc Transmission Line, AC Collector Lines and Construction Power Components

"Due to the spatial overlap of the HVdc transmission line, northern ac collector lines and the construction power components, these Project components are being combined for their description for VEC mammal species in the existing environment. Based on analysis outlined in the *Bipole III Mammals Technical Report* coastal and barren ground caribou, boreal woodland caribou, moose, elk, American marten, beaver and wolverine are all found in the vicinity of the HVdc Transmission lines, ac collector lines and/or construction power lines.

Based on desktop analysis, a relatively small amount of beaver habitat, approximately 8 km, is anticipated to overlap with the HVdc transmission line, ac collector lines and construction power components. Regarding American Marten, approximately 93 km of the HVdc Transmission line and 2.2 km2 of the ac collector lines are anticipated to intersect American marten habitat. Wolverine… may overlap with a portion of their home range, it is anticipated that this Project component will not disturb wolverine at a population level (*Bipole III Mammals Technical Report*).

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… Based on desktop analysis, it is anticipated that approximately 77 km of elk habitat will intersect with the HVdc transmission line.

Moose are relatively common within the Project Footprint… Local Study Area contains favourable habitat for existing moose populations (*Bipole III Mammals Technical Report*)… approximately 234 km of moose habitat will intersect with the HVdc transmission line, ac collector lines and construction power components.

… [Project] components are anticipated intersect 165 km of the Wabowden caribou range, 68 km of the Reed Lake range and 120 km of the Bog range (*Bipole III Mammals Technical Report*). Additionally, coastal and barren ground caribou are anticipated to overlap with these Project components."

Keewatinoow Converter Station & Associated Facilities

"In comparison to other components of the Project, the Keewatinoow Converter Station and ground electrode consist of a relatively small Project Footprint. Few VEC species overlap with this particular Project component (*Bipole III Mammals Technical Report*)… elk, will not be affected at all… no beaver habitat and an extremely small amount of marten habitat (less than 0.1 km2) and moose habitat (approximately 3 km2) are anticipated to overlap with the Keewatinoow Converter Station and Ground Electrode Project Footprint.

…may overlap with a small portion [of wolverine] home range, it will generally will not disturb wolverine at a population level.

The Keewatinoow Converter Station and ground electrode fall outside the northern extent of boreal woodland caribou range in Manitoba (Manitoba Conservation 2006)… the northern portion of the Project Study Area contains habitat that is occasionally occupied by coastal (Pen Islands) and barren-ground (Beverley-Qamanirijuaq) caribou. As such, there may be occasions during caribou migrations in which these ranges overlap with the Keewatinoow Converter Station and ground electrode sites."

Keewatinoow Construction Camp

"… the northern construction camp consists of a relatively small Project Footprint. Few VEC species overlap with this particular Project component (*Bipole III Mammals Technical Report*)… elk, will not be affected at all by this component… no beaver habitat and an extremely small amount of marten habitat (less than 0.1 km2) and moose habitat (less than 0.2 km2) are anticipated to overlap with the northern construction camp footprint;…though this project component may overlap with a small portion of a [wolverine] home range, it will generally will not disturb wolverine at a population level.

Based on analysis reported in the *Bipole III Caribou Technical Report,* migratory caribou are anticipated to have ranges which overlap to varying degrees with the northern onstruction camp project footprint."

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Borrow Sites

"Based on analysis and observations outlined in *the Bipole III Mammals Technical Report* and the *Bipole III Caribou Technical Report*, few VEC species overlap with borrow and excavation sites associated with the Project. Species anticipated to overlap with this component include costal and barren-ground caribou, American marten, beaver and moose… elk and boreal woodland caribou will not be affected by this project component… borrow and excavation sites will not disturb wolverine at a population level..."

Riel Converter Station & Associated Facilities

"Based on analysis of VEC habitat within the Local Study Area (*Bipole III Mammals Technical Report*) the Riel Converter Station and ground electrode are not expected to overlap with VEC habitat."

6.2.7 Birds and Habitat 6-91

"… The sustainability of habitat is an important consideration to maintain bird populations… This section provides information on the following: Bird groups in the Project Study Area; Summary by ecozones; Species at risk; VECs; and Existing environment at Project Components.

For other information… refer to the the *Bipole IIIAboriginal Traditional Knowledge Technical Report* and the *Bipole III Birds Technical Report*."

6.2.7.1 Overview 6-91

"Of the approximately 400 species of birds found in the Province of Manitoba, 371 species have ranges that overlap the Local Study Area (Appendix 6A, Table 6A-5) (Farrand 1983; Robbins *et al.* 1983; Carey *et al.* 2003). Most of the bird species in Manitoba found in the Project Study Area are migratory…"

6.2.7.2 Bird Groups in the Project Study Area 6-91

"Approximately 218 species are known or expected to nest within the Project Study Area. Of the species potentially found in the Project Study Area, 35 are federally or provincially listed as Extirpated, Endangered, Threatened, and/or Species of Special Concern. Fourteen of the species are known or expected to nest within the Local Study Area are listed under the federal *Species at Risk Act* (SARA), *The Endangered Species Act* (Manitoba)[(MESA]), or the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), with the majority of these species occurring in southern and central Manitoba (MESA 1998; SARA 2002; COSEWIC 2010).

For the purposes of this EIS, birds have been organized into the following groups: Waterfowl and other waterbirds; Colonial waterbirds; Birds of prey; Upland game birds; Woodpeckers; and Songbirds and other birds."

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Waterfowl and Other Waterbirds

"Waterfowl and other waterbirds are primarily migratory, nesting in Manitoba in spring… These birds have few geographical restrictions in Manitoba… A total of 32 species of waterfowl and other waterbirds were observed in the Local Study Area (Appendix 6A Table 6A-6), 21 of which are known to breed there… waterfowl and other waterbirds are ducks, geese, swans, loons, coots, rails, and cranes. Yellow rails… currently listed under SARA or MESA. These species, as well as mallard and sandhill crane, have been selected as VECs."

Colonial Waterbirds

"Birds that form groups to breed and nest are termed colonial waterbirds… generally migratory… gulls, terns, grebes, pelicans, cormorants, herons, bitterns, and shorebirds. Thirty-four colonial waterbirds species were observed during bird surveys in the Local Study Area… rely on the large number of island, lake and wetland habitats found throughout and adjacent to the Project Study Area… Least bitterns are species at risk found in the Local Study Area. Least bittern and great blue heron were selected as VECs."

Birds of Prey

"Birds of prey are found throughout the Project Study Area and could include a total of 31 species including falcons, hawks, owls, osprey and vultures… Twenty-two species were observed during bird surveys in the Local Study Area… During surveys conducted in 2010, nine migration corridors were identified that exhibited high concentrations of birds of prey. These birds are found in all major habitat types within the Project Study Area, including forests, grasslands, wetlands and tundra… Species at risk that could occur in the Local Study Area include ferruginous hawk, burrowing owl, and short-eared owl. These species, as well as bald eagle, were selected as VECs."

Upland Game Birds

"Upland game birds are found in both forested and non-forested terrestrial habitats, and include partridges, pheasants, grouse, and turkeys. Eight species are potentially found in the Local Study Area (Appendix 6A, Table 6A-5)… Upland game birds observed during ground and aerial surveys included ruffed grouse, sharp-tailed grouse and spruce grouse. Ruffed grouse and sharp-tailed grouse were selected as VECs. None of the upland game birds in the Local Study Area are listed by SARA or MESA."

Woodpeckers

"Of the ten woodpecker species that occur in Manitoba, five are permanent residents, three are summer visitors, and two are infrequent visitors (Taylor 2003b). Eight species were observed during bird

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surveys in the Local Study Area… Red-headed woodpeckers are a species at risk, and they and pileated woodpeckers were selected as VECs."

Songbirds and Other Birds

"Songbirds and other birds, including passerines, are the most abundant of all bird groups in Manitoba. Some of the bird families in this group such as chickadees, nuthatches and some finches and jays are year-round residents, while other groups including, but not limited to, flycatchers, swallows, thrushes, kinglets, pipits, vireos, tanagers, blackbirds, sparrows and warblers are mainly short-distance or long-distance migrants. A total of 120 species were observed during bird surveys in the Local Study Area… Of the 165 species potentially found within the Local Study Area, only 32 are year-round inhabitants (Carey *et al.* 2003).

Many songbird families and species exhibit strong breeding and foraging habitat preferences… Due to increased vegetation diversity at edge habitats and forest openings such as transmission line ROWs, corresponding increases in passerine diversity may occur (Yahner 1988; Gates and Giffen 1991). Conversely, population declines observed in some birds may be attributed to their habitat requirements, as species that favour interior habitat will experience declines as the habitat becomes increasingly fragmented into smaller and smaller patches (Bender *et al.* 1998). Olive-sided flycatcher, Sprague's pipit, golden-winged warbler, and Canada warbler are examples of passerines, are species at risk, and have been selected as VECs. Common nighthawks and whip-poor-wills, members of the Goatsuckers family, are also species at risk and VECs that are found in the Project Study Area."

6.2.7.3 Summary by Ecozone 6-94

"The Project Study Area evaluated for birds is approximately 1,400 km long and transects five distinct ecozones: Hudson Plain and Taiga Shield, Boreal Shield, Boreal Plain, and Prairie. These ecozones comprise 3% and 3%, 37%, 35%, and 23% of the study area, respectively. A complete listing of bird species found within the five ecozones comprising the Project Study Area, and their scientific names, is provided in Appendix 6A (Table 6A-5)."

Taiga Shield and Hudson Plain

"…Representative birds in the Taiga Shield Ecozone include red-throated loons, red-necked phalaropes, northern shrike, osprey, tree sparrow, spruce grouse, and common raven… This ecozone represents major habitat for significant populations of breeding waterfowl, especially snow geese and Canada geese. Other birds include rock and willow ptarmigan and many migratory species such as shorebirds (Smith *et al.* 1998; Carey *et al.* 2003).

Ninety-three bird species were recorded in the Taiga Shield and Hudson Plain ecozones during surveys in the Local Study Area. In all, 156 species can be found in the Taiga Shield Ecozone and 161 can be found in the Hudson Plain Ecozone (Carey *et al.* 2003). Waterfowl and other waterbirds, colonial waterbirds, birds of prey, upland game birds, woodpeckers, and songbirds and other birds were

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observed. Songbirds made up the greatest number of species (n = 64), while only two species of upland game birds were observed. Species at risk included common nighthawk, olive-sided flycatcher, and rusty blackbird.

…Species associated with coniferous dense and wetland-shrub habitats included olive-sided flycatcher, gray jay, and dark-eyed junco. Pine siskin, blackpoll warbler, and rusty blackbird were associated with shrub-tall and coniferous-dense habitats, and northern flicker, American robin, and Wilson's warbler were associated with shrub-tall and coniferous-dense habitat. A detailed description of bird habitat associations can be found in the *Bipole III Birds Technical Report*."

Boreal Shield

"…Representative birds in the Boreal Shield Ecozone include boreal owls, great horned owl, blue jay, white-throated sparrow, and evening grosbeak. Of the 306 bird species potentially found in the Boreal Shield Ecozone (Carey *et al.* 2003), 131 were recorded during surveys in the Local Study Area. Waterfowl and other waterbirds, colonial waterbirds, birds of prey, upland game birds, woodpeckers, and songbirds and other birds were observed. Songbirds made up the greatest number of species (n = 70), while only two species of upland game birds were observed. Species at risk included common nighthawk, olive-sided flycatcher, Canada warbler, and rusty blackbird.

…In the Churchill River Upland Ecoregion, gray jay, white-throated sparrow, and fox sparrow were associated with shrub-tall and mixedwood-dense habitat, and northern waterthrush, alder flycatcher, and greater yellowlegs were associated with wetland-herb and shrub-tall habitat. In the Hayes River Upland Ecoregion, most species were associated with wetland-herb and wetland-shrub habitat, particularly red-winged blackbird, hermit thrush, and ruby-crowned kinglet. Other species were associated with broadleaf-dense, mixedwood-dense, and coniferous-dense habitat, including hairy woodpecker, Tennessee warbler, and Nashville warbler."

Boreal Plain

"…Wetlands and peatlands cover up to 50% of the ecozone (Smith *et al.* 1998), providing habitat for a number of bird species such as gulls, birds of prey, and songbirds.

Birds representative of the Boreal Plain Ecozone include boreal owl, great horned owl, red-tailed hawk, blue jay, rose-breasted grosbeak, and evening grosbeak. Of the 344 bird species potentially found in the Boreal Plain Ecozone (Carey *et al.* 2003), 197 were recorded during surveys in the Local Study Area. Waterfowl and other waterbirds, colonial waterbirds, birds of prey, upland game birds, woodpeckers, and songbirds and other birds were observed. Songbirds made up the greatest number of species (n = 108), and four of the eight species of upland game birds were observed. Species at risk recorded in the Boreal Plain Ecozone were yellow rail, common nighthawk, olive-sided flycatcher, golden-winged warbler, Canada warbler, and rusty blackbird.

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…In the Interlake Plain Ecoregion… Northern flicker, common raven, black-and-white warbler, and Philadelphia vireo were associated with broadleaf-open and developed habitats, while ruffed grouse, pileated woodpecker, and cedar waxwing were associated with broadleaf-open and mixedwood-dense habitats. In the Mid-boreal Lowland Ecoregion… Hairy woodpecker, cedar waxwing, and common raven were associated with coniferous-dense and broadleafdense habitat, and yellow warbler, black-capped chickadee, and alder flycatcher were associated with broadleaf-dense and wetland-herb habitats."

Prairie

"… The greatest potential number of listed bird species can occur in this ecozone… Characteristic bird species include ferruginous hawk, American avocet, great blue heron, and black-billed magpie (Smith *et al.* 1998; Carey *et al.* 2003).

Of the 356 bird species potentially found in the Prairie Ecozone, 195 were recorded during surveys in the Local Study Area. Waterfowl and other waterbirds, colonial waterbirds, birds of prey, upland game birds, woodpeckers, and songbirds and other birds were observed… Species at risk recorded in the Prairie Ecozone were least bittern, yellow rail, red-headed woodpecker, Canada warbler, and rusty blackbird. Other species at risk such as burrowing owl were also recorded in this ecozone.

… Species associated with broadleaf-open habitat included downy woodpecker, least flycatcher, ruffed grouse, and cedar waxwing. Mallard and red-winged blackbird were associated with wetland-shrub habitat. Sandhill crane, pied-billed grebe, and American bittern were associated with wetland-shrub and wetland-herb habitat."

6.2.7.4 Species at Risk 6-98

"A total of 584 individuals from eight species at risk were observed during the bird surveys. Of these, olive-sided flycatchers and rusty blackbirds were the most common (200 and 194 observations respectively)… The only Endangered bird species observed was a burrowing owl found nesting in a pasture. Burrowing owls have, as of late, been classified as Extirpated from Manitoba, although this species periodically returns to the province. No ferruginous hawks, burrowing owls, short-eared owls, whip-poor-wills, loggerhead shrikes, or Sprague's pipits were recorded during breeding bird surveys in or near the Local Study Area. Species at risk that could be found within the Local Study Area are outlined in Table 6.2-11.

Whooping crane, piping plover, red knot, Ross's gull, peregrine falcon, chimney swift, Baird's sparrow, and yellow-breasted chat are extremely unlikely to nest in the Local Study Area, are rare transients through western Manitoba, or have known breeding locations in the province that would not be affected by the Project. Additional details can be found in Section 5.4.4.7 of the *Bipole III Birds Technical Report*…"

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6.2.7.5 Valued Environmental Components 6-101

"As described in Chapter 4 the Approach to Assessment, birds and habitat VECs are organized into the following groups:

- Waterfowl and waterbirds - mallard, sandhill crane, yellow rail;
- Colonial waterbirds – great blue heron, least bittern;
- Birds of prey – bald eagle, ferruginous hawk, burrowing owl, short-eared owl;
- Upland game birds – sharp-tailed grouse, ruffed grouse;
- Woodpeckers – pileated woodpecker, red-headed woodpecker; and
- Songbirds and other birds – common nighthawk, olive-sided flycatcher, loggerhead shrike, Sprague's pipit, golden-winged warbler, Canada warbler, rusty blackbird.

The *Bipole III Birds Technical Report* (Section 3.2) contains additional details. It should be noted that a number of species at risk in the Project Study Area, including whooping crane, piping plover, red knot, Ross's gull, peregrine falcon, chimney swift, and Baird's sparrow, were not designated as VECs…"

Waterfowl and Waterbirds

Mallard

"Mallards are abundant and breed throughout much of Manitoba, although they are much more common in the prairie pothole region of the province (Baydack and Taylor 2003)… Mallards were the most frequently detected waterfowl and other waterbird species during bird surveys and were distributed generally in clusters where suitable habitat occurred along the entire length of the route surveyed (Map Series 6-2200). A total of 6,894 individuals were observed during bird surveys in the Local Study Area…"

Sandhill Crane

"Sandhill cranes are common migrants and breeders in the agricultural-forest transition areas of Manitoba as well as the far north of the province (Holland *et al.* 2003a)... A total of 774 sandhill cranes were observed throughout the Local Study Area during bird surveys, except in the agricultural area south of Gladstone and west of Winnipeg (Map Series 6-2200) in most locations where suitable habitat occurred…"

Yellow Rail

"…This species is listed as Special Concern by SARA, and is not listed by MESA… Breeding habitat is described as wet sedge meadows where sedge species in deep water are selected for (Bookhout and Stenzel 1987; Bookhout 1995). A total of 75 yellow rails were recorded during the breeding bird surveys, with the most southern observation occurring 16 km southeast of McCreary (Map Series 6-2200). The locations of all yellow rails identified and recorded during the 2010 breeding bird surveys

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correspond with all known ranges and distributions of this species (Bookhout 1995; Carey *et al.* 2003)."

Colonial Waterbirds

Great Blue Heron

"This species is a widespread breeder in the southern half of Manitoba, and is very uncommon in the north (Koonz 2003a)… Breeding habitat and colony locations are more commonly associated with undisturbed marsh, wetlands, and open water bodies… A total of 103 records of great blue herons, including colonies, were made during bird surveys in the Local Study Area (Map Series 6-2200), all within known ranges and distributions of this species (Carey *et al.* 2003)."

Least Bittern

"Least bitterns are listed as Threatened by SARA, and are not listed by MESA. They are rare breeders in Manitoba, uncommonly found in the southeast and west to Delta Marsh in small wetlands (Koes 2003)… Four least bitterns were recorded during the breeding bird surveys, three located 12 km south of Winnipegosis and one about 7 km north east of Langruth (Map Series 6-2200). These locations appear to be a northerly extension of their range in Manitoba. Least bitterns were recorded during the 2010 breeding bird, colonial waterbird, and waterfowl surveys at locations north and west of all known ranges and distributions of this species (Gibbs *et al.* 1992; Carey *et al.* 2003)."

Birds of Prey

Bald Eagle

"Bald eagles are common in Manitoba and nest in all forested areas of the province, with some reports of pairs nesting in agricultural areas (Koonz 2003b). Nests are commonly found in mature forests, usually within 2 km of a water body, depending on the availability of prey in the area (Buehler 2000). A total of 324 bald eagles were observed during bird surveys in the Local Study Area (Map Series 6-2200)…"

Ferruginous Hawk

"Ferruginous hawks are not listed by SARA, and are listed as Threatened by MESA. Ferruginous hawks are uncommon breeders in Manitoba, and their range is limited to the southwestern corner of the province (De Smet 2003a)… No ferruginous hawks were observed during any of the bird surveys completed in the Project Study Area in 2010. A single ferruginous hawk was identified in western Manitoba during spring raptor surveys in 2009. See Map Series 6-2200 for the potential range of this species in the Province."

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Burrowing Owl

"Burrowing owls are rarely found in Manitoba and are at risk of extirpation; observations are restricted to the southwestern portion of the province (De Smet 2003b). They are listed as Endangered by SARA and MESA… No burrowing owls were observed during any of the bird surveys completed in 2010 (see Map Series 6-2200). In 2009, a single burrowing owl was identified in a pasture north of Carberry in the Project Study Area but far from the Local Study Area."

Short-eared Owl

"Despite a largely continuous distribution ranging from northern Canada to northern Mexico (Holt and Leasure 1993), the short-eared owl is listed as Special Concern under SARA. Short-eared owl populations have declined by approximately 23% over the past decade with habitat loss and the degradation of habitat areas… Two short-eared owls were observed during the nocturnal owl surveys. One owl was detected 7 km south of Mafeking along PTH 10 (Map Series 6-2200). The second owl was observed 5 km south of the Overflowing River along PTH 10. These observations fell within the known range of short-eared owls in Manitoba (Holt and Leasure 1993; Holland and Taylor 2003e)."

Upland Game Birds

Ruffed Grouse

"Ruffed grouse are common year-round inhabitants of southern Manitoba's deciduous and mixedwood forests and of northern coniferous forests (Holland and Taylor 2003a)… They tend to avoid clear-cut forest (Blanchette *et al.* 2007). During bird surveys in the Local Study Area, ruffed grouse observations were limited to areas south of The Pas, and were sporadically clustered in particular areas rather than being widespread (Map Series 6-2200). A total of 226 ruffed grouse were observed, in most locations where suitable habitat occurred, and all within known ranges and distributions of this species (Rusch *et al.* 2000; Carey *et al.* 2003)."

Sharp-tailed Grouse

"Sharp-tailed grouse are gregarious year-round inhabitants of Manitoba, excluding areas in the far north (Taylor 2003c)… Forty sharp-tailed grouse were observed throughout the Local Study Area during bird surveys, in most locations where suitable habitat occurred (Map Series 6-2200) and all corresponding with known ranges and distributions of this species (Connelly *et al.* 1998; Carey *et al.* 2003)."

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Woodpeckers

Red-headed Woodpecker

"Red-headed woodpeckers are listed as Threatened by SARA and are not listed by MESA. They are uncommon in Manitoba, found south of the boreal forest (Taylor 2003d)… A single red-headed woodpecker was observed along the Rat River north of Otterburne during the breeding bird surveys… Three red-headed woodpeckers were recorded incidentally along the Rat River during other surveys in 2010 (Map Series 6-2200)."

Pileated Woodpecker

"Pileated woodpeckers are year-round residents of forested areas of central and southern Manitoba… Pileated woodpeckers were observed in most of the Local Study Area (Map Series 6-2200) and in many locations where suitable habitat occurred. The greatest number of observations was in the Porcupine Mountain, Duck Mountain, and Riding Mountain areas and observations were less frequent between The Pas and Thompson. All 95 observations were within known ranges and distributions of this species (Bull and Jackson 1995; Carey *et al.* 2003)."

Songbirds and Other Birds

Common Nighthawk

"Common nighthawks are listed as Threatened by SARA and are not listed by MESA. They breed throughout Manitoba, with the exception of the extreme north… Seven common nighthawks were observed during bird surveys in the Local Study Area. The most southerly observation was approximately 12 km northwest of Plumas while the most northerly observation was 34 km north of Gillam (Map Series 6-2200). All common nighthawks identified and recorded during the 2010 breeding bird surveys correspond with all known ranges and distributions of this species (Bookhout 1995; Carey *et al.* 2003)."

Whip-poor-will

"Whip-poor-wills are common breeders throughout the southern boreal region of Manitoba, extending from the southeastern corner of the province up to central Saskatchewan (Taylor and Holland 2003)… Whip-poor-wills' habitat preference is significantly associated with edge habitat of regenerating woodlands… No whip-poor-wills were observed during the 2010 breeding bird surveys. Thirteen whip-poor-wills were recorded incidentally during surveys in 2009 (Map Series 6-2200)."

Olive-sided Flycatcher

"Olive-sided flycatchers are listed as Threatened by SARA and are not listed by MESA. Olive-sided flycatchers are sparsely distributed south of the boreal forest tree-line in Manitoba… Olive-sided

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flycatchers were present throughout the Project Study Area (Map Series 6-2200). Observations were much more prevalent in the North than in the area south of The Pas. South of Swan River, observations of olive-sided flycatchers were infrequent and widely separated, corresponding with their patchy distribution south of the boreal forest. All 200 olive-sided flycatchers recorded during the bird surveys in the Local Study Area correspond with all known ranges and distributions of this species (Altman *et al.* 2000; Carey *et al.* 2003)."

Loggerhead Shrike

"Loggerhead shrikes are listed as Threatened by SARA and Endangered by MESA. The loggerhead shrike is a rare and declining species in Manitoba, usually found in the southwest and around Winnipeg (De Smet 2003c)… No loggerhead shrikes were observed during bird surveys in the Project Study Area (Map Series 6-2200)."

Sprague's Pipit

"Sprague's pipits are listed as Threatened by SARA and are not listed by MESA. Sprague's pipits inhabit southwestern Manitoba, are characteristic of mixed-grass prairie, and are associated with open grasslands (Holland *et al.* 2003b)… No observations of Sprague's pipit were made during bird surveys in the Project Study Area (Map Series 6-2200)."

Golden-winged Warbler

"Golden-winged warblers are uncommon and localized breeders in Manitoba, with an estimated few hundred breeding pairs in the province (Edie *et al.* 2003)… Favoured nesting habitat consists of abandoned farmland in early stages of succession and recently cut forest areas such as clear-cut mature forest and transmission line right of ways (ROWs) that are not mowed, recent forest fires, and blowdowns (Buehler *et al.* 2007).

… Goldenwinged warbler observations were very limited, and were all made in two relatively small clusters (Map Series 6-2200). One cluster of observations was made in the Duck Mountains and another in an area east of Winnipeg, near the Riel Converter Station site. In all, 23 golden-winged warblers were recorded. No other golden-winged warbler observations were made. These locations correspond with all known ranges and distributions of this species (Confer 1992; Carey *et al.* 2003)."

Canada Warbler

"Canada warblers are found in the southern half of the boreal forest in Manitoba, and more commonly in west central Manitoba…Canada warbler observations were made in a large portion of the Project Study Area during breeding bird surveys (Map Series 6-2200). They were most commonly found between The Pas and Swan River, in areas adjacent to the Porcupine Hills. A total of 80 individuals were recorded. The area surrounding The Pas appeared to be of some importance, as 30 Canada warbler observations were made… correspond with all known ranges and distributions of this species (Conway 1999; Carey *et al.* 2003)."

Rusty Blackbird

"Rusty blackbirds are currently listed as a species of Special Concern under SARA. This is largely due to habitat conversion and blackbird control programs occurring in the birds' United States wintering range (COSEWIC 2006). Rusty blackbirds are not listed by MESA… in Manitoba they are typically found north of the 55th parallel (Nero and Taylor 2003)… The most southerly rusty blackbird observation was near Briggs Spur while the northern limit was located about 23 km northeast of Limestone Generating Station (Map Series 6-2200). The locations of all 194 rusty blackbird observations correspond with all known ranges and distributions of this species (Altman and Sallabanks 2000; Carey *et al.* 2003)."

6.2.7.6 Existing Environment at Project Components 6-109

HVdc Transmission Line

"The HVdc transmission line is the largest Project component that had the highest potential for spatial and temporal overlap with the most number of bird species and bird habitats in the Project Study Area. Bird surveys were conducted along the proposed HVdc transmission line… In rank order of abundance, the three most common bird species by group included:

- Waterfowl and other waterbirds [36 species total] - mallard, Canada goose, snow goose;
- Colonial waterbirds [37 species total] - ring-billed gull, Wilson's snipe, Franklin's gull;
- Birds of prey [25 species total] - red-tailed hawk, northern harrier, bald eagle;
- Upland game birds [5 species total] - ruffed grouse, sharp-tailed grouse, wild turkey;
- Woodpeckers [7 species total] - northern flicker, yellow-bellied sapsucker, hairy woodpecker; and
- Songbirds and other birds [125 species total] - white-throated sparrow, red-winged blackbird, Tennessee warbler.

VECs identified in proximity to the proposed HVdc transmission line included mallard, sandhill crane, great blue heron, bald eagle, ruffed grouse, sharp-tailed grouse, and pileated woodpecker, and species at risk including yellow rail, least bittern, short-eared owl, red-headed woodpecker, common nighthawk, and golden-winged warbler, Canada warbler, olive-sided flycatcher, and rusty blackbird… A diversity of bird species could be associated with habitats found along the ROW. The most commonly observed species included whitethroated sparrow, red-winged blackbird, and Tennessee warbler. For more information regarding bird species, available habitat, and Project components see the *Bipole III Birds Technical Report* Section 5.4.3."

Keewatinoow Converter Station & Associated Facilities

Keewatinoow Converter Station and Ground Electrode

"In comparison to other components of the Project, the Keewatinoow Converter Station and northern ground electrode consist of a relatively small Project Footprint. Bird surveys were conducted… Bird groupings observed included waterfowl and other waterbirds (two species), colonial waterbirds (six species), woodpeckers (one species), and songbirds and other birds (41 species). VEC species identified… sandhill crane, as well as species at risk including olive-sided flycatcher, and rusty blackbird. Important habitats modeled… Bird species associated with these habitats, such as alder flycatcher, yellow warbler, and swamp sparrow, respectively, are expected to occur frequently…"

AC Collector Lines and Construction Power Lines

"Bird surveys were conducted… Bird groupings observed included waterfowl and other waterbirds (2 species), colonial waterbirds (4 species), woodpeckers (1 species), and songbirds and other birds (38 species). VEC species identified… sandhill crane, as well as species at risk including olive-sided flycatcher, and rusty blackbird. Important habitats modeled… Bird species associated with these habitats, such as alder flycatcher, yellow warbler, and swamp sparrow, respectively, are expected to occur frequently…"

Keewatinoow Construction Camp

"In comparison to other components of the Project, the northern construction camp consists of a relatively small footprint. Bird surveys were conducted… Bird groupings observed included waterfowl and other waterbirds (2 species), colonial waterbirds (2 species), and songbirds and other birds (28 species). VEC species identified… sandhill crane, as well as species at risk including olive-sided flycatcher, and rusty blackbird. Important habitat modeled…Bird species associated with these habitats, such as alder flycatcher, yellow warbler, and swamp sparrow, respectively, are expected to occur frequently…"

Borrow Sites and Excavated Material Disposal Areas

"The borrow sites and excavated material disposal area and general borrow areas consist of a relatively small project component footprint. Bird surveys were conducted… Bird groupings observed at these sites included waterfowl and other waterbirds (2 species), colonial waterbirds (2 species), and songbirds and other birds (30 species). VEC species identified… sandhill crane, as well as species at risk including olive-sided flycatcher and rusty blackbird. Important habitats modeled… Bird species associated with these habitats, such as alder flycatcher, yellow warbler, and swamp sparrow, respectively, are expected to occur frequently…"

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Riel Converter Station & Associated Facilities

"In comparison to other components of the Project, the Riel Converter Station and southern ground electrode consist of a relatively small project footprint. Bird surveys were conducted… Bird groupings observed included colonial waterbirds (two species), birds of prey (three species) and songbirds and other birds (21 species). No VEC species were identified… Existing habitat at Riel and the southern ground electrode are either disturbed, or consist of agricultural land. Few bird species and no VEC species are likely to occupy the sites. Habitat types modeled… Bird species associated with these habitat types… include savannah sparrow, clay-coloured sparrow, red-eyed vireo, red-winged blackbird, and brown-headed cowbird, respectively."

6.2.8 Amphibians and Reptiles 6-112

6.2.8.1 Overview 6-112

"The assessment of the Project as it relates to the amphibians and reptiles within the Local Study Area focuses on selected VECs. Although some VEC species of interest within the Project Study Area do not have distribution ranges overlapping the Local Study Area, distribution ranges are in close proximity to the Project Footprint, and suitable habitat is present within the right-of-way, warranting inclusion… this section will also focus on the VECs used in Project evaluation… A description of the environmental assessment approach can be found in Chapter 4 (Environmental Assessment Approach), as well as the *Bipole III Terrestrial Invertebrates, Amphibians and Reptiles Technical Report.*

This section provides information on the following: Amphibian and reptiles groups in the Project Study Area; Summary by ecozones; Species at risk; VECs; and Existing environment at Project components."

6.2.8.2 Amphibians and Reptiles in the Project Study Area 6-112

"There are 15 amphibian and eight reptile species that occur in Manitoba (Table 6.2-13, Appendix 6A - Figures 6A-1 to 6A-7); Preston 1982). Of these, 12 amphibian and all eight reptile species have ranges overlapping the Project Study Area; not all species have distributions within the Local Study Area.

Amphibians and reptiles are distributed within the Project Study Area ecozones in accordance with their individual niche habitats, ranging from prairie species residing in the sand prairies of southwestern Manitoba to boreal species overwintering under forest leaf litter. Additionally, Manitoba's wetlands, representing 41% of the land area in the province (National Wetlands Working Group 1988) are essential for the breeding stage of Manitoban anuran species."

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6.2.8.3 Summary by Ecozones 6-115

Taiga Shield and Hudson Plain

Amphibians

"Of the 12 species of amphibians and eight species of reptiles found within the Project Study Area, only the wood frog and the boreal chorus frog… the northern leopard frog… have distributions that overlap the Local Study Area within these ecozones."

Reptiles

"There are no documented reptile species in Manitoba with distribution ranges extending as far north as the Taiga Shield and Hudson Plain ecozones (Table 6.2-13)."

Boreal Shield

Amphibians

"The Boreal Shield Ecozone hosts the second largest number of amphibian species of any ecozone in Canada (CARCNET 2009)…. the wood frog and boreal chorus frog have distributions overlapping the Boreal Shield portion of both the Project and Local Study Areas. The northern leopard frog… the American toad… and northern spring peeper [have distributions within this Ecozone]…"

Reptiles

"…The red-sided garter snake is the only reptile that has a distribution range within the portion of the ecozone overlapped by the Project Study Area (Table 6.2-14)."

Boreal Plain

Amphibians

"The Boreal Plain Ecozone of Canada is home to nine species of amphibians… Within the Project Study Area… overlapping with distribution ranges of the wood frog, the boreal chorus frog, the northern leopard frog (Table 6.2-14), and the Canadian toad (Table 6.2.8-2). Additionally, Cope's gray treefrog…, gray treefrog…, gray tiger salamander…, and the common mudpuppy… all have distribution ranges within the southern regions of this Ecozone (Table 6.2.8-2)… the blue spotted salamander… and the northern spring peeper has a distribution range within the Boreal Shield Ecozone extending into the Project Study Area both north and south of Lake Winnipeg (Table 6.2-14)."

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Reptiles

"The Boreal Plain Ecozone is home to six of the eight species of reptiles found in Manitoba (Table 6.2-14)… the red-sided garter snake… the smooth green snake…, the northern redbelly snake…, plains garter snake, the common snapping turtle, and the western painted turtle… The smooth green snake inhabits only the southernmost portions of the Boreal Plains Ecozone overlapping the Project Study Area (Table 6.2-14)."

Prairie Amphibians

"…This ecozone has the greatest number of amphibian species of all Project Study Area ecozones and includes the boreal chorus frog, wood frog, northern leopard frog, Canadian toad, gray treefrog, Cope's gray treefrog, gray tiger salamander, common mudpuppy, and the plains spadefoot (Table 6.2-14). Within Manitoba, the plains spadefoot is unique to this ecozone; an isolated population exists within the Project Study Area surrounding Dauphin Lake. This isolated population likely overlaps the right-of-way within the Local Study Area."

Reptiles

"The Prairie Ecozone has the highest diversity of reptiles in western Canada with 13 species (eight within Manitoba) including turtles, lizards and snakes (CARCNET 2009). In addition to all of the Boreal Plain Ecozone reptile species, the Prairie Ecozone is also home to the plains hognose snake and the northern prairie skink. The snapping turtle, western painted turtle, northern redbelly snake, plains garter snake, and red-sided garter snake have distribution ranges overlapping the entirety of the Prairie Ecozone within the Project Study Area (Table 6.2-14). The smooth green snake has a distribution range in southwestern Manitoba, overlapping most of the Prairie Ecozone within the Project Study Area.

… Within the Local Study Area, habitat models estimate a total of 4.4 km2 of sandy soil, 3.71 km2 of which is present in the Prairie Ecozone. Sandy soils are associated with several species of reptile. The plains hognose snake and the northern prairie skink both have isolated distributions within the Prairie Ecozone of southwestern Manitoba. Although these populations do not overlap the Local Study Area, they are in close proximity to the Project footprint, where suitable sandy-soil habitat exists."

6.2.8.4 Species at Risk 6-119

"The *Species at Risk Act* lists two Manitoba amphibian species, one of which can be found in the Project Study Area. The northern leopard frog (*Lithobates pipiens*) is listed by the federal *Species at Risk Act* (SARA) as a Species of Special Concern. It is not listed under *The* [Manitoba] *Endangered Species Act* (MESA). Additionally, the plains spadefoot toad (*Spea bombifrons*, hereafter called the plains spadefoot) is found within the Project Study Area and is listed as protected under Division 6 of *The Wildlife Act* (Government. Of Manitoba 1987, Table 6.2-13). It is not listed under SARA or MESA.

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Only one Manitoba reptile species, which can be found in the Project Study Area, is listed by SARA. The northern prairie skink (*Plestiodon septentrionalis septentrionalis*) is listed as Endangered. It is also listed as Protected under Division 6 of *The Wildlife Act* (Government of Manitoba 1987, Table 6.2-13). The common snapping turtle (*Chelydra serpentina serpentina*) has recently been designated as a species of Special Concern by COSEWIC, but is not listed under SARA. Neither species found within the Project Study Area are listed under MESA. Additionally, the plains hognose snake (*Heterodon nasicus nasicus*) is found within the Project Study Area and is listed as protected under Division 6 of *The Wildlife Act* (Government of Manitoba 1987, Table 6.2-13). It is not listed under SARA or MESA."

6.2.8.5 Valued Environmental Components 6-119

"In total, three amphibian and two reptile species were selected as VECs. Selected VEC species include the following:

- Amphibians: Plains spadefoot, wood frog, and northern leopard frog.
- Reptiles: Red-sided garter snake, and northern prairie skink."

Plains Spadefoot

"… In Manitoba, the plains spadefoot toad is restricted to the southwest region, where sandy soils occur, with an isolated population occurring north of Riding Mountain National Park near Dauphin…"

Wood Frog

"The wood frog (*Lithobates sylvaticus*) is primarily forest-dwelling, utilizing small ephemeral ponds for breeding and using terrestrial habitats for overwintering… While six Manitoba species occur north of Lake Winnipeg, only the Wood Frog can be found as far north as the Northwest Territories (Appendix 6A - Figure 6A-1)."

Northern Leopard Frog

"The northern leopard frog is widely distributed in Manitoba, inhabiting the southern two thirds of the province, with northern distribution limits in the northernmost reaches of the Bipole III Project Study Area (Appendix 6A - Figure 6A-1)…"

Red-Sided Garter Snake

"The red-sided garter snake (*Thamnophis sirtalis parietalis*) inhabits the southern half of the province (Appendix 6A - Figure 6A-6),… Populations are greatest in the Interlake where an abundance of marshes, shallow lakes and poor drainage result in ideal summering habitat and abundant limestone bedrock that provide denning sites…"

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Northern Prairie Skink

"The northern prairie skink is Manitoba's only true lizard, and Manitoba's only endangered or threatened herptile. The prairie skink is limited to a small area (in southwestern Manitoba (Appendix 6A - Figure 6A-7), and requires sandy soils for nesting, overwintering and for summering burrows (COSEWIC 2004)…"

6.2.8.6 Existing Environment at Project Components 6-121

[MWL: For a more detailed description of survey results and observations, please refer to the *Bipole III Terrestrial Invertebrates, Amphibians and Reptiles Technical Report*.]

HVdc Transmission Lines

"All five VEC amphibian and reptile species have distributions or suitable habitat overlapping the Local Study Area of the HVdc transmission line and associated 66 m right-of-way (Appendix 6A– Table 6A-7).

The plains spadefoot has an isolated distribution range within the Project Study Area, limited to the HVdc transmission line corridor and right-of-way within the vicinity of Dauphin Lake, where sandy soils are found. In total, the Local Study Area contains 21 km2 of plains spadefoot suitable breeding habitat in this area, of which 0.28 km2 (1.4%) is located within the 66 m right-of-way… Although anuran call surveys in 2010 did not find any plains spadefoot individuals at survey sites, incidental observations during the course of 2009 field studies have identified the presence of the plains spadefoot in the vicinity of Dauphin Lake.

Suitable breeding habitat (i.e. wetlands) and distribution ranges of northern leopard frogs and wood frogs are found throughout the Project Study Area, including within all five ecozones of the HVdc transmission line corridor and right-of-way. In total, there is 1,698 km2 of suitable habitat present within the Local Study Area corridor, 21 km2 of which is found along the 66 m right-of-way. Of the 170 call survey sites examined along the transmission line corridor and its vicinity, wood frogs were detected at 122 (i.e. 72%) of the sites, and northern leopard frogs at 23 (i.e. 14%) of the sites…

Suitable garter snake hibernacula habitat is found in all three major Ecozones of the Local Study Area corridor and right-of-way, extending from the Dauphin Lake area to approximately 160 km north of The Pas, with the greatest concentration (88%) occurring within the Boreal Plain Ecozone (Appendix 6A – Table 6A-7)… In total, the Bipole III three mile corridor contains 57 km2 of suitable garter snake hibernacula habitat, of which 1.2 km2 is located within the 66 m right-ofway (Appendix 6A – Table 6A-7). Field investigations at selected garter snake hibernacula sites, as well as ATK interviews, confirmed that hibernacula habitat may in fact be present in such areas…

The northern prairie skink has an isolated distribution range within the Prairie Ecozone of the Project Study Area. Although the current known northern prairie skink distribution range does not overlap the

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Local Study Area and right-of-way, suitable habitat does exist within these areas within the St. Claude/Assiniboine River area (Appendix 6A – Table 6A-7)… In total, the Local Study Area contains 4.4 km2 of suitable prairie skink habitat, 3.71 km2 of which is found within the Prairie Ecozone, and 0.09 km2 (i.e. 2.1%) of which is contained within the 66 m right-of-way. Skink coverboard surveys conducted… did not find any prairie skinks. However, a possible skink track was observed at one of the sites."

Keewatinoow Converter Station & Associated Facilities

"Wetland habitat associated with breeding wood frogs and northern leopard frogs is present… In total, 0.02 km2 of wetland habitat is identified within the Keewatinoow Converter Station footprint, and 1.45 km2 within the northern electrode footprint. No other amphibian and reptile VEC habitat was identified…"

Keewatinoow Construction Camp

"A total of 0.02 km2 of suitable northern leopard and wood frog habitat (i.e. wetlands) was identified within the northern construction camp footprint area (Appendix 6A – Table 6A-8). No other amphibian and reptile VEC habitat was identified…"

AC Collector Lines and Construction Power Lines

"A total of 2.8 km2 of suitable northern leopard and wood frog habitat (i.e. wetlands) was identified within the northern AC collector lines and construction power lines right-ofways (Appendix 6A – Table 6A-8), including 0.08 km2 within the Henday to Long Spruce right-of-way, 0.01 km2 within the Keewatinoow to construction power site right-of-way, 0.004 km2 within the northern electrode line right-of-way, and 2.70 km2 within the AC collector line right-of-way. No other amphibian and reptile VEC habitat was identified…"

Borrow Areas

"Wetland habitat associated with breeding wood frogs and northern leopard frogs is present… In total, 0.411 km2 of wetland habitat is identified within proposed borrow area locations, and 0.290 km2 within excavated material placement sites. No other amphibian and reptile VEC habitat was identified…"

Riel Converter Station & Associated Facilities

"No amphibian and reptile VEC habitat was identified within the Riel Converter Station or the southern electrode site footprint."

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6.2.9 Terrestrial Invertebrates 6-124

6.2.9.1 Overview 6-124

"The assessment of the Project as it relates to the terrestrial invertebrates within the Local Study Area focuses on selected VECs. Although some VEC species of interest within the Project Study Area do not have distribution ranges overlapping the Local Study Area, distribution ranges are in close proximity to the Project footprint, and suitable habitat is present within the rights-of-way, warranting inclusion… this section will also focus on the VECs used in the Project evaluation…

This section provides information on the following: Terrestrial invertebrate groups in the Project Study Area; Summary by ecozone; Species at risk; VECs; and Existing environment at Project components."

6.2.9.2 Terrestrial Invertebrate Groups in the Project Area 6-124

"Terrestrial invertebrate communities and habitats within the Project Study Area are diverse… Habitat for many terrestrial invertebrates is generally assumed to be abundant and widely distributed across the province. Some specialist species, however, are associated with habitats that are limiting within the Project Study Area. Loss of these limiting habitats would have negative effects to such species. Since habitat loss and degradation are the most common causes of species declines, and might occur from the development of a transmission line, it is important to identify limiting and unique habitats for the conservation efforts of associated terrestrial invertebrates.

One of the foremost limiting habitat types within the Project Study Area is the natural grasslands within the prairie landscape, associated with many specialist terrestrial invertebrates, including several species at risk. Changes in management practices in more widespread habitats can also have major effects on existing terrestrial invertebrate populations. Logging and related activities, for example, can result in changes in carabid beetle capture rates (Saint-Germain *et al.* 2005) and assemblages (Niemelä *et al.* 1993; Beaudry *et al.* 1997)."

6.2.9.3 Summary by Ecozone 6-125

"In general, terrestrial invertebrate composition varies between Canadian ecozones, as each ecozone has a unique combination of temperature patterns, humidity, and available food resources."

Taiga Shield

"The Taiga Shield Ecozone is classified as Subarctic, and borders with the southern arctic, where species predominantly include Diptera (flies), Hymenoptera (bees, ants, wasps, sawflies, etc.), Lepidoptera (butterflies and moths), some ectoparasites of warm-blooded vertebrates, as well as mites and Collembola (springtails)."

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Hudson Plain

"Due to poor drainage, the Hudson Plain Ecozone has one of the largest continuous wetlands in the world. The resultant terrestrial invertebrate assemblage is known for its biting insects (Canadian Biodiversity 2010), which includes species from the order Diptera, including black flies (family Simulidae), horse flies and deer flies (family Tabanidae) and mosquitos (family Culicidae)."

Boreal Shield & Boreal Plain

"There are an estimated 22,000 insect species occurring in the Boreal Shield and Boreal Plain ecozones, which together comprise the boreal zone of Canada. Similar to species found in the arctic region, the predominant insects in the Boreal Shield include advanced holometabolous taxa such as Lepidoptera (characterized by species such as the spring azure, American copper, monarch butterfly and mourning cloak), Hymenoptera, Diptera, and Coleoptera (beetles) (Biological Survey of Canada 1988). At the family level, about a third of Canadian families of Coleoptera and Lepidopotera are found within the boreal zone, while at the species level, about half to two-thirds of Canadian species occur in and around the boreal zones (Danks and Foottit 1989).

… agromyzids and anthomyiids (Diptera), gall makers such as tenthredinid (Hymenoptera) sawflies, and other phytophages, as well as their predators and parasites (Danks and Foottit 1989).

At the forest floor… beetles (Coleoptera). Soil and leaf layers contain many species of mites and many species of dipteran (fly) larvae such as tipulids, mycetophilids, and sciarids (Danks and Foottit 1989).

Some groups, such as soil dwelling oribatid and prostigmatid mites, and dipteran larvae… Biting flies such as black flies, mosquitos, midges and horse flies are very abundant…

Some economically important phytophagous species including moths, sawflies, scolytid beetles, and cerambycid beetles, show periodic outbreaks within the boreal region (Biological Survey of Canada 1988)… Damaged forests may have limited functions for wildlife habitat or commercial use, and biodiversity may be altered as a result of such damage (Hall 1996).

… A fifth of the Boreal Shield is covered in wetlands and bogs… Insect taxa with aquatic juvenile life stages subsequently occur in the area as emergent terrestrial adults (Kovats *et al.* 1996)."

Prairie

"Herbivorous terrestrial invertebrate taxa tend to predominate in grasslands and the Prairie Ecozone. Groups include Hemiptera, Lepidoptera, Orthoptera (grasshoppers, crickets, cockroaches, etc.), and many Coleoptera (Hayes 1927; Biological Survey of Canada 1988). While many species are generalists and can be found in agricultural landscapes, some species, such as the Dakota skipper, are specialists associated with the intermittent patches of native grasslands found within the Prairie Ecozone… the Ottoe and Uncas skippers, are specialists of sandy soils, uncommon within Manitoba… Within the

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Local Study Area, habitat models estimate a total of 4.4 km2 of sandy soil, 3.71 km2 of which is present in the Prairie Ecozone. Native grasslands and associated sandy soil habitats are considered unique or limiting terrestrial invertebrate habitats within both the Project and Local Study Area."

6.2.9.4 Species at Risk 6-127

"Currently there are eleven terrestrial invertebrate species in Manitoba considered as species at risk, nine of which have present or historical distributions overlapping the Project Study Area (Table 6.2-15).

Eight of the terrestrial invertebrate species at risk have restricted to fragmented populations or population centres within the Prairie Ecozone: the Uncas skipper (*Hesperia uncus*), Dakota skipper (*Hesperia dacotae*), Dusky Dune moth (*Copablepharon longipenne*), Ottoe skipper (*Hesperia ottoe*), Pale Yellow Dune moth (*Copablepharon grandis*), Verna's Flower moth (*Schinia verna*), White Flower moth (*Schinia bimatris*) and Golden- Edged Gem (*Schinia avemensis*). The Monarch butterfly (*Danaus plexippus*) is more widespread, with a distribution that corresponds with both the Prairie and Boreal Plain Ecozones, present wherever its host plant milkweed is found.

Several issues may contribute to declines of terrestrial invertebrate species. For species at risk, habitat loss is one of the biggest concerns… Terrestrial invertebrates are typically very sensitive to microclimatic changes… habitat fragmentation can have large effects…"

6.2.9.5 Valued Environmental Components 6-129

"In total, three species were selected as VECs. These species have current or historical distribution ranges within the Project Study Area and in close proximity to the Local Study Area, in particular, the ROWs. Although known populations do not overlap the Local Study Area, suitable habitat exists for these species within the Local Study Area.

Selected VEC species include the following: Dakota skipper; Ottoe skipper; and Uncas skipper."

Dakota Skipper

"The Dakota skipper is currently listed as Threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and under SARA and MESA (Table 6.2-15). Historically, the Dakota skipper has been found in seven isolated populations or population centers in Manitoba. In 2002 the Dakota skipper was present at only two of these centers, including the Inwood and Lundar area in the inter-lake region between Lake Winnipeg and Lake Manitoba, and southwestern Manitoba near Griswold (COSEWIC 2003; Appendix 6A - Figure 6A-9). Historical records exist for Miniota, Brandon, Stuartburn, Tolstoi, and the Winnipeg area. Extant populations do not fall within the Bipole III Local Study Area. There has been a historical sighting recorded for

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the Winnipeg area, which is in the proximity of the study boundaries. However, this record is from the 1930s with an unknown exact location, and no recent records are available from the Winnipeg area (COSEWIC 2003).

… it is unlikely that any of it exists within the Local Study Area…The Dakota skipper is very sensitive to the conversion of remnants of prairie to cropland…"

Ottoe Skipper

"The Ottoe Skipper is found in upland, dry, mixed-grass (bluegrass) prairies and sand prairies (COSEWIC 2005)(Appendix 6A – Figure 6A-9… Manitoba is the only province in Canada where the species has been found. Currently, it is listed as Endangered by COSEWIC and under SARA, and as Threatened under MESA (Table 6.2-15). Historical populations include Spruce Woods Provincial Park, Aweme (10 km north of Wawanesa), and Rounthwaithe (COSEWIC 2005). No historical populations are known within the Local Study Area. The last documented occurrence of the Ottoe skipper was in the late 1980s and it is possible that the species may be extirpated in Canada (COSEWIC 2005)…

Although the species has not been documented in recent years…there is little suitable habitat…"

Uncas Skipper

"The Uncas skipper is a potentially extirpated species with a historical population within the Prairie Ecozone near the Project Study Area, around Westbourne, Manitoba. Additionally, as with the Uncas skipper, suitable sandy soil prairie habitat was found within the Local Study Area.

… It is listed as Endangered under MESA (Table 6.2-15). It is not listed by COSEWIC or under SARA… The Uncas skipper appears to be declining as a result of habitat loss, and is rare or uncommon in the northern part of its range. There are no recent records from Manitoba and it may no longer occur here (ITIS 2009). Historically, Manitoba records have included Beulah, Brandon, Carberry, Glenboro and the vicinity of Westbourne, Manitoba (Klassen *et al.* 1989, Appendix 6A - Figure 6A-8). A historical record is also available for the vicinity of Winnipeg (Canadian Biodiversity Information Facility 2009)."

6.2.9.6 Existing Environment at Project Components 6-130

HVdc Transmission Lines

"All three VEC terrestrial invertebrate species have distributions or suitable habitat overlapping the Local Study Area of the HVdc transmission line and associated 66 m right-of-way (Appendix 6A – Table 6A-9).

Suitable Dakota skipper habitat was identified within the Project Study Area, but field surveys found the habitat at selected study sites to be sub-optimal… there is a possibility that native prairie habitat suitable for Dakota skipper may be present, although unlikely, as true suitable tall grass habitat is rare in Manitoba and its identification, as based on models, is difficult. Sweep-net surveys conducted at selected suitable habitat sites along the right-of-way in the St. Claude/Assiniboine River area did not find any Dakota skippers. Furthermore, only two of six survey sites contained any of the plant species associated with the presence of the Dakota skipper…

As with the northern prairie skink, the Ottoe and Uncas skippers have isolated distribution ranges within the Prairie Ecozone of the Project Study Area where sandy soil prairies exist. Although no known population centres of either species overlap the Local Study Area and right-of-way, suitable habitat does exist within the St. Claude/Assiniboine River area of the transmission line (Appendix 6A – Table 6A-9)… In total, the Local Study Area contains 3.7 km2 of suitable Ottoe and Uncas skipper habitat is present within the Prairie Ecozone, of which 0.09 km2 (i.e. 2.1%) is contained within the 66 m right-of-way (Appendix 6A – Table 6A-9). Sweep-net surveys conducted at selected suitable habitat sites within the Project Study Area did not find any Ottoe or Uncas skippers."

Keewatinoow Converter Station & Associated Facilities

"No terrestrial invertebrate VEC habitat was identified within the Project footprints for the Keewatinoow Converter Station and associated facilities."

Riel Converter Station & Associated Facilities

"No terrestrial invertebrate VEC habitat was identified within the Riel Converter Station or the ground electrode site project footprint."

6.3 SOCIO-ECONOMIC ENVIRONMENT 6-132

6.3.1 Land Use 6-132

6.3.1.1 Overview 6-132

"The following section documents an overview of land use in the Project Study Area. A detailed description can be found in the Bipole III Land Use, Bipole III Agriculture, Bipole III Lands of Special Interest and TLE Lands, and the Bipole II Forestry Technical Reports.

This section provides information on the following topics: Land tenure and residential development; Private forest lands; Aboriginal lands; Designated protected areas and Protected Areas Initiative; Infrastructure; and Agriculture."

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6.3.1.2 Land Tenure and Residential Development 6-132

Property and Lands

"With the exception of the river lot survey system, the Province has generally been surveyed according to a section-township-range system. Beyond the limits of agricultural settlement and those surveys conducted to locate specific land interests (e.g., railway rights-of-way), large portions of northern Manitoba have not been formally surveyed…

The Project Study Area includes unorganized Crown-owned and/or public lands… Approximately half the Project Study Area is characterized as having property holdings that are privately-owned.

Crown lands are defined as provincial lands designated under Order-in-Council that are administered under *The Crown Lands Act* and include lands such as provincial parks, provincial forests, wildlife management areas, community pastures and ecological reserves). The distribution of Crown land within the Project Study Area encompasses unorganized lands north and east of the Porcupine Mountains to the Gillam area, and varies from municipality to municipality across southern agro-Manitoba.

… Crown leased land is found throughout the Project Study Area… The Rural Municipalities (RMs) of Mountain and Ethelbert are two examples where there are numerous parcels of land primarily leased from the Crown.

At the municipal level, there are publically-owned lands within the Project Study Area that can be used for a variety of purposes, including agriculture, historical municipal sites, landfills, cemeteries, municipal infrastructure, wildlife areas or future development (infrastructure or otherwise). Certain lands can also be dedicated to towns and villages within municipalities for specific development purposes.

Aside from provincial Crown land, large-scale federal Crown land ownership in the Project Study Area principally includes First Nation Reserves) Riding Mountain National Park, and Canadian Forces Base Shilo (or CFB Shilo) located east of Brandon…"

Municipal Jurisdictional Authority

"Local government jurisdiction is divided primarily between RMs and urban centres (incorporated cities, towns and villages). Sparsely settled or northern areas may be organized as Local Government Districts (LGDs), while many smaller settlements and communities have no independent municipal status.

There are 60 RMs and one LGD in the Project Study Area (Table 6.3-1)… The LGD is located in the northern part of the Project Study Area… There are a total of 41 incorporated cities, towns and villages in the Project Study Area, most being located in the southern part.

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Each municipal jurisdiction is governed by a Reeve or Mayor and an elected council, and is responsible for a broad range of infrastructure, services and land use planning within their jurisdiction… Map 6-23 shows RMs, the LGD and northern towns and cities in relation to the Project Study Area.

There are 23 Northern Affairs Communities (NACs) in or adjacent to the Project Study Area… The NACs in the Project Study Area are as follows: Baden, Barrows, Camperville, Cormorant, Crane River, Dawson Bay, Duck Bay, Easterville, Herb Lake Landing, Ilford, Meadow Portage, Moose Lake, National Mills, Nelson House, Pelican Rapids, Pikwitonei, Powell, Red Deer Lake, Sherridon, Spence Lake, Thicket Portage, and Wabowden, Westgate."

Municipal Development Controls

"Land use planning responsibilities in municipal jurisdictions in the Project Study Area fall under the jurisdiction of the respective municipalities or planning districts… There are 24 planning districts in the Project Study Area (Map 6-24). With the exception of the Thompson Planning District, the remaining planning districts in the Project Study Area are located south of Red Deer Lake. The remaining planning districts are as follows: Roblin, Lakeshore, Agassiz, Rossburn, Swan Valley, Mountainview, Ste. Rose, Tri-Roads, Carlton Trail, Shoal Lake, Mid-West, Neepawa & Area, Brandon & Area, Nor-Mac, Portage la Prairie, White Horse Plains, South Riding Mountain, Tanner's Crossing, Big Grass, Cypress, South Central, Grey-St. Claude, and Macdonald-Ritchot.

Municipalities that do not fall under a planning district or are without a development plan are subject to Provincial Land Use Policies (Regulation 184/94)...

Much of the land in the northern part of the Project Study Area is unorganized Crown land and therefore not subject to municipal zoning or development control regulations. Some of the NACs have land use plans in place to govern use and development of lands within their jurisdiction including Cormorant, Sherridon and Wabowden.

A summary of land use regulations and their status in the municipalities in the Project Study Area is found in Appendix 6B, Table 6B-1. From a development control perspective, the majority of lands designated within the municipal jurisdictions in the southern part of the Project Study Area, outside of urban centres or general development areas are either Agricultural or Rural policy areas. In all cases, development plans provide that utilities should be permitted in any land use designation subject to requirements in a municipal zoning by-law and should be developed in a manner to minimize any incompatibility with neighbouring land uses. As a Crown Corporation, Manitoba Hydro is not formally subject to municipal land use and development controls, but generally adheres to them in developing new facilities.

With respect to the Town of Gillam, the Harmonized Gillam Development (HGD) committee is a working group made up of representatives from Fox Lake Cree Nation, the Town of Gillam, Manitoba Hydro and the Province of Manitoba…The process has been ongoing since 2007… One of the

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objectives of the HGD is to implement a collaborative and cooperative approach to planning and development in Gillam…"

Residential Development

"Although southern portions of the Project Study Area have the majority of the population, there are a number of communities and settlements in the northern portion… Larger urban centers located in the Project Study Area include The City of Thompson, The Town of The Pas, The City of Dauphin, The Town of Neepawa, The City of Portage la Prairie, and The City of Winnipeg.

The southern portion of the Project Study Area from Winnipeg south and west to the Red River is characterized by a dense settlement pattern, fragmented property ownership, complex transportation networks, and a diverse land use character. Aside from urban centres, rural (non-farm) residential development and farmsteads are evident throughout the region. West of the Red River to Portage la Prairie, rural farmsteads predominant across the south-central region of the Project Study Area. North of Portage la Prairie through the Parkland Region north to Swan River and Mafeking, the settlement pattern is similar but not as dense. Marginal agricultural lands located along the west side of Lakes Manitoba and Winnipegosis are characterized by a relatively sparse settlement pattern, as is the area north of Mafeking to The Pas, and the portion of the Project Study Area further north to Gillam. NACs are more prevalent in the Project Study Area north of Mafeking to the Town of Gillam.

… Within the Project Study Area, there are 17 Hutterite colonies. Land use on Hutterite Colonies can vary but agriculture is the primary resource activity,…"

6.3.1.3 Private Forestlands 6-137

"… Many privately owned lands are forested, some of which may be registered as woodlots with Manitoba Agriculture, Food and Rural Initiatives or the Manitoba Forestry Association (MFA)… Registered woodlots within the Project Study Area are shown on Map Series 6-2500."

6.3.1.4 Aboriginal Lands 6-138

"First Nation Reserve lands are Federal Crown lands that have been set aside for the sole use of a particular First Nation. There are 26 First Nations with Reserve Lands in the Project Study Area or which undertake traditional activities in the Project Study Area (Table 6.3-2; Map Series 6-2600)…"

Table 6.3-2: First Nations with Reserve Lands in or Undertake Traditional Use in the Bipole III Project Study Area

"

- Birdtail Sioux First Nation
- Chemawawin First Nation
- Dakota Plains First Nation
- Opaskwayak Cree Nation
- Pine Creek First Nation
- Rolling River First Nation

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- Dakota Tipi First Nation
- Sandy Bay Ojibway First Nation
- Ebb & Flow First Nation
- Sapotaweyak Cree Nation
- Fox Lake Cree Nation
- Sioux Valley Dakota Nation
- Gamblers First Nation
- Swan Lake First Nation
- Keeseekoowenin Ojibway First Nation
- Tataskweyak Cree Nation
- Long Plain First Nation
- Tootinaowaziibeeng Treaty Reserve
- Mathias Colomb First Nation
- Waywayseecappo First Nation
- Mosakahiken Cree Nation
- War Lake First Nation
- Nisichawayasihk Cree Nation
- Wuskwi Sipihk First Nation
- O-Chi-Chak-Ko-Sipi First Nation
- York Factory First Nation"

Treaty Land Entitlement

"Treaty Land Entitlements (TLEs) refer to land owed to certain First Nations under the terms of the Treaties… Table 6.3-3 lists the Treaties signed by each First Nation in the Project Study Area, together with outstanding TLEs. Map Series 6-2600 identifies TLEs in the Project Study Area. Appendix 6B, Table 6B-2) lists all TLEs in the Project Study Area. [being: Fox Lake Cree Nation, Nisichawayasihk Cree Nation (NCN), York Factory First Nation, Opaskwayak Cree Nation, Mathias Colomb Cree Nation, Rolling River First Nation, Sapotaweyak Cree Nation, Wuskwi Sipihk Cree Nation]

…Under the Framework Agreement, Manitoba is to transfer up to 1,100,626 acres of land to Canada to be held in reserve… An entitled First Nation may select Crown land or acquire other land from its treaty area within the Province. An entitled First Nation can select Crown land or acquire other land outside of its treaty area if it can establish a reasonable social or economic development objective…"

Past Hydro Development Agreements

"In 1977, as a result of the effect of hydro-electric development on the Nelson and Churchill Rivers, and the Lake Winnipeg Regulation Project, the Government of Canada, the Province of Manitoba, Manitoba Hydro and the Northern Flood Committee Inc. (NFC), representing five directly affected First Nations (Cross Lake First Nation, Nelson House - now Nisichawayasihk Cree Nation (NCN), Split Lake – now Tataskweyak Cree Nation (TCN), York Factory First Nation and Norway House Cree Nation) signed the Northern Flood Agreement (NFA).

To address outstanding issues with respect to implementing the NFA, in 1986, the Northern Flood Committee proposed that Comprehensive Implementation Agreements be developed. Through the 1990s, TCN, York Factory Cree Nation, NCN, and Norway House Cree Nation signed CIAs with Canada, Manitoba and Manitoba Hydro. In 1997, Cross Lake First Nation decided not to continue with negotiations toward a CIA and requested that Canada, Manitoba and Manitoba Hydro continue to implement the NFA directly. Cross Lake First Nation and Norway House Cree Nation are outside of the Project Study Area.

In addition to the implementation agreements, in 2004, the Province of Manitoba and Manitoba Hydro signed an Impact Settlement Agreement (ISA) with the Fox Lake Cree Nation (FLCN) to address effects of past hydro-electric development in the lower Nelson River area on their community. The agreement also outlines a process to address the adverse effects of certain types of future developments in the Fox Lake Traditional Territory and Resource Management Area as defined as areas that are used intensively by Fox Lake members in the ISA.

In 1992, TCN, Manitoba Hydro, Manitoba and Canada signed the 1992 Implementation Agreement to guide the implementation of the Northern Flood Agreement with TCN. This agreement included a range of provisions, including compensation for adverse effects, and led to the creation of the Split Lake Resource Management Area."

Resource Areas and Resource Management Areas

"… In the NFA, Resource Area meant the Trapline Zones of the NFA First Nations and the rivers and lakes which were traditionally available to those residents, and used by them as a source of food supply, income in kind, and income.

Trapline Zone in the NFA means the Registered Trapline Zone set aside by Manitoba generally for the use of the community… the land within a Resource Area is defined by the map, but the extent of the rivers and streams "traditionally available" is less certain. There is nothing that restricts those rivers and streams to the boundaries of the Registered Trapline Zones or otherwise defines the limits of what was available.

Within the NFA, the term Resource Area defines where Manitoba is granted a first priority to wildlife resources to residents of the NFA First Nation… Since the Resource Areas are based on Registered Trapline Zones allocated to communities, there is a link between the traditional areas used by a First Nation and their Resource Areas. This link has increased in importance with the consultation obligations related to Section 35 of the Constitution of Canada.

Resource Management Areas (RMAs)… are defined by maps based on the Registered Trapline Zones…RMAs are established for purposes of facilitating local review of application for Provincial permits and to develop long-term planning land and resource use development plans.

The review of permit applications and the development of long term plans falls on the Resource Management Board (RMB) appointed in relation to the RMA…

Map Series 6-2600 shows the RMAs in the Project Study Area… Approximately 345,000 acres of the Fox Lake RMA is located in the Project Study Area. Approximately 4.5 million acres of the Split Lake RMA is located in the Project Study Area. The Nelson House RMA covers an area totaling approximately 3.8 million acres within the Project Study Area. Approximately 465,640 hectares of the Cormorant RMA is located within the Project Study Area. Approximately 42,660 hectares of the Moose Lake RMA is located within the Project Study Area, while approximately 9,360 hectares of the Ceder Lake RMA is located within the study area.

In addition, a settlement agreement with OCN recognized a Resource Area traditionally used by members of the First Nation including the following: The Pas Registered Trapline district (RTL), the commercial and domestic fisheries in The Pas RTL, and the portion of the area known as the Summerberry Marsh."

6.3.1.5 Designated Protected Areas and Protected Areas Initiative 6-141

"The status of various lands throughout the Project Study Area is subject to special designations intended to ensure sound conservation practice and/or to minimize potential conflict with resource use."

Federal Designated Lands

"Riding Mountain National Park (RMNP), located south of Dauphin, covers 297,300 hectares of rolling hills and valleys in the Manitoba Escarpment (Map Series 6-2800)… The Riding Mountain Biosphere Reserve (RMBR), established by UNESCO (the United Nations Educational, Scientific and Cultural Organization) in 1986, includes RMNP and 15 surrounding RMs… It encompasses approximately 1,381,000 hectares (13,810 square km), incorporating RMNP (3,000 km2 as the protected core) and is one of 12 biosphere reserves that presently exist across Canada as part of the Canadian Biosphere Reserves Association…

… The RMBR has no formal legal jurisdiction. It relies on voluntary support which comes from businesses, communities and educational and government partners…

Other Federally designated lands in the Project Study Area include CFB Shilo Operations and Training Base, located 35 km east of the City of Brandon, and CFB and National Defence Department sites at the James Armstrong Richardson International Airport in the City of Winnipeg (i.e., 17 Wing) and within the RM of Headingley (i.e., St. Charles Rifle Range)."

Provincial Designated Lands

"Manitoba's Protected Areas Initiative (PAI) is a government program, administered by Manitoba Conservation, which began in 1990 and is dedicated to establishing a network of protected areas to capture the biological diversity of Manitoba's varied landscapes… Protected areas are lands, freshwater or marine areas, where logging, mining, hydroelectric development and oil and gas development, are prohibited through legislation… However, activities such as hunting, trapping and fishing, as well as activities associated with First Nation rights and agreements are permitted in protected areas (Manitoba Conservation 2011)."

Ecological Reserves

"Ecological reserves are created to preserve unique and rare examples of plants, animals, and geological features… are permanently protected… Designated reserves are owned by the Province of Manitoba and managed by Manitoba Conservation. There are seven ecological reserves in the Project Study Area as follows: Lake Winnipegosis Salt Flats, Palsa Hazel, Red Rock, Armit Meadows, Birch River, Cowan Bog, and Jennifer and Tom Shay. These are illustrated on Map Series 6- 2800 and, in total, consist of 3,642 hectares of protected land."

Provincial Forests

"Provincial forests are Crown lands owned by the Province of Manitoba and managed by Manitoba Conservation… There are five provincial forests in the Project Study Area as follows: Cormorant, Swan-Pelican, Porcupine, Duck Mountain and Spruce Woods (Map Series 6-2800). In total, the provincial forests in the Project Study Area encompass approximately 11,915 km2."

Provincial Parks

"There are 30 provincial parks found within in the Project Study Area (Map Series 6-2800)… Designated provincial parks within the Project Study Area include: eight natural parks, eighteen recreational parks, and four heritage parks (Table 6.3-4).

The various classifications of provincial parks, and the subsequent land use categories within each specific provincial park, include differing conservation priorities… "

Wildlife Management Areas

"Wildlife Management Areas (WMAs) are Crown lands designated by the Province of Manitoba for the protection of wildlife habitat and for wildlife-related forms of outdoor recreation such as hunting. WMAs are managed by Manitoba Conservation. There are 22 WMAs within the Project Study Area, encompassing 458,000 hectares of land (Table 6.3-5 and Map Series 6-2800)…"

Areas of Special Interest and Other Protected Areas

"Areas of Special Interest (ASI) are an important component of the PAI, and are identified on the basis of enduring features (i.e., combinations of soils and surficial geology) that are representative of the biodiversity within Manitoba's Natural Regions… There are 11 ASIs in the Project Study Area (Table 6.3-6 and Map Series 6-2800). None of the identified ASIs are currently formally protected or legally designated.

The Project Study Area contains two legally designated portions of Provincial Forests which are permanently protected under the PAI. These are the Bell and Steeprock Canyons Protected Provincial Forest Area, which is located north of Swan River, the Douglas Marsh Protected Forest Area located near Spruce Woods Provincial Park, to the east of Brandon.

Park Reserve designations are used to assist in the creation of protected areas… The southeast corner of Amisk Provincial Park Reserve is located in the Project Study Area (Map Series 6-2800)…"

Heritage Rivers

"The Red River was nominated in 2005 as a Historic River, under the Canadian Heritage Rivers System (CHRS)… give national recognition to the important rivers in Canada, to conserve them and to educate the public about them (Hilderman Thomas Frank Cram 2006).

A Management Approach for the Red River has been prepared by Rivers West – Red River Corridor Association Inc…"

Non-Governmental and Crown Corporation Conservation Programs

"There are four principal non-government conservation agencies and Crown Corporations working to identify and manage lands for habitat conservation in the study area: Ducks Unlimited Canada (DUC), Manitoba Habitat Heritage Corporation (MHHC), the Manitoba Wildlife Federation (MWF) and

Nature Conservancy of Canada (NCC). These conservation program sites in the Project Study Area are illustrated in Map Series 6-2900.

… Within the Project Study Area some of [DUC] projects include: wetland conservation project at Big Grass Marsh near Gladstone; Brandon Riverbank protection program… Carberry waste water lagoon revitalization… boreal wetland conservation, particularly in the Saskatchewan River Delta… efforts in addressing wetland loss and conserving wetlands in prairie "pothole" country. DUC maintains numerous smaller parcels of land… scattered throughout the Project Study Area…

… MHHC works through two major program areas: North American Waterfowl Management Plan (NAWMP) and Managing the Waters Edge. Its program under the NAWMP focuses on the area west of Lake Manitoba between Neepawa, Russell, Minnedosa and Brandon. MHHC also maintains numerous parcels of land in the Project Study Area under conservation agreements, particularly in the parkland region southwest of Riding Mountain National Park.

MWF is a conservation organization comprised of hunters, anglers and outdoor enthusiasts… The MWF also manages over 90 properties (11,400 acres of land) throughout southern agro-Manitoba as part of a land trust.

…[NCC] project activities are focused on the Riding Mountain Aspen Parkland (RMAP) and the prairie pothole region south of RMNP, which houses one of Manitoba's most prolific bird habitats. The RMAP is located in one of only 12 Biosphere Reserves (a UNESCO designation for natural areas of concern) in Canada… NCC is working with landowners to protect a 25 km remnant of wilderness between RMNP and Duck Mountain Provincial Forest/Park, known as the Riding Mountain Wildlife Corridor (approx. 9,000 ac [3,642 ha])…"

Conservation Districts

"There are eighteen Conservation Districts covering 85% of rural Manitoba — fifteen of which are in the Project Study Area (Table 6.3-7 and Map Series 6-2900). Conservation. Districts are created to provide technical and financial assistance to area residents in the planning and delivery of watershed programs…"

Community Pastures

"The Community Pastures Program (CPP) is an initiative of the Agri-Environment Services Branch (AESB) of Agri-Food and Agriculture Canada… the Province acquires and places marginal land under Federal administration and control… as unpatented Provincial Crown land… The mandate of the program is to conserve the land resource, protect it from future deterioration due to drought while utilizing the land primarily for the grazing and breeding of livestock… Map Series 6-2900 illustrates the location of twelve community pastures in the Project Study Area through western and southern Manitoba. They are Pasquia, Birch River, Lenswood, Cote-San Clara, Duck Mountain, Bield, Dauphin-Ethelbert, McCreary, Alonsa, Westbourne, Lakeview and Langford."

6.3.1.6 Infrastructure 6-149

"The Project Study Area is affected by several infrastructure installations and networks. Facilities and networks include airports/aerodormes, communication towers, lagoons and waste disposal sites, and linear corridors and rights-of-way for provincial and municipal roadways, railways, hydro transmission and distribution lines, telephone lines, oil and natural gas pipelines and water pipelines/aqueduct. Principal elements of the study area infrastructure are discussed below and illustrated on Map Series 6-3000."

Provincial Trunk Highways and Provincial Roads

"There are 26 Provincial Trunk Highways (PTHs) within the Project Study Area… Within the Project Study Area there are a total of 119 provincial roadways. All provincial roads in Manitoba are two-lane highways and are either gravel or paved. Provincial road density is higher in the southern portions of the Project Study Area, most noticeably between the cities of Dauphin and Winnipeg…

Resource roads are used principally to access mining areas and forest harvest sites. These resource roads are largely concentrated in northern and north-central Manitoba, between Thompson and the Duck Mountains. Map Series 6-3000 illustrates the network of resource and other unclassified roads within the Project Study Area…"

Railways

"Railway companies that currently maintain rail lines in the Project Study Area include: Canadian National Rail (CNR); Canadian Pacific Railway (CPR); Greater Winnipeg Water District Railway; Keewatin Railway Company; and Hudson Bay Railway (HBR) Company. These lines are principally concentrated in agro-Manitoba… There are numerous abandoned rail rights-of-way throughout the Project Study Area as illustrated on Map Series 6-3000."

Transmission and Distribution Lines

"Manitoba Hydro transmits electricity over nearly 100,000 km of transmission and distribution lines. The approximate lengths of transmission lines connected to Manitoba Hydro's transmission network include the following: 2,000 km of 500 kV transmission (ac and HVdc); 5,000 km of 230 kV transmission (ac); 1,400 km of 138 kV transmission (ac); 2,900 km of 115 kV transmission (ac); and 7,200 km of 66-69 kV sub-transmission. Aside from these lines, there are numerous distribution lines (25 kV and below) located throughout the Project Study Area. The location of the existing transmission lines in the Project Study Area are shown on Map Series 6-3000."

Oil and Gas Pipelines

"The main natural gas, oil pipelines and smaller distribution pipelines are shown in Map Series 6-3000. A major underground natural gas pipeline (i.e., TransCanada Pipeline mainline) spans the southern portion of the province… smaller distribution pipelines which stem from the TransCanada Pipeline mainline. As the primary provider of natural gas in the province, Manitoba Hydro also maintains distribution stations in smaller urban centres."

Water Pipelines and Reservoirs

"The City of Winnipeg currently receives water through an aqueduct system that transports water from Shoal Lake in Ontario, to the Deacon Reservoir, immediately east of the City of Winnipeg in the RM of Springfield…

Other municipal communities are supplied with potable water from various sources such as water treatment plant systems, including booster and pressure stations, underlying aquifer wells, water storage reservoirs, and a series of distribution pipelines…"

Airports/Aerodromes and Float Plane Bases

"There are several licensed airports/aerodromes in the Project Study Area… A listing of the facilities in the Project Study Area is in Appendix 6B Table 6B-3. Some are used as a primary mode of access to some remote communities in northern Manitoba…lodges and outcamps in the Project Study Area… unlicensed private facilities exist in the Project Study Area, including those utilized by aerial spray applicators."

Communication Facilities

"There are a number of communication facilities in the Project Study Area. Most are located close to communities and provide services such as cellular phone, wireless internet, cable and radio. Towers and antennas have been erected across the province for a variety of technical and transportation services… Towers located in the Project Study Area are listed in Appendix 6B Table 6B-4. Appendix 6B, Figure 6B-1 shows the section that the facilities have been divided into."

Waste Disposal Sites and Sewage Lagoons

"Waste disposal sites and sewage lagoons are located throughout the Project Study Area. These facilities are located near most major urban centres, and towns and villages, including many northern communities. They are also associated with numerous industrial sites and facilities (e.g., generating station sites, mine sites and abandoned mine sites). A listing of waste disposal sites and sewage lagoons located in the Project Study Area is found in Appendix 6B Table 6B-5. shows the sections that the facilities have been divided into."

6.3.1.7 Agricultural Land Use/Productivity 6-152

"Agriculture is important in Manitoba, as an income-generating sector, directly and indirectly contributing about 12% of the province's GDP. For the Province as a whole, Manitoba's 2006 farm population continued its steady decline in numbers… Within the Project Study Area, the total number of farm operators in the vicinity of the Carrot River valley at The Pas was approximately 145. South of The Pas to the Swan River valley and Duck Mountain, there were approximately 1,640 farm operators. Between the Roblin-Dauphin area and the Westbourne area, there were approximately 8,035 farm operators and from Portage la Prairie area to the Springfield area, there were approximately 4,033 farm operators…

…The greatest regional cropped areas are the Gladstone-Portage la Prairie-Starbuck, Carmen-Morris-Altona, and Beausejour-Dugald- Steinbach regions. The only region where less than 50% of land was under continuous cropping was the area west of Lake Manitoba to Dauphin Lake and the Duck Mountain area…

… The 2006 Census indicated there were 19,054 census farms in Manitoba, a decline of 9.6% from the reported total of 21,071 farms in 2001. The number of farm operators also declined 7.5% from 2001 to 2006. While the overall number of farms in Manitoba has been declining, the size in terms of area has increased…

[This section describes in depth the soil conditions and suitability and presence of agricultural activities ie. Crop production, pasture land and livestock farming etc.]"

Soil Capability and Agricultural Use

"The Project Study Area consists of seven major agricultural categories of use as determined on the basis of soil type, present and potential agricultural use, and the intensity of present agricultural use (Map Series 6-3100). Soil type and soil capability is discussed in the physical environment section. A description of the categories of agricultural productivity is as follows:

- Category 1 – **Limited Agricultural Use Areas** – Most of these lands are located in areas generally with trees, swamp and lakes where there is little or no agricultural activity. Where the land is being used for agriculture, the main activity is grazing and hay production with small amounts of land in cultivation… These soils are generally found north of PTH 16 from the east side to the center of the Westlake area, north past the north side of Rorketon, and then past Winnipegosis, Cowan, Lenswood, Mafeking and north to The Pas.

- Category 2 – **Mixed Farming Areas** – These lands are generally found intermixed with limited agricultural use lands in pockets between PTH 16, Plumas, Ste Amelie, Eddystone, and Rorketon north, Winnipegosis, Cowan, Lenswood, the Swan River Valley, Mafeking and The Pas. These types of lands are also found northwest of Laurier, along PTH 10 from Dauphin to Cowan and around Boggy Creek… Farmers in the area produce crops and livestock on cultivated and native, hay and pasture lands…

- Category 3 – **Cereal, Special Crop and Mixed Farming Areas** – These areas include lands where cereal and special crops are grown, with limited row crop production, low irrigation potential, and where there is a mixed farming presence. Areas with this production pattern include all of the lands south and west of RMNP, west of the Duck Mountains and the east side of the Swan River Valley.

- Category 4 – **Cereal and Special Crop Areas** – These lands are intensively cropped areas with limited row crop production. There is less potential for row crop production or irrigation… found in the Red River Valley, south and west of the City of Dauphin, the central and western parts of the Swan River Valley and other smaller areas in between McCreary and Neepawa…

- Category 5 – **Cereal, Special and Row Crop Areas** – These lands consist of high value row crops… This includes higher elevation lands in the Red River Valley…The lands along the

Arden Ridge north of Austin… the Dauphin area south and west, the Swan River Valley and other smaller areas in between McCreary and Neepawa…

- Category 6 – **Existing and Potential Irrigation Areas** – These lands consisting of sandy soils from Carman to Elm Creek to St Claude and Rathwell… found on both sides of the Assiniboine River and at PTH 1 West from Austin to Bagot and north to Beaver… irrigation area continues north of the Assiniboine River along the Arden Ridge to Arden and east of Gladstone, and around Portage la Prairie…

- Category 7 – **Intensive Livestock Production Areas** – This area is found between PTH 1 East and east the Red River. There are many intensive livestock operations… Hog and poultry production are very common in the area east of the Red River. This area also has the greatest concentration of people in the Project Study Area…"

Organic Farm Production

"…Concerns related to transmission line development would principally extend to the sensitivity of organic farming to right-of-way vegetation control and the use of herbicides.

In Manitoba, a crop is marketed as "Certified Organic" where the land on which it is grown has been free of synthetic fertilizers, herbicides and pesticides for at least three years prior to crop harvest…

…As of 2009-10, there were 49 organic producers, processors and handlers registered with Organic Producers Association of Manitoba (OPAM) that are in the Project Study Area (outside the City of Winnipeg). Most are located in the south-central and Western regions near the communities of Ste. Agathe, St. Claude, Portage, Gladstone, Brandon, Neepawa, Miniota, Erickson, Shellmouth, Inglis, Dauphin, Valley River, Gilbert Plains, Grandview, and Swan River."

6.3.2 Resource Use 6-158

6.3.2.1 Overview 6-158

"The following section documents an overview of resource use in the Project Study Area. A detailed description can be found in the *Bipole III Land Use, Bipole III Forestry, Bipole III Resource Use, Bipole III Aquatics, Bipole III Terrestrial Ecosystems and Vegetation and Bipole III Aboriginal Tradtional Knowledge Technical Reports*. This section provides information on the following:

- Commercial forestry;
- Mining/Aggregates;
- Trapping;
- Amphibian/reptile commercial harvesting;
- Commercial fishing;
- Wild rice harvesting;
- Recreation and Tourim; and
- Domestic resource use"

6.3.2.2 Commercial Forestry 6-159

"The Province of Manitoba is responsible for administration of all resources on Crown lands. Forestry falls within the mandate of Manitoba Conservation and for timber resources, Forestry Branch… There are five provincial forests — Cormorant, Porcupine, Duck Mountain, Swan Pelican and Spruce Woods — in the Project Study Area (Map 6-31)… With the exception of Duck Mountain Provincial Park, all provincial parks prohibit commercial timber harvesting…

On Crown land, Forestry Branch… maintains a forest inventory (Forest Resource Inventory and the newer Forestlands Inventory) for the Commercial Forest Zone including private lands. No forest inventory exists for the northern non-commercial Forest Zone. For forest management purposes, the province has been divided into administrative units of Forest Sections (FS) which are subdivided into Forest Management Units (FMU) (Manitoba Conservation website 2009). The FSs and FMUs found in the Bipole III Project Study Area are shown on Map 6-31.

The non-commercial forest zone, which is known as FMU 76, is located north of the Churchill River, Nelson River and Hayes River FSs. Manitoba Conservation is responsible for the administration of resource use… a forest inventory for FMU 76 has not been developed. The area is deemed non-commercial in terms of forestry due to lack of infrastructure, distance to mills and markets for forest resources and environmental conditions (climate) that limit tree growth rate and size…

The forests are managed on a sustained yield basis where the Annual Allowable Cut (AAC) is calculated and extraction rates are regulated accordingly. The Forestry Branch has the primary responsibility for the determination of sustainable harvest volumes (AAC) in conjunction with Forest Management License (FML) holders. The Manitoba Conservation AAC/Sustainable Wood Supply (SWS) levels for the Project Study Area are provided in Table 6.3-8."

Tenure of Forested Crown Land

"In Manitoba, there are three vehicles under which tenure of forested Crown lands may occur: Forest Management License Agreements (FMLAs); Timber Sale Agreements (TSAs); and Timber Permits (TPs)."

Forest Management License Agreements

"Under *The Forest Act*, provision is made for the establishment of a Forest Management License (FML). A FML is an area-based agreement between the Province and a company that provides a long-term fibre supply to a wood-using industry in exchange for accepting forest management responsibilities that include planning, supervising and administrating of both timber harvesting and forest renewal activities. The Project Study Area overlaps the FMLs of two companies in Manitoba (Map 6-31), Tolko Industries Ltd. (FML #2) and Louisiana Pacific (LP) Canada Ltd (FML #3)…

…Forest management and forest renewal are the responsibility of Manitoba Conservation on Crown forestland outside of FML areas and within FML areas where the wood is used by a facility other than that operated by a holder of a FML.

Tolko's Forest Management Plan (FMP) expired in 2009 and the development of a new FMP has been delayed. In May 2010 Forestry Branch provided an extension to the submission of the FMP until May 31, 2013. LP and Manitoba Conservation are currently analyzing the sustainability of the wood supply. A new FMP is expected to be submitted by December 2011. Both Licenses are currently operating under authority of Annual Operating Plans (AOPs) (Keenan, pers. comm. 2011)."

Timber Sale Agreements

"A Timber Sale Agreement (TSA) is a legal document describing the softwood and/or hardwood volume to be harvested, the specific locations and any special conditions for that harvest. TSAs may be issued under a number of circumstances by way of auction, direct award, community allocation, special allocation, or quota. In most cases, the responsibility for planning and forest renewal activities resides with Manitoba Conservation (Manitoba Conservation 2006)… There were 18 Timber Sale Agreement Holders in FML #3 and #11 in FML #2 in 2010 (Manitoba Conservation 2010a). Quota Holders operating in the Project Study Area and the quota allocations are identified in Appendix 6B Tables 6B-6 and 6B-7."

Timber Permits

"Timber permits (TPs) are issued on a one-time basis for both commercial and personal harvests of less than 300 m3 per year. These most commonly apply to domestic needs for firewood, fence posts, or for small lumber/sawmill operations. Forest management planning and forest renewal requirements for areas harvested under TPs are the responsibility of Manitoba Conservation. TPs are issued by Manitoba Conservation District Offices and often, due to their small volumes, are not area specific. There were 12 Timber Permit Holders in FML #3 in 2010 (Manitoba Conservation 2010a)."

Forest Resource Utilization

Tolko Industries Limited (Manitoba)

"Tolko Industries Limited (Manitoba) is based in The Pas where it owns and operates a kraft pulp and paper mill and a modern small-dimension sawmill. Its license area (FML #2) includes the northern portions of the Mountain and Interlake Forest Sections, the Saskatchewan and Highrock Forest Sections and most of the Nelson River Forest Section (Map 6-31). The volume of wood available to Tolko as stated in their Forest Management License Agreement is 2,000,000 m3 per annum of timber consisting of up to 1,600,000 m3 of softwood and up to 600,000 m3 of aspen to meet the requirements of the plant, as well as a proposed expansion… Acceptable softwood species used in the operation are black spruce, white spruce, jack pine and, to a limited extent, balsam fir.

… Manitoba has the authority to withdraw land from the FML holder for other land use purposes."

Louisiana Pacific Canada Ltd.

"In 1994, LP Canada Ltd. (LP) constructed an $80 million oriented-strand board plant in the RM of Minitonas in the Swan River Valley. The plant was designed to use 900,000 m3 of hardwood and produce 310,000 tonnes of oriented strand board (OSB) annually.

The Forest Management License Agreement for LP provides for 900,000 m3 per annum of hardwood to meet the requirements of the OSB mill. The company has agreed from the onset to secure its annual timber requirements by accessing timber from both Crown and private lands, from within and outside of FML #3. FML #3 includes FMUs 10, 11 and 13 within the Mountain Forest Section and lies between the Saskatchewan border to the west, Lake Manitoba/Lake Winnipegosis to the east, Riding Mountain National Park to the south, and the Porcupine Provincial Forest and Township 40 to the north (Map 6-31) LP also has rights to hardwood in FMUs 12 and 14 even though these are within Tolko's FML Area…

…Spruce Products Ltd. is the largest softwood allocation holder (Quota) within the Mountain Forest Section and operates a saw mill, planer and kiln operation in Swan River… the company works jointly with LP to plan and supervise harvesting operations in FML #3…

The Province has the authority to withdraw land from LP Canada's FMLA where required for other land use purposes."

Third Party Operators (Timber Quota Holders & Special Allocations)

"Third Party Operators have individual timber allocation agreements with Manitoba Conservation independent of Forest Management License holders. Associated timber volumes are regulated through Timber Sale Agreements with the Province, but forest management planning requirements for quotas held on FMLAs are the responsibility of the FML holder. Quota Holders and Special Allocations outside of FML areas are administered and supervised by Forestry Branch. The Province is also responsible for all silvicultural activities unless assigned to the FML holder or, in the case of FML #3, assigned to the Mountain Forest Section Renewal Company. Quota volume allocations assigned to quota holders within the Project Study Area… The total volumes were 323,044 m3 of softwood and 71,680 m3 of hardwood…"

Aboriginal-Owned Forestry Operations

"There are an estimated ten Aboriginal forestry-related companies operating in the Project Study Area. Some of these companies also provide transmission line right-of-way clearing services to Manitoba Hydro. On such projects, merchantable timber is salvaged where economical to do so. Nelson House Forest Industries (NHFI) owns and operates a sawmill. In 2010, it was processing salvaged timber from the construction of the Wuskwatim Generating Station (Gwazuik, pers. comm., 2010). Pukatawagon has also received an allocation in support of a community owned sawmill, as have other First Nation communities in the past (Chapman, pers. comm., 2010). As of 2010, few remain in operation."

Forest Research / Monitoring Activities

"There are a number of forest research and monitoring activities ongoing in the Project Study Area. These include: plantation sites; forest resource inventory permanent sample plots (PSPs); tree improvement sites; ecosystem monitoring plots; forest health research plots; and climate and atmospheric study sites. Potential issues concerning development relate to potential conflicts or infringement on research and monitoring sites, the most important of which are the tree improvement program sites…

Manitoba Conservation and its partners through the Trees for Tomorrow program are planting one million trees per year as part of Manitoba's Kyoto and Beyond action plan… Forestry Branch has an ongoing growth and yield study program that aims to more accurately quantify forest growth and incremental volume relative to time… Within the Project Study Area, PSPs have been established in FMUs 55, 61, 83 and 89 (Carlson, pers. comm, 2010).

Manitoba Conservation has established tree improvement cooperatives with Tolko Industries Ltd. and LP Canada Ltd. to evaluate field performance of seed collected from genetically superior stock. Seed orchards have been established to provide seed for forest renewal programs… Several Manitoban Conservation long-term ecosystem monitoring plots are located within the Project Study Area including: smelter monitoring conducted at 27 sites established in the early to mid-1980's to monitor the effects of atmospheric emissions from HudBay and Vale Inco smelters on forest…

The Canadian Forest Service (CFS) has established numerous forest research plots within Manitoba. The Acid Rain National Early Warning System (ARNEWS) is a nationwide study, initiated in 1984, with the objective of detecting early signs of air pollution damage to Canada's forests (Environment Canada website, 2010)… The Forest 2020 Plantation and Assessment Demonstration Initiative is part of the Climate Change Action Plan for Canada. The initiative's focus is on improving Canada's capacity to create a strategic carbon reservoir and increase fibre supply. The CFS was delivering the program in cooperation with the Manitoba Forestry Association.

The Boreal Ecosystem-Atmosphere Study (BOREAS)… Study Area encompassed approximately 875 km2 of the boreal forest located northwest of Thompson, and north and northeast of Nelson House. Although the study has been completed and the site decommissioned, some research projects are continuing in the Project Study Area.

Tolko Industries Ltd. is involved in various research initiatives within FML #2. Tolko's Growth and Yield Program has established permanent sample plots (PSP)… Since 1997, 450 ecological monitoring permanent sample plots (PSP) have been established within FML #3 to collect ecological, growth and yield successional data (LeBlanc, pers. comm., 2010)."

Forestry Support Programs

"… The Manitoba Woodlot Program is delivered by the MFA and MAFRI who provide woodlot management support for landowners, including those within the Project Study Area (Fosty, pers. comm., 2010).

The Manitoba Hydro Forest Enhancement Program promotes and offers support to non-profit, non-government organizations and educational institutions that have identified projects of benefit to a community, region or the province. The program encourages cooperative community projects and focuses on tree plantings, public forest education and innovative forest projects (Carruthers, pers. comm., 2010)…

The federally funded Agri-Environment Services Branch… promotes Agro-forestry as an approach to land use that incorporates trees into farming systems to maximize shelterbelt biodiversity and habitat value and is limited to agricultural areas in the Project Study Area."

6.3.2.3 Mining/Aggregates 6-167

Minerals

"There is a wide range of minerals and other commodities (including aggregate) mined in the Project Study Area (i.e., silver, gold, cobalt, copper, nickel, lead, zinc, lithium, palladium, platinum, uranium and tungsten)…

Considerable mineral exploration activity is being undertaken by mining companies or joint ventures, as well as by individual prospectors in the Project Study Area. In Manitoba, provisions within *The Mines and Minerals Act* and Provincial Land Use Policies (Regulation No. 184/94) … the Land Use Policy Regulations states that lands containing high mineral potential, such as greenstone belts and the Thompson Nickel Belt, be protected from land uses that would prohibit or unduly restrict exploration, development and extraction of metallic minerals."

Mining

"Mines operating in the Project Study Area include: VALE Inco Ltd. (nickel, copper, gold, silver, cobalt and platinum at the Birchtree Mine in the vicinity of Thompson), HudBay Minerals Inc. operated by the Hudson Bay Mining and Smelting Co. Ltd. (copper, zinc, gold and silver at Mine 777 and Trout Lake Mines in Flin Flon, and Chisel North Mine in Snow Lake). There are also numerous past producing properties…"

Project Study Area.

"HudBay Minerals Inc. has also recently identified a new mining site near Lalor Lake… located near the community of Snow Lake. Other potential specific mineral interests were identified by mining companies in the Thompson Nickel Belt during the course of research and the EACP for the Project (Chapter 5)…"

Mining Claims, Leases and Permits

"… Mineral exploration license areas, mining claims and mineral leases are numerous throughout the Project Study Area (Map 6-32). As of 2010, approximately 67 license areas involving some 16 separate companies were registered within the Project Study Area.

… As of 2010, there were approximately 4,364 mining claims scattered throughout the Project Study Area. These are principally concentrated between Thompson and The Pas. The Project Study Area also includes extensive mineral leases particularly surrounding Wekusko Lake and the Town of Snow Lake. In addition, virtually all of the land surrounding PTH 6 between Setting Lake and the City of Thompson is subject to mineral leases… As of 2010, there were approximately 3,812 mineral leases in the Project Study Area… Within the Project Study Area, there were 426 quarry leases registered in 2010."

Aggregate Resources

"The Province, through the Provincial Land Use Policies, designates aggregate deposits and quarry mineral potential areas based on importance of the resource… Potential aggregate resources with high, medium and low designations are widely scattered throughout the Project Study Area (Map 6-33).

[MWL: This section describes the location and quality of aggregate resources (current and potential) within the Project Study Area.]"

6.3.2.4 Trapping 6-172

"The registered trapline system is a provincially (Manitoba Conservation) administered commercial furbearer harvest management system whereby the registered trapline holder is granted the exclusive opportunity to harvest furbearing animals in an individual trapline. The system is intended to facilitate sustainable furbearer populations…

… There are 21 trapline sections either partially or entirely in the Project Study Area as follows: Limestone, Camper Duck, Camper Duck A, Camper Duck B, Duck Mountain, Easterville, Flin Flon, Porcupine, Split Lake, Snow Lake, Moose Lake, Pikwitonei, Cormorant, Nelson House, Sherridon, Cranberry Portage, Thicket Portage, Pukatawagan, Red Deer/Shoal River and Wabowden. Within each trapline section, individual traplines are identified and can be allocated to registered trapline holders…

There are approximately 343 Registered Traplines (i.e., smaller administrative units given to trapline holders) either partially or entirely located within the Project Study Area…

Trapping records obtained from Manitoba Conservation… south of the Red Deer/Shoal River and Porcupine Mountain area in the west-central part of the Project Study Area (i.e., east of Lake Winnipegosis [Dawson Bay]). In all, seventeen different species… In descending order of occurrence, the most common species trapped in southern Manitoba between 1996 and 2008 included beaver, muskrat, and marten. Species that were rarely trapped included wolverine, badger, and raccoon.

In addition, in the Project Study Area, there are four Special Trapping Areas (STAs) as follows: Saskeram, Clearwater, Easterville and Summerberry. The SPA designation allows for greater flexibility in the regulation of trapping related matters unique to the local environment… For example, the Summerberry STA… directed at muskrat management…

The Project Study Area contains 8.9 million hectares of RTLs, as well as STAs. The sections included in the Project Study Area are illustrated in Map 6-34. Trapping records obtained from Manitoba Conservation identify eighteen furbearing species harvested from registered traplines in the Project Study Area. In descending order of occurrence, the most common species trapped in the northern portion of the study area between 1996 and 2008 included beaver, marten, and muskrat. Species that were rarely trapped included black bear, and wolverine.

With the exception of the Western RTL District, there are no registered trapline sections in the southern portion of the Project Study Area. The south is covered by four Open Trapping Zones (1, 2, 2A and 3). There is also an Open Trapping Zone (5) surrounding The Pas. In descending order of occurrence, the most common species trapped between 1996 and 2008 in the Open Trapping Zones included beaver, marten, and muskrat Manitoba Conservation unpublished data 2009)."

6.3.2.5 Amphibian and Reptile Commercial Harvest 6-174

"In Manitoba, commercial amphibian harvesting has occurred since at least 1920 (Seburn & Seburn 1998)… sold to biological supply houses and dealers…Since 2004, only one Amphibian and Reptile Dealer Licence has been issued annually by Manitoba Conservation, and only for the collection of northern leopard frogs. Manitoba Conservation also sells several Family and Individual Licences to catch and sell amphibians, and these harvests are generally sold to dealers. Although harvest locations are unknown, harvesters from 2007 to 2009 resided in the communities of St. Laurent, Crane River, Vogar and Ebb and Flow. It is likely that most of the harvesting would have occurred in the vicinity of these communities, of which Ebb and Flow and Crane River are located in the Project Study Area."

6.3.2.6 Commercial Fishing 6-174

"Aquatic resource use within the Project Study Area is diverse (Section 6.2.4)… Within the Project Study Area, the water bodies of the Nelson and Saskatchewan river basins, and lakes Manitoba and Winnipegosis represent a significant part of the Manitoba commercial fishing industry.

In the Nelson River basin, water bodies in the Project Study Area that support round weight commercial fishing quotas ≥ 20,000 kg are: Split Lake, Setting Lake, Wekusko Lake, and Pakwa Lake. In the Saskatchewan River basin, water bodies meeting these criteria include: North and South Moose Lake, Cormorant Lake, Cedar Lake, and the Saskatchewan River. Lake Manitoba and Lake Winnipegosis both support substantial Manitoba commercial fisheries…. The primary fish species subjected to commercial quota restrictions in the Project Study Area include lake whitefish, pickerel, sauger, northern pike, lake trout, and goldeye. Species such as lake cisco (classified as tullibee), longnose sucker, and white sucker (both classified as mullet), and carp are not subject to quotas, but contribute significantly to the total commercial harvest of some lakes (Manitoba Water Stewardship 2010a)."

Bait Fishing

"… In 2009, active bait-fish blocks in the Project Study Area included Reed Lake, Wekusko Lake, Cormorant Lake, Lake Winnipegosis, Cooks Creek, the Red River, and the Saskatchewan River."

6.3.2.7 Wild Rice Harvesting 6-175

"Wild rice is Manitoba's only native cereal… The highest concentration of wild rice leases are found between the 53rd and 56th parallels, north of Cranberry Portage, and adjacent to Sherridon Lake road. Dyce, Cormorant, Dolomite, Hargrave, North Moose, South Moose, Reed, and Wekusko are lakes within the Project Study Area licensed for commercial wild rice harvesting…

Manitoba's wild rice harvesting is governed by *The Wild Rice Act* (1984). The Act states that persons harvesting rice require a license to harvest, excluding First Nation members, who may harvest rice for household purposes in areas designated for harvesting. The Province of Manitoba issues two types of wild rice licenses to anyone interested in wild rice production: development license and production license… In addition, ten-year block licenses are issued to First Nation community areas with provision for issuance of sub-licenses. There are 40 development licenses, 108 production licenses and 1 block license within the Project Study Area (J. Bannerman, Crown Land and Property Agency, pers. comm. 2010)."

6.3.2.8 Recreation and Tourism 6-176

Lodges, Campgrounds and Resort Areas

"There are numerous lodges operating within the Project Study Area (Map 6-35). Table 6.3-9 provides a listing of the lodges, their capacity, along with the services they provide. A number of lodges offer guiding, fishing, and hunting for bear, moose, waterfowl and upland game birds. In addition, a few lodges offer nature tours. Some have outcamps, which offer accommodations, located away from the main lodge, as well as campgrounds.

A large number of the lodges are located between The Pas and Flin Flon, as well as in the vicinity of the Grass River Provincial Park and Wekusko Lake. There are also several lodges in Paint Lake Provincial Park, on the Nelson River, as well as in the vicinity of Waskaiowaka Lake. In the southern portion of the Project Study Area, there are lodges in the vicinity of Duck Mountain Provincial Park, as well as Dauphin Lake and to the west of Lake Winnipegosis.

Resorts and campgrounds are generally found within or in the vicinity of parks and communities in the Project Study Area… Locations of resorts and campgrounds in the Project Study Area are listed in Appendix 6B Table 6B-8. Most are located in the southern part of the Project Study Area."

Hunting and Outfitting

"There are numerous outfitters operating in the Project Study Area. These include those offering big game hunting services such as those with non-resident bear, moose and deer hunting allocations. There are also numerous waterfowl and game bird outfitters that operate throughout the Project Study Area… Outfitting businesses tend to involve either the consumption of wildlife or fisher resources, or ecotourism activities such as rafting, canoeing, hiking, wildlife viewing, horseback riding, and boat tours. Currently, there are 78 known outfitters operating in the Project Study Area…

A number of Game Hunting Areas (GHAs) and Game Bird Hunting Zones (GBHZs0 are in the Project Study Area [Map 6-36]. Within Manitoba Conservation's Northeast Region, including GHAs 3, 9, 9A and 10 (part),nthere are seven outfitter allocations in the Project Study Area. Manitoba Conservation's Northwest Region includes GHAs 6A, 7, 7A, 8, 10 (part) and 11. There are eight outfitter allocations in these GHAs encompassing the Project Study Area. The Western Region of Manitoba Conservation includes GHAs 12, 14, 14A, 18B, 19A, 19B, and 24. There are 48 outfitter allocations in these GHAs encompassing the Project Study Area. In Manitoba Conservation's Central Region, which includes GHAs 25B, 30, 31, 32, 33 and 34A, there are 18 outfitter allocations within the Project Study Area. Parts of GBHZs 1, 2, 3 and 4 are in the Project Study Area."

Sport Fishing

“Sport fishing occurs throughout the Project Study Area… Much of the sport fishing in the northern portion of the Project Study Area is limited by lack of road access. However, water bodies in this area are accessible for sport fishing via fly-in lodges and outfitters.”

Adventure Travel and Eco-tourism

“Many adventure travel and eco-tourism activities occur in the Project Study Area, including: bird and wildlife viewing; hiking and nature interpretation; canoeing/kayaking; mountain biking and adventure racing/orienteering; equestrian; snowshoeing, dog sledding and cross-country skiing; Aboriginal traditional experience; and local festivals. Adventure travel and eco-tourism is often explored through self-directed activity, however many organizations which provide a guided experience operate in the Project Study Area.”

[MWL: Description and location of various outfitters, Associations and festivals…]

Recreational Resources

Recreational Trails

“The majority of the designated recreational trails outside of established parks within the Project Study Area are located in the parkland and south-central areas of Manitoba. The southern recreational trails are located in the vicinity of the Town of Carman, along the Seine River in Winnipeg and other locations (e.g., Transcona trails, Fort Whyte Alive), in the Town of Treherne and the Boyne River Valley, the Vermillion River Trail in Dauphin, and the Assessippi ski area in the Assiniboine Valley. Northern recreation trails include a trail in The Pas/RM of Kelsey, The Kwasitchewan Falls Trail along the Grass River, and the Thompson Trail around the City of Thompson (Manitoba Recreational Trails Association, 2010).

Of the known recreational trails, the TransCanada Trail (TCT) is the most extensive through the Project Study Area (Map 6-35)... approximately 984 km stretching along a route south of the City of Winnipeg to Duck Mountain Provincial Forest at the Manitoba/Saskatchewan border.”

Cross Country Trails and Downhill Skiing Areas

“Downhill skiing areas and cross country skiing trails are maintained in a number of locations within the Project Study Area, particularly within the parks. Walking trails are groomed after snow fall and converted for the winter season. Several prominent locations within the Project Study Area include: Ski Valley Minnedosa… Asessippi Ski Area… Mystery Mountain [Thompson]… Beaudry Provincial Park… Spruce Woods Provincial… Riding Mountain National Park… Bittersweet Cross Country Ski Trails…Assiniboine Hills Trail… Langford Winter Park [Neepawa]… Rivendell Cross Country Ski Area [Roblin]… One facility located to the south of the City of Flin Flon…

There are numerous snowmobile trails within the Project Study Area… With the exception of the Snow Lake, Thompson, and Paint Lake Provincial Park areas, the majority of established snowmobile trails are south of Snow Lake. For the year 2010, there were 20 snowmobile clubs operating trails within the

Project Study Area (Map 6-35). In addition to the club snowmobile trails, Porcupine Provincial Forest, Paint Lake, Grass River, Clearwater Lake, Spruce Woods, and Duck Mountain Provincial Parks contain numerous snowmobile trails and warming shelters."

Municipal Recreational Facilities

"Municipal recreational facilities exist throughout the Project Study Area. These include municipal parks, community centers, golf courses, and other recreational sports fields…their coordinates listed in Appendix 6B Table 6B-9."

Attractions, Museums, Historical Landmarks and Travel Routes

"Tourism attractions, museums and historical landmarks are found in a variety of locations across the Project Study Area… RMNP and Manitoba's Museum of Agriculture, which is located in Austin…the Interpretive Centre in Ste. Agathe and forestry tours of Tolko Industries in The Pas.

Historic landmarks are found across the Project Study Area. These include original homesteads, schools which are no longer used, etc. There are eight main historic travel routes in the Project Study Area. These include: the Northern Woods and Water Route (PTH 6 and 68) from Winnipeg to The Pas; Yellowhead Route (PTH 16) from Winnipeg to Russell and Saskatchewan; Red Coat Trail (PTH 2) from Winnipeg to Souris; Lord Selkirk Highway (PTH 75) from Winnipeg to Emerson; Assiniboine Trail (PTH 26) from Winnipeg to Portage la Prairie; Dawson Trail (PR 207) from Winnipeg to Richer; Park's Route (PTH 5) from the Canada-US border through McCreary; and MOMs Way (PTH 12) from the Canada-US border to Ste. Anne."

Designated Canoe Routes

"An extensive network of lakes, rivers and streams dominate the landscapes within the Project Study Area, much of which is navigable…There are nine designated canoe routes in the Project Study Area (Map 6-35). These are as follows: Grass River, Land of Little Sticks, The Middle Track and Hayes River, Chain Lakes, Blue Lake, Beaver Lake, The Waterhen Country, Assiniboine River, and Riviére Aux Rats canoe routes."

6.3.2.9 Domestic Resource Use 6-187

"An Aboriginal Traditional Knowledge (ATK) process was created for the Project. The process involved community participation in ATK workshops or community-led studies (Chapter 5, and *Bipole III Aboriginal Traditional Knowledge Technical Report*). Information obtained through the ATK process assisted in providing information on domestic resource use in the Project Study Area.

Domestic resource use includes hunting, fishing, trapping and gathering. The last type of resource use can include the collection of berries, medicinal plants, tree products (culturally modified trees) such as birch bark stripping for baskets, art, diamond willow carving and other cultural products, fire wood gathering, and harvesting of herbs for smudging, blessing and other ceremonial purposes. Communities in the Project Study Area use a wide array of plants and animals for traditional purposes. Resources are harvested throughout the year for specific seasonal resources. For example, waterfowl hunting typically occurs more frequently in the spring and fall, while small furbearers are typically harvested through the winter and fishing occurs throughout the year. Often more than one domestic resource activity takes place at the same time; for example, fishing often supplements hunting and is sometimes considered a survival food."

Resource Gathering

"Plants important to Aboriginal people for medicine, food, cultural and other purposes were identified through the ATK process and included, but was not limited to, areas within wetlands, uplands and in areas of sandy soils. More than 80 plant species of traditional value were noted as being used through the ATK process (Appendix 6B Table 6B-10).

Plants are used to treat a range of ailments…These pharmaceutical plants are used carefully to contribute to the general well being of those persons who ask for help.

Plant and berry harvesting typically occurs close to a community although people will travel longer distances to harvest specific plants… harvested at different times of the year… A number of communities in the Project Study Area harvest trees for a variety of purposes…

Herbs and plants such as mint, tamarack, sweet grass, Labrador tea, sage, Seneca root, pitcher plant, and ginger root were noted throughout the Project Study Area for their medicinal qualities… Some plants were noted as being used historically and are no longer found or are found in limited supply (Daniels et al. 2011). Berries harvested include blueberries, strawberries, saskatoons, raspberries, cloud berries, and cranberries.

During plant surveys conducted for Swan Lake First Nation, approximately 95% of the greater than 200 species identified are known as medicinal plants or have other uses by the community (Reeves 2011). Through the ATK process, the communities of Pikwitonei, Thicket Portage, Barrows, Duck Bay, Cormorant, Camperville, Pine Creek and Herb Lake Landing identified community plant harvesting for medicinal purposes and berry harvesting of strawberries, raspberries and saskatoons; and community firewood gathering. Community members of Dawson Bay participate in community and family plant harvesting (i.e., blueberries, strawberries, raspberries, cranberries, chokecherries, moss berries, sweet grass and maple tree sugar tapping) for subsistence, traditional medicines and economic gain, and firewood.

Chemawawin First Nation and the community of Easterville's traditional gathering activities include: berry harvesting (i.e., strawberries, raspberries, blueberries, chokecherries); harvesting of plants (i.e., Seneca root, ginger roods) and herbs for ceremonial or medicinal purposes, as well as for supplemental income; and tree harvesting for logs and other uses (i.e., cedar for medicine, firewood for heating homes, driftwood for crafts [birch baskets]). Wuskwi Sipihk First Nation indicated that members gather Seneca root, sweet grass, maple sap and eggs, along with berries and wild rice gathering and sowing.

Dakota Plains First Nation indicated members harvested plants and berries in the fall including cranberries, chokeberries, raspberries, plums, saskatoons, wild onions, wild turnips, wild garlic, cattails and sage, as well as other plants for medicinal use. Dakota Tipi First Nation members also harvest berries and plants. Long Plain First Nation indicated that members collect berries (raspberries, strawberries, grapes, plums, rhubarb, crap-apples, saskatoons, chokecherries, cranberries, pin cherries, gooseberries, nana berries, and sand cherries; red willow bark; medicinal herbs for smudging, blessing and purifying and other plants (seneca root, wee-kaa root, sweet clover, little red cherries, bark, skunk grease, and sage use for a variety of purposes.

Fox Lake Cree Nation and Tataskweyak Cree Nation identified general plant harvesting and gathering locations in the vicinity of the northern Project components."

Fishing

"Domestic fishing occurs throughout the year in the Project Study Area. Major species targeted include lake whitefish, pickerel and pike. Lake sturgeon has also been harvested traditionally where they occur. In addition, trout have been identified as an important fish species in creeks in the Gillam area. Other species harvested include perch. Pikwitonei, Thicket Portage and Herb Lake Landing identified domestic and recreational fishing activities including catch and release of sturgeon due to declining populations. Other communities engaged in domestic fishing include Cormorant, Chemawawin First Nation, Easterville, Pelican Rapids, Camperville, Barrows, Wuskwi Sipihk First Nation, Dawson Bay, Dakota Plains First Nation, Dakota Tipi First Nation and Duck Bay."

Hunting and Trapping

"Traditional hunting activities were identified across various regions of the Project Study Area. Large game, specifically moose, elk, white-tailed and mule deer, woodland caribou, barren-ground and coastal caribou, black bear, fox and wolf were identified as being included in traditional hunting within the project study area, with harvested species varying based on species availability in an area. Of the large game, moose have been traditionally hunted in the Gilliam, Thompson, Snow Lake, The Pas, Swan River areas and in the surrounding areas of Riding Mountain National Park. Deer have been traditionally hunted in the Swan River and The Pas and RMNP areas, while elk has been traditionally harvested in the areas surrounding RMNP.

Small animal harvesting in the Project Study Area was identified to include upland game birds (pheasant, ruff grouse, sharp tail, partridge, ptarmigan), ducks, geese and rabbits. These have traditionally been hunted in the Gilliam, Thompson, Snow Lake, The Pas, Swan River areas and in the surrounding areas of Riding Mountain National Park, and further south.

Aboriginal communities have reported mallard as part of their domestic harvest. Other waterfowl species reported included lesser scaup, redhead, and canvasback, for example. Traditional goose harvest continues to be important for northern communities. Half of the respondents in one interview reported harvesting ducks and one third reported harvesting geese. Outfitting was identified as an activity in or near the Project Study Area. Duck hunting with American tourists was specified by one community in the Lake Winnipegosis area (*Bipole III Resource Use Technical Report*). Migration routes for ducks and geese have been identified by several communities, and are an important component of local harvest strategies. Cranes were held traditionally in high esteem, and because this species was culturally important, they were not hunted. Colonial waterbird nesting sites have been identified in or near the southern portion of Project Study Area. At least one heron colony was specified. Owls, eagles, and osprey have been identified in or near the southern portion of the Project Study Area by Aboriginal communities. Some birds of prey such as eagles have been identified as sacred, and were not hunted (*Bipole III Aboriginal Traditional Knowledge Technical Report*).

Upland game bird harvest has been identified as a past and present activity by Aboriginal communities in Manitoba, including pheasant, ruffed grouse, sharp-tailed grouse, partridge, chicken, and ptarmigan. Several sites for grouse and partridge hunting were specified.

… First Nations people do not require a license to trap for domestic purposes and generally have the right of access to trap within: First Nation Reserve Lands, Wildlife Management Areas, Provincial Forests, areas of Provincial Parks where licensed trapping is permitted, unoccupied Crown lands, other Crown lands where licensed hunting or trapping is permitted, and private land with the permission of the landowner or occupant of Federal land. In terms of trapping, species trapped include: beaver, coyote, fisher, fox, marten, mink, muskrat, rabbit, weasel, and wolf. Although trapping occurs at various times of the year, it was noted trapping generally occurred along rivers, during the spring. Fur bearing animals were trapped for both meat and use of the hide; hide was stretched for sale and many people prepared meat for consumption.

Many of the communities that participated in the ATK process indicated that members trap. OCN indicated that the Elk trapping zone is designated as a youth line that serves as an outdoor classroom providing an opportunity for youth to practice ways of OCN people, learn about habitat and wildlife management practices, and wilderness safety."

Metis

"The Manitoba Metis Federation (MMF) undertook a self-directed study to identify interests and concerns of its members with respect to the Project… the MMF self-directed study concluded that MMF members engage in harvesting activities throughout the Project Study Area… a screening survey which was mailed to all individuals over 15 years of age holding a valid Metis Harvester Card (3,278 in total). As part of the survey, respondents were asked to draw on maps provided with the survey the areas where they regularly undertake traditional activities (hunting, fishing, trapping and gathering). In addition, respondents were asked about participating in a more detailed interview. Three hundred and eighty two respondents were found through this process to engage in traditional use in the Project Study Area.

Through the detailed interviews, the Metis harvesters who were interviewed advised that they undertook food harvesting and trapping in the Project Study Area. A number of interviewees reported harvesting large animals and fishing. Many indicated they harvest small animals and less than half indicated that they engage in gathering activities. Based on the interviews, fall is the most important season for animal harvesting, followed by winter. Summer and, then winter, are the most important seasons for fishing. Berries and edible plants are mainly harvested from late summer to fall freeze up, while medicinal plants are harvesting throughout the year."

6.3.3 Economy 6-191

"Manitoba's economy is highly diversified with a major presence in manufacturing, transportation, agriculture, hydro-electric development, minerals, forestry, finance and trade. The largest individual sector is manufacturing, followed by retail trade, agriculture and other primary industries… – mining, agriculture and forestry…

The following outlines labour force characteristics within the Project Study Area, including the size of the potential labour force, unemployment levels, participation rates, industry and occupations, education levels and income Appendix 6B Table 6B-11. Based on the 2006 census data, the potential labour force (i.e., the population that are over 15 years of age which is considered working age) was 683,750 people in First Nations, NAC and incorporated communities, or approximately 75% of the Project Study Area (including the City of Winnipeg)… The size of the potential labour force in the First Nation and NAC communities within the Project Study Area was 13,405, or approximately 55% of the total population in these communities…

…The most prevalent industries and occupations in which workers from incorporated communities and First Nation communities were employed in 2006 [Appendix 6B Table 6B-11.]… the three most prevalent in the Province were health care and social assistance, retail trade and manufacturing… In Project Study Area RMs… agriculture, forestry, fishing and hunting were the most prevalent… Agriculture, forestry, fishing and hunting were most prevalent in NAC communities, followed by public administration and educational services. In First Nation communities, the most three prevalent industries were public administration, health care and social assistance, and educational services…"

6.3.3.2 Mineral Economic Base 6-193

"Mining is the second largest primary resource sector of the Manitoba economy. There are currently 16 active mining companies; 5 metallic mineral and 11 industrial mineral and 67 active exploration companies. There are 10 producing mines, 1 smelter and 2 refineries[5] presently operating in the province.

In 2009, the total value of mineral production for metals ($1.18 billion), industrial minerals ($144 million) and petroleum ($620 million) amounted to over $1.9 billion. Manitoba's top four metals include; nickel, copper, zinc and gold…

In 2009, the mineral industry accounted for approximately 4.7% of provincial Gross Domestic Product (GDP)… The Manitoba mining and exploration sector employed an average of 5,400 in 2009…"

6.3.3.3 Forestry Economic Base 6-194

"With approximately 11.7 million hectares of certified forest area, forestry has an important role in the economy of Manitoba. The Manitoba forestry sector employed approximately 6,700 direct jobs in 2009…

In 2008, the total revenue of goods manufactured from forestry and logging industry ($63,054,000), pulp and paper product manufacturing industry ($457,680,000) and wood product manufacturing industry ($585,523,000) amounted to over $1.1 billion…

Two key forestry companies have established operations within the Project Study Area, Tolko Industries Ltd. (Tolko) at The Pas and Louisiana Pacific (LP) Canada at Swan River. Tolko is the primary employer in The Pas. Its current operations include both a pulp and paper mill and a lumber mill. Currently, Tolko employs 750 people at the mill site with an additional 350 people in woodland contractor operations…

Louisana Pacific Canada's Minitonas Oriented Strand Board (OSB) plant has been in operation since 1996 and has provided approximately 175 jobs at the Minitonas OSB Mill and forestry Resources Division in Swan River and has accounted for roughly $20 - $50 million annually in sales (Profile Canada, 2011)… In addition to these larger mills, there are numerous other wood processing facilities located within the Project Study Area, including softwood and hardwood sawmills (e.g. Waugh's Woods, Spruce Products Ltd.), post and pole plant, and pressure treating facilities (Prairie Forest Products Ltd., Roblin Forest Products Ltd.)…"

6.3.3.4 Hydro Northern Training and Employment Initiative 6-195

"An extensive training initiative, called the Hydro Northern Training and Employment Initiative (HNTEI), took place from 2002 through 2010. The purpose of the HNTEI was to provide an opportunity for northern Aboriginal people to enhance their skills and obtain training for jobs relevant to the construction of the Wuskwatim Project and the proposed Keeyask Project,. Although the HNTEI was not developed specifically for the Bipole III Project, the initiative has enhanced skills of many members of the northern Aboriginal labour force and it is expected that many will be employed in the construction phase of the Project.

The HNTEI provided academic upgrading and technical training (accompanied by life skills programming) in the following areas: Construction designated trades; Construction non-designated trades; Construction support jobs; and Technical and professional occupations.

Technical training courses for occupations were offered in the following areas: truck driving, heavy equipment operation, carpentry, cooking, catering, security, plumbing, crane operation, welding, ironworking, business support and computer systems maintenance.

The $60.3 million training initiative was funded by Manitoba Hydro, Canada and the Province of Manitoba… the Wuskwatim and Keeyask Training Consortium Inc. [WKTC Inc.] which, in turn, advanced funds each year to participating First Nations and the Manitoba Metis Federation [MMF]…

…The HNTEI provided training to more than 2,600 Aboriginal residents of communities throughout Northern Manitoba…"

6.3.4 Services 6-196

6.3.4.1 Overview 6-196

"Services are critical to meeting a wide range of human needs. Community services include provision of housing, public infrastructure (to provide potable water and waste handling, roads, electricity and other needs) and public facilities to provide health care, education and other government services. Services highlighted are those potentially affected as a result of Project-related sources of effects and include housing, temporary accommodations (hotels, etc.), water and sewer services, electricity, policing and emergency services, and travel and transportation.

Given the location of the proposed Keewatinoow Converter Station and associated facilities in northern Manitoba, addition detail is provided for the Town of Gillam. Although the FLCN community at Bird is the closest community to the proposed converter station site at an estimated distance of 35 km, there are a limited range of amenities in the community…

Gillam is approximately 90 km from the proposed converter station and associated acilities. Over 250 FLCN members reside in Gillam. The community offers publicly and privately provided services in the health, education, retail, hospitality, and administrative sectors. Gillam is the operations and maintenance center for Manitoba Hydro's Nelson River facilities, as well as numerous transmission lines in the region. The largest segment of the community's population consists of Manitoba Hydro operations and maintenance employees and their families. Being a larger community, Gillam has a number of amenities including a lounge, liquor vendor, liquor sales store, two hotels, two restaurants, and one publically accessible multipurpose recreation centre."

6.3.4.2 Community Services 6-197

Housing

"Appendix 6B Table 6B-11 outlines the total number of occupied private dwellings, dwellings requiring major repair, average number of rooms per dwelling, and average household size in the Project Study Area overall, and for First Nations, NACs and incorporated communities, as compared to the province based on 2006 Statistics Canada data.

There were a total of 341,989 occupied private dwellings in the ProjectStudy Area, of which 261,135 were in the City of Winnipeg. There were 5,068 occupied dwellings in First Nations communities and 926 occupied dwellings in NACs. Exlcuding Winnipeg, there were 74,860 occupied private dwellings in cities, towns, villages, RM and the LGD in the Project Study Area.

The 2006 Statistics Canada data shows that a greater proportion of housing in the Project Study Area First Nation and NAC communities required major repairs than in incorporated communities in the Project Study Area or the Province… in general, Project Study Area First Nation and NAC communities had higher levels of crowding when compared to other communities and the Province as a whole…

Of the occupied private dwellings in Gillam, approximately 74% were rental units, the majority of which are owned by Manitoba Hydro… There is a shortage of housing in Gillam…Manitoba Hydro recently developed six to eight single-family lots (*Bipole III Socio- Economic Baseline Technical Report*, 2011) and a four-plex unit is under construction. There are plans to construct a minimum of 100 houses in Gillam over the next ten years.

The Town of Gillam is currently looking into developing three new housing subdivisions. These subdivisions would consist of approximately 400 lots (*Bipole III Socio-Economic Baseline Data Technical Report*, 2011)…"

Temporary Accommodations

"Temporary accommodations in the Project Study Area include hotels, motels, bed and breakfasts, and lodges and resorts. Within the Project Study Area, it is estimated that there are approximately 7,900 of these which can accommodate approximately 23,700 people (*Bipole III Socio-economic Baseline Data Technical Report*)…"

Water and Sewer Services

"Water and sewer services are available in most communities in the Project Study Area, but the type of service varies with the community and often depends on the location of homes… urban centres provide piped water and sewer… towns and villages use a combination of water treatment reservoirs and community wells… smaller communities - community wells, some of which provide only non-treated water. Sewage services… involve sewage treatment plants, sewage lagoon systems and septic holding tanks with pump-out.

… Most of the First Nation communities have on-site services for water utility and sewage facilities … Some First Nation communities have off-site services…

Water and sewer services also vary between NACs. Piped water is supplemented by water delivery, reservoir/dugout, lake-source, individual wells with truck service or public wells, and public pick-up in some cases… Communities either have piped sewage service or sewage is hauled to lagoons with pump-outs from holding tanks."

Electricity

"Electrical service is available in all communities in the Project Study Area. Electricity is provided by Manitoba Hydro through land lines."

6.3.4.3 Emergency and Policing Services 6-199

Health Services

"Health services in the Project Study Area by community are listed in Appendix A of the *Bipole III Socio-Economic Baseline Data Technical Report*. Hospitals are available in Ste. Anne, Thompson, Gillam, The Pas, Flin Flon, MacGregor, Portage la Prairie, Neepawa, Dauphin, Grandview, Ste. Rose, Winnipegosis, Swan River, as well as several in The City of Winnipeg. In addition, a number of the communities in the Project Study Area have health centres and clinics…

…In terms of First Nation communities and NACs in the Project Study Area, there are two First Nation and Inuit Health Branches, as well as various health centres, health offices and nursing stations that offer additional care. The First Nation and Inuit Health Branches are located in Camperville and Wasagamach. Ebb & Flow First Nation, Keeseekoowenin Ojibway First Nation, OCN, Long Plains First Nation, Swan Lake First Nation, Tootinaowaziibeeng Treaty Reserve and Waywayseecappo First Nation have health centres. The communities of Birdtail Sioux First Nation, Gamblers First Nation and Rolling River First Nation have health offices. Health services offered vary but can include treatment and prevention programs in the areas of nutrition, dental, health education, and nursing and physician services… Ambulance services are found throughout the Project Study Area…a few communities transport patients by air to other centres for medical treatment (e.g., Moose Lake)."

Fire Halls and Departments

"Fire halls and departments are found throughout the Project Study Area (*Bipole III Socioeconomic Baseline Data Technical Report)*. Most of the major Project Study Area communities have dedicated fire services including Winnipeg (30 fire halls), Portage la Prairie, Dauphin, Flin Flon, The Pas, Thompson and Gillam. Many of the smaller communities have volunteer fire services to respond in the event of an emergency."

Police Services

"Apart from The City of Winnipeg, there are numerous Royal Canadian Mounted Police (RCMP) detachments located throughout the Project Study Area. These include Cranberry Portage, Dauphin, Flin Flon, Gillam, Minnedosa, Neepawa, Portage la Prairie, Roblin, Swan River, The Pas, Thompson, and many other detachments based in smaller communities… Two First Nations within the Project Study Area have their own police services. OCN has a police department and the Dakota Ojibway Police Service operates out of The City of Brandon…"

6.3.5 Travel and Transportation 6-201

6.3.5.1 Airports and Aerodromes 6-201

"Airports and aerodromes in the Project Study Area are listed in Appendix 6B Table 6B-3… Winnipeg International Airport is the largest airport in the Province. The other major airports in the Project Study Area are located at the communities of Thompson, Flin Flon, The Pas and Gillam…

The Thompson Regional Airport is a northern regional hub for both passenger and cargo traffic… Bases for Custom Helicopters, RCMP Air Division and Manitoba Government are also at the Thompson Airport. Thompson Airport has experienced increases in passenger traffic associated with the development of the Wuskwatim Projects and increases in cargo traffic with the closing of winter roads earlier in recent years…"

6.3.5.2 Existing Road Network and Traffic Volumes 6-201

"Provincial Trunk Highways (PTHs) and Provincial Roads (PRs) likely required for the construction of the Project include PR 207, PTH 15, PTH 101, PTH 6, PR 391, PR 280, and PR 290. In addition to these primary roads, a number of other PRs will likely be utilized for the project (*Bipole III Transportation Technical Report*). The 2009 Annual Average Daily Traffic (AADT) volumes along the primary traffic routes between Winnipeg and the site of the proposed Keewatinoow Converter Station, as well as others likely to be affected by construction of the Riel Converter Station are summarized in Table 6.3-10."

Traffic Volume

"… Manitoba Hydro's large-scale projects have had a large impact on traffic volumes on the provincial road network, in particular PR 391, PR 280 and PR 290…"

Collisions

"Collision data for PR 280 and PR 290 was considered relevant to this discussion given the potential impact of the Keewatinoow Converter Station construction camp on this indicator…"

Gillam Area Roads

"Two provincial roads (PR) exist in the area immediately surrounding the construction site for the Keewatinoow Converter Station: PR 280 and PR 290… Fox Lake (Bird) is located off of PR 290 and is about a 30 minute drive (35 km) from the construction site. Gillam is located off of PR 280, southwest of its junction with PR 290.

Under normal driving conditions, the trip between Gillam and Fox Lake (Bird) is approximately 45 minutes… The state of the road (particularly PR 290) is quite poor… The Conawapa access road is generally in good driving condition… None of the provincial roads that are relevant to the Keewatinoow Converter Station and associated facilities (PR 290, PR 280, PR 391) are expected to exceed road capacity due to Manitoba Hydro-related travel."

Existing Rail Network and Volumes (Northern Manitoba)

"The Hudson Bay Railway (HBR) owns and operates a rail network comprising of approximately 1,300 km of rail line in central and northern Manitoba… The main line spans between The Pas and Churchill via the communities of Wabowden, Thompson, Pikwitonei, Kelsey, Ilford and Gillam. A shorter line exists between The Pas and Flin Flon via the communities of Atik, Cranberry, Sherritt Junction, and Channing. Interchanges to other rail lines exist at The Pas, which connects to the Canadian National (CN) rail network, and Sherritt Junction, which connects to the Keewatin Railway Company (KWC) rail line…The existing traffic volume on the rail network is in the order of 17,000 and 19,000 car loads / year…"

6.3.6 Personal, Family and Community Life 6-204

6.3.6.1 Total Population 6-204

"The Project Study Area covers approximately 102,435 km2 (approximately 18.5%) of the Province (Map 6.1)… The largest portion of the population lives in the southern portion of the Project Study Area, primarily between the Swan River-Dauphin region and the City of Winnipeg…

… population of communities within the Project Study Area was approximately 858,934 (Appendix 6B Table 6B-11). The City of Winnipeg… population of 633,451 (approximately 74%)… The total on-reserve population in 2006 for First Nation communities in the Project Study Area was approximately 21,203… total [Northern Affairs Communities (NAC)] population of approximately 3,056. Approximately 14% of the Project Study Area population resided in RMs, compared to approximately 9.7% in cities, towns and villages excluding Winnipeg. Approximately 73.7% resided in Winnipeg, 2.5% in First Nations, and approximately 0.4% in NACs…

Of the total Project Study Area population of 858,934 in 2006, 111,335 persons identified themselves as Aboriginal or approximately 13%. This compared to approximately 11% in incorporated communities, approximately 79% in NACs and approximately 86% in First Nation communities."

6.3.6.2 Population Growth and Structure 6-205

"…Between 2001 and 2006, the population in the Project Study Area decreased by 0.5% (Appendix 6B Table 6B-11. In comparison, the population of the entire Province of Manitoba increased by 2.6%. In the same timeframe, the on-reserve population of First Nation communities increased by 7.6%...

Table 6.3-11 illustrates age characteristics of community types in the Project Study Area in comparison to Manitoba in 2006…

… The First Nation communities in the Project Study Area are a relatively young population as approximately 55% of the total population less than 25 years of age (Figure 6.3-1)… For the Province as a whole, only 33% of the total population is less than 25 years of age…"

Community Organization

"… First Nation communities in the Project Study Area elect a Chief and Council who are responsible for formal community decision-making pertaining to a wide variety of matters. The terms seaved between elcitions vary according to each First Nation…

NACs typically elect a Mayor and Council under the auspices of *The Northern Affairs Act*. However, some of the smaller NACs (for example, Herb Lake Landing) appoint a contact person that works with the provincial government to administer and manage the community.

Incorporated cities and towns elect Mayors and Councils which typically serve four-year terms in office. RMs elect Reeves and Councils which also serve four-year terms in office…"

6.3.6.3 Health 6-208

"Health services in Manitoba have been divided into regions through the establishment of Regional Health Authorities (RHAs)… Communities in the Project Study Area are within the boundaries of nine separate RHAs as follows (Map 6-37): Assiniboine; Brandon; Burntwood; Central; Norman; North Eastman; Parkland; South Eastman; and Winnipeg… [See Appendix 6B Tables 6B-12 and 6B-13]

As an indicator of overall health in the project study area, an overview of RHA and provincial health data in terms of infant mortality and life expectancy is provided (Table 6.3-12). Infant mortality and life expectancy are widely used indicators to measure the well-being and health of the population respectively.

In the Province of Manitoba, the infant mortality rate is 6.6 per 1,000 live births. In the RHAs in the Project Study Area, this rate varies from 3.5 in the Brandon RHA to 10.3 in the Burntwood/Churchill RHAs…

In the Province as a whole, life expectancy at birth is 79.3 years. The South Eastman, Brandon, Central and Winnipeg RHAs all had higher life expectancies at birth. In the remaining RHAs, life expectancy ranged from 71.3 years in the Burntwood/Churchill RHAs to 78.2 years in the North Eastman RHA…

…In a recent Community Health Assessment conducted by the Province of Manitoba for the RHAs in Manitoba, the Burntwood RHA ranked highest (indicating the lowest overall health rating). The most prominent public health issues within the RHA include: addictions (alcohol, drugs, etc.); quality of housing; quality of water; and diseases, including diabetes… Hospital utilization was higher in the Burntwood RHA (173.3 per 1,000 population) compared to the province as a whole (81.7 per 1,000 population)."

6.5.5Aesthetics

"The aesthetics of the Project Study Area vary with the topography and vegetation of the natural landscape, as well as the degree of human activity associated with settlement patterns and with consumptive and non-consumptive land/resource uses beyond communities. Manitoba's regions outside Winnipeg encompassed within the Project Study Area (either in whole or in part) include: North of 53, Parkland, Central Plains, Pembina Valley and Western Regions (Travel Manitoba, 2011). A description of the landscape within the regions is provided below.

North of the 53rd parallel, the Project Study Area is located in the North of 53 Region… sparsely populated and Thompson is the only city in the region… located in the Boreal forest within the Canadian Shield, and has numerous lakes. Mining, hydro-electric development, forestry, commercial fishing, trapping, transportation and tourism are the region's major industries… Flin Flon is a mining community…The Pas serves as a major centre for forestry, transportation, tourism, and government and other services… Snow Lake is a mining community…

Most of the Parkland region is located in the Project Study Area. Riding Mountain National Park and Duck Mountain Provincial Park area located in the region in the Project Study Area. Dauphin is the region's largest centre… numerous lakes, rivers and streams, and offers all-season recreational opportunities. Much of the economy is agriculturally based.

The Western Region is includes forested hills and many small lakes. Brandon… largest centre. The region includes Spruce Woods Provincial Park and the Carberry Desert, a large area of rolling sand dunes. The main industry throughout the region is mixed agriculture.

The Central Plains and Pembina Valley Regions are located in south-central Manitoba… only a small portion of the Pembina Valley Region is included in the Project Study Area…Portage la Prairie is the largest community in the region. Agriculture is the major industry in the area…"

6.3.7 Culture and Heritage Resources 6-213

6.3.7.1 Culture 6-213

"…There are distinct Aboriginal groups in the Project Study Area — Cree, Ojibway, Dakota Sioux, and Métis. For the Project, an Aboriginal Traditional Knowledge (ATK) process and Key Person

Interviews (KPIs) were conducted in the Project Study Area (*Bipole III Aborginal Traditional Knowledge Technical Report* and *Bipole III Socio-Economic Baseline Data Technical Report*)…

… Aboriginal culture, in general, is rooted in the interrelationship of all things, where the ecosystem and all its components interact with one another to maintain harmony and balance. Commercial value of the land is secondary to its natural productivity…

… Non-Aboriginal culture tends to view and appreciate the ecosystem for its commercial, recreational and aesthetic qualities and, as a result, the landscape is not as strongly linked to cultural identity. For example, most of the incorporated municipalities in the project study area were developed, and have been sustained, primarily for resource use reasons…

… Both groups place importance on future generations which includes the need for economic stability in terms of employment and job opportunities…"

6.3.7.2 Heritage Resources 6-214

"The Project Study Area is a complex patchwork of human adaptation that has, over the past 10,000 years, served as a record of cultural land use and occupancy by human populations."

Cultural Sequencing

"The nature of deglaciation some 12,000 years ago (ya) and the subsequent development of glacial Lake Agassiz determined the physical boundaries of early human occupation in the Project Study Area. The location of tangible cultural heritage (artifacts and features) in Manitoba coincides with post-glacial conditions that allowed successive migrations of wildlife and plants into previously inaccessible lands…

…Six major water ways transect the Project Study Area: Nelson, Burntwood, Grass, Saskatchewan, Assiniboine and Red rivers. Together these rivers drain a substantial portion of the interior, all of which empty into Hudson Bay via the Nelson River… interlacing river systems played a significant role in the movement of human populations. The archaeological record confirms this by the distribution of some tools, exotic tool-making stone, pottery designs, and cultural expression in the way of pictographs, petroforms and burial practices that are to be found within the Project Study Area…

Manitoba's heritage is loosely defined into two periods – Pre-European contact and Historic. These are described further below and in the *Bipole III Heritage Resources Technical Report*."

Pre-European Contact Period

"The pre-European contact period represents the time before face-to-face encounters between indigenous people and Europeans… The frequency of cultural sequencing within various ecosystems of the Project Study Area is noted in the table below. Maps 6-38 to 6-40 illustrate the distribution of the various cultural sites within the Project Study Area."

The Historic Period

"The archaeological record for this period follows two somewhat parallel paths: European and Historic Aboriginal… Explorers and fur traders were the earliest Europeans to arrive in the Project Study Area, followed by a number of Hudson Bay Company (HBC) surveyors that explored areas along the Burntwood, the Saskatchewan and the Assiniboine Rivers. A number of fur trade posts were established through these early explorations. Soon after the formation of the HBC, the French entered Manitoba, interested in fur trade and imperialistic expansion.

… The progression of the fur trade led to the strengthening of the relationship between indigenous peoples and fur trade servants through the intermarriage of these two groups resulting in the emergence of a new culture (i.e., "country born" in the north and Métis)…

…The Confederation of Canada in 1867 led to the founding of the Dominion Land Surveys of 1870 which incorporated the Province of Manitoba under a section, township, and range system of land classification. Numerous settlers arrived in the province, purchasing land through these government surveys and changed the cultural landscape of the Project Study Area. In 1880, the Canadian Pacific Railway (CNR) arrived in southwestern Manitoba and facilitated access to and from communities…

…Beginning in 1871, settlements of First Nations were under pressure to take Treaty with the Federal Government. Between 1871 and 1905 five treaties were signed in Manitoba and reserves were created shortly thereafter."

Distribution of Heritage Resources

"The distribution of archaeological sites was examined by ecozone: Hudson Bay Lowland; Boreal Forest; Parkland and Prairie. The distribution of early Palaeo points was located above the Campbell Beach Ridge. Late Palaeo/early Plano sites were widely spread throughout the lower half of the overall study area (south of The Pas), while sites in northern half occur mainly on the western edge of the Project Study Area. Archaic period sites were distributed along major waterways and suggested an influx of both Shield and Plains Archaic. The vast distribution of Woodland archaeological sites throughout the Boreal and northern Parkland ecozones suggested rapid movement of ideas and/or people from the southeast. The southern Parkland and Prairie ecozones indicated movements of Plains people from the south and west. Site distribution was in keeping with earlier bison-hunting people and was considered to represent diffusion of changing technology rather than new people.

The presence of late Woodland period pottery, consistent with proto-Anishinaabe, at a site at Brandon, at a site at the Manitoba Narrows, and at Dauphin Lake illustrate a much broader range of Woodland-related people who accessed prairie resources such as bison on a seasonal basis. Bison are also known to have a much larger range than that of the historical period. Although outside of the Project Study Area, bison bone has been found at archaeological sites within the Interlake, and pictographs depicting bison have been found along the Bloodvein River at the Ontario/Manitoba border.

The Aboriginal content of the Historic Period has not been effectively identified and many sites that are noted as Historic (general) or fur trade may belong to the Historic Aboriginal category. The historic development of Manitoba is well represented within the Project Study Area (Map Series 6-4100). Further to the general archaeological inventory, federally, provincially or municipally designated sites, as provided by the Historic Resources Branch, indicates that the Historic Period is well represented (Map Series 6-4100). However, few designations have been made to Aboriginal sites."

Heritage and Cultural Resource Inventory Summary 6-217

"According to the Historic Resources Branch inventory database, there are 4,912 heritage and cultural resource sites registered within the Project Study Area (Map Series 6-4100). Sites range in age from 10,000 ya to 100 ya, and include campsites, burials, animal kill sites, tool-making stations, lookouts, quarries, ceremonial features, homesteads, industrial locations, pictographs, fur trade posts, and palaeontological specimens such as plant and animal fossils. Of the total number of sites, 3,023 are archaeological sites (i.e., any site or object that shows evidence of human endeavour) of which 77 are registered burial sites.

Other heritage and cultural sites include Centennial Farms, cairns and plaques, and federal, provincial and municipally designated sites. Any active farm that is more than 100 years old and has been held by the same family is designated provincially as a Centennial Farm…

In 2010, two new archaeological sites were discovered at the location of the proposed Keewatinoow Converter Station from field investigations as part of the Heritage Resource Impact Assessment (HRIA) process. The sites were situated on low rise gravel ridges that were likely beaches of the former Tyrrell Sea. Both sites contained elements of settlement, such as concentrated lithic scatters and stone features that represent human activity possibly at 3,500 years ago. HdKl-01 contained a number of stone features, three of which may represent former burial sites, in addition to numerous loci of lithic scatter. Further to these cultural features, a microblade tool was recovered during test excavation and may represent Palaeo-Inuit occupation. The second site contained stone features that may be tent rings; no diagnostic tools were found at this site during controlled surface collection."

7.0 IDENTIFICATION AND EVALUATION OF ALTERNATIVE ROUTES AND SITES 7-1

"This chapter provides an overview of the approach to route/site selection. … objectives of the … minimize adverse biophysical and socio-economic impacts, and to satisfy technical and cost requirements for the Project. … The stages of the route/site selection processes have included review and comment by stakeholders including directly affected Aboriginal communities, landowners, elected municipal officials, interest groups, other interested parties, and government representatives (Chapter 5, Environmental Assessment Consultation Program). The alternative route/site selection processes used regional and site-specific biophysical, socio-economic and cultural features to identify and evaluate alternative routes/sites and to select preferred route/sites for the Bipole III line and other project components. Careful routing and siting of transmission facilities is critical to avoidance and minimization of potentially adverse effects associated with their development. … Amongst the various economic criteria identified, line length was used for the comparison of alternative routes within the context of the study area established for the Project. …"

7.1 NORTHERN AND SOUTHERN PROJECT COMPONENTS ROUTE/SITE SELECTION PROCESS 7-2

"Sites for Keewatinoow Converter Station … established principally on the basis of technical siting criteria (i.e., engineering criteria)… Alternative sites for the converter station were identified within approximately 5.5 km (3.4 miles) of the Conawapa Generating Station … There is a technical requirement that the ground electrode be located within 50 km (31 miles) of the Keewatinoow Converter Station site. … Alternative sites for the construction power station and construction camps were identified in close proximity to the potential Conawapa Generating Station site to allow or possible reuse as part of the potential development of Conawapa. … Keewatinoow Converter Station, construction power station, northern ground electrode and electrode line, as well as portions of the collector and construction power lines are located in the Fox Lake Resource Management Area (RMA) and the Fox Lake Traditional Territory.1 … Approximately 226 km of the Bipole III transmission line as well as a portion of the related facilities is located within the Split Lake Resource Management Area (SLRMA). … The site for the Riel Converter Station is owned by Manitoba Hydro and was established through the Riel Reliability Improvement Initiative Project, which received its Environment Act Licence in April 2009. There is a technical requirement that the ground electrode be located within 50 km (31 miles) from the Riel Converter Station site. … Routing of the electrode line was deferred pending identification of the preferred location of the electrode, and is subject to further public consultation with the RM of Springfield and affected landowners. … alternative sites/routes were subject to environmental assessment input from biophysical and socio-economic disciplines, which were considered in the selection of the preferred site/route."

7.1.1 Keewatinoow Converter Station and Associated Facilities 7-4

7.1.1.1 Keewatinoow Converter Station 7-4

Environmental Features/Constraints

"The Keewatinoow Converter Station site selection process involved identifying candidate locations within close proximity (5.5 km [3.4 mile]) of the potential location of the Conawapa Generating Station. … selection process … based on a set of critical pass/fail technical requirements, …Ten sites were initially identified … [five] sites did not meet the critical pass/fail requirements and hence, … All five candidate sites, … for the Keewatinoow Converter Station are located in the Fox Lake RMA (Map 7-2). … Table 7.1-1 presents a summary of the ratings of each alternative converter station site as low, moderate or
high for level of constraint by each technical discipline. … In terms of the alternative sites for the Keewatinoow Converter Station, from an environmental perspective:

- Site NCS4b was the most favoured site by each discipline. …
- Site NCS3 was the next most favoured site …
- Sites NCS1a, NCS1b and NCS4a were the least favoured sites …

All sites were rated as having no known occurrences of rare and endangered species. However, some sites do have the potential for rare and endangered species to occur as a result of the presence/absence of specific habitat that is indicative of these species occurring (i.e., suitable anuran habitat, riparian areas for bird habitat). Field investigations related to the converter station site selection were conducted, where required, … Review with Fox Lake Cree Nation as to the criteria for identifying the alternative converter station sites was undertaken."

Technical Constraints

"From a technical perspective, all five alternative sites for the Keewatinoow Converter Station were considered acceptable. … the top two ranking sites NCS4a and NCS4b … A description of the rationale for selecting Site NCS4 from a technical perspective is in Chapter 3, Project Description, Section 3.5.1.1.
…Based on a follow-up field survey of the preferred site (NCS4), evidence of archaeological resources (i.e., possible burial sites and a small campsite) was encountered. Further follow-up heritage resource field investigations occurred in the summer of 2011. Based on the field investigations, the site of the possible burials is located within existing fencing and, based on discussions with Historic Resources Branch, the site will be permanently fenced prior to any construction activities. The second site, which is a small campsite, has been disturbed by a road. This site will require further archaeological investigation and monitoring during construction. Ongoing discussions are being held with Fox Lake Cree Nation and further discussions will occur with the Heritage Resources Branch prior to site development."

7.1.1.2 Northern Construction Camp 7-7

"A start-up camp is required for the Project and was selected based on technical criteria as outlined in Chapter 3… Two alternatives were considered and evaluated for the main construction camp as follows:

- To the south of the Conawapa access road near the site of the potential Conawapa Generating Station site; and
- To the north of the Conawapa access road.

Manitoba Hydro also considered housing options in the Town of Gillam for the main construction camp. Technical considerations … included available access, size requirements, soil conditions and terrain … There was little difference in the two locations from an environmental perspective… The preferred site is an old burn site which limits the amount of clearing required. It was determined that establishing a construction camp near the Keewatinoow Converter Station site, in the vicinity of the proposed Conawapa Generating Station site, would be considered best based on available access, size, soil conditions and terrain. The selection of this site facilitates its subsequent reuse for possible future generating station development and avoids the cost and environmental effects of duplicating facilities in two different locations. The location also avoids concerns about potential adverse effects associated with having a camp located near the community of Bird which have been raised as an issue by Fox Lake Cree Nation."

7.1.1.3 230 kV AC Northern Collector and Construction Powerline Routes 7-7

"Routes for the 230 kV northern collector lines were selected to maximize use of existing rights-of-way. … technical specialists evaluated the features/constraints from biophysical and socio-economic perspectives for the collector lines and construction powerline rights-of-way."

Soils

"The northern collector line … routes … area dominated by Organic Cryosols which represent the dominant soil type. Other important soils …Eutric Brunisols. … The rights-of-way are dominantly very poorly to poorly drained (731.4 ha, 89%) and consist mostly of mesic (509 ha, 62%) and fibric (222 ha, 27%) soil textures."

Aquatics

"The collector lines and construction powerline have a total of 43 watercourse crossings, consisting mostly of various tributaries of the Nelson River. The crossings were rated for fish habitat and sensitivity to disturbance. Based on the habitat assessments, four watercourse crossings were considered to provide "No Fish Habitat." These crossings were wetlands with no connection to other waterbodies. Watercourse crossings considered "Marginal" fish habitat included 31 of the crossings. These crossings consisted of upstream habitat of tributaries, far from their confluence with the Nelson River. They were within bog/fen habitat, which **likely support only forage fish**. Watercourse crossings considered "Important" fish habitat included eight of the crossings. These crossings included major rivers such as the Nelson and Limestone rivers with known indicator and forage fish populations. They also included downstream habitat of tributaries, close to their confluence with the Nelson River. Crossings of tributaries with known indicator and forage fish populations were also considered "Important", even if these crossings were within upstream bog/fen habitat, as indicator fish are likely to use this habitat to some extent. No crossings were considered to have **"Critical" fish habitat.** For habitat sensitivity to disturbance, five watercourse crossings were considered to have a "Low" rating. Four of these crossings consisted of wetlands with "No Fish Habitat", and one was a small tributary with no signs of instability. Crossings considered to have "Moderate" habitat sensitivity to disturbance included 38 of the crossings. Most of these crossings (34) consisted of tributaries with broad, soft floodplains. Also, two tributaries had unknown bank conditions, and the Nelson and Limestone Rivers had exposed soil banks, indicating potential instability. No crossings were considered to have "High habitat sensitivity" to disturbance."

Vegetation

"Based on land cover classification, vegetation cover types for the rights-of-way included exposed land (17.5 ha), tall shrub (90.8 ha), treed wetland (11.1 ha), wetland shrub (217.6 ha), wetland herb (17.8 ha), dense coniferous (52.3 ha), open coniferous (124.6 ha), sparse coniferous (279.8 ha) and a very minor component of dense mixedwood (<0.01 ha). The footprint for the collector lines also included 192.6 ha of riparian habitat and 544.1 ha of bog wetland."

Mammals

"Spatial habitat datasets were utilized in evaluating and modeling specific components of mammal and caribou habitat for the collector and construction power lines rights-of-way. The habitat-based assessment tool identified habitat areas for specific individual mammals and VECs, including beaver, marten, moose and caribou. Based on the predictive model, the rights-of-way for the lines consisted of 6.9 ha of beaver habitat (0.71% of the Local Study Area); 215 ha of American marten habitat (7.4% of the Local Study Area); and 114 ha (0.77% of the Local Study Area). In this region, migratory caribou (coastal and barren ground) are occasional migrants and occupants. These include the coastal populations, the Pen Island and Cape Churchill herds, and the Beverley-Qamanirjuaq barren ground caribou. With respect to caribou, two predictive models were utilized, including calving habitat and winter habitat. The area of calving habitat within the rights-of-way was determined to be 360 ha (0.25% of the Local Study Area), whereas the area of winter habitat was determined to be 743 ha

(0.44% of the Local Study Area)."

Birds

"Breeding bird surveys in the Hudson Bay Lowland Ecoregion … collector line footprint … yielded 92 bird species observed 4,736 times at 502 locations. Passerine species were the most observed birds, with 64 species, followed by colonial waterbirds (41 species), waterfowl (28 species) and woodpeckers (20 species). In the Hudson Bay Lowland Ecoregion, the most commonly recorded bird species were whitethroated sparrow (n = 403), fox sparrow (n = 387) and Lincoln's sparrow (n = 327).
Fourteen bird species were sampled a single time including blue-winged teal, belted kingfisher, common merganser, spruce grouse and broad-winged hawk. Of those bird species identified as Valued Environmental Components (VECs), habitat for 11 species was noted in the collector line and construction power line rights-of-way including mallard, sandhill crane, bald eagle, ruffed grouse, sharp-tailed grouse, pileated woodpecker, yellow rail, short-eared owl, common nighthawk, olive-sided flycatcher, and rusty blackbird."

Reptiles and Amphibians

"Wetlands are essential for the breeding stage of all Manitoban amphibian species, … found throughout the Province, including the northern collector and construction power line rights-of-way … total area of [reptile and Amphibian] habitat classes intersected … 4.8 km (3.0 mile) Local Study Area … includes: 0.7 km2 of wetland habitat, 0.2 km2 of herb wetland habitat, 2.3 km2 of shrub wetland habitat, and 0.3 km2 of treed wetland habitat."

Protected Areas Initiative, Areas of Special Interest, Reserve Lands and Treaty Land Entitlements

"No issues were identified with respect to Protected Areas Initiative (PAI) lands, Areas of Special Interest (ASIs), Reserve Lands or Treaty Land Entitlement (TLE) land selections…. a portion of the right-of-way for the lines crosses through the southeast edge of the Churchill Wildlife Management Area (WMA). No issues are expected to arise …in terms of PAIs/ASIs."

Land Use

"… located within the municipal boundaries of the Town of Gillam, and in a portion of the Fox Lake and Split Lake Resource Management Areas (RMAs). The rights-of-way for the lines from Henday to the Keewatinoow Converter Station site cross the rail line to Churchill at two points (at Limestone and Amery). Other linear infrastructure crossed includes PR 290, as well as existing transmission lines."

Heritage Resources

"A heritage resource impact assessment (HRIA) … conducted in summer 2011. Although access to some areas along the rights-of-way was limited, no heritage concerns were identified."

7.1.1.4 Northern Ground Electrode Site 7-11

"Site selection for the northern ground electrode involved identifying sites with desirable engineering/technical characteristics within a 50 km (31 mile) radius of the preferred site for the Keewatinoow Converter Station (Map 7-5). As outlined in Chapter 3, Section 3.5.1.2, the identified sites were evaluated and ranked according to technical criteria. …Thirteen… initially considered … all sites were considered viable options, some … less preferred from an environmental perspective."

Biophysical Features/Constraints

Birds

"With respect to birds… differences between the alternative sites … presence of riparian habitat versus upland habitats. … generally making them more productive and diverse. … Bird populations generally have higher densities in wetland, creek and riparian habitats. … A review of the alternative sites indicated that most listed species are unlikely to occur … but there is a small potential for a few listed species such as rusty blackbird, olive-sided flycatcher, yellow rail and short-eared owl to inhabit the area. … loss of habitat and habitat fragmentation could be associated with the ground electrode line and development of a maintenance road … Therefore, distance to a road is important in the evaluation of the sites. … Bird populations could have lower densities and diversity at these upland sites when compared to wetland, creek and riparian habitats … There is a small potential for a few listed species such as common nighthawk to inhabit the area as it prefers edges and openings in upland forest." [MWL: References to site numbers removed see chapter 3 for more detail about electrode siting]

Aquatics

"The alternative sites located near water sources that are of potential concern are ranked from lowest to highest for potential impact to fish and fish habitat … The potential effect on adjacent aquatic environments is due to in-stream construction, diversion of flow, placement of deleterious substances in or near fish bearing water, and water withdrawals from fish habitat. Sites with no watercourse overlap are preferred from an aquatics perspective and are ranked from lowest to highest in potential impacts … Of the eight additional alternative sites, five overlap with Leslie Creek … and two overlap an unnamed tributary of Leslie Creek."

Amphibians and Reptiles

"One species of concern listed under SARA (i.e., the northern leopard frog), was identified as potentially occurring in the area. … potential impacts from construction activity, placement of deleterious substances in and near waterbodies used by local anurans; and water withdrawals from anuran breeding habitat."

Vegetation

"Two plant species of concern were observed in the vicinity of the alternative ground electrode sites… Herriot's sage and arctic bluegrass. No protected species were known to be located at the alternative sites. Field assessments were conducted at nine alternative ground electrode sites, during which 58 different plant species were recorded. Snow willow was the only species of conservation concern observed during the surveys … ranked as uncommon (S3) by the MCDC. No species listed by COSEWIC or under SARA or MESA were observed during the surveys."

Caribou and Mammals

"Field studies were conducted to assess the alternative sites in relation to distribution and habitat requirements of coastal caribou and northern mammals. In general, electrode sites in proximity to existing access were preferred. Evidence of short-term winter use by Cape Churchill coastal caribou was present in the form of discernable winter trail and cast antlers for Sites …. These sites were considered less preferred Sites … were situated near riparian habitats. Aerial surveys of Site NES9 revealed evidence of winter use by coastal caribou. Because of caribou presence, this site was considered one of the two least preferred sites. Evidence of winter mammal sign was observed at Site NES11 from aerial and winter surveys. The area is infrequently occupied by Cape Churchill and Pen Island caribou. Trails were observed at Sites NES14 to NES21; however, there was no evidence from either a habitat or distribution perspective for caribou and northern mammals. Sites NES14 to NES21s were contained within areas of existing disturbance and were considered favourable locations for the ground electrode. No evidence was noted for either northern mammals or caribou at Site NES12, although trails were present. Higher habitat diversity was observed at Site NES 12 … was more remote … As such, it was considered one of the two least preferred sites from a coastal caribou and northern mammal perspective…"

Socio-Economic Features/Constraints

Land Use

"From a land use perspective, Sites … are located in the Churchill WMA. A portion of the WMA is identified as an ASI under Manitoba's PAI. None of the sites fall within the ASI boundary. Sites …. are within the Fox Lake RMA… With the exception of NES12, all other sites are within the Fox Lake Traditional Territory as defined in the 2004 Fox Lake Impact Settlement Agreement (ISA) [Chapter 5, Section 5.4.3.1]. Sites … are located in the Split Lake RMA. … The Conawapa access road provides access to Sites NES1 to NES 9 and NES13. No road access is available for Sites NES10 to NES12. There is rail access to the east of NES11."

Heritage Resources

"There are two provincially registered archaeological sites near SitesNES8 and NES9. …there is potential for palaeontological material to be present [MWL: near other sites]. … NES11 has been identified near the Weir River HBR crossing, in an area known for its extensive fishery, pre-European contact and historic weir structures may be present in the river. As a result, potential historic fishing campsites may be present.

Technical Constraints

"From a technical perspective, the three ground electrode sites that showed the best geophysical characteristics were selected for further evaluation and ranking (Sites NES4, NES6 and NES7) [Chapter 3, Project Description, Section 3.5.1.2]. … geophysical and geographical perspective, NES6 was determined to be the best …Follow-up field investigation to determine the presence of heritage resources on the preferred site occurred in the summer of 2011. No heritage resources were identified. Detailed design for the recommended site NES6 commenced in early 2011 …Detailed design will determine the exact footprint, type and location of the electrode. Detailed surface resistivity, electro-osmosis, detailed sub-surface geology, permafrost, and well water production rates will also be determined."

7.1.1.5 Northern Ground Electrode Line 7-15

"Manitoba Hydro considered two options for routing the ground electrode line. … either along an existing cut line (i.e., a former construction power route that was cleared in the 1980s) or along the existing Conawapa access road … preferred route for the line is along the existing cut line, which is also the most direct route (Map Series 7-300)."

7.1.2 Riel Converter Station 7-15

"The Riel Converter Station site will be located at the existing Riel Station, …in the RM of Springfield (Map 7-6). A portion of the station site (and related transmission line rights of-way) was purchased at the time of development of the 500 kV Dorsey-Forbes international transmission line … The site is currently being developed as part of The Riel Reliability Improvement Initiative which received its Environmental Act Licence in 2009. … the majority of infrastructure required for the Riel Converter Station has been or is being completed as part of Riel Sectionalization."

7.1.2.1 Southern Ground Electrode 7-16

"Site selection for the southern ground electrode involved identifying sites with desirable characteristics within a 50 km (31 mile) radius of the Riel Converter Station site. … the identified sites were evaluated and ranked according to technical criteria. … Seven potential ground electrode sites were initially investigated … all located in the RM of Springfield (Map 7-6). … four sites were ranked in order of preference: Site 1, Site 3, Site 10 and Site 2. All four sites were considered technically feasible for development with Site 1 having the lowest overall electrical interference effects. … All of these sites were reviewed from biophysical and socio-economic perspectives as outlined below."

Biophysical Issues/Constraints

Forestry

"Site 10 would have limited effects on forestry values as the majority of the site is classified as wetlands and therefore non-productive in forestry terms."

Aquatics

"Site 1 is removed from any water source and is located on farmland. … Site 1 is preferred."

Amphibians and Reptiles

"In terms of the presence of amphibians, reptiles and terrestrial invertebrates, shallow wetland areas in Sites 2 and 3 could potentially act as breeding habitat for some anurans requiring more ephemeral breeding spots, such as wood frogs and boreal chorus frogs. … Site 1 being preferred."

Birds and Mammals

"In terms of birds and mammals, the most apparent difference between the alternative sites is the amount of forest habitat available. The presence or absence of natural forest cover has a larger tendency to influence bird and mammal communities, generally making them more productive and diverse than those compared to croplands. … Site 1 would likely have the least amount of negative effects on birds and mammals as it consists primarily of agricultural croplands. ..."

Vegetation

"Several plant species of conservation concern were previously observed in the vicinity of the alternative ground electrode sites. Field assessments were conducted at four alternative … sites … 129 different plant species were recorded. Two species of concern were observed, including: showy lady's-slipper (Sites 2 and 3); and black ash (Site 10). Both … ranked by the MCDC as uncommon (S3). No species listed by COSEWIC or under SARA or MESA were observed at the time of the surveys."

Socio-Economic Issues/Constraints

Land Use

"From a land use perspective, Site 1 (22-11-6 EPM) was not preferred given the number of rural residences and farmsteads in the section, followed by Sites 2 and 3. Site 10 has no rural residences or farmsteads in the section."

Agriculture

"From an agricultural perspective, including field severance and agricultural productivity, Section 21-11-6 EPM (Site 1) had the most productive soils and was being cropped. Section 26-11-7 EPM (Site 2) had some limited agricultural activity, while Sections 13-11-7 EPM (Site 3) and 8-11-8 EPM (Site 10) were not currently being utilized for agriculture."

Heritage Resources

"In the RM of Springfield, many sites of a native origin have been disturbed over the years by cultivation. No known areas of potential concern have been identified according to Manitoba Historic Resources Branch records."

Technical Constraints

"…Sites 1, Site 3, Site 10 and Site 2 … were considered technically feasible for development of the ground electrode [but] because of land use issues with Site 1, … Site 1c was preferred from a biophysical perspective although it is currently under agricultural production, and contains two residences and two shelterbelts. In the summer of 2011, a Heritage Resource Impact Assessment was conducted for the Site 1c … no heritage materials were found. … Detailed design will determine the exact footprint, type and location of the electrode. Detailed surface resistivity, electro-osmosis, detailed subsurface geology, and well water production rates will also be determined."

Consultation

"A consultation process was conducted for the southern ground electrode as part of Round Four of the EACP. The process included a presentation to the RM of Springfield, a landowner information event and a Public Open House. The purpose was to present the alternative sites for the ground electrode, respond to issues, ideas and concerns, and to gain feedback on the sites. … landowners within a half-mile of the preferred ground electrode site indicated that about half had some concern with the site while about half indicated they had no concern. Specific issues … impacts of a ground electrode on EMF, property values and safety. Manitoba Hydro contacted the two owners of three properties that would need to be purchased for site development. Property purchases for the site seem to be feasible. Public Open House responses indicated limited concerns with the preferred site for the southern ground electrode."

7.1.2.2 Southern Ground Electrode Line 7-20

"Manitoba Hydro is in the process of selecting a route for the southern ground electrode line in the RM of Springfield to connect Riel Converter Station to the preferred ground electrode site … will closely resemble the line currently in service for Dorsey convertor station … similar in size to distribution power lines common along roadsides in rural Manitoba. It is anticipated that it can be routed on existing road or other rights-of way. …The preferred route and any responses from local landowners adjacent to the preferred route will be provided to Manitoba Conservation in December 2011."

7.2 BIPOLE III HVDC TRANSMISSION LINE: ALTERNATIVE ROUTE IDENTIFICATION PROCESS 7-20

"… commenced with the definition of a study area that reflected the basic functional requirements of the Project and was considered sufficiently broad to allow identification of several alternative routes for the Bipole III HVdc transmission line (Map 7-1). … Area were based on the conceptual location of the Keewatinoow Converter Station and the site of the southern converter station at Riel Station. …western boundary is the Manitoba-Saskatchewan boundary … eastern boundary was established, in part, by the existing location of Bipoles I and II and the need to maintain separation from them… also been defined by the presence of large water bodies (i.e., Cedar Lake, Lake Winnipegosis and Lake Manitoba)."

7.2.1 Regional Constraint Criteria 7-20

"Potential issues and sensitivities in terms of biophysical, socio-economic, technical (engineering) and cost considerations were translated into a list of regional features/constraints criteria. The list evolved as the SSEA process progressed … criteria listed in Table 7.2-1 represent features/constraints which should generally be avoided by alternative routes. …development buffers (termed Local Study Areas) which were 4.8 km (3.0 mile) wide and centered on the alternative routes were identified along each of the alternative routes to allow for potential effects …"

7.2.1.1 Biophysical and Socio-Economic Features/Constraints 7-21

"A listing of biophysical and socio-economic features/constraints … was developed (Table 7.2-1). … reflects previous experience with similar transmission projects, Aboriginal Traditional Knowledge (ATK), local knowledge, and stakeholder input during the EACP, technical specialist input and particular features of the Project Study Area itself. All features/constraints were considered to be important and, as such, were not formally prioritized. …**Biophysical features/constraints** included park reserves, ecological reserves, protected areas under the Protected Areas Initiative [PAI]), National parks and Provincial wilderness parks, Areas of Special Interest (ASI) and other high and moderate priority areas under PAI, other provincial parks, provincial forests and Wildlife Management Areas (WMAs), critical habitat (e.g., caribou calving areas) and important bird habitat areas, species at risk (areas of concern, rare plant species and communities) and conservation program/project sites (e.g., Manitoba Habitat Heritage Corporation [MHHC], Ducks Unlimited Canada [DUC], etc.). **Socio-economic features/constraints** included First Nation Reserve Lands, Treaty Land Entitlement (TLE) selections, Northern Flood Agreement lands, existing towns, villages and settlements (including areas designated for future urban development), municipal parks and other recreational areas/facilities, military land reserves, intensive agricultural operations, mineral interests and operations, communication towers, and airport and aerodrome facilities. …"

7.2.1.2 Technical (Engineering) and Economic Constraints 7-22

"Table 7.2-1 outlines technical (engineering) and cost constraints … routing through major waterbodies, extensive area of deep peat and widespread permafrost areas should be avoided. …In terms of cost constraints of routing a transmission line, limiting the line length and number of heavy angle structures is considered. … Reliability criteria … maintaining separation of the Bipole III line from other major transmission lines and, in particular, Bipoles I and II…"

7.2.1.3 Routing Opportunities 7-22

"… two general types of routing opportunities were identified … [1] existing linear rights-of-way and … [2] land base. …existing linear rights-of-way… (subject to the system reliability criterion requiring separation from major transmission lines)… In terms of the land base in agricultural Manitoba, marginal agricultural lands and pasture lands were considered as potential routing opportunities. Lands with limited or no agricultural use… generally involve less concern about disruption of agricultural practice than do more productive and more intensively used agricultural lands. … the only feasible alternative may be routing through productive agricultural lands in some areas."

7.2.2 Overview of the Routing Process for the Bipole III Line 7-23

"The following provides an overview of the routing process for identification of alternative routes for the Bipole III line."

7.2.2.1 Mapping of Biophysical, Socio-Economic, Technical (Engineering) Features/Constraints and Routing Opportunities 7-24

"… to identify alternative routes, environmental information … were assembled from existing published sources of information. … A preliminary listing of potential issues and concerns was developed … Table 7.2-1. … The regional features/constraint and opportunity data were digitally mapped on a set of Geographic Information System (GIS) and National Topographic System (NTS) base maps at a 1:250,000 scale. … The data collection process involved contact with a variety of local and provincial government agencies, as well as institutional and private organizations (e.g., DUC, MHHC, MWF, NCC, etc.), and literature searches of both published and unpublished reports and data sets. In some instances, original data (e.g., agricultural data) were collected through field work for the purpose of determining specific alternatives. The compiled data were applied as route selection criteria to identify and characterize the alternative routes."

7.2.2.2 Public Consultation 7-24

"… four rounds of consultation (Chapter 5). Rounds 1 and 2 … early 2008 to the winter of 2008, … Round 1 meetings with planning districts, elected officials and the leadership of northern and southern communities in the general area … Round 2 activities were initiated in early 2009 and continued to the fall of 2009/… discussions with elected officials, First Nation Leadership and Northern Affairs Community (NAC) councils of communities in the Project Study Area, planning districts, resource users, landowners, interest groups, government departments, as well as Regional and Community Open Houses. … Round 2 elicited a number of suggested routing constraints and opportunities which were taken into consideration in identifying alternative routes for the line. This included the identification of abandoned railway lines in the Swan Valley Planning District that could offer potential routing opportunities, a preference to route the Bipole III line to the east of the Town of Swan River, and the presence of a number of organic farms in the Big Grass Planning District."

7.2.2.3 Aboriginal Traditional Knowledge 7-25

"… Manitoba Hydro wanted to be respectful and inclusive of different forms of knowledge…Manitoba Hydro recognizes the importance of early and meaningful engagement of Aboriginal communities in project planning processes, including the importance of incorporating ATK perspectives. …community participation in ATK workshops undertaken by the Manitoba Hydro study team and community-led studies funded by Manitoba Hydro, but undertaken independently of the ATK workshop process. …19 communities participated in 15 ATK workshops, and seven communities undertook self-directed studies. … **Incorporation of the findings of the ATK process into the selection of the preferred route was complicated as the process took place at different points in the Project planning process.**"

7.2.2.4 Identification of Alternative Routes 7-25

"The first stage of the identification of alternative routes consisted of identifying routing features/constraints and bottleneck areas in the Project Study Area… Technical (engineering) constraints, cost considerations and possible routing opportunities were considered in the identification of alternative routes. …Moose Lake (North and South), and Red Deer Lake create two bottleneck areas (Map 7-8). …Other constraints in this area include a TLE selection along the Red Deer River. ...identification of alternative routes, three "main" alternative routes (Alternatives A, B and C), including a development buffer (4.8 km [3.0 mile] wide centered on the routes and termed the Local Study Area…This allowed for route adjustments to avoid site-specific features. … second stage of the process, which was the comparison of the alternative routes, more detailed analysis was undertaken to compare and evaluate the alternative routes identified within the Local Study Areas."

7.2.3 Description of Alternative Routes 7-26

"… alternative routes are illustrated on Map 7-9. … input from stakeholders including communities and other potentially affected parties was sought in identifying (Rounds 1 and 2 of the EACP) and comparing the alternative routes … All three routes originate at the proposed site of the Keewatinoow Converter Station, and then proceed southwest, south and then southeast to the Riel Converter Station site, east of the City of Winnipeg. … Alternative Route A … longest and the least direct route …Route

B … the most southern and eastern route, and … the shortest. …Route C … is the central route …and is intermediate in length."

7.2.4 Preliminary Evaluation of Alternative Routes A, B and C 7-28

"The Local Study Areas (a 4.8 km [3.0 mile] wide band centred on each alternative route) for the three main alternative routes (A, B and C) … all three main alternative routes avoid:

- Species at Risk – Areas of Concern; and
- National Parks.
- Features/constraints which are crossed or in the vicinity of the alternative routes to varying degrees, but which can be avoided at the preferred route selection stage, include:
- First Nation Reserve and Treaty Land Entitlement (TLE) lands;
- Ecological Reserves, Provincial Wilderness Parks;
- Protected Areas Initiative (PAI) - high and medium priority protected areas;
- Provincial Natural and Heritage Parks;
- Caribou calving areas;
- Waterfowl locations;
- Manitoba Habitat Heritage Corporation (MHHC)/Ducks Unlimited Canada (DUC)
- Manitoba Wildlife Federation (MWF) / Nature Conservancy of Canada (NCC) project/program sites; and
- Existing towns, villages and settlements.

Constraint features crossed to a similar extent by or in the vicinity of the three alternative routes include:

- Medium priority Areas of Special Interest (ASIs);
- Other provincial parks and provincial forests;
- WMAs;
- Important Bird Areas;
- Major Rivers/Creeks;
- Other Crown Land parcels;
- Aggregate deposits/sand deposits / mining interests; and
- Community Pastures.

Table 7.2-2 provides an overview of the three main alternative routes in terms of features/constraints and routing opportunities."

7.3 PRELIMINARY PREFERRED ROUTE SELECTION PROCESS 7-30

7.3.1 Overview of Process 7-30

"Round 3 of the EACP presented the alternative routes for the Bipole III line (Chapter 5). … stakeholder meetings and Public Open Houses in communities near the alternative routes. Input received through the EACP and ATK processes contributed to the evaluation/comparison of the alternative routes. Subsequent to Round 3 …first step was the formation of a multidisciplinary committee to develop a process for Preliminary Preferred Route (PPR) selection. A committee of discipline specialists was formed in January 2010 to review public, stakeholder, and Aboriginal input …"

"The evaluation and analysis was based on 27 pre-established criteria representing biophysical, socio-economic, land use, technical considerations and stakeholder and public input (Appendix 7A, Table 7A-1). Route segments were … rated …(Step 2; Table 7.3-1). …iterative approach of alternative segment adjustment/identification, evaluation and comparison served to, where possible, bypass identified constraints and/or minimize potential Project effects to the extent possible. This finally led to the selection of the PPR that was presented in Round 4 of the EACP."

7.3.2 Initial Selection of the PPR from Route Alternatives (Outcome)... 7-31

"A criteria list was created for evaluation of the multiple route segments and comparison between segments. The Route Selection Matrix (RSM) was a tool to assemble and record input during this stage of the process from the various disciplines, as well as technical and stakeholder input (Appendix 7A, Table 7A-1). … In order to conduct a comparison and evaluation of the various routes and segments the Project Study Area was broken down into 13 sections (Map 7-9). Within each section a comparison was made between the segments making up the major route alternative (A, B or C) or sub-routes of these. A separate sheet for each of the 13 sections demonstrates the comparison and evaluation process (Appendix 7A, Table 7A-1). A total of 27 criteria appear in the RSM tables … Biophysical factors … Socio-economic factors … Land use factors …Technical criteria included separation from Bipoles I and II, foundation conditions, number of angle towers, construction access, and line length. An additional criteria was added in the RSM for Aboriginal input. … Evaluation of the alternative route segments (in each of the 13 sections) was carried out by the committee of discipline specialists. … specialists considered each segment to be a 4.8 km (3.0 mile) wide band, termed the Local Study Area. … Once all the information and data was compiled into the matrix, the committee collectively decided on the selection of a route in each of the 13 sections. … Additional information regarding the matrix and factors used in the evaluation of alternative routes, along with the matrix itself, is provided in Appendix 7A."

7.3.2.1 Initial Preferred Route (From RSM analysis) 7-32

"The outcome of the analysis recorded in the RSM was the initial selection of a preliminary preferred route. The following provides a description for this initial outcome from the RSM … From the Keewatinoow Converter Station, the route proceeds westerly … crosses through the Stephens Lake ASI, which is unavoidable, … route then crosses PR 280 near Orr Lake and heads southwest across the Odei, Burntwood and Grass rivers staying east of Paint Lake Provincial Park, while taking advantage of forestry activities east of PTH 6 to PR 373. It avoids most caribou range in that includes rural residences and barn complexes. It moves north past the Village of Landmark, east to avoid the community of Dufresne and crosses the TransCanada Highway before heading north to an existing transmission line right-of-way, where it parallels the Dorsey to Forbes, Minnesota (D602F) 500 kV international transmission line west into the Riel Converter Station site**. A detailed description of the initial preferred route, as selected using the RSM, is outlined below**…"

[MWL: A detailed description of each section has been omitted – see 7-33 to 7-43]

Section 1 …
Section 2 …
Section 3 …
Section 4 …
Section 5 …
Section 6 …
Section 7 …
Section 8 …
Section 9 …
Section 10 …
Section 11 …
Section 12 …
Section 13 ….”

7.3.3 Final Selection of a Preliminary Preferred Route (Outcome 2) 7-44

“The first evaluation/comparison of the alternative route segments identified an initial preferred route for most sections of the Bipole III line. … In other cases, the identification of new alternative route options was required. Reasons for adjustments and identification of new options were attributed to a variety of constraints including caribou, mining interests and agriculture, as well as stakeholder input through Round 3 of the EACP. Where adjustments to alternative route segments were identified outside of the 4.8 km (3.0 mile) Local Study Area, new evaluations were undertaken by technical specialists. …The new segments are also shown on Map Series 7-1000 and in Table 7.3-1. **Apart from the sixteen new alternative route segments, further issues regarding mineral resources, comments provided by mining companies and the Mining Association of Manitoba, caribou concerns raised by the Manitoba Conservation Integrated Resource Management Teams (IRMTs), and the specific selection of the Keewatinoow Converter Station site resulted in the identification of additional route segments. These adjustments were identified at a late date after the main PPR selection process. As such these route adjustments received a separate segment designation (P1 toP4). The adjustments required further evaluation to ultimately identify the preliminary preferred route.”**

[MWL: Specific route segment codes largely omitted for ease of reading]

“Section 1
The only change created …. was to align the Bipole III transmission line route with the preferred placement of the Keewatinoow Converter Station.
Section 2
… Mining Association of Manitoba Inc. (MAMI) registered strong opposition to any alternative route that traversed the Thompson Nickel Belt area. After consideration by the study team, a new alternative route was proposed numbered B7C7- 1. This segment moved the transmission line off of the main area of high mineral interest. … The segment was also reviewed by the Provincial Integrated Resource Management Team (IRMT) who did not express any specific concerns over the new segment.
Sections 3 and 4
Although additional new alternative routes … were identified and considered to resolve issues related

to mineral interests, these were discounted over concerns relating to habitat fragmentation and potential effects to caribou and their habitats. … Late in the process MAMI provided a map of alternative routings which led the committee to consider several more segments in the area that would reduce potential effect on mining and exploration in the Thompson Nickel Belt. … had the advantage, aside from addressing the mining industry concerns, of missing some recreation areas by going east of Paint Lake Provincial Park. P2 was considered because it was further west from the community of Wabowden and avoided the active Bucko Lake area. … accepted and became part of the Bipole III preliminary preferred route in section 4.

Section 5

A small alteration … south of Montreal Lake in Ralls Island to deal with the proximity of a residence to the preferred route.

[MWL: Section 6 is missing from the EIS see 7-46 to 7-47]

Section 7

A new alternative route… identified to mitigate diagonal alignment over agricultural lands and was adopted as part of the preliminary preferred route in that section. The segment also takes advantage of paralleling a road allowance. …some high ratings relating to the proximity to outfitter allocations and crossing part of the local community pasture …These were considered manageable and the segment accepted as part of the Preliminary Preferred Route (PPR) (Map 7-11).

Sections 8 and 9

An adjustment to … avoid an existing Wildlife Management Area (WMA) …also avoided a number of culture/heritage sites identified … Sections 8 and 9 was revisited due to a number of issues related to agriculture, conservation, and biophysical concerns. Additional segments were created at the southern end of Section … Route adjustments and new alternatives sought to address the concern by Manitoba Conservation over the use of the ecologically sensitive Arden ridge and the diagonal crossing of agricultural land. …In Section 9 two segments were added to deal with similar issues as in Section 8. Route adjustments were required to address the issues relating to the Arden Ridge and agricultural issues such as diagonal routing and irrigation (existing and potential). This resulted in Segments … being added for consideration. With the addition of these segments routing in both Sections 8 and 9 could be reconsidered. Since the ratings in Section 8 were somewhat close originally, the new considerations took into account which combination of new segments resolved the most issues. …

Section 10

Segment … was created to deal with diagonal routing across farmlands, proximity to First Nation land, and finding a suitable crossing of the Assiniboine River.

Section 11

Section 11 Segments … were identified to address concerns over diagonal alignments and recommendations from the municipalities to take advantage of linear features such as drains. The two new segments offered alternative ways of getting to … the preliminary preferred route in this section. …

Section 12

… required some adjustment to create separation form residences and farmyards. … also addressed concerns over diagonal alignments and proximity to housing east of the Red River crossing.

Section 13

New segment alternatives … identified to address residential housing and developments, specifically along the Seine River. …”

7.4 FINAL PREFERRED ROUTE SELECTION 7-49

"The preliminary preferred route was presented as part of Round 4 EACP (Chapter 5) beginning in August 2010. The purpose of Round 4 was to respond to issues and concerns raised during Round 3, to present the preliminary preferred route and to gain feedback on the route. Round 4 included stakeholder meetings and Public Open Houses in communities near the preliminary preferred route. In addition, a series of landowner information centres was undertaken to provide further opportunity for landowners to discuss the Project one-on-one with Manitoba Hydro representatives. … A synopsis of the route adjustments considered as a result of consultation feedback, and the associated outcomes are outlined below (Appendix 7B- Preliminary Preferred Route Adjustments; Map Series 7-1200). …Participants were advised that there would be one to two towers on each quarter section. Towers would be centred within the 66 m wide right-of-way. The right-of-way would typically be aligned so as to minimize any disruption arising from the towers and the conductors. … the offset distance between the towers and the edge of their field or property line … would be approximately 95 feet. This would not permit some farm implements (e.g., many sprayers are 120 feet wide) to be easily manoeuvred between the tower and the property line, … After Round 4, Manitoba Hydro assessed this concern and proposed a re-alignment of the right-of-way. … Manitoba Hydro would re-align the right-of-way infield to facilitate passage of large equipment between the towers and the property or field edge … In situations where machinery would be unable to manoeuvre, Manitoba Hydro will consider compensation. … final alignment in these circumstances will be subject to discussion with directly affected landowners during easement negotiations."

7.4.1 Route Adjustments by Section 7-51

7.4.1.1 Sections 1 and 2 7-51

"In Sections 1 and 2, TCN proposed that several adjustments be made to the preliminary preferred route where it crosses through the Split Lake RMA. TCN suggested that the preliminary preferred route follow PR 280 as much as possible and that the separation distance between the route and Assean Lake be maximized as TCN has selected a TLE parcel in this area. In addition, TCN suggested that the route be adjusted to cross west of Hunting Lake, which was identified as an important area to the community. In addition to TCN's concerns, an outfitter operating in the southwest portion of the Split Lake RMA expressed concern with the close proximity of the preliminary preferred route to a cabin and developed bear bait stations. In response to TCN's concerns, the preliminary preferred route was adjusted to follow PR 280, and maximize separation between Assean Lake/Assean Reserve Lands and the route. These adjustments also served to address outfitter concerns through this area."

7.4.1.2 Section 4 7-52

"In Section 4, numerous competing rationale were considered for making an adjustment to the preliminary preferred route in the vicinity of the Thompson Nickel Belt and Halfway Lake. Concerns with respect to routing included presence of caribou and important habitat, potential restrictions on mining exploration (particularly with exploration techniques), impact to recreational areas and communities, and proximity to Bipoles I and II. Manitoba Hydro investigated four alternative options, including maintaining the preliminary preferred route, and participated in several meetings with mining industry representatives. Map 7-13 illustrates the four options considered. …. The route option selected involved an alignment that crossed through an area east of the Thompson Nickel Belt, Halfway Lake and the community of Wabowden before rejoining the preliminary preferred route alignment at Ponton, just south of the junction of PTH 6 and PTH 39. …"

7.4.1.3 Section 7 7-52

"In Section 7, Manitoba Conservation requested that the preliminary preferred route be routed to avoid crossing through the proposed Red Deer WMA and ensure that a local salt spring that feeds into an existing ecological reserve be avoided. Upon review, it was determined that the preferred route was the most viable in terms of not affecting the salt spring and minimizing the extent to which the proposed WMA was crossed. Manitoba Hydro identified tower placement adjustment or "tower spotting" as a suitable design measure to avoid identified areas of concern. In Section 7, it was determined that a potential corner tower location on private land in the Birch River area would affect a set of granary bins that had been placed by the landowner on the highest point on the flood-prone property. Discussion with neighbouring landowners resulted in the acceptance of an adjustment to relocate the preliminary preferred route to the north side of the road allowance for approximately 4.8 km (3.0 mile) in an east-west direction to avoid this concern."

7.4.1.4 Sections 8 and 9 7-53

"Several adjustments were made to the preliminary preferred route in Sections 8 and 9 to address various landowner concerns. In the RM of Alonsa, minor route adjustments were made to relocate the route further away from the residential yard site and into the adjacent forest cover to minimize visibility from the property. In another location, a landowner expressed concern about the proximity of the route to Robertson Lake, a waterfowl staging lake and also a Ducks Unlimited Canada project site. The preliminary preferred route was adjusted slightly west to avoid the open water and wetlands area. Manitoba Hydro will also consider the placement of bird diverters on the line through this area.
A further adjustment was made in Section 9 just north of the Assiniboine River crossing. The landowner expressed the concern that the route would impact an existing irrigation pivot and split the management unit. The preliminary preferred route was adjusted slightly northerly to reduce the potential for impacts. Further adjustment to eliminate the potential effect was not possible as it would have resulted in an impact to an existing WMA parcel (part of the Whitemud Watershed WMA and a designated protected area under the PAI)."

7.4.1.5 Section 10 7-53

"In Section 10, an adjustment was made to the preliminary preferred route to avoid crossing through a property that has been developed by the landowners as a 'natural park'. In addition, landowners in the vicinity have livestock fences and shelterbelts for cattle that were identified along the half-mile line which would be impacted by the route. The preliminary preferred route was moved to the east, off the half mile line and adjacent to it, for approximately 4.8 km (3.0 mile) to avoid these concerns."

7.4.1.6 Other Small Route Adjustments 7-53

"Through Sections 9 to 13 of the preliminary preferred route, numerous other small adjustments were made, where possible, to address the following landowner concerns or suggestions. …placement of the preliminary preferred route directly on the half mile line to split compensation between landowners and lessen potential effects; adjustments of the preliminary preferred route to the opposite side of the road allowance; movement of the alignment off the half-mile line, and willingness to accommodate the movement of an angle tower onto a property owner's land. …"

7.5 DESCRIPTION OF FINAL PREFERRED ROUTE 7-54

"The final preferred route for the Bipole III line starts and terminates at the Keewatinoow and Riel Converter Station sites, respectively, is approximately 1385 km in length, and follows a course west of lakes Winnipegosis and Manitoba (Map 7-14). Starting in the north, in Section 1, the final preferred route proceeds westerly for approximately 92 km (57 miles) through a sparsely populated area before it crosses an abandoned rail right-of-way and the existing HBR line. It is then routed through the Churchill WMA (a portion of which is also designated as an ASI) for approximately 14 km (8.7 miles). The portion that is routed through the ASI is approximately 4.8 km [3 miles] in length. East of the HBR line, the final preferred route is located within the Town of Gillam boundaries, and crosses through the Fox Lake RMA as defined under the ISA. West of the HBR line, the final preferred route crosses through unorganized territory and through the Stephens Lake ASI just northeast of Stephens Lake for approximately 61 km (38 mile). In Section 2, the final preferred route proceeds in a southwesterly direction south of Limestone and Waskiaowaka lakes and north of the TCN Reserve Lands for a total length of approximately 118 km (73 mile). The route crosses through the Stephens Lake ASI in this section for approximately 15 km (9 miles). In Section 3, the final preferred route continues in a southwesterly direction between Pukatawakan and Orr lakes for a distance of approximately 28 km (17 miles). The preferred route then crosses PR 280 and parallels the road for approximately 2.5 km (1.5 miles) east of Orr Lake and just north of the Odei River before crossing the Burntwood River. From the crossing of the Burntwood River, the final preferred route continues in a southwesterly direction in Section 4, to a point west of Bryce Bay and Partridge Crop Lake, for a distance of approximately 290 km (180 miles), staying east of Paint Lake Provincial Park. Southeast of Paint Lake Provincial Park, the final preferred route proceeds south, to the east of Wabowden and then west to the Ponton area, avoiding numerous mining claims and mineral lease areas within the Thompson Nickel Belt. From the Ponton area, the final preferred route proceeds southwesterly for approximately 80.5 km (50 miles) southwest to the Dyce Lake area. In Section 5, from Dyce Lake to The Pas area, the final preferred route crosses through the Tom Lamb WMA (and ASI) for approximately 50 km (31 miles) before crossing the Saskatchewan River east of The Pas. The total distance of the final preferred route in Section 5 is approximately 101 km (63 miles). In Section 6, south of The Pas, the final preferred route generally crosses through unorganized territory to the Red Deer River where it flows into Dawson Bay on Lake Winnipegosis for a distance of approximately 104 km (65 miles). The final preferred route crosses three proposed WMAs. The proposed Red Deer WMA (to be protected under PAI) is crossed by the final preferred route for approximately 27 km (17 miles). The proposed Summerberry WMA portions (both protected and unprotected) are crossed for approximately 17 km (10 miles) and 29 km (18 miles) respectively. In Section 7, the final preferred route generally proceeds in a southeasterly direction, between the Porcupine Mountains and Swan Lake, from Mafeking to Cowan for approximately 112 km (69 miles). The final preferred route crosses through the RMs of Mountain (North) and Minitonas. It crosses numerous parcels of agricultural Crown land for a distance of approximately 65 km (40 miles), principally located north and east of Bellsite and Mafeking, west of Swan Lake at Indian Birch, and north and east of Cowan. In this section, the final preferred route crosses through the Swan-Pelican Provincial Forest Reserve for approximately 15 km (9 miles) and is routed on the west sides of the forest reserve to the Steeprock WMA, north of Mafeking, and the Lenswood Community Pasture, east of Lenswood. The final preferred route does include some localized soil and terrain concerns that are considered manageable. Crossing of the Swan-Pelican

Provincial Forest in this section is not avoidable. Through Section 8, the final preferred route generally follows south easterly along the western shores of lakes Winnipegosis and Manitoba for approximately 156 km (97 miles) taking advantage of compatible land uses such as woodlands, pasture and forage lands to a point south of Eddystone, west of Ebb and Flow Lake. The final preferred route crosses through the RMs of Mountain (South), Mossey River, Lawrence and the northern half of Alonsa. Through this area, the final preferred route crosses through agricultural Crown land parcels for approximately 83 km (51 miles), many of which are not avoidable. In Section 9, the final preferred route continues in a southerly direction along the western shore of Lake Manitoba, south of Eddystone to a point where it crosses the Assiniboine River southwest of the Long Plains First Nation Reserve. The total length of the preferred route in Section 9 is approximately 168 km (104 miles). The final preferred route crosses through the southern half of the RM of Alonsa, and through the RMs of Lakeview, Westbourne, the western edge of Portage la Prairie, North Norfolk and South Norfolk. It crosses prime agricultural lands and irrigation potential areas taking advantage of road allowances and other utility right-of-ways where possible. The final preferred route crosses through parcels of agricultural Crown land for approximately 23 km (14 miles). Designated lands in the vicinity of the final preferred route include the Alonsa Community Pasture, the Langruth WMA, and the Lakeview Community Pasture (all on the west side of the route); and two parcels of the Whitemud Watershed WMA at the Assiniboine River crossing. The final preferred route continues generally in a straight west to east alignment for approximately 76 km (47 miles) in Section 10 south of PTH 2. It is located south of the communities of St. Claude, Haywood, Elm Creek and Fannystelle through the RMs of Grey, Dufferin and a small portion of Macdonald. The final preferred route principally crosses through high agricultural capability lands and intensive agricultural use areas with active and potential irrigation. The agricultural concerns were addressed further through route adjustments to eliminate diagonal placements and alignment along existing linear features (e.g., drains, roads) where possible. In Section 11, the final preferred route crosses to the north of Brunkild and to the south of Domain to a crossing of the Red River approximately 2 km (1.2 miles) south of Ste. Agathe. The final preferred route in Section 11 is approximately 42 km (26 miles) long crossing through the RMs of Macdonald and Ritchot. Through this section, it crosses through the river lot survey pattern to the west and east of the Red River for approximately 6 km (4 miles). East of the Red River the final preferred route crosses through a more densely populated rural setting that includes a considerable concentration of rural residences, intensive agriculture and barn complexes. The final preferred route in Section 12 crosses for approximately 35 km (22 miles) in an easterly and then northerly direction through parts of the RMs of Ritchot and Hanover. In Section 13, the final preferred route runs north past the Village of Landmark on its east side, north and then east to avoid the community of Dufresne, and crosses the TransCanada Highway before heading north to an existing transmission line right-of way, where it parallels the existing D602F transmission line west into the Riel Converter Station site. In Section 13, the final preferred route is approximately 50 km (31 miles) in length, crossing through the RMs of Tache, Ste. Anne and Springfield. Intensive agricultural use, and farm and rural residential development predominate. Even though the final preferred route minimizes proximity to extensively developed areas and pockets of rural residential development, route adjustment was required near Lorette and Dufresne to further minimize potential impacts to existing residential development, particularly in the vicinity of the Seine River. Some field tower and diagonal line placement may be required to avoid housing and intensive livestock facilities.”

8.0 EFFECTS ASSESSMENT AND MITIGATION 8-1
8.1 INTRODUCTION 8-1

"This chapter identifies and assesses the environmental effects of the Project and proposed mitigation to avoid or remedy potential adverse environmental effects, and includes the following sections:

- Biophysical Effects of the Project;
- Socio-economic Effects of the Project;
- Accidents and Malfunctions; and
- Effects of the Environment on the Project.

Environmental effects and mitigation are identified and assessed separately as regards construction and operation phases for each of the Project's components…

…Spatial avoidance of adverse environmental effects as a result of the site and route selection process is a powerful tool for dramatically reducing potential negative effects of the Project. While decisions regarding avoidance mitigation must be balanced against technical feasibility and associated cost, avoidance is also accomplished by scheduling construction activities to avoid sensitive/important time periods for some species (e.g., bird nesting, caribou calving).

… Specific biophysical and socio-economic environmental components that could potentially be impacted by the Project are identified as Valued Environmental Components (VECs) to facilitate assessment of the interactions between the Project components and specific valued components of the environment…

Predicted positive and negative residual environmental effects (i.e., effects on VECs after mitigation) are identified in the assessment and the regulatory significance of these residual effects is evaluated using the framework and approach described in Chapter 4, Section 4.2.10. As described in Chapter 4, potential effects of the Project on VECs are initially ranked as "Significant" (high residual effect), "Potentially Significant" (moderate residual effect) or "Not Significant or Insignificant or Negligible" (low residual effect) based on three criteria: duration, magnitude and geographic extent1 of the effect. For effects initially ranked as "Potentially Significant" or "Significant", a final determination of regulatory significance is made after consideration of the other significance criteria described in Chapter 4 (i.e., frequency and reversibility of the effect, and the ecological/societal importance or resilience of the VEC).

Assessment of cumulative effects is described in a separate chapter (Chapter 9)…

…This chapter also provides a summary of follow up and monitoring activities related to each major environmental component. All mitigation measures are consolidated and organized into a draft Environmental Protection Plan (EnvPP) which accompanies this Environmental Impact Assessment EIS (see Chapter 11). This EnvPP defines the specific impact management measures to be applied to the Project to minimize adverse residual effects. It has been prepared to address environmentally sensitive areas/sites potentially affected by development of the Project. Mitigation measures are taken from applicable legislation, standards, guidelines, best practices, experience, and other recognized sources. A final EnvPP will be revised and submitted to the regulatory authorities following the environmental assessment review and approval process and prior to project construction."

"There are a number of key topics that influence how the Project may affect the soil and terrain environment. These primarily consist of the following:

- Loss of soil structure and increase in soil bulk density due to compaction;
- Loss of topsoil due to erosion by wind or water;
- Loss of permafrost due to degradation;
- Loss or impairment of landscape integrity of unique features;
- Loss of terrain material due to mass wasting;
- Soil mixing;
- Soil temperature increases;
- Herbicide residue; and
- Surficial and bedrock removal."

Compaction
"Soil compaction refers to the squeezing together of soil particles which results in reduced space available for air and water and a loss of soil structure. The movement of vehicles and equipment, the temporary and long-term storage of materials, and the placement of structures can result in soil compaction and rutting…Indirect effects of soil compaction can include increased run-off, decreased vegetative growth and potentially reduced crop yields (MAFRI 2008).

The effects of soil compaction can be mitigated by targeting dry or frozen ground conditions for construction activities, using temporary ground cover or matting in problem areas, reducing the extent of traffic movements, and rehabilitating areas that have been compacted by ploughing."

Erosion
"Erosion is a natural process and refers to the detachment, movement and removal of soil from the land by wind or water. Project activities that disturb and expose soil surfaces or concentrate water drainage, such as moving equipment, clearing and removing vegetation, stripping and stockpiling soils can accelerate naturally occurring erosional processes…Indirect effects of soil erosion include the deposition of eroded materials in surface water bodies and low areas…

Effects of water erosion can be mitigated by targeting frozen soils and reducing soil-water contact, particularly on slopes; whereas, effects of wind erosion can be mitigated by targeting moist soils and reducing periods of bare soil exposure."

Permafrost Degradation
"Permafrost degradation refers to decreases in the lateral/areal or vertical extent of permafrost soils. Activities that compact or remove the seasonally-thawed active soil layer (i.e., the soil that insulates the underlying permafrost) such as moving vehicles and equipment and clearing or removing vegetation can result in a loss of permafrost… Indirect effects of permafrost degradation… increases in greenhouse gas releases to the atmosphere.

Strategies for reducing the degradation of permafrost include avoidance, construction under frozen conditions and minimizing compaction or removal of the insulating active layer cover."

Landscape Integrity
"…Single and rare-occurrence Protected Areas Initiative (PAI) enduring features and other unique terrain and soil features, such as beach ridges and salt flats, are considered to be unique terrain and soil features and vulnerable to impairment or loss of landscape integrity… Potential indirect adverse effects as a result of impairment or loss of landscape integrity include loss of biodiversity and impairment of aesthetic experiences which contribute to human physical and mental well-being (Manitoba Conservation N.D.).

Generally, effects to landscape integrity can be mitigated through routing avoidance of unique terrain and soil features, where possible, and minimization of affected areas where avoidance is not possible."

Mass Wasting
"Mass wasting, or the downhill movement of soil under the influence of gravity… Very steep slopes and unstable soils are susceptible to mass wasting, particularly along waterbodies and other areas of sloped land… Mass wasting may result in large increases of sediment to surface waters, loss of associated vegetation and potential increased risk of personnel injury.

The avoidance of construction on and creation of very steep slopes, as well as the avoidance of concentrating water in sloped areas can generally reduce the risk of mass wasting."

Soil Mixing
"… The movement of vehicles and equipment, stripping and grading of work areas and excavation and trenching of foundations and lines can result in admixing…

Mitigation measures such as constructing during dry or frozen ground conditions, stripping and stockpiling topsoil and subsoil separately for use in site rehabilitation, using liners under stockpiles of excavated saline subsoils and filling excavations with suitable material may prevent or reduce adverse effects due to soil admixing."

Soil Temperature Increases
"Soil temperature is influenced by soil cover and may be increased when soil cover, such as tree canopy cover, low vegetation and forest litter, is removed. Increases to the mean soil temperature can result in changes to moisture conditions causing dry or droughty soils where soil moisture is currently a limitation, loss of permafrost…

Soil temperature increases can be mitigated by reducing the extent of clearing required by utilizing existing access routes and siting temporary work areas in natural openings, retaining ground cover and allowing for natural vegetation establishment, where appropriate."

Herbicide Residues
"… Herbicide residuals may result in reduced soil productivity, which may have an indirect adverse effect of reduced vegetative growth (Government of Saskatchewan 2007); however, this is not expected if industry standards and best practices are used…

Since 1985, Manitoba Hydro has significantly reduced the use of soil residual herbicide products for management of vegetation (operation phase) along transmission line rights-of-way… Manitoba Hydro does not use aircraft to apply herbicides to rights-of-way and large-scale herbicide use on northern transmission lines was discontinued in 1990, in favour of practicing the winter shearing method instead. Manitoba Hydro completes annual reporting of the product and quantity of herbicides, as well as the locations of application to Manitoba Conservation in accordance with Pesticide Use Permits issued pursuant to the provisions of *The (Manitoba) Environment Act*."

Surficial and Bedrock Material Removal
"The removal of mineral, organic and surficial (unconsolidated), and bedrock (consolidated) aggregate materials for the backfill of excavations and construction of tower foundations will result in a loss of material at those sites… potential creation or destabilization of steep or unstable slopes, increased water erosion risk and risk of fish mortality and mammal disruption due to the use of explosives.

… Through Project mitigation, the residual effect to surficial and bedrock materials is not anticipated to effect any of the valued environmental components of the soil and terrain environment.

Residual effects to surficial and bedrock materials are anticipated to be adverse, of low ecological and societal importance, small magnitude, affecting the local assessment area on an infrequent basis over the long-term with irreversible effects that are within regulatory requirements and objectives regarding the use of minerals."

8.2.1.3 Valued Environmental Components 8-8

"For the purposes of focusing the environmental effects assessment, the following VECs of the soil and terrain environment have been identified: soil productivity; and terrain stability…"

8.2.1.4 Environmental Effects Assessment and Mitigation 8-9

"… Potential environmental effects of the Project were identified using a combination of methods, including an environmental interaction matrix, feature mapping, professional opinion and review of Aboriginal Traditional Knowledge (ATK), key perspectives and comments from the Environmental Assessment Consultation Process and literature (Bipole III Terrain and Soils Technical Report)."

… The assessment covers the construction (including site cleanup/remediation) and operation/maintenance of the following Project components:

- HVdc Transmission and ac Collector Lines;
- Keewatinoow Converter Station;
- Riel Converter Station; and
- Ground Electrodes and Lines."

HVdc Transmission and ac Collector Lines

Soil Productivity

Construction

"Soil productivity, in the form of agricultural capability of soils in rural Manitoba, would likely be affected primarily due to the use of heavy equipment and vehicles, disturbance of surface materials during grading, excavation of foundations, and removal of vegetation…

Soil productivity of organic soils in northern Manitoba may be affected due to the combined effects of lost soil structure from heavy equipment and vehicle traffic; lost surficial material due to accelerated wind and water erosion caused by surface disturbance from clearing and grading and increased mean soil temperature from clearing.

The following mitigation measures are recommended…

- Construction activities in southern Manitoba will be undertaken, where possible, under dry conditions in high compaction risk areas (Bipole III Terrain and Soils Technical Report) and moist conditions in high to severe wind erosion risk areas, where possible;
- Snow will be ploughed or compacted to facilitate deeper frost penetration;
- Access routes will be located along existing traffic routes where possible and will be determined in advance. Vehicles should be restricted to those routes;
- Low ground-pressure vehicles (i.e., wide tracked machinery) will be used, particularly in areas of high compaction risk, where possible;
- Topsoil will be stripped and stockpiled separately from subsoil, based on visual assessment of colour change, prior to excavation or establishment of temporary workspaces;
- In areas of known salinity, excavated soils will be stored on liners or at designated work/spoil areas, where possible;
- Runoff will be directed away from disturbed areas to prevent further site degradation where necessary;
- In agricultural land, at least 300 mm of topsoil will be spread on any excavation site;
- Vegetation establishment in areas not identified as requiring special treatment will occur naturally or through annual cropping; and
- Where required, the right-of-way should be graded, disced or deep-ploughed to alleviate compaction and remove ruts caused by rubber-tired and tracked vehicles after construction to restore soil productivity.

… No significant residual effects to soil productivity are anticipated as a result of the Project."

Operation

"Soil productivity could be affected by respective reductions in agricultural capability and soil productivity in agricultural and northern Manitoba during inspection and maintenance and right-of way vegetation management activities for the HVdc transmission and ac collector lines….

Adverse effects to agricultural capability and soil productivity may be mitigated by the following:

- Inspection and maintenance activities will be conducted during frozen and dry ground conditions, where feasible; and
- Herbicides will be applied according to standard Manitoba Hydro practices, outlined in Chapter 3 (Project Description).

Residual effects to soil productivity are not anticipated during the operation of the HVdc transmission and ac collector lines."

Terrain Stability

"Terrain stability may be affected by grading, moving equipment, clearing, using explosives (where required) and altering natural drainage patterns. The removal and compaction of insulating surface vegetation and soils overlying permafrost-affected soils may increase the potential for permafrost thaw and subsidence…

Investigations determined that there are four existing sites along the transmission line route that have unstable or steep slopes within the Local Study Area (Chapter 6). These sites have been identified as ESS where tower placement and equipment access will be carefully selected to avoid de-stabilizing the slopes.

The following mitigation measures are recommended to prevent the destabilization of terrain during transmission and collector line construction:

- The removal of natural vegetation on sloped terrain, particularly adjacent to waterways, will be avoided to the greatest extent possible;
- Stripping through organic vegetative layers will be avoided to the extent possible on permafrost-affected soils. The top layer of organic soil and ground vegetation will be retained to prevent or minimize disturbance, where practical and feasible;
- Snow will be graded and compacted in right-of-way work areas and along access routes, where possible or required for safety, to prevent thaw and increase frost penetration;
- Where vegetation is removed from sloped terrain, the area will be replanted with deep-rooted shrubs, such as willow, where feasible to prevent slope degradation;
- Slope undercutting and slope modification at angles greater than 30° will be avoided, to prevent sliding or slumping and any slopes over-steepened beyond 30° will be graded to reduce the slope;
- Diversion berms of compacted native soils or logs will be used on moderate and steep slopes (i.e., greater than 15-20%) to divert water away from the slope after construction. Berms will be spaced 45 m or less apart and skewed with a downstream gradient of 5-10% and end in natural vegetation;
- Borrow pits will not be located within 100 m of identified steep slopes and/or unstable slopes, to prevent initiation or acceleration of instability due to blasting;
- The introduction of water to slopes will be limited to the greatest extent possible; and
- Drainage will not be altered to concentrate flows, especially in sloped terrain.

Potential for loss of terrain stability due to mass wasting and permafrost thaw following disturbance are considered residual effects. The residual effects are considered primarily negative. These long-term residual effects would be moderate in magnitude, confined to the Project Site/Footprint, occur on an infrequent basis, and are irreversible. No significant residual effects to terrain stability are anticipated as a result of the Project.

Terrain stability is not anticipated to be affected by the operation of the HVdc transmission and ac collector lines."

Keewatinoow Converter Station and Area

Soil Productivity

"Soil productivity within the Keewatinoow Converter Station Site footprint would be affected by an impairment of soil quality due to compaction and admixing during site preparation activities, such as clearing, grading and compacting imported materials. The following mitigation measures should be conducted to prevent a loss of productive soils at the Keewatinoow Converter Station site:

- Topsoil or surface organic soil will be stripped and stockpiled prior to site grading for use in reclamation of temporary work spaces, where possible; and
- After construction the site will be remediated by measures such as, replacement of topsoil and recontouring.

No residual effects to soil productivity are anticipated during the construction or operation phase of Keewatinoow Converter Station."

Terrain Stability

"Terrain stability at the Keewatinoow Converter Station Site footprint is not anticipated to be affected by construction of the Keewatinoow Converter Station site as potentially unstable permafrost materials will be excavated from the Project Footprint and replaced with suitable fill, as described in Chapter 3 (Project Description). The following mitigation measures may prevent the destabilization of terrain within immediately adjacent areas during construction:

- The burning of slash from clearing on adjacent permafrost soils will be avoided to prevent melting; and
- Site drainage will be directed through existing drainage channels or pathways to prevent degradation of additional permafrost materials.

Residual effects to terrain stability are not anticipated by the construction or operation phase of Keewatinoow Converter Station."

Borrow Areas

"Borrow areas and excavated material placement areas have been identified in the vicinity of Keewatinoow Converter Station for use at northern project components… Additional existing and new borrow sites will be identified for other project components…

…Depending on the planned future use for the site, aggregate borrow sites should be closed, or reclaimed, in accordance with the Mine Closure Regulation, M.R. 67/99 and Manitoba Mine Closure Regulation 67-99 General Closure Plan Guidelines (Manitoba Industry, Trades and Mines 2006)."

Soil Productivity

"Soil productivity is anticipated to be affected by the combined effects of topsoil removal and subsurface soil excavation and removal and increased water erosion potential. Soil landscape alteration (i.e., surface elevation and depth to water table) as a result of soil excavation will further affect soil productivity. The following activities may minimize the effect of borrow areas and excavated material placement areas on soil productivity:

- Borrow areas and excavated material placement areas will be sited in upland areas with well-drained, mineral soils, where possible;
- Topsoil (i.e., mineral or organic) will be stripped and temporarily stockpiled prior to borrow material excavation and placement of excavated materials;
- Borrow materials will not be excavated below the upper surface of the water table;
- Runoff will be directed away from disturbed areas (e.g., quarry walls, access routes) with control measures prior to excavation;
- Borrow sites will be contoured following excavation to ensure functional site drainage;
- Topsoil will be replaced following completion of construction activities; and
- Borrow pits will be re-vegetated by seeding or promotion of natural encroachment of native species.

The potential residual effects of borrow pit excavation to soil productivity are considered primarily negative in direction. These long-term residual effects would be small in magnitude, confined to the Project Site/Footprint, occur on an infrequent basis, and are irreversible. No significant residual effects to soil productivity are anticipated as a result of the Project."

Terrain Stability
"Terrain stability is anticipated to be affected as a result of the creation or destabilization of steep or unstable slopes within existing and new borrow sites. The use of explosives, if used, within borrow sites may also contribute to the destabilization of slopes. In addition, surface disturbance and removal of vegetation for the creation of new borrow sites in permafrost-affected soils is anticipated to result in permafrost degradation at the site. The following activities may minimize the effect of utilizing existing and new borrow sites on terrain stability:

- Existing permitted borrow sources will be utilized, to the extent possible, especially in regions of permafrost-affected soils;
- Borrow pits will not be located within 100 m of steep slopes, where possible;
- Access trail grades should not exceed 12%; and
- Excavations will be backfilled or re-sloped to a stable profile in accordance with site reclamation plans.

Potential residual effects to terrain stability are considered negative. These long-term residual effects would be small in magnitude, confined to the Project Site/Footprint, occur on an infrequent basis and are irreversible. No significant residual effects to terrain stability are anticipated as a result of the Project."

Riel Converter Station

…

Soil Productivity
"Soil productivity in the form of agricultural capability is not anticipated to be affected by construction or operation of the Riel Converter Station, as the site is not currently under agricultural production."

Terrain Stability

"Terrain stability and unique terrain and soil features are not anticipated to be affected by the construction or operation of the Riel Converter Station site due to the absence of susceptible terrain features, including slopes and permafrost and unique features."

Ground Electrodes and Lines

Soil Productivity
"Soil productivity is anticipated to be affected… The following activities may minimize the effect of construction of the ground electrodes and associated lines on soil productivity:

- Ground electrodes will be constructed during winter, to target frozen or dry ground conditions, where possible;
- Ploughed or compacted snow will be placed over the sites to facilitate deeper frost penetration (northern electrode site only);
- Topsoil will be stripped and stockpiled at site prior to excavation for ground electrode installation for replacement following completion of construction activities;
- Existing access routes will be used, where possible, and any new access routes, if required will be planned in advance of mobilization; and
- The southern ground electrode site will be graded, diced or deep-ploughed following construction to alleviate compaction and remove ruts caused by rubber-tired and tracked vehicles after construction to restore agricultural productivity or grassland.

Potential residual effects of loss of soil structure from compaction and rutting of heavy equipment in Organic soil (northern electrode site) to soil productivity are considered primarily negative. These medium-term residual effects would be moderate in magnitude, confined to the Project Site/Footprint, occur on an infrequent basis, and are reversible during the life of the Project. No significant residual effects to soil productivity are anticipated as a result of the Project."

Terrain Stability
"Terrain stability is anticipated to be affected by the loss or melting of discontinuous permafrost at the northern ground electrode site… The burning of slash from clearing on adjacent permafrost soils will be avoided to prevent melting in order to minimize the effect of construction of the northern ground electrode and electrode line on terrain stability.

Potential residual effects of loss of terrain stability due to permafrost thaw following disturbance (northern electrode site) to terrain stability are considered primarily negative. These long-term residual effects would be medium in magnitude, confined to the Project site or footprint, occur on an infrequent basis, and are irreversible. No significant residual effects to terrain stability are anticipated as a result of the Project.

Operation of the ground electrode and associated lines is not anticipated to result in any effects to valued components of the soil and terrain environment."

Soil Productivity
"Residual effects to soil productivity will be primarily related to some loss of soil structure due to compaction and rutting along portions of transmission and electrode lines rights-of-way in northern Manitoba and increased soil temperatures in areas of cleared vegetation. Despite the use of best management practices and environmental protection planning, unmitigated compaction will occur at Project sites and along Project rights-of-way in northern Manitoba… …No significant adverse effects to soil productivity are anticipated as a result of the Project."

Terrain Stability
"Residual effects to terrain stability will be primarily related to some potential for loss of terrain stability due to mass wasting and permafrost thaw. Mass wasting and permafrost subsidence could occur in areas somewhat important to ecological function (e.g. riparian areas). … No significant adverse effects to terrain stability are anticipated as a result of the Project."

Post-construction Follow-up
"…The following post-construction follow-up plan should be undertaken to confirm that mitigation measures to alleviate compaction are effective and ensure a loss of agricultural productivity is not experienced as a result of the Project.

…Semi-annual monitoring of crops using aerial or ground patrols should be undertaken for two years following construction on agricultural lands, to assess any compaction or other soil issues, as is typically done on pipeline projects (CH2M Hill 2008)… If mechanical post-construction measures are not sufficient in relieving compaction, alternative measures including the plowing under of organic matter, such as wood chips or a green manure crop planting (e.g., alfalfa) should be considered to improve lost soil structure (Conoco Phillips and TCPL 2008)."

Inspection

"During construction of right-of-ways, the work areas, marshalling yard sites, trafficking paths and access trails, if any, will be inspected by the Manitoba Hydro inspector for staining and/or stressed vegetation that may have been caused by equipment leaks or accidental spills and debris, prior to decommissioning…Any contaminated soil should be remediated on-site or removed…"

Monitoring

"The condition of any erosion and sediment control environmental protection measures implement should be monitored by the Contractor and/or Manitoba Hydro Inspector during construction of the Project… Erosion and sediment control measures should remain in place until vegetation has re-established."

8.2.2.2 Potential Effects and Key Topics 8-22

"… Climate-related issues include the potential for increased Greenhouse Gas emissions from vehicles during construction, operation and maintenance, and accidental release of electrical insulating gases during converter station operation and maintenance.

… The Project contribution to GHG emissions was analyzed using a life cycle assessment approach that includes all GHC implications from the manufacture and transportation of construction materials to land-use changes and fuel burning in equipment."

8.2.2.3 Valued Environmental Components 8-22

"The VECs for this environmental assessment are:

- Climate; and
- Air quality."

8.2.2.4 Environmental Effects Assessment and Mitigation 8-22

"…The review of air quality is applicable anywhere in the vicinity of the project footprint and is not assessed by project component."

Climate

Greenhouse Gases

"The primary climate change implications of the Project are those associated with its greenhouse gas emissions. Manitoba Hydro contracted the Pembina Institute to prepare a quantitative GHG life cycle assessment (LCA) of the Bipole III Transmission Project (Bipole III Greenhouse Gas Lifecycle Assessment Technical Report). GHG implications of the Project were determined through an analysis of the materials and energy use associated with the proposed route and capital equipment. The analysis covers all phases and sources of GHG for the projected life of the project.

… Eighty-two percent of the GHG implications are attributed to the transmission line portion of the project. Fifty-six percent of all emissions are associated with aluminum production activities and land use changes from right-of way clearing. The Project will disturb 9,017 ha of land of which 3,270 ha of land will be permanently altered to maintain the right-of-way. The land-use contribution is estimated based on the difference in carbon content between forested land and the resulting vegetation cover on a cleared right-of-way, as well as the impact of any biomass combustion at the time of clearing.

… Other potential sources of GHG include sulphur hexafluoride (SF6), which is used as insulating medium in high voltage switch gear, circuit breakers, and other electrical equipment…

… Mitigation measures to limit effects to carbon stocks include the following:

- Where feasible, cleared merchantable timber will be salvaged and reused;
- Care will be taken to maintain all existing above and below ground drainage patterns through proper culvert/bridge placements;

- Post-construction rehabilitation will include previously cleared sites, where rehabilitation is feasible, and will include the spreading of salvaged organic soils on the surface to encourage site re-vegetation;
- Where possible, overburden materials will be stockpiled and compacted to reduce carbon losses and capped where feasible to maintain sequestered carbon stocks within the soil; and
- Where construction occurs over permafrost the level of disturbance will be minimized and efforts made to retain natural thermal insulation, including the promotion of natural thermal cover re-establishment.

The residual effect on climate is that there will be some GHG emissions over the life cycle of the Project. The emissions are considered to be small in magnitude, of short duration during manufacture and construction, of medium duration during operation, regional in extent (Project Study Area), continuous in frequency, reversible, and not significant."

Climate Change

"... climate change was generally concluded not to affect the assessment of the Project's effects on the biophysical or socio-economic environment."

Air Quality

Construction

"…With proper mitigation, potential effects on local air quality will not likely be an issue for worker or public health. The residual effects related to operating construction equipment, burning of unsalvaged timber and slash will be negative, small in magnitude, short-term in duration, in the Local Study Area, infrequent, reversible, and not significant."

Operation

"Ongoing operation and maintenance activities are unlikely to affect local air quality… […] Hazardous materials could potentially be released into the air as result of an accidental spill… Manitoba Hydro has standard protocols in place, which would minimize potential effects on air quality if a contingency event such as fire occurred. …Potential operational effects on air quality are negative, small in magnitude, extending to the Local Study Area of medium-term duration, reversible, and not significant."

8.2.2.5 Summary of Residual Environmental Effects and Significance 8-28

"A characterization and summary of residual effects on Climate and Air Quality VECs is presented in Table 8.2-3."

[MWL: Summary of Table 8.2-3 Below]

Climate VEC

- GHG Emissions from the construction and operation of the HVdc Transmission are negative, small in magnitude, limited to the Project Study Area, short to medium term in duration and overall not significant

Air Quality VEC

- Local emissions from construction activities of the HVdc Transmission are negative, small in magnitude, limited to the Project Study Area, short-term in duration and overall not significant.
- Local emissions from operation of the HVdc Transmission are negative, small in magnitude, limited to the Project Study Area, short to medium-term in duration and overall not significant.

8.2.2.6 Follow-up 8-29

"Follow-up is not required in relation to GHG emissions other than to record project inputs and volumes to improve the accuracy of the GHG contribution…

Air quality monitoring will not be required due to the very localized area and short-term nature of any residual effects from construction activities…"

8.2.3 Groundwater 8-30
8.2.3.1 Overview 8-30

8.2.3.2 Potential Effects and Key Topics 8-30

"The potential effects of the Project to groundwater can be divided into the following three key topic areas:

- Groundwater quality;
- Aquifer productivity; and
- Unintended discharges."

8.2.3.3 Valued Environmental Components 8-31

"… aquifer productivity and aquifer quality have been identified as VECs."

8.2.3.4 Environmental Effects Assessment and Mitigation 8-31

"… The Project will require the construction of wastewater treatment lagoons, for the Construction Camp and the Keewatinoow Converter Station. However this will be subject to separate licensing under *The (Manitoba) Environment Act* and not assessed in this EIS."

HVdc Transmission and ac Collector Lines

Aquifer Quality

Construction

"In general, groundwater quality is not expected to be affected under normal conditions of construction and operation of the proposed Bipole III transmission line and associated infrastructure; however there is the potential for environmental effects to groundwater quality through entry of contaminants into groundwater, such as herbicides, and ground electrode coke leachate described further below. Foundation drilling for tower installation also creates the potential for ground and surface water interconnection.

The main potential issue with transmission line construction in regards to groundwater is related to drilling for tower foundations, especially in sensitive areas such as artesian areas… result in a direct groundwater discharge to the surface or interconnections of aquifers if auger holes are not sealed properly or quickly enough… Interconnections of artesian saline aquifers with potable aquifers may result in degradation of groundwater quality.

… The following activities will be conducted to minimize or preclude unintended groundwater discharge during drilling and foundation installations in areas of documented springs and artesian groundwater conditions:

- A qualified driller with appropriate experience will always be used for work in areas underlain by artesian aquifers;
- Water levels will be monitored during drilling and foundation installation;
- Emergency response plans will be in place for sealing/grouting and pumping in artesian areas; and
- Follow up inspections of installed foundations will be undertaken to monitor for excess moisture.

Implementation of appropriate mitigation should preclude any residual effects on groundwater from tower foundation drilling."

Operation

"Aquifer quality along the HVdc transmission and ac collector lines could potentially be affected by an impairment of groundwater quality due to application of herbicides for vegetation management along rights-of-way during operation.

... Aquifer vulnerability mapping was compared to the project components of Bipole III for potential interaction and effects. Vulnerable un-confined aquifers in proximity to project components were deemed environmentally sensitive sites where particular attention is paid to mitigation and protection of the resource. The ESSs for groundwater are contained in the EnvPP that accompanies the Bipole III EIS.

There is a regulatory process that Manitoba Hydro must go through to carry out vegetation management programs involving herbicides. This ensures proper use and application. Manitoba Hydro must apply each year to Manitoba Conservation for "Pesticide Use Permits" issued under *The (Manitoba) Environment Act* before any herbicide program is implemented…

… Mitigation measures that will be employed to minimize or preclude any potential for impairment of groundwater quality along rights-of-way will include the following:

- No herbicides are used in clearing new rights-of-way. (Manitoba Hydro *et al*. 2003);
- If herbicides are required to control vegetation growth, all applicable permits and provincial regulations will be followed;
- On private lands, prior to any vegetation management work, landowners or appropriate authorities will be contacted to obtain the necessary permission; and
- Based on the above mitigation measures there are no anticipated residual effects."

Aquifer Productivity

"Aquifer productivity is not anticipated to be affected by normal operation of the HVdc transmission and ac collector lines, due to the absence of effect pathways or interactions."

Keewatinoow Converter Station and Area

Aquifer Quality

Construction

"Potential effects on groundwater quality consist mainly of excavation of borrow materials and accidental spills and leaks from construction equipment and installation of station equipment.

… The excavation of borrow materials would unlikely result in the exposure of perched water table within the granular deposits, which are approximately 30 below the ground surface. However, construction activity within the in borrow pits involves frequent machinery use and increases risk of accidental hydrocarbon spills discussed in Accidents and Malfunctions.

There are no anticipated residual effects of the construction on groundwater quality."

Operation

"Aquifer quality at the Construction Camp may potentially be affected by an impairment of groundwater quality from the operation of the required septic lagoon. However the assessment of the construction and operation of a wastewater lagoon for the Keewatinoow station and workcamps will be the subject of a separate licence application to Manitoba Conservation…

… Aquifer quality at the Keewatinoow Converter Station site and area could also be potentially affected by an impairment of groundwater quality due to application of herbicides for vegetation management along rights-of-way during operation. Based on the mitigation measures that will be employed to minimize or preclude any potential for impairment of groundwater quality, there are no anticipated residual effects."

Aquifer Productivity

Construction

"Groundwater withdrawal will be required to provide water resources for both the proposed Bipole III construction camp and the Keewatinoow Converter Station… the confined bedrock aquifer in the area could serve as the main source of groundwater supply for the construction camp and Keewatinoow Converter station… Unless properly sited and designed groundwater use has the potential to deplete the local aquifer and/or draw surface water from the connected Nelson River into the aquifer. A residual effect on aquifer productivity is anticipated as discussed in Section 8.2.3.5.

… There are no mitigation activities required for the drawdown of groundwater at the camp due to reversibility of the effect and absence of impact to the surficial environment or other aquifer users. The residual effect of aquifer drawdown is characterized as negative in direction, medium term in duration, small in magnitude, confined to the Project Site/Footprint, will occur on a regular/continuous basis, and is reversible during the life of the Project. The effects are therefore considered to be not significant."

Operation

"Aquifer productivity at the Keewatinoow Converter Station may be affected by groundwater drawdown from the use of groundwater to supply water to the station. The drawdown will be minimal during on-going operation of the station with 40 people on site. There are no mitigation activities for the drawdown of groundwater at the northern converter station during operation.

The residual effect of aquifer drawdown is characterized as negative in direction. These medium-term residual effects would be small in magnitude, confined to the Project Site/

Footprint, will occur on a regular/continuous basis, will be reversible during the life of the Project and therefore are considered not significant."

Riel Converter Station

Aquifer Quality and Aquifer Productivity

"Aquifer quality and aquifer productivity are not anticipated to be affected by construction or operation of the Riel Converter Station, due to the absence of effect pathways/interactions. Water supply and wastewater disposal systems will be connected to the City of Winnipeg systems precluding effect pathways/interactions."

Ground Electrodes and Lines

Aquifer Quality

Construction

"Aquifer quality is not anticipated to be affected by normal construction of the ground electrodes and lines, due to the shallow, horizontal ring electrode design."

Operation

"The potential for aquifer quality to be impaired at the ground electrode sites exists due to leachate from the continually-saturated buried coke beds at the electrode sites…

…The requirement for the coke beds to be kept saturated may cause any naturally occurring components in this material to leach which could directly affect groundwater quality. Leachate from coke commonly contains metals such as aluminum, manganese, nickel and vanadium (Puttaswamy *et al*. 2010). Within in-situ experiments, metal concentrations were often found to not be significantly elevated; however, this was likely due to the metals being taken up by organic and inorganic constituents (peat, naphthenic acids and other dissolved organic carbon species) (Squires 2005; Baker *et al*. 2007; Baker *et al*. 2008). Minute to no levels of polycyclic aromatic hydrocarbons were found in coke leachate (Squires 2005).

The aquifer at the preferred southern electrode site is protected by 10 to 20 m of clay that underlies the site and acts as a barrier, and the site is characterized by an upward hydraulic gradient which provides further protection against the potential entry of contaminants into the aquifer.

The subsurface conditions at the northern electrode site are not well understood…The potable bedrock aquifer is covered by approximately 60 to 80 m of overburden, primarily till deposits characterized by low permeability;… the stratigraphy at the preferred northern electrode site suggests a pathway to the surface waters of the Nelson River may exist…. The till overburden provides good protection to the underlying bedrock aquifer from the downward migration of leachate at the preferred northern electrode site. There is, however, potential that leachate will migrate downwards from the surface at this site, reach the low permeability till layer, migrate laterally to the east and seep out on the Nelson river bank, potentially reaching an aquatic receptor. …
The following activities will be conducted to prevent impairment of groundwater quality at the sites due to use of coke material for ground electrode construction:

- The coke material will be tested (e.g., leachate analysis) prior to use for potential contaminants and the need for monitoring based on the results; and
- Ground electrode irrigation will only be conducted during dry soil conditions and in amounts not exceeding what is required to maintain saturated soil conditions to prevent leaching."

Aquifer Productivity

Construction

"Aquifer productivity is not anticipated to be affected by normal construction of the ground electrodes and lines."

Operation

"Underground irrigation systems will be installed at the ground electrode sites to allow for soil wetting during periods of dry soil conditions, with irrigation water being sourced from groundwater at the sites… The groundwater withdrawal requirements for electrode irrigation are anticipated to be minimal; therefore disturbance to aquifer productivity is not anticipated and there are no anticipated residual environmental effects."

The existing infrastructure at the Riel Station site currently relies on surface water resources provided by Deacon Reservoir… Accordingly, an assessment of the effect of the operation of the proposed Riel Converter Station on groundwater was determined to not be required."

Construction and Operation

Aquifer Quality

"While not highly likely, an unintended groundwater discharge to the surface could result in a residual effect which would be negative in direction and could impact both the surface and subsurface environments. The surficial discharge may have high ecological and social importance depending on the quality of the discharging groundwater and the effect may range from low to high in magnitude. The geographic extent would likely be localized and the impact is considered to be short-term and sporadic. Reversibility of the impact would be dependent on the quality and quantity of the discharging groundwater. Saline groundwater discharges could also directly or indirectly affect other local environments (e.g., terrestrial/soils) and these effects could potentially outlast those to the groundwater or surface water environments. After mitigation measures and remediation activities, the residual effects are is anticipated to be not significant."

Aquifer Productivity

"…This residual effect is not considered to be significant."

Table 8.2-4: Residual Environmental Effects Summary – Groundwater

[MWL Summary below: Aquifer productivity from the construction and operation of the Keewatinoow Converter Station is considered to be negative, small in magnitude, limited to the Project Site/Footprint, medium-term in duration and overall not significant.]

"…recommended long-term raw water quality monitoring to address possible changes to aquifer water quality over longer time periods and possible surface water intrusion from the Nelson River to the aquifer during long term (e.g., multi-year) pumping in the water treatment process stream; particularly during high river staging (e.g., winter ice staging) events…"

"The aquatic environment includes both the non-living (water, rocks, soil) and living (plants, invertebrates, fish) components of rivers, creeks, lakes and ponds…

… There are at least 82 species of fish found within the Project Study Area… Department of Fisheries and Oceans (DFO) Operation Statements will be used where applicable to mitigate any potential effects on fish and fish habitat."

8.2.4.2 Potential Effects and Key Topics 8-42

"… Potential effects of all Project-related activities on the aquatic environment can generally be divided into several areas:

- Loss of riparian vegetation;
- Erosion and sediment entering water courses;
- Direct loss or alteration of fish habitat;
- Coke leachate from installation of ground electrodes;
- Contamination from structures and foundations; and
- Blockage in fish passage, and/or alterations in flows."

Riparian Loss

"Riparian vegetation plays an important role in the maintenance of water quality and fish habitat in water courses… Fisheries and Oceans Canada has developed operational statements for both Overhead Line Construction and Maintenance of Riparian Vegetation within Existing Rights-of- Way (DFO 2007a and 2007e). Mitigation outlined in these two documents will serve to avoid any potential effects of riparian vegetation clearing on fish habitat."

Erosion and Sedimentation

"Vegetation removal and improper construction practices near watercourses can result in increased erosion leading to sedimentation of streams… Because riparian vegetation plays an important role in reducing erosion and sedimentation of water courses, adhering to riparian vegetation mitigation, as described in Operational Statements (DFO 2007a and 2007e) will help reduce erosion and sedimentation at stream crossings."

Direct Loss or Alteration of Fish Habitat

"Infilling a water body would represent a loss of fish habitat and potentially block fish migration route… DFO operation statements for temporary crossings, ice bridges and snow-fills, isolated or dry open-cut crossings, will be used where applicable to avoid potential environmental effect on fish habitat."

Coke Leachate

"Petroleum coke is a solid, carbonaceous material that is placed around the ground electrode rod to increase its conducting surface. The rod along with the coke is located approximately 3 m under the ground. The coke has the potential to leach various hazardous substances, such as metals and PAHs (polycyclic aromatic hydrocarbons). Effects during construction include the deposition of fine particulate coke material resulting in an increase in Total Suspended Solids (TSS) of a water course and the introduction of PAH and metals to the water course."

Contamination from Structure Foundations and Installations

"Construction of cast-in-place concrete structures (e.g., foundations) near watercourses may result in accidental releases of concrete or concrete wash water into watercourses… Releases into aquatic environments can cause increases in pH of the water resulting in damage to fish tissue. Also, elevated pH levels may increase toxicity of other substance in the water, such as ammonia."

Blockage in Fish Passage and/or Alteration of Flow

"Installing the ground electrodes might entail isolating the construction area while maintaining downstream flows (method used if there is flowing water in the watercourse at the time of construction)."

8.2.4.3 Valued Environmental Components 8-45

"The previously described potential environmental effects were investigated for the project by assessing the effects on VECs. Two VECs were chosen for the aquatic environment component of the proposed developments: surface water quality and fish habitat…

The key indicator resources associated with fish habitat…

- Physical fish habitat (substrate composition, channel characteristics, cover composition and habitat units);
- Water quality (DO, TSS and turbidity);
- Hydrology (velocity and water depth); and
- Riparian vegetation (riparian health and riparian vegetation composition)."

8.2.4.4 Environmental Effects Assessment and Mitigation 8-45

"… Water courses were assessed based on fish habitat quality and the sensitivity of the habitat to determine the potential effect of the Project component… Existing aquatic environment information was collected and analyzed for the project areas. This information included the review of available fish and fish habitat information, local knowledge obtained through ATK studies, and field studies conducted at a selected subsample (57) of the stream crossing sites for the transmission line, converter station, and ground electrode sites…

… activities identified that could contribute to the potential environmental effects previously described that may affect the aquatic environment. These include the following:

- Clearing and maintenance of riparian vegetation at water course crossings on the HVdc Transmission Line, ac Collector lines and Northern Ground Electrode Line rights-of-way;
- Installation of permanent transmission line towers;
- Stream crossings at electrode sites;
- Construction of the northern converter station;
- Installation of ground electrode rings;
- Development and operation of the construction camp; and
- Accumulation of waste materials on-site during construction and operation of the Project."

HVdc Transmission and ac Collector Lines

Construction

"The Project will require overhead line crossings of 360 water courses (317 crossings for the HVdc Transmission Line, 43 crossings for the ac Collector Lines and five crossings for the northern ground electrode line). The right-of-way of the overhead lines is adjacent to the riparian areas of an additional 58 water courses (57 for the HVdc Transmission Line, and one for the ac Collector Lines).

Fish habitat was assessed for each water course crossing site. None was considered as critical habitat, 86 were assessed as important fish habitat, 216 as marginal fish habitat and 58 as no fish habitat. Sites rated as important included perennial watercourses supporting a diversity of habitat features and fish species throughout most of the year; whereas Marginal habitat sites were often temporary streams with low habitat and fish species diversity, supporting fish for only a short portion of the year.

Of the 360 water course crossing sites, only eight were rated high with respect to sensitivity of the site. This was due to a combination of quality of fish habitat and stability of the site (e.g., eroding and highly unstable banks). Moderately sensitive sites represented 175 stream crossings and included sites where broad saturated floodplains were susceptible to rutting as well as sites with erosion prone banks. The remaining 177 sites were rated as Low sensitivity due largely to low quality fish habitat. Further details are available within the Bipole III Aquatics Technical Report.

The High sensitivity sites include: Burntwood River; Mitishto River (Site 143); Steeprock River; Woody River; North Duck River; Assiniboine River; Red River; and Rat River. These eight sites are all classified as important fish habitat and will be susceptible to bank erosion from construction vehicles and machinery and are considered ESS… Increased precautionary measures, with respect erosion protection and right-of-way clearing and maintenance at sensitive sites will be required...

… As the nature of stream crossing work for overhead transmission lines can be accomplished with a low risk to fish habitat and minimal effect on the aquatic environment DFO has specified operational statements that if applicable and adhered to, do not require further assessment or authorization under *The Federal Fisheries Act*. Manitoba Hydro intends to use the Operation Statements for all aspects of potential effects on stream and riparian areas from the construction and maintenance of overhead lines for the project. DFO Operation Statements are provided as an appendix in the Bipole III Aquatics Technical Report.

Stream crossings are considered ESS. Location information and protection measures will be identified in the draft Bipole III EnvPP for the project that accompanies this EIS.

Access to the construction areas of the HVdc transmission line will need temporary access trails. Of the 44 construction access trails outside of the proposed right-of-way, 25 will require stream crossings with a total of 125 crossings… The same DFO Operation Statements and mitigation measures will be applied…

Mitigation is organized into DFO operational statements, vegetation removal, erosion and sediment control, stream crossings, concrete works and riparian management. The operational statement for

Overhead Line Construction (DFO 2007a) includes mitigation measures that will be adhered to for Bipole III transmission line construction:

- Where possible, installation of lines over water courses and poorly drained habitats such as bogs and fens will be conducted under frozen conditions or aerially;
- Where possible, transmission line approaches and crossings will be perpendicular to the watercourse and will avoid unstable features such as meander bends, braided streams and active floodplains; and
- All structures (temporary and permanent), will be placed above the ordinary high water mark (HWM).

Vegetation Removal

- Removal of riparian vegetation will be limited to select plants within the right-of-way required to accommodate overhead lines, and uprooting of plants will be minimized;
- Clearing limits and sensitive areas will be clearly marked prior to vegetation removal;
- Clearing will be conducted under favourable weather conditions. Construction activities will be postponed under adverse weather (i.e., storm events) to minimize potential sediment introduction into the aquatic environment; and
- Slash/debris piles will be adequately stabilized and stored well above the (HWM).

Erosion and Sediment Control

- Disturbed riparian areas will be re-vegetated following completion of works;
- Appropriate erosion and sediment control measures will be implemented to mitigate sediment introduction into watercourses;
- In addition for the eight sites identified as High sensitivity to disturbance , site specific sediment and erosion control plans will be developed; and
- Erosion and sedimentation control measures will be routinely inspected to ensure effectiveness."

Equipment Crossing of Streams

"Existing stream crossings will be used whenever possible for getting construction equipment to the far side of a stream. Where an existing crossing does not exist or is not practical for use… Ice Bridges and Snow Fills (DFO 2007c) should be adhered to, including the following:

- Temporary stream crossings will be constructed only where existing crossings do not exist or are not practical for use;
- Temporary stream crossings consist of bridges, dry streambed fords or a one-time ford in flowing waters;
- Whenever possible, existing trails, roads and cut lines will be used as access routes;
- Crossings will be constructed on a straight section of the watercourse, perpendicular to the channel;
- Clean materials will be used in the construction of temporary crossings and all materials will be removed upon project completion or prior to freshet; whichever occurs first;
- One-time fording of flowing streams and temporary bridge construction will only occur where the channel width is less than five m (from HWM to HWM);

- Fording in flowing waters will occur within appropriate fisheries timing windows, as outlined in DFO's Manitoba In-water Construction Timing Windows for the Protection of Fish and Fish Habitat (DFO 2007d);
- Fording will occur under low flow and favourable weather conditions and will avoid known fish spawning areas;
- Where necessary, measures to protect the streambed and banks will be in place prior to fording (e.g., pads, swamp mats). Protection measures will not impede fish passage, or constrict flows; and
- If fording will likely result in erosion and degradation of the streambed and banks, a temporary bridge will be constructed."

Concrete Works

- "Any uncured or partly cured concrete will be kept isolated from water courses; and
- Concrete wash water or water that has contacted uncured or partly cured concrete will be isolated from watercourses until it has reached a neutral pH."

Riparian Management Areas – Right-of-Way Buffer Zone

"Potential effects of transmission line construction and maintenance on nearby water bodies where stream crossings are not occurring, will be mitigated by the establishment of Riparian Management Areas, and will include a Reserve Zone (RZ) where no vegetation clearing will occur and a Machine Free Zone (MFZ)…

…These residual effects will be negative in direction, small in magnitude, restricted to the Local Study Area, of short-term duration, and reversible. Therefore the potential residual effects are considered not significant."

Operation

"Vegetation removal near watercourses can result in increased erosion leading to sedimentation of streams, as described in Construction Effects… Vegetation management mitigation is listed below to protect riparian areas and maintain their function."

Vegetation Management

"During the operation of the project, riparian vegetation management within the right-of-way will adhere to DFO's Maintenance of Riparian Vegetation in Existing Rights-of-way (DFO 2007e) operational statement including the following measures:

- In riparian areas, vegetation will be maintained in a way that leaves root systems intact;
- Riparian vegetation maintenance within 30 m of the HWM will affect a maximum of 1/3 of woody vegetation (e.g., trees and shrubs) within the right-of-way;
- Riparian vegetation maintenance will be conducted by the method that minimizes stream bank disturbance and if rutting or erosion is likely, appropriate bank protection measures will be implemented prior to machinery use;

- All waste materials (slash) will be stabilized well above the HWM to mitigate entry into the watercourse; and
- Application of herbicides will adhere to appropriate best management practices and all chemical applications will be conducted by a certified applicator.

Potential residual effects on surface water quality and fish habitat from HVdc transmission line and ac collector lines operation will include some loss of riparian vegetation at stream crossings, and the temporary disturbance to stream banks and bed, during periodic maintenance activities. These residual effects are characterized as negative in direction, small in magnitude, restricted to the local study area, and of medium-term duration. Therefore the potential residual effects are considered negligible and not significant."

Keewatinoow Converter Station and Area

Construction

"The Keewatinoow Converter Station site is located south of Goose Creek… No new permanent stream crossings are required for the project. Access to construction sites will be of the existing Conawapa service road. The potential effects to the aquatic environment from project development in the Keewatinoow area include:

- Converter station siting over an existing un-named ephemeral stream;
- Workcamp proximity to several streams – Creeks Fourteen and Fifteen; and
- Concrete batch plant water discharge.

An unnamed creek lies within the site of the Keewatinoow Converter Station north of Gillam, MB along the Conawapa access road… This creek is rated as Marginal Fish Habitat and does not support fish directly (Bipole III Aquatic Environment Technical Report). The creek provides indirect fish habitat in the form of water, nutrients and food (lower trophic levels) to the Nelson River…

…Construction of the converter station is expected to result in the infilling of 622 m of the total 1,500 m long creek channel.

The unnamed creek at the converter station does not support fish and serves as indirect fish habitat only. Therefore the fish and fish habitat sensitivity was rated as Low. Infilling approximately 622 m of the upper reaches of the creek was rated as High for scale of negative effect (Table 8.2-5). Approximately 40% of the channel length of the small unnamed creek would be affected leading to high ratings irrespective of the value or sensitivity of the fish habitat.

The construction of the Keewatinoow Converter Station will negatively affect a large proportion of the total creek channel. However due to the nature of the habitat and lack of fish presence (i.e. boreal wetland and no fish), the risk of habitat effects is considered very Low according to the Risk Assessment Matrix. The combined **rating of low for habitat sensitivity and high for scale of negative effect still fits within the matrix for a combined rating of Low** and as such does not require Federal Fisheries authorization for habitat alteration disturbance or destruction (HADD) (DFO 2010). Mitigation measures will be applied for the prevention of erosion and sediment entering the remaining portion of the un-named creek.

… Mitigation measures are organized into erosion and sediment control, riparian vegetation, instream works and concrete wash water."

Erosion and Sediment Control

"The potential for erosion or transfer of sediments into streams or riparian areas adjacent to the construction sites will be mitigated using the following measures:

- Erosion and sedimentation control measures will be in place before construction commences and will be maintained throughout the construction phase;
  …
- Sediment fencing should be used and installed correctly…
- Surface erosion control measures such as hydroseeding, organic mulches, wood fibre, peat moss, wood chips/bark, brush matting, or the application of water may also be used…
- To reduce dust…water or other wind erosion control methods will be applied…
- Erosion prone areas, such as steep slopes, erodible soils, wet areas, and areas adjacent to watercourses, will be monitored to ensure erosion is minimized;
  …
- Surface runoff will be directed into well-vegetated areas or settling basins and to existing drainage systems when possible;
  …"

Riparian Vegetation

- "Potential effects of construction on nearby water bodies in the Keewatinoow area will be mitigated by creating development and construction setbacks from riparian areas. Riparian Management Areas will be established for nearby streams, and will include a Reserve Zone (RZ) where no vegetation clearing will occur… "

Instream Works

- "Instream work will be conducted during favourable weather conditions… to minimize potential sediment introduction into the aquatic environment;
- All instream construction activities will be conducted in isolation from flowing water using a temporary diversion if necessary;
  …
- Turbid water generated from the isolated work site will be pumped away from the watercourse to a vegetated area, filter fabric dam or other acceptable area that will provide filtration and/or settling time prior to entering watercourses; and…"

Concrete Wash Water

"In the event that wash water from settling ponds is discharged, either overland or directly to Goose Creek, the discharge water will be treated to meet the following criteria:

- Wash water will be treated to meet the Manitoba Water Quality Standard for municipal wastewater effluents of 30 mg/L TSS prior to discharge; and
- Wash water will be treated, as required, to meet the Manitoba Water Quality Standards, Objectives, and Guidelines (MWQSOG) for the protection of aquatic life for pH 6.5-9.0, prior to discharge.

… the potential residual effects are considered not significant."

Borrow Sites and Excavated Material Placement Areas

"There are no plans to conduct any instream work for the excavation of aggregate materials for construction. However the borrow sites as mapped overlap existing streams or waterbodies. These sites were evaluated for fish habitat quality as part of the assessment.

…Because groundwater contributes to stream flow, potential effects to surface water quality and fish habitat from borrow pit activities include effects to groundwater… In addition, accidental fuel spills in borrow pit areas, which serve as groundwater recharge areas, could contaminate streams.

…
Mitigation measures will include the following:

- Borrow pits and excavated material placement areas will be located away from streams and waterbodies to avoid potential effects of borrow pit activity on fish and fish habitat;
- Excavations will not be undertaken below the water table; and
- Spill containment equipment will be put in place in borrow areas for large fuel containing stationary equipment (e.g., crushing equipment). For mobile equipment a re-fueling area will be designated away from depressional or excavated areas…
- Riparian Management Areas (RMAs) will be established surrounding all water bodies…
- Drainage control measures will be used around excavated material placement areas to prevent sediment-laden runoff from reaching any adjacent streams.

… residual effects are characterized as negative in direction, small in magnitude, restricted to the Local Study Area, of short-term duration, limited to the construction period and reversible. Therefore the potential residual effects are not significant."

Operation

"The operation of the Keewatinoow Converter Station will have limited potential to affect the aquatic environmental component. The operation of a wastewater facility for the station will be the subject of a separate environmental application. Other than the operation of a wastewater facility, the main operational activity of potential concern would be the use of herbicides for vegetation management on the site. The following mitigation is provided for that issue.

- Vegetation control including the application of herbicides during station operation will adhere to appropriate best management practices that prevent any off-site movement of chemicals and to appropriate application by certified applicators.

No residual negative adverse effects on fish habitat or water quality are expected from the operation of the Keewatinoow Converter Station."

Riel Converter Station

"There are no water courses within the Riel Converter Station site. A channelized drain, South Bibeau Drain lies 40 m to the west of the Riel Converter Station site. The drain is classified as indirect fish habitat and does not directly support fish. Therefore no construction or operation related effects to the aquatic environment are expected."

Northern Ground Electrodes and Line

"Construction

One ground electrode will be required for each of the Keewatinoow and Riel Converter Stations… Currently a shallow land ring electrode design is being proposed. The electrode will be a buried metallic rod approximately five cm in diameter. The rod is buried in a ring with a diameter of approximately 800 m and will require a site area of approximately four km2, together with an access road for construction and ongoing maintenance. There will also be a low voltage overhead line connection between the ground electrode site and the converter station…

…The iron ring electrode is embedded in a coke matrix to increase conductivity. The coke consists primarily of carbon but also may contain small amounts of PAHs. The metallic rod along with the coke is located approximately three to four metres under the ground. Coke leachate from ground electrodes could potentially enter surface waters through introduction to groundwater and subsequent discharge through springs. No acute effects to aquatic organisms are expected from coke; however, overall it is considered to have a low potential to cause adverse effects on the aquatic environment (US EPA 2008).

The potential of coke leachate to enter surface water depends on groundwater and surface water movements at the preferred ground electrode sites. Based on borehole logs near northern ground electrode site NES6, groundwater appears to be between 6 and 10 m below ground and overlain by clay at the site. Therefore, there is no upward movement of water to transfer leachate to the un-named stream on the site. The soil within the site is described as well-drained, and consequently coke leachate if any would be draining down and not up into surface water.

Mitigation for construction of the ground electrode and line will follow that prescribed for the HVdc transmission line and ac collector lines.

In addition, mitigation for construction of the ground electrode crossing of the unnamed creek will include the following:

- DFO's Operational Statement for Isolated or Dry Open-Cut Stream Crossings is applicable for the installation of the ground electrode and will be implemented and adhered to;
  …

Handling of coke bedding material:

- Coke will be rinsed or leached (aged) before use, to remove any metals loosely bound to its surface;
- To prevent an accidental spill of coke into the aquatic environment, coke materials will be stored greater than 100 m from the ordinary high water mark; and
- Coke will be adequately contained and will be protected from wind and rain to prevent entry of fine particulates into streams through runoff or dust deposition.

… Residual effects are characterized as negative in direction, small in magnitude, restricted to the Local Study Area, of short term duration, restricted to the construction period and reversible. Therefore the residual effects are considered not significant."

Operation

"Potential effects of ground electrode operation relate to Electric and Magnetic Field (EMF) and vegetation management. The operation of the ground electrode can create some electric and magnetic fields. Modeling analyses… concluded that electrical fields would not reach levels required to elicit effects in fish… no effects on fish are expected from electrode operation.

Vegetation removal… can result in increased erosion leading to sedimentation of streams. Proper use of herbicides as indicated above for the Keewatinoow converter will mitigate this concern.

… These residual effects are characterized as negative in direction, small in magnitude, restricted to the local study area, and of medium-term duration. Therefore the potential residual effects are considered negligible and not significant."

Southern Ground Electrode

"The ground electrode installation for the southern converter station is the same as for northern site except for the diameter of the ring and there are no watercourses that lie within the southern ground electrode site… No residual effects are anticipated."

8.2.4.5 Summary of Residual Environmental Effects and Significance 8-60

"… The two main potential effects from construction and operation of overhead transmission lines are loss of riparian habitat and instream sedimentation. With appropriate mitigation measures implemented for construction and operation, the residual effects are considered not significant. Construction access trails, required to access the HVdc transmission line right-of-way, will follow existing linear disturbed areas… the residual effects from stream crossings on the construction access trails are considered not significant.

Development of the Keewatinoow Converter Station site will require the infilling of a portion of a small unnamed creek. The creek is considered Marginal fish habitat and the wetland-type habitat does not support fish directly. Infilling would result in the displacement of water from the site to similar habitat adjacent to the site that drains to the area downstream. The potential for increased local and downstream suspended and streambed sediment burdens caused by construction can be effectively mitigated through proper control measures and therefore the residual effects are considered not significant.

The Construction Camp footprint does not overlap any water courses and, with appropriate riparian buffers, there will be no significant residual effects.

There are no water courses within the Riel Converter Station site and therefore construction and operation of the Riel Converter Station will have no significant residual effects on the aquatic environment.

The construction of the ground electrodes poses a low risk to fish habitat. There is no water course at the southern site; however, two roadside ditches are located directly south and north of the site and Cooks Creek is located west of the site. These will be protected during construction; erosion and sedimentation controls will be implemented as necessary. Construction of the northern ground electrode will include isolated or dry open-cut stream crossing construction. Potential effects from construction include riparian clearing, erosion and sedimentation, improper streambed restoration, and alteration of stream flow. These effects will all be mitigated through the implementation of DFO's Operation Statement for Isolated or Dry Open-Cut Stream Crossings (DFO 2007f).

Coke leachate is not predicted to enter surface water at either of the ground electrode sites. If leachate did enter a water body, it is not expected to have a measureable effect on the aquatic environment. Similarly coke physically entering a watercourse through a spill is considered to have a low potential to cause adverse effects on the aquatic environment. Therefore the residual effect of the placement and presence of coke on the aquatic environment is considered not significant.

Potential borrow pit areas include 14 sites, six of which are situated near water bodies. Borrow pit activities may have a negative effect on fish and fish habitat through erosion and sedimentation to streams, as well as pollution of and changes to groundwater flow. These effects can be negated through appropriate mitigation measures, therefore resulting in no significant residual effects."

8.2.4.6 Follow-up 8-63

"Construction monitoring will be used to evaluate the effectiveness of mitigative measures developed for this project…

All disturbed bed and bank sites will be restored comparable to pre-disturbance conditions…"

8.2.5 Terrestrial Ecosystems and Vegetation 8-63
8.2.5.1 Overview 8-63

8.2.5.2 Potential Effects and Key Topics 8-63

"There is a wide range of potential effects and key topics relevant to terrestrial ecosystems and vegetation. Overall, no measureable residual effects are expected from the Project in most potential topic areas given the mitigation measures that will be adopted. The following key topics are addressed below, as background to the assessment of Project effects on specific VECs:

- Modification of vegetation adjacent to the disturbance zone;
- Fragmentation;

- Vegetation diversity;
- Invasive and non-native plants;
- Access;
- Wildfire risks;
- Dust;
- Herbicides; and
- Non-VEC plants and communities."

Modification of Vegetation Composition and Structure Adjacent to the Disturbance Zone

"The removal of vegetation and the creation of new forest edges along a disturbance zone as a result of construction activities for the transmission lines and other associated project components may result in changes to the nearby forest vegetation…

The potential effects on vegetation adjacent to a disturbance area can be mitigated by implementing the following mitigation measures:

- Construction activities will be carried out during the winter months to minimize removal of shrub and understory species; and
- Grubbing will be minimized within the right-of-way to reduce root damage except at foundation sites."

Fragmentation

"… Construction of the proposed Bipole III HVdc transmission line and other Project components will result in fragmentation of vegetation communities. A 66 m right-of-way will be cleared of trees and shrub vegetation, while wetland vegetation such as sparsely treed bogs will be less affected from fragmentation as a result of less overstory removal. The Bipole III transmission line right-of-way will intercept a total of 480 km of forest which is 35% of the entire route…

Mitigation measures were not identified, as fragmentation effects are non-mitigable for the transmission lines, Keewatinoow converter station, construction camp, borrow sites and access roads/trails as a result of vegetation clearing. The issue is addressed in the assessment of Project effects on the VECs for vegetation that are reviewed in subsequent sections."

Vegetation Diversity

"… Depending on the type of vegetation (e.g., trembling aspen stand), several species can exist at each stratum. Other Project components such as the Keewatinoow converter station, construction power station, construction camp and borrow sites will have complete removal of vegetation and therefore are non-mitigable.

The potential effects on vegetation diversity can be mitigated by implementing the following mitigation measures:

- Construction activities will be carried out during the winter months when effects to plant species are minimized;

- Grubbing will be minimized within the right-of-way to reduce root damage except at foundation sites; and
- Native plant species will be used for revegetation of disturbed areas… focus on the development of stable plant communities…"

Invasive and Non-native Plants

"… The abundance of non-native or introduced plant species may increase as a result of construction, maintenance and site decommissioning activities along the transmission line right-of-way and other Project components…

… During the field assessments in 2010, 27 non-native species were observed throughout the Project Study Area; five of these were invasive plants…

…The potential effect of introduction of invasive or non-native plants into cleared areas can be limited by implementing the following mitigation measures:

- Construction, maintenance and decommissioning activities will be carried out during the winter months;
- All equipment will be washed and inspected prior to working in new sites to reduce the spread of introduced species;
- Construction materials (i.e., gravel) will be taken from clean sources and ground cover materials will be weed free prior to use; and
- The access management plan to be developed for the project, will consider means to limit the introduction of non-native plants during clearing and construction of the proposed transmission lines."

Access

"Clearing and construction of transmission line rights-of-way as well as the creation of new access roads/trails for the Project can allow increased access by non-community members to sensitive areas that have been identified by local Aboriginal communities and can result in the potential loss of important vegetation resources found at these sites. Although non-Aboriginal people also have long-established traditional uses related to botanical resources, several locations along the preferred route have been identified that support plants that are used by Aboriginal people, including areas for berry picking, medicine gathering, and harvesting plants and trees for cultural purposes. The harvesting and profiting from non-timber resources by non-community members is a concern for Aboriginal people (National Aboriginal Forestry Association 1999).

General mitigation measures for protecting vegetation resources used by Aboriginal people include the following:

- The access management plan(s) to be developed for the Project, will consider means to limit access to areas deemed important for plant harvesting by an Aboriginal community."

Wildfire Risks

"Wildfires have the potential to develop from the accumulation of slash during construction and maintenance activities for the Project…

General mitigation measures to reduce the risk of wildfires include the following:

- The removal of slash and other tree maintenance activities will be scheduled to avoid the forest fire season, and burning should occur in the winter months;
- Slash will be cut, piled, burned or disposed of as specified in the Manitoba Conservation work permits;
- Where practical, slash piles will be located on sites with mineral soils;
- Slash piles will be placed away from the right-of-way edges to reduce the potential for scorching of standing vegetation; and
- All fires must be completely extinguished after burning of slash and burn piles will be monitored to confirm that hotspots are not present."

Dust

"… Vegetation adjacent to access roads where dust levels are high may be susceptible to changes in photosynthetic rate and decreases in growth.

General mitigation measures for reduction of any dust on vegetation include the following:

- Construction, maintenance and decommissioning activities for many areas will be carried out during the winter months; and
- Water or approved dust suppression agents that will not negatively affect surrounding vegetation will be used for dust abatement (Manitoba Hydro 2006) where and when necessary."

Herbicides

"Herbicide use during maintenance of transmission line rights-of-way not only inhibits the growth of undesirable species but also can negatively affect desirable species by causing undue stress and possible mortality of vegetation that may be considered important for reasons such as wildlife, traditional uses, or have botanical value…

General mitigation measures for herbicides include the following:

- Clearing of the transmission line right-of-way and other sites, will employ a nonherbicide method such as hand cutting, mechanical cutting or winter shearing;
- If herbicides are required to control vegetation growth, all applicable permits and provincial regulations (*The Noxious Weed Act)* will be followed;
- On private lands, prior to any vegetation management work, landowners or appropriate authorities will be contacted to obtain the necessary permission;
- On Crown Lands the necessary work permit(s) will be obtained, as required under The *Manitoba Forest Act;* and
- Species of concern will be monitored and identified/marked and the use of herbicides restricted in these areas."

Non-VEC plants and Plant Communities

"… It is estimated that approximately 3,355 ha of upland forest vegetation occurs along the transmission line RoW and approximately 738 ha for the other project components…

There are 317 watercourse crossings on the preferred route… Approximately 957 ha of riparian habitat occurs along the transmission line right-of-way and 310 ha for all other project components…

Bog, fen and marsh wetlands were identified along the transmission line right-of-way and cover approximately 1,456 ha. Only bog and fen wetlands were identified for other Project components… Project activities may also affect species of concern that may be present in these areas…

Environmentally sensitive areas for terrestrial ecosystems and vegetation identified …Approximately 10 ha of dry upland prairies, 535 ha of patterned fen wetlands and 6 ha of salt marshes/flats occur within the transmission line right-of-way… No residual effects were identified for patterned fens or salt marshes/flats, since they will be avoided and/or buffered to prevent any project disturbance on these sensitive plant communities.

The potential effects of the project on non-VEC plants and plant communities can be limited by implementing the following mitigation measures:

- Clearing and construction activities will be carried out during the winter months…
  …
- Tree removal will be confined within the limits of the right-of-way, with the exception of danger trees located outside the right-of-way that can affect transmission lines (Manitoba Hydro 2006);
  …
- Trees will be felled into the right-of-way and other project component sites so as not to damage existing vegetation along right-of-way or other project component boundaries;
- A minimum vegetation (i.e., trees and shrubs) buffer width of 30 m of the high water mark will be maintained for waterbodies such as lakes, ponds and streams;
  …
- Where construction activities do not occur over winter months, construction mats will be considered for use where wetlands may be affected (Minnesota Department of Commerce *et al*. 2010);
- Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur (Minnesota Department of Commerce *et al*. 2010); and
- During construction, measures will be implemented to manage storm water runoff to reduce the potential for erosion (Minnesota Department of Commerce *et al*. 2010)."

8.2.5.3 Valued Environmental Components 8-71

"… The two VECs determined and reviewed for terrestrial ecosystems and vegetation for the Project:

- Plant species and communities of conservation concern; and
- Native grasslands/prairie areas.

…Plant species and communities of conservation concern were identified as a VEC and utilized in the assessment due to the low abundance of these species and the need to protect them either provincially, federally or as a result of their being listed by the Manitoba Conservation Data Centre as very rare to uncommon.

… Thirteen plant species that are listed as protected have the potential to occur in the southern portion of the study area and may potentially be affected by construction activities. Native grassland and prairie areas… among the most threatened in North America…"

8.2.5.4 Environmental Effects Assessment and Mitigation 8-72

"…Effects are assessed on preferred Project components after site selection. Avoidance of areas or potential effects was a major focus of route selection. Over sixty alternative routing segments were rated for the potential level of effect on each environmental component. Segments were chosen that had the least potential effects on the various components where possible in consideration of 28 evaluated criteria. The route and site selection process is described in Chapter 7."

HVdc Transmission and ac Collector Lines

Plant Species and Communities of Conservation Concern

Construction

"Fifteen locations for plant species of conservation concern were previously known to occur along the transmission right-of-way, two in the area of the alternate southern ground electrode site, and one along the northern collector right-of-way (MBCDC records). Field assessments identified species of concern at the construction power station, alternative northern and southern ground electrode sites and 26 other locations within the Local Study Area. Nine species of conservation concern, listed by the MBCDC, were observed along the preferred route right-of-way (exact locations unknown) during surveys conducted for Swan Lake First Nation (Reeves 2011)…

… Although no species of conservation concern were identified on the final preferred route for the transmission line during the field assessment in 2010, fifteen previously known locations of plants of conservation concern listed by the MBCDC occur along the transmission line right-of-way. These are polygon (i.e., general area on a map) records where no exact locations have been identified. Thirteen plant species that are listed as protected have the potential to occur in native grassland/prairie areas in the southern portion of the Project Study Area and may potentially be affected by construction activities…

Mitigation measures to reduce the negative effect to plant species of conservation concern include the following:

- Construction and site decommissioning activities will be carried out during the winter months when effects to plant species are minimized;
- Where activities do not occur over winter months, disturbance to the shrub and herb layers will be minimized where species of conservation concern have been observed;
- Existing access roads and trails will be used to the extent possible; and

- Locations of species of conservation concern will be clearly marked with flagging tape prior to construction and site decommissioning activities.

Based on the mitigation measures to be provided there are no anticipated residual effects of construction on plant and plant communities of conservation concern."

Operation

"Plants and plant communities of conservation concern can potentially be lost as a result of maintenance activities within the HVdc transmission line and ac collector line rights-of-way… Mitigation measures identified to minimize potential effects to plant and plant communities of conservation concern include the following:
[MWL: Same as above…and;]

- In areas where species of conservation concern have been identified, a non-herbicide method will be used, such as hand cutting, mechanical cutting or winter shearing.

Based on the mitigation measures to be provided there are no anticipated residual effects of operation on plant and plant communities of conservation concern."

Native Grasslands/Prairie Areas

Construction

"Dry upland prairies, a type of native grassland found along the HVdc transmission line, exemplify the best variety of native prairie that occurs in the study area. These areas were also designated as an ESS for the Project. These areas are known to support species of conservation concern listed by the MBCDC and Dalea villosa, a protected species by the federal *Species at Risk Act* (SARA) and *Manitoba Endangered Species Act* (MBESA)… these sites occupy an area of approximately 9 ha…

There is potential for native grassland/prairie areas located in the southern portion of the Project within the HVdc transmission line right-of-way to be disrupted by construction (i.e. heavy equipment use and grubbing activities) and site decommissioning activities…

Approximately 755 ha of the grassland cover type (considered agricultural pastureland) have the potential to be affected by construction and site decommissioning, while less than 10 ha of dry upland prairie which are part of grasslands and have been identified as environmentally sensitive sites may be affected…

Mitigation measures identified to reduce potential effects for construction activities for the transmission line include the following:

- Construction and site decommissioning activities will be carried out during the winter months to minimize surface damage, rutting and erosion;
- Where activities do not occur during winter months, soil and vegetation disturbance will be minimized in the dry upland prairie areas;
- Where disturbance has occurred in areas prone to increased erosion, vegetation will be re-established using native species appropriate for the site;

- Trees will be removed by low ground disturbance methods;
- Where trees do not pose a threat to the operations of the transmission line, clearing will be reduced in these areas; and
- Existing access roads and trails will be used to the extent possible.

Based on the mitigation measures to be provided the residual effect is considered negative, small magnitude, confined to the Project Site/Footprint, of medium-term duration, one-time frequency, and reversible upon decommissioning, and therefore is not considered significant."

Operation

"Native grasslands may potentially be disrupted during HVdc maintenance activities within the transmission line right-of-way…

Mitigation measures identified to reduce potential effects to grassland/prairie areas include the following:

- Routine maintenance activities will be carried out during the winter months to minimize surface damage, rutting and erosion;
- Where maintenance activities do not occur during winter months, soil and vegetation disturbance will be minimized in the dry upland prairie areas;
- Where disturbance has occurred, vegetation will be re-established using native species appropriate for the site;
- Existing access roads and trails will be used to the extent possible; and
- Species of concern will be identified/marked and monitored, and the use of herbicides will be restricted in these areas.

Based on the mitigation measures provided there are no anticipated residual effects."

Keewatinoow Converter Station and Area

Plant Species and Communities of Conservation Concern

"The potential effect identified for plants and plant communities of conservation concern is the loss of plants from one species (snow willow) that will occur during construction activities. The snow willow is a species of conservation concern and ranked S3 (uncommon) by the MBCDC. These plants were observed during the field assessments at the construction power station. No effects are anticipated for plant species of conservation concern for site decommissioning activities. The loss of some snow willow plants at the construction power station from construction activities is considered non-mitigable due to the complete removal of all vegetation cover from the site and therefore was identified as a residual effect. This species was observed at nine other locations in the vicinity of the construction power station during the field assessments and is not in danger of increasing its conservation status under MCDC criteria with the removal of some plants for the Keewatinoow area project activity.

The loss of some plants from one species of conservation concern is small magnitude, confined to the Project Site/Footprint, of long-term duration, one-time frequency, and irreversible/ permanent even after decommissioning, and therefore is not considered significant."

Native Grasslands/Prairie Areas

"There are no environmental or residual effects for native grassland/prairie areas from construction or site decommissioning activities for the Keewatinoow converter station, construction power station, construction camp, borrow sites or access roads/trails.

No environmental or residual effects are anticipated to the VECs from operation activities for the Keewatinoow converter station, construction power station, construction camp, and borrow sites."

Riel Converter Station

Construction

"No environmental or residual effects are anticipated to the VECs…"

Operation

"No environmental or residual effects are anticipated to the VECs…"

Ground Electrodes and Lines

Plants and Plant Communities of Conservation Concern

"No environmental or residual effects are anticipated to this VEC…"

Native Grasslands/Prairie Areas

"No environmental or residual effects are anticipated to this VEC…"

8.2.5.5 Summary of Residual Environmental Effects and Significance 8-77

"Residual effects, which are resultant changes in the environment after the application of mitigation measures, were rated using significance criteria (e.g., direction, frequency, magnitude, geographic extent) and taking into account all Project components and activities (Table 8.2-6). It was determined that the following residual effects for the VECs will occur after implementation of mitigation measures: loss of plants (from one species) of conservation concern, and removal of trees that may occur in dry upland prairie sites. A brief characterization and rationale of each residual effect can be found below."

Plant Species and Communities of Conservation Concern

"Loss of plants of conservation concern specifically snow willow from construction activities for the construction power station site was identified as an effect. Plant species of conservation concern were identified as a VEC because they exist in low numbers, play a role in helping to preserve species diversity and may be protected either provincially or federally, or listed by the Manitoba Conservation Data Centre as very rare to uncommon. Due to the complete removal of vegetation at the construction power station, the loss of plants of conservation concern is considered non-mitigable. This residual effect is considered not significant based on the significance evaluation criteria and that recognizing that snow willow is ranked S3 other locations for this plant were found in the vicinity of the northern Project components and Local Study Area of the HVdc transmission line."

Native Grassland/Prairie Areas

"Removal of trees that may occur in dry upland prairie sites, by construction activities for the HVdc transmission line, was identified as a residual effect. Grasslands and prairie areas, of which dry upland prairie sites are a part, have been identified as a VEC due to the importance of these habitats for species of conservation concern and because this type of ecosystem is among one of the most threatened in North America. During field assessments, areas of sparse tree cover that span the width of the HVdc transmission line right-of-way were observed in dry upland prairie sites and may be completely removed during construction activities, resulting in a potential residual effect. Mitigation can potentially serve to restrict the location, extent, method, and timing of Project activities but the removal of trees will occur and therefore was identified as a residual effect. This residual effect is considered not significant based on the significance evaluation criteria and recognizing that trees were commonly observed in this ecosystem and dry upland prairie sites are not protected areas."

8.2.5.6 Follow-up 8-79

"In order to confirm that mitigation measures are implemented effectively, monitoring will be conducted for Project components and project activities… Monitoring will be carried out on environmentally sensitive areas, including species of conservation concern and botanical resource areas identified through the ATK process, as well as riparian areas, and non-native species…

Revegetation and access management plans are recommended to be developed for the Project which includes measures that would be implemented to reduce potential environmental effects… Access management plans would help to reduce the introduction of non-native species, the risk of fire, and access by other people to vegetation resources used by Aboriginal people as identified through the ATK process…"

8.2.6 Mammals and Habitat 8-80

8.2.6.1 Overview 8-80

"Mammals play an important role within the functioning ecosystems found throughout the various ecoregions contained within the Project Study Area… The following environmental effects assessment is focused on VEC mammal species described below that are found in the Project Study Area."

Mammal Groups

"For the purpose of this assessment mammals have been organized into ungulates, furbearers and small mammals. Further details on descriptions of mammals and potential effects can be found in the Bipole III Mammals Technical Report."

Ungulates

"For the purpose of this report, ungulate VEC mammal species include coastal and barren ground caribou (*Rangifer tarandus groenlandicus*), boreal woodland caribou (*Rangifer tarandus caribou*), moose (*Alces alces*) and elk (*Cervus elphas*)…

In this assessment particular attention was given to boreal woodland caribou due to their federal and provincial status as a threatened species and their distribution across the northern portion of the Project Study Area…"

Furbearers

"For the purpose of this report, furbearer VEC mammal species include beaver (*Castor canadensis*), American marten (*Martes americana*) and wolverine (*Gulo gulo*)…

In addition, Grey wolf (*Canis lupis*), were also considered in the environmental assessment process as a VEC linkage species due to their potential effects on VEC ungulates due to potential increased predation effects caused by linear development."

Small Mammals

"While small mammals (bats, mice, voles, shrews, squirrels, chipmunks, rabbits, etc.) were assessed and evaluated, decisions resulting from VEC selection processes (See Bipole III Mammals Technical Report 2011) resulted in ungulates and furbearers being selected as VEC species."

8.2.6.2 Key Topics and Potential Environmental Effects 8-81

"… the following important wildlife topics were identified for VEC and VEC linkage species within the Project Area.

Mortality
- Increased mortality due to overharvesting via increased access (trapping, hunting, poaching);
- Increased mortality from improved predator mobility via linear corridors; and
- Decreased reproductive capacity (fecundity) due to disturbance or displacement.

Habitat Alteration
- Potential loss or change of Habitat;
- Potential loss of functional habitat via reduction of forage due to disturbance and edge effects; and
- Potential loss of important or unique habitat components (mineral licks, calving areas, dens, reproductive habitat).

Sensory Disturbance
- Displacement (resulting in avoidance of the area).

…"
Mortality

Increased Mortality Due to Overharvesting

"…Trappers often use rights-of-way and access roads to access previously remote area. However, this may only impact the Local Study Area and immediate surroundings (Jalkotzy *et al*. 1997). As habitat becomes more limited via habitat removal and fragmentation and trapping access increases, species such as American marten may become more vulnerable to population declines (Webb and Boyce 2009)."

Increased Mortality Due to Increased Predation

"… Linear corridors with less human use, such as remote transmission rights-of-way, may be more attractive to wolves (Stein 2000). Based on this literature, there is potential for increased ungulate mortality along and near the various components. These potential effects are anticipated to arise primarily during the operation phase of the Project."

Decreased Reproductive Capacity

"Decreased reproductive capacity is generally not a concern with mammal VECs due to their population status and distribution. Boreal woodland caribou are the exception to this as the Bipole III HVdc transmission line will bisect known calving habitat in the Wabowden area and is discussed below in Section 8.2.6.3. Boreal woodland caribou habitat is comprised of all components that fulfill the necessary year round life requisites required for reproduction (rutting, calving and calf rearing) and foraging (physiological health) while providing refuge from predators (Environment Canada 2008). Females with calves have been found to be less tolerant of disturbances and more likely to avoid disturbances than other individual caribou in the herd (Weir *et al*. 2007). Additionally, caribou in the Project Study Area show considerable fidelity to previously used calving areas in this area (Bipole III Caribou Technical Report). Disturbance may also displace calving females into less secure habitats containing predators. Since caribou calves are vulnerable to predation (Mech *et al*. 1995), loss of previously used, safer calving sites increases risk of calf mortality. This combined with the low fecundity and productivity expressed by boreal woodland caribou, they are sensitive to slight increases in mortality from predators (Thomas 1995)."

Habitat Alteration

Direct Loss of Habitat

"… While habitat loss can occur through the clearing of habitat for transmission line rights-of- way, early successional habitat created through vegetation maintenance along the right-of-way during the operation phase can benefit other ungulate species such as moose, deer and elk (Jalkotzy *et al*. 1997) as rights-of-way provide an enhanced source of high quality palatable forage in proximity to thermal and security cover. rights-of-way represent a small percentage of an ungulates' home range and the amount of habitat loss is expected to be negligible."

Habitat Fragmentation and Functional Habitat Loss

"… caribou movement and habitat use may be affected by fragmentation of core habitat. However, the long term effects of fragmentation on caribou movement and persistence are still largely unknown and require study."

Loss of Important or Unique Habitat

"For the purpose of this EIS, ESS for mammals were defined as site specific features or unique habitats that are particularly important in the maintenance of species' life functions, and where these features may be highly susceptible to transmission line construction and operation activities. These include dens, mineral licks and important habitats…"

Sensory Disturbance

Displacement

"Sensory disturbance due to clearing of a construction site and/or ongoing maintenance/activity may result in mammal avoidance of the immediate vicinity where the disturbance is occurring (Bubenik 1982; Jalkotzy *et al*. 1997)…"

8.2.6.3 Valued Environmental Components 8-86

"… Project effects on the following VECs:

- Coastal and barren ground caribou;
- Boreal caribou;
- Moose;
- Elk;
- American marten;
- Beaver; and
- Wolverine.

Grey wolves were also included in the environmental assessment process as a VEC Linkage Species due to their potential effects on VEC species through increased predation impacts potentially associated with linear development.

Due to the status and potential residual effects on caribou, the following provides a detailed background narration on caribou with emphasis on boreal woodland caribou in order to set the context for the environmental assessment in Section 8.2.6.4."

Caribou

"Caribou are generally identified by two major sub-species and both are found within the Project Study Area. These include boreal woodland caribou (*Rangifer tarandus caribou*) and migratory barren-ground caribou (*Rangifer tarandus groenlandicus)* (Linnaeus)…

…Based on the last assessments done in 2006, none of the local caribou populations found in the Project Study Area is currently considered to be at High Risk or unsustainable. As discussed and given the dated nature of the information used in these assessments, Manitoba Hydro identified potential gaps in data and information in order to effectively identify and mitigate impacts to boreal woodland caribou by avoiding critical habitat and local populations to the extent possible as part of the Site Selection Environmental Assessment (SSEA) process within the Project Study Area."

Status of Caribou Data and Information

"In understanding the dated nature of information and the need for current data to conduct the Bipole III SSEA, Manitoba Hydro collaborated with Manitoba Conservation on a number of strategic monitoring and research initiatives to acquire current data to be used in the selection of a Preliminary Preferred Route that would minimize overall impacts on caribou ranges in the Project Study Area by avoiding core use areas and critical habitat. Most importantly, these collaborative monitoring initiatives were guided by an objective evaluation of the potential threats to boreal woodland caribou as a result of transmission line development and operation…

…Specific issues addressed in the threat assessment and associated draft corporate strategy include; loss of forage (both direct and functional loss due to sensory disturbance), range fragmentation, increased predation, northward encroachment of white-tailed deer, parasites, changes in prey/predator dynamics and increased mortality from hunting. This process provided a critical path for Manitoba Hydro in the implementation of targeted monitoring and research activities aimed at mitigating the potential impacts of Bipole III on caribou through effective routing to avoid caribou range and the identification of site specific mitigation. Some of these studies are also linked to effects monitoring being conducted for the Wuskwatim transmission line project which currently intersects core caribou use areas within the Project Study Area. Initial indications of this effects monitoring to date have illustrated minimal to no effect on boreal woodland caribou range use and occupation."

Boreal Woodland Caribou Ranges

"… It is anticipated that many of the current range designations and boundaries may change with the development of the revised Manitoba Strategy anticipated in 2012. The results of recent Bipole III specific telemetry studies have provided a significant source of new information previously not available to Manitoba and Canada at the time of their respective recovery strategy development…

… From the Bipole III perspective, the main objectives of the targeted collaborative monitoring focused on obtaining data to more accurately describe local population ranges and their response to existing anthropogenic linear development. These data were strategically used in the SSEA process to select a route that minimized intersection with local populations, their calving and calf-rearing areas, core winter use areas, and/or other potential critical habitat. These data combined with historical knowledge and ATK gathered specifically for this project were utilized in evaluating alternate routes and selecting a Preliminary Preferred Route. Based on this new information, 11 potential local populations were identified within or intersecting the Project Study Area. The names and associated provincial and federal status of these are listed in Table 8.2-7…

… Of the 11 potential ranges, only three are traversed and include; the Wabowden, Reed Lake and The Bog ranges…

The Preliminary Preferred Route selection was considered to be the optimal route from a caribou perspective for all three ranges, due to the overall minimization of potential impact on boreal woodland caribou within the Project Study Area."

8.2.6.4 Environmental Effects Assessment and Mitigation 8-91

"…"

HVdc Transmission and ac Collector Lines

"The following subsections provide a summary of effects and mitigation recommendations for all VEC mammals potentially affected by the HVdc transmission and ac collector lines."

Coastal and Barren Ground Caribou

Construction and Operation

"The northern portion of the Project Study Area includes habitat that is occasionally occupied by the coastal and the Beverley-Qamanirijuaq barren-ground caribou. ATK information suggests that Pen Island caribou frequent the study area and that local woodland caribou are also present. The results of Bipole III specific studies indicate the sporadic presence of both Cape Churchill and Pen Island animals in the northern portion of the Project Study Area…

Due to the spatial and temporal variability in occurrence of these populations in the narrow northerly portion of the Project Study Area, there would be little useful purpose in choosing a different route…

… Sensory disturbance due to clearing and ongoing access of the right-of-way by construction crews during clearing and construction of the HVdc and converter station may result in short-term avoidance…

With the establishment of the HVdc right-of-way, there is potential for increased movement of grey wolves following construction… With increased access as a result of the HVdc, it is possible that there may be increased opportunity for hunting by humans…

… In order to address the various potential Project effects the following mitigation measures have been developed:

- Use along the right-of-way will be limited to reduce sensory disturbances and minimize functional habitat loss during caribou migration events which are infrequent and unpredictable.
- Existing satellite collared animals from the Cape Churchill and Pen Island herds will be monitored during construction. Aerial surveys will be conducted to verify numbers and concentrations of animals that may or may not migrate into construction areas. Manitoba Hydro will maintain access control onto the right-of-way and cooperate with Manitoba Conservation in measures that will protect excessive harvest in the area…
- Hunting by project personnel will be prohibited and firearms restricted in work camps and associated areas to minimize caribou mortality.

Based on the mitigation measures outlined here, the residual effects expected include potential increased harvest of animals on and along the new right-of-way as a result of improved local access, when and if significant migration events occur. These residual effects for coastal and barren ground caribou are characterized as negative in direction, small in magnitude, Local Study Area in geographic extent, medium term in duration, sporadic/intermittent in frequency, and reversible, and therefore considered not significant."

Boreal Woodland Caribou

Construction and Operation

"For boreal woodland caribou, the main Project environmental effects are primarily associated with construction and operation of the HVdc transmission line, and construction access.

…The following ecological and demographic considerations are relevant to the assessment of Project effects:

- **General:** Boreal woodland caribou are typically found in large, un-fragmented tracts of mature coniferous-dominated boreal forest with inherently low ecological diversity and low predator densities…
- **Predators:** Moose and deer are typically associated with disturbed forests… Woodland caribou are typically not associated with these early seral forests; their strategy to avoid predators results in their spacing away from the primary prey of wolves and black bear (*Ursus americanus*) (Bergerud *et al.* 1990).
- **Sustainability of a local population:** … Predation by wolves is typically the main cause of population decline… Black bears are also known to be a factor in limiting some ungulate populations through predation of calves (Boutin 1992; Ballard 1994).
- **Habitat not typically the limiting factor:** Although important factors in boreal woodland caribou distribution and abundance, habitat supply, quality and availability, are not typically considered as limiting factors in most boreal caribou populations in the boreal forest when predators are present…
- **Cumulative effect response to linear development:** Linear development as a cumulative pathway of decline is not clearly understood in the scientific literature and Manitoba Hydro is being proactive in its research and monitoring initiatives to gain insight into related potential effects…"

Residual Effects – Overview of Relevant Ranges

"Manitoba Hydro's SSEA process provided an opportunity for mitigating the majority of potential effects through the selection of the FPR away from high risk ranges and other local population core winter and summer ranges. In addition, the majority of the HVdc transmission line is routed in proximity to existing linear features… three of eleven occurring boreal woodland caribou ranges are potentially impacted by the FPR. These include the Bog Range, the Reed Lake Range and the Wabowden Range. The Bipole III Caribou Technical Report contains details regarding background and analysis regarding these three potentially affected caribou ranges."

The Wabowden Range

"… The FPR bisects, as opposed to intersects, core winter use area and known calving areas for the Wabowden range… Bisecting a presently unfragmented core winter use area in the Wabowden range…

increases the uncertainty for specialists in predicting the effects on caribou and the degree to which the herd in question can sustain itself.

- Of all boreal woodland caribou evaluation ranges, the Wabowden Range has the highest degree of existing fragmentation due to anthropogenic disturbance…. potential for increased predation…
- … habitats is not a limiting factor in sustaining boreal woodland caribou populations and, therefore, direct loss of habitat due to the right-of-way is not considered to be an issue for the Wabowden range…

Some level of sensory disturbance is expected but is anticipated to be minimal based on a preliminary assessment of individual caribou movement and range use from Bipole III and Wuskwatim monitoring."

The Reed Lake Range

"Direct loss of habitat is not considered to be a factor for the Reed Lake Range as habitat is not limiting in the Project Study Area… does not bisect any major core use area and avoids all known calving areas…."

The Bog Range

"The HVdc transmission line will largely skirt the edges of the Bog Range core use areas and will parallel an existing transmission line corridor where it bisects, for about four miles, a narrow strip of the range containing core use area and potential calving habitat…"

Summary of Residual Effects on Boreal Woodland Caribou

"Sensory disturbance due to clearing of and on-going access to the right-of-way by construction crews as the line is assembled may result in short-term avoidance and displacement for all three ranges… Boreal woodland caribou may be temporarily displaced due to disturbance and access if they are present during construction.

… Increased access increases the risk of poaching of animals during winter in their core use areas.

…There is also potential for increased movement of grey wolves along the right-of-way following construction for all three ranges…

The specific mitigation activities that will be implemented to address the potential effects are as follows:

- Timing of construction (winter) will mitigate sensory disturbance on females during calving and calf rearing in calving areas.
- Natural low tree cover in the Wabowden and Bog ranges will be maintained in core winter use areas and known and potential calving areas to maintain natural functional structure to encourage ongoing use by boreal woodland caribou…

- Maintenance of low tree cover and the development of natural vegetation corridors will also minimize predator flow through these critical habitats and discourage human use of the right-of-way for snowmobile travel and other uses…
- In the Wabowden range, robust and effective access control to the right-of-way from PTH #6 will be applied near core use areas. This will be based on site specific conditions and methods that halt or limit ATV and snowmobile traffic. Methods include gates (during construction) and the spreading of debris, ditching and trenching (post construction)…
- Future maintenance along the right-of-way during operations will involve helicopter access and minimize snow packing in the Wabowden Range. In other areas development of Manitoba Hydro snowpack trails will be limited in core winter areas to minimize potential predator effects into core areas and potential illegal hunting activities.
- Limiting recreational use and travel by ATVs and snowmobiles along the right-of-way in the core winter use areas and known potential calving areas…
- Ancillary access and other project footprints (staging areas) will be located to avoid core use areas and reduce potential disturbance, functional habitat loss, and temporary range fragmentation…
- Hunting by Project personnel will be prohibited and firearms use restricted in work camps and areas which will minimize mortality.
- Long term monitoring of the boreal caribou ranges intersected by the Project will continue and include population monitoring, and assessment of recruitment and mortality…
- Monitoring of wolves will be conducted in all boreal woodland caribou ranges intersecting the Project…
- Studies will be initiated on the effects of black bears and the potential effects of the right-of-way on bear activity and predation in calving areas near the right-of-way in the Wabowden range.

Subject to the successful implementation of the mitigation measures outlined above, the residual effects of the HVdc transmission line on boreal woodland caribou are sensory disturbance due to clearing and ongoing access, short-term avoidance and displacement during construction, the risk of an increase in illegal hunting due to additional access, the risk of an increase in the presence of wolves due to additional access, and increased presence of bears due to an increase in succulent biomass.

The residual effects of the HVdc transmission line on boreal woodland caribou in the Wawbowden, Reed Lake and Bog ranges after successful implementation of the mitigation measures outlined above are expected to be negative in direction, small in magnitude, Project Study Area in geographic extent, short term (construction) and medium term (operation) in duration, regular to continuous in frequency, reversible after Project decommissioning, and therefore not significant.

… Overall monitoring and adaptive management plans in each range will need to be reviewed and updated as required when the new federal and provincial recovery strategies and provincial assessments for each range are released in 2012."

Moose

Construction

"Transmission lines are expected to have little impact on habitat availability for moose. Potential effects to moose habitat were primarily mitigated during the routing and planning process of the Project. As a result, a relatively small amount (1.1 km2) of moose habitat is anticipated to be removed for the ac collector lines component of the Project, while it is anticipated that the transmission line right-of-way will intersect 253.6 km of moose habitat in the Project Study Area (Map 8-2). In addition, the Henday-Long Spruce, Keewatinoow construction power and northern electrode line 50 m rights-of-way are anticipated to intersect 3.1 km, 1.2 km and 0.1 km of moose habitat, respectively…"

Operation

"During Bipole III HVdc Transmission Line operations, local moose populations, movements and habitat area are anticipated to be affected by infrequent maintenance activities of the transmission line and right-of-way, including periodic inspections and vegetation maintenance using helicopters, machinery, vehicles, and people…

…The following mitigation measures will be applied to moose in the Local Study Area in addition to general mitigation measures:

- In the northern areas disturbances from construction activities will occur during winter which will avoid the sensitive parturition period near potential moose calving sites such as bogs and wetlands.
- Pre-construction surveys will be conducted to identify and locate mineral licks, and specific protection prescriptions developed based on site and environmental conditions.
- Hunting by Project personnel will be prohibited and firearms restricted in work camps and right-of-way access by hunters limited during construction to minimize moose mortality.

Summary Residual Effects

"The residual effects on moose from Project construction and operation include potential for: overharvest from increased access; sensory disturbance; some functional habitat loss; increased predation; and increased parasites and disease. The residual effects are characterized as negative in direction, small in magnitude, Local Study Area in geographic extent, medium term in duration (operation), regular/continuous in frequency, reversible and therefore considered not significant."

Elk

Construction

"Elk populations and habitat in southwestern and western Manitoba may be affected by the Bipole III HVdc transmission line construction. Potential effects from the ac collector line construction and operation are not expected because spatial overlap does not occur with elk distribution in the province. The main effect of the Project during construction is likely to be habitat alteration, although the potential effect on the local elk population is highly likely to be small because few elk are found in the Local Study Area (Map 8-3)…"

Operation

"During Bipole III HVdc transmission line operations local elk populations, movements and habitat would be affected by infrequent maintenance activities, including periodic inspections and vegetation maintenance using helicopters, machinery, vehicles, and people…"

Summary Residual Effects

"The residual effects on elk from Project construction and operation include potential for: overharvest from increased access; some functional habitat loss; fragmentation; sensory disturbance; increased transmission of disease and parasites; and increased predation. The residual effects are characterized as negative in direction, small in magnitude, Local Study Area in geographic extent, medium term in duration (operation), regular/continuous in frequency, reversible, and therefore considered not significant."

American Marten

Construction

"American marten habitat occurs regularly along the transmission line right-of-way. This species prefers mature conifer forest (Chapin *et al*. 1997) and due to this specific habitat preference, may experience stronger effects via habitat removal conducted during the Project lifespan than species with more general habitat requirements… It is anticipated that 2.2 km2 of a total of 436.7 km2 of marten habitat in the Local Study Area will be removed for the ac collector lines, while it is anticipated that the HVdc transmission line right-of-way will intersect 92.9 km of marten habitat in the Local Study Area (Map 8-4). It is anticipated that the Henday-Long Spruce right-of-way will intersect 1.6 km of marten habitat."

Operation

"Operation of the transmission lines is expected to have a negligible impact on marten populations. No additional habitat will be lost during operations; however, fragmentation may remain an issue…

…The following mitigation measures will address the majority of residual effects on American marten.

- Clearing of the right-of-way during winter months to lessen disturbance of female marten and their young."

Summary Residual Effects

"The residual effect on American marten from Project construction and operation is mainly short term displacement during construction; functional habitat loss; fragmentation; sensory disturbance; and increased mortality due to trapping. The residual effects are characterized as negative in direction, moderate in magnitude, Local Study Area in geographic extent, medium term in duration (operation), regular/continuous in frequency, reversible, and therefore considered not significant."

Beaver

Construction

“Beaver populations and habitat may be affected by Bipole III HVdc transmission line and ac collector line construction. The clearing of forested stands and construction of transmission lines will alter beaver habitat by reducing available material used in building lodges. These losses will only occur in the portion of the 79.7 km2 area to be altered through ac collector line construction where suitable riparian habitat and beavers are currently present (Map 8-5)…”

Operation

“Beaver populations and habitat may be affected through the operation and maintenance of the Bipole III HVdc transmission and ac collector lines… Mitigation measures developed for the protection and management of riparian and aquatic habitats, specifically use of buffers, will aid in the protection of beaver habitat… ”

Summary Residual Effects

“The residual effect on beaver from Project construction and operation is mainly decreased local beaver population and some sensory disturbance. The residual effects are characterized as negative in direction, small in magnitude, Project Site/Footprint area in geographic extent, medium term in duration (operation), sporadic/intermittent in frequency, reversible, and therefore considered not significant.”

Wolverine

Construction

“Based on aerial tracking, areas containing high wolverine densities were not located within the Project Study Area; thus the effects of the Project on wolverine populations are anticipated to be minimal…”

Summary Residual Effects

“The residual effects on wolverine from Project construction include potential for: sensory disturbance. The residual effects are characterized as negative in direction, small in magnitude, Project Site/Footprint assessment area in geographic extent, short term in duration, infrequent in frequency, reversible, and therefore considered not significant.

The residual effects for wolverine during Project operation include potential for overharvest through trapping and increased access and are characterized as negative in direction, small in magnitude, Local Study Area in geographic extent, medium term in duration, regular/continuous in frequency, reversible and therefore considered not significant.

In addition the residual effects on wolverine from Project operation include potential for sensory disturbance. The residual effects are characterized as negative in direction, small in magnitude, Project

Site/Footprint assessment area in geographic extent, medium term in duration, infrequent in frequency, reversible, and therefore considered not significant."

Sites Access Roads…

[MWL: These sections have very similar mitigation measures and residual effect as those outlined in HVdc Transmission and ac Collector Lines section. See: 8-109 to 8-114.]

Keewatinoow Converter Station and Area…

[MWL: These sections have very similar mitigation measures and residual effect as those outlined in HVdc Transmission and ac Collector Lines section. See: 8-115 to 8-121.]

Borrow and Excavation Sites…

[MWL: These sections have very similar mitigation measures and residual effect as those outlined in HVdc Transmission and ac Collector Lines section. See: 8-121 to 8-124.]

Riel Converter Station

"Based on analysis documented in the Bipole III Mammals Technical Report no effects are expected on VEC mammal species from construction or operation of the Riel Converter Station."

Ground Electrodes and Lines…

[MWL: These sections have very similar mitigation measures and residual effect as those outlined in HVdc Transmission and ac Collector Lines section. See 8-124 to 8-127.]

8.2.6.5 Summary of Residual Environmental Effects and Significance 8-127

"… Potential changes in the distribution and abundance of species due to the development of the Project and ongoing maintenance may include the following:

- Loss or alteration of habitat associated with the placement of permanent structures such as the transmission line, converter stations, substations, etc.;
- Loss or alteration of habitat associated with facilitating the development of permanent structures associated with Bipole III development i.e. roads, work camps, etc.;
- Displacement of species through mechanized processes deterring species use of particular areas during initial Bipole III construction and ongoing maintenance;
- Increased predator and human movements across the landscape as a result of the maintenance of the cleared Bipole III rights-of-way creating accessible linear features; and
- Additional fragmentation/reduction of connectivity in potentially high use habitat areas.

… While most mammal species will be affected by the Project, these effects are typically minimal in scope. In the case of boreal woodland caribou, the FPR does intersect three boreal woodland caribou ranges. Boreal woodland caribou (listed at Medium Risk in two ranges and Low Risk in the third range) will be negatively affected by the HVdc transmission line. A number of core winter use and summer calving and calf rearing areas in the Wabowden range are being traversed and in most areas the potential effects from construction in these areas is expected to be low. However the potential of long term residual impacts are not certain and will require ongoing monitoring and adaptive management which is described in the Bipole III Caribou Technical Report.

The following is a summary of the residual effects for the mammal VECs (see Table 8.2-8)."

Coastal and Barren Ground Caribou

"Residual effects associated with the construction and operation of the HVdc line are expected after proposed mitigation to be not significant. However there is potential for periodic major migrations of caribou into the Project Study Area which could result in significant mortality events from excessive hunting. There are no significant residual effects expected on migratory or coastal caribou populations. Given the small area required for the construction and operation of the converter station and northern ground electrode, there are no expected residual effects."

Boreal Woodland Caribou

"Residual effects of the HVdc transmission line on boreal woodland caribou in the Wawbowden, Reed Lake and Bog ranges after successful implementation of the proposed mitigation measures are expected to be not significant. The expected residual effects relate primarily to potential increase in predation rates, especially in areas where the HVdc line bisects or intersects known core winter use areas and known calving areas. Compared to the Wabowden range, the Reed Lake and the Bog range are less susceptible to predicted effects due to the location of the HVdc line in relation to core winter and summer use areas. There is scientific uncertainty regarding the residual effects resulting from the Project's linear development and how this contributes to the overall cumulative effects from other disturbance within ranges, and there is concern regarding a risk of unsustainable losses in the population (particularly in the Wabowden range) from the incremental effects of the Project due to the risk of increased predation, increased hunting and increased presence of bears. The nature of effects will be monitored and adaptive management (including integrated management solutions) applied as required in the Wabowden range (and potentially in the Bog range)."

Beaver, Marten and Wolverine

"Overall, the Project is expected to have minimal to no residual effects on beaver, marten and Wolverine in the Project Study Area."

Moose and Elk

"Residual effects associated with moose and elk are not significant. There will be short term displacement during construction of the HVdc transmission line (moose and elk), Keewatinoow Converter Station and the northern ground electrode (moose). Given the small area required for construction and operation of the converter station and northern ground electrode, there are no expected residual effects. Habitat availability will not be affected for these species; however increased mortality may result from improved hunter access in some northern areas. The majority of effects were managed and mitigated through routing that avoided important moose and elk areas."

8.2.6.6 Follow up and Monitoring 8-132

"… Monitoring of caribou populations will be on-going. Collaborative research and monitoring is being undertaken between Manitoba Hydro, Manitoba Conservation and the University of Manitoba. Monitoring and research include on-going collaring of caribou and wolves and specific research assessing caribou persistence in relation to linear development. Monitoring of caribou populations will be on- going, with the purpose of assessing the effects of linear features on caribou populations and caribou use of habitat. Monitoring and analysis of caribou recruitment and mortality in relation to various disturbance/range regimes is being undertaken."

8.2.7 Birds and Habitat 8-132

8.2.7.1 Overview 8-132

"… of the approximately 400 bird species found in Manitoba, 371 have been identified as having ranges within the Project Study Area with 218 being seasonal breeders; some of which have precise breeding habitat requirements. Fourteen of these 218 species are listed under *The Endangered Species Act* of Manitoba (MESA) or the federal *Species at Risk Act* (SARA)…"

8.2.7.2 Potential Effects and Key Topics 8-133

"…The Potential Effects and Key Topics of Project-related effects on bird are as follows:

Mortality

- Due to collisions with vehicles or machinery, and collisions with transmission wires;
- Of waterfowl, other waterbirds, and upland game birds due to hunting;
- Mortality or nest loss due to construction or maintenance during the spring nesting season; and
- Increased susceptibility to brood (nest) parasitism and/or terrestrial predators.

Habitat Alteration

- Loss or alteration on Project rights-of-way and component footprints.

Sensory Disturbance

- And/or habitat avoidance due to clearing or maintenance activities; and
- Disruption of daily movements due to the physical presence of humans, machinery, or Project structures."

8.2.7.3 Valued Environmental Components 8-137

"VECs focused on federal and provincially listed species at risk, waterfowl and other waterbirds, colonial waterbirds, upland game birds, birds of prey, and woodpeckers…

… A large number of bird VECs were selected due to the large Project Study Area and resultant diversity of bird species using different habitats. However, due to the nature of the Project (primarily a long transmission line), many of the VECs are susceptible to similar Project effects and/or mitigation measures. Therefore, in order to reduce redundancy the VEC information is summarized by broader environmental group (e.g., waterfowl and waterbirds) and type of effects (e.g., mortality).

Bird VECs are organized into the following groups:

- Waterfowl and waterbirds - mallard, sandhill crane, yellow rail;
- Colonial waterbirds – great blue heron, least bittern;
- Birds of prey – bald eagle, ferruginous hawk, burrowing owl, short-eared owl;
- Upland game birds – sharp-tailed grouse, ruffed grouse;
- Woodpeckers – pileated woodpecker, red-headed woodpecker; and
- Songbirds and other birds – common nighthawk, olive-sided flycatcher, loggerhead shrike, Sprague's pipit, golden-winged warbler, Canada warbler, rusty blackbird."

8.2.7.4 Environmental Effects Assessment and Mitigation 8-138

"This section describes the effects and mitigation for each VEC for each Project component. During the route selection process three route alternatives with a number of interconnections were assessed in order to determine which alternative would have the fewest effects on bird populations and their habitats (see Chapter 7). This included the selection of a route that avoided wildlife management areas, ecological reserves, provincial parks, provincial forests, Ducks Unlimited hotspots, Important Bird Areas, and areas with high paired density values, where possible. Where it was not possible to avoid these features (e.g., Important Bird Area located near The Pas) routes were selected to minimize potential effects on bird populations, by following pre-existing linear features or developments wherever possible…"

HVdc Transmission and ac Collector Lines

Waterfowl and Waterbird VECs (Mallard, Sandhill Crane and Yellow Rail)

Construction
"…"
Mitigation

"The following mitigation measures are proposed to minimize and mitigate effects of the HVdc transmission and ac collector lines on waterfowl and waterbirds during the clearing and construction phase. Additional measures are included for the yellow rail, a species at risk:

- Hunting and harvesting of wildlife by Project staff will be limited while working on Project sites and restrict firearms at construction sites, minimizing the potential effect of harvesting on mallard mortality;
- Project activities during bird breeding and brood rearing months will be restricted from April 1 to July 31, to reduce the risk of nest destruction and sensory disturbance;
- Searches for yellow rail nests will be undertaken prior to spring or summer construction if the timing of construction activity overlaps with sensitive time periods;
- Setback distances will be applied for yellow rail nesting if the timing of construction activity overlaps with sensitive time periods (the recommended setback distance for yellow rail is 350 m and is to be applied to construction zones in southern Manitoba if they intersect with species at risk habitats and active breeding areas); and

- Vegetated buffers will be maintained in riparian areas to minimize the effect of habitat alteration on waterfowl and waterbirds.

Based on the above mitigation measures, residual effects on mallard, sandhill crane and yellow rail during construction are characterized as negative in direction, small magnitude, limited to the Local Study Area, short-term in duration, regular/continuous in frequency, and reversible, and therefore considered not significant."

Operation

…

Mitigation

"The following mitigation measures are proposed to minimize and mitigate Project related effects on waterfowl and waterbirds during the operation phase:

- Access trails associated with the rights-of-way will be decommissioned to reduce access to the area by hunters and decrease the local harvest of waterfowl and other waterbirds;
- Shrubby vegetation will be maintained on the rights-of-way where possible to impede transportation via ATV and some foot traffic, to reduce access to the area and to reduce sensory disturbances arising from recreational use;
- Bird diverters will be placed at environmental sensitive sites such as wetlands (see Bipole III Birds Technical Report Section 6.2.3), to reduce the potential for collisions with wires;
- Vegetation management activities will be avoided near wetlands from April 1 to July 31 on the length of the right-of-way, to prevent nest disturbance or abandonment;
- Searches for yellow rail nests will be undertaken prior to spring or summer vegetation management if the timing of maintenance activity overlaps with sensitive time periods and locations; and
- Setback distances (as per Construction section) will be applied if the timing of vegetation management overlaps with sensitive time periods.

Based on the above mitigation measures, residual effects on mallard, sandhill crane and yellow rail during operation are characterized as negative in direction, small magnitude, limited to the Local Study Area, medium-term in duration, sporadic/intermittent in frequency, and reversible, and therefore considered not significant."

Colonial Waterbird VECs (Great Blue Heron and Least Bittern)

Construction

"**…**"

Mitigation

"The following mitigation measures are proposed to minimize and mitigate effects of the HVdc transmission and ac collector lines on colonial waterbirds during the clearing and construction phase. Additional measures are developed for least bittern, a species at risk:

- Project activities will be restricted during bird breeding and brood rearing months from April 1 to July 31 to reduce the risk of nest destruction and sensory disturbance;
- Vegetated buffers will be maintained in riparian areas to minimize the effect of habitat alteration on colonial waterbirds;

- Buffers within a 200 m radius of heron colonies will be maintained from April 1 to July 31 to protect from sensory disturbance during the breeding season;
- Buffers within a 100 m radius of heron colonies will be maintained from August 1 to March 31 to protect nest trees and maintain the integrity of nesting sites;
- Searches for least bittern nests will be undertaken prior to spring or summer construction if the timing of construction activity overlaps with sensitive time periods; and
- Setback distances for least bittern will be applied if the timing of construction activity overlaps with sensitive time periods (the recommended setback distance for least bittern is 400 m and is to be applied to construction zones in southern Manitoba if they intersect with species at risk habitats and active breeding areas).

Based on the above mitigation measures, residual effects on great blue heron and least bittern during construction are characterized as negative in direction, small magnitude, limited to the Local Study Area, short-term in duration, regular/continuous in frequency, and reversible, and therefore considered not significant."

Operation

"…"
Mitigation

"The following mitigation measures are proposed to minimize and mitigate effects of the transmission and ac collector lines on colonial waterbirds during the operation phase:

- Bird diverters will be placed at environmental sensitive sites such as wetlands (see Bipole III Birds Technical Report Section 6.2.3) to reduce the potential for collisions with wires;
- Vegetation management will be limited in areas where least bittern could occur from April 1 to July 31to minimize the risk of nest destruction and sensory disturbance during the nesting season (see Bipole III Birds Technical Report for potential habitat and locations);
- Colonies or other groups of birds will be avoided during helicopter use for line maintenance (AltaLink Management Ltd. 2006);
- Shrubby vegetation will be maintained on the rights-of-way where possible to impede transportation via snowmobiles, ATV and some foot traffic, to reduce access to the area and reduce sensory disturbances arising from recreational use;
- Searches for least bittern nests will be undertaken prior to spring or summer vegetation management if the timing of maintenance activity overlaps with sensitive time periods and locations; and
- · Setback distances for least bittern (see Construction section) will be applied if the timing of vegetation management overlaps with sensitive time periods.

Based on the above mitigation measures, residual effects on great blue heron and least bittern during operation are characterized as negative in direction, small magnitude, limited to the Local Study Area, medium-term in duration, sporadic/intermittent in frequency, and reversible, and therefore considered not significant."

Birds of Prey VECs (Bald Eagle, Ferruginous Hawk, Burrowing Owl and Shorteared Owl)

Construction

"…"

Mitigation

"The following mitigation measures are proposed to minimize and mitigate effects of the HVdc transmission and ac collector lines on birds of prey during the clearing and construction phase:

- Trees containing large stick nests will be left undisturbed until unoccupied to minimize mortality due to nest destruction during the nesting season, particularly when clearing the south-western portion of the right-of-way to avoid disturbing ferruginous hawk nests;
- Artificial structures will be provided for nesting if unoccupied nests must be removed to reduce the loss of nesting habitat (i.e., but only if the raptor nest is not located adjacent to a sensitive site e.g., sharp-tailed grouse lek or species at risk habitat);
- Buffers within a 200 m radius of eagle and osprey nests will be maintained from April 1 to July 31 to protect from sensory disturbance during the breeding season;
- Buffers will be maintained within a 100 m radius of eagle and osprey nests from August 1 to March 31 to protect nest trees and maintain the integrity of nesting sites;
- Project activities during bird breeding and brood rearing will be restricted from April 1 to July 31 to reduce the risk of nest destruction and sensory disturbance;
- Searches for ferruginous hawk, burrowing owl and short-eared owl nests will be undertaken prior to spring or summer construction if the timing of construction activity overlaps with sensitive time periods;
- Setback distances for species at risk will be applied if the timing of construction activity overlaps with sensitive time periods (the recommended setback distance ferruginous hawk is 1,000 m, and is 500 m for burrowing owl and short-eared owl is and is to be applied to construction zones in southern Manitoba if they intersect with species at risk habitats and active breeding areas);
- Construction activity will be prohibited within 1,000 m of ferruginous hawk nests for 45 days following hatching of young to minimize disturbance (Environment Canada 2009); and
- Buffers will be maintained within a 100 m radius of large stick nests from August 1 to March 31 to protect nest trees and maintain the integrity of nesting sites.

Based on the above mitigation measures, residual effects on bald eagle, ferruginous hawk, burrowing owl, and short-eared owl during construction are characterized as negative in direction, small magnitude, limited to the Local Study Area, short-term in duration, regular/continuous in frequency, and reversible, and therefore considered not significant."

Operation
"…"
Mitigation

"The following mitigation measures are proposed to minimize and mitigate Project related effects on birds of prey during the operation phase:

- Vegetation management activities will be avoided near large stick nests from April 1 to July 31 to prevent nest disturbance or abandonment during the nesting season (see Bipole III Birds Technical Report for potential habitat and locations);
- Buffers will be maintained within a 50 m radius of active large stick nests when discovered;
- Bird diverters will be placed at ESSs such as the Red River crossing (see Bipole III Birds Technical Report Section 6.2.3) to reduce the potential for collisions with wires;
- Perch deterrents such as porcupine wire or triangles will be installed where raptor perching and nesting are problematic to discourage such activity, reducing the small chance of electrocution and possibly the need for removing nests;
- Artificial nest structures will be installed in adjacent habitats where nests on transmission towers are removed, to reduce loss of nesting habitat (i.e., but only if the raptor nest is not located adjacent to a sensitive site e.g., sharp-tailed grouse lek or species at risk habitat);
- Shrubby vegetation will be maintained on the rights-of-way where possible to impede transportation via snowmobile and ATV and some foot traffic to reduce sensory disturbances arising from recreational use;
- Searches for ferruginous hawk, burrowing owl and short-eared owl nests will be undertaken prior to spring or summer vegetation management if the timing of maintenance activity overlaps with sensitive time periods and locations;
- Setback distances for ferruginous hawk, burrowing owl, and short-eared owl (see Construction section) will be applied if the timing of vegetation management overlaps with sensitive time periods; and
- Maintenance activity will be prohibited within 1,000 m of ferruginous hawk nests for 45 days following hatching of young to minimize disturbance (Environment Canada 2009).

Based on the above mitigation measures, residual effects on bald eagle, ferruginous hawk, burrowing owl, and short-eared owl during operation are characterized as negative in direction, small magnitude, limited to the Local Study Area, medium-term in duration, sporadic/intermittent in frequency, and reversible, and therefore considered not significant."

Upland Game Bird VECs (Sharp-tailed Grouse and Ruffed Grouse)

Construction
"…"
Mitigation

"The following mitigation measures are proposed to minimize and mitigate effects of the HVdc transmission and ac collector lines on sharp-tailed and ruffed grouse during the clearing and construction phase:

- Project activities during bird breeding and brood rearing months will be restricted from April 1 to July 31 to reduce the risk of nest destruction and sensory disturbance;
- Hunting and harvesting of wildlife by Project staff will be limited while working on Project sites and restrict firearms at construction sites to minimize the effect of harvesting on upland game bird mortality; and
- Setback distances will be applied around sharp-tailed grouse leks if discovered and if the timing of construction activity overlaps with sensitive time periods.

Based on the above mitigation measures, residual effects on sharp-tailed grouse and ruffled grouse during construction are characterized as negative in direction, small magnitude, limited to the Local Study Area, short-term in duration, regular/continuous in frequency, and reversible, and therefore considered not significant."

Operation

"…"
Mitigation

"The following mitigation measures are proposed to minimize and mitigate effects of the transmission and ac collector lines on sharp-tailed and ruffed grouse during the operation phase:

- Access trails associated with the rights-of-way will be decommissioned to reduce access to the area by hunters and to decrease the local harvest of upland game birds;
- Shrubby vegetation on the rights-of-way will be maintained where possible to impede transportation via snowmobile, ATV and some foot traffic to reduce access to the area by hunters and decrease the local harvest of and sensory disturbance to sharp-tailed and ruffed grouse;
- Bird diverters will be placed at environmental sensitive sites such as sharp-tailed grouse leks (see Bipole III Birds Technical Report Section 6.2.3), to reduce the potential for collisions with wires; and
- Perch deterrents such as porcupine wire or triangles on transmission towers will be installed near sharp-tailed grouse leks to reduce predation on sharp-tailed grouse by raptors.

Based on the above mitigation measures, residual effects on sharp-tailed grouse and ruffled grouse during operation are characterized as negative in direction, small magnitude, limited to the Local Study Area, medium-term in duration, sporadic/intermittent in frequency, and reversible, and therefore considered not significant."

Woodpecker VECs (Pileated Woodpecker and Red-headed Woodpecker)"

Construction
"…"
Mitigation

"The following mitigation measures are proposed to minimize and mitigate effects of the HVdc transmission and ac collector lines on woodpeckers during the clearing and construction phase. Additional measures are provided for red-headed woodpecker, a species at risk.

Project activities during bird breeding and brood rearing months will be restricted from April 1 to July 31 to reduce the risk of nest destruction and sensory disturbance;

- Dead standing trees will be retained where possible;
- To reduce the loss of woodpecker nesting habitat;
- Danger trees near the rights-of-way will be topped, rather than removed, to reduce the loss of adjacent woodpecker nesting habitat;
- Clearing of trees with roost cavities will be limited to daylight hours, and preferably in fall, to minimize disruption of resident woodpeckers and retain shelter and nesting sites;

- Searches for red-headed woodpecker nests will be undertaken prior to spring or summer construction if the timing of construction activity overlaps with sensitive time periods; and
- Setback distances will be applied if the timing of construction activity overlaps with sensitive time periods (the recommended setback distance for red-headed woodpecker is 200 m and is to be applied to construction zones in southern Manitoba if they intersect with species at risk habitats and active breeding areas).

Based on the above mitigation measures, residual effects on pileated woodpecker and red-headed woodpecker during construction are characterized as negative in direction, small magnitude, limited to the Local Study Area, short-term in duration, regular/continuous in frequency, and reversible, and therefore considered not significant."

Operation

"…"

Mitigation

"The following mitigation measures are proposed to minimize and mitigate effects of the transmission and ac collector lines on woodpeckers during the operation phase:

- Vegetation management will be limited in areas where red-headed woodpecker could occur from April 1 to July 31 to minimize the risk of nest destruction and sensory disturbance during the nesting season (see Bipole III Birds Technical Report for potential habitat and locations);
- Where feasible, danger trees near the rights-of-way topped, rather than removed, to reduce the potential loss of adjacent woodpecker nesting habitat;
- Removal of danger trees with roost cavities will be limited to daylight hours, to minimize disruption of resident woodpeckers and retain shelter and nesting sites;
- Removal of danger trees near the right-of-way will be prohibited during the spring nesting period to minimize nest destruction and sensory disturbance during the nesting season;
- Shrubby vegetation will be maintained on the rights-of-way where possible to impede transportation via snowmobile and ATV, and some foot traffic, to reduce sensory disturbances arising from recreational use;
- Searches for red-headed woodpecker nests will be undertaken prior to spring or summer vegetation management if the timing of maintenance activity overlaps with sensitive time periods and locations; and
- Setback distances for red-headed woodpeckers (see Construction section) will be applied if the timing of vegetation management overlaps with sensitive time periods.

Based on the above mitigation measures, residual effects on pileated woodpeckers and red-headed woodpeckers during operation are characterized as negative in direction, small magnitude, limited to the Local Study Area, medium-term in duration, sporadic/intermittent in frequency, and reversible, and therefore considered not significant."

Songbirds and Other Bird VECs (Common Nighthawk, Whip-poor-will, Olivesided Flycatcher, Loggerhead Shrike, Sprague's Pipit, Golden-winged Warbler, Canada Warbler and Rusty Blackbird)

Construction

"…"
Mitigation

"The following mitigation measures are proposed to minimize and mitigate effects of the HVdc transmission and ac collector lines during the clearing and construction phase, with additional measures for species at risk:

- Project activities during bird breeding and brood rearing months will be restricted from April 1 to July 31, to reduce the risk of nest destruction and sensory disturbance;
- Searches for nests will be undertaken prior to spring or summer construction if the timing of construction activity overlaps with sensitive time periods;
- Setback distances will be applied if the timing of construction activity overlaps with sensitive time periods (the recommended setback distance is 200 m for common nighthawk and whip-poor-will, 300 m for olive-sided flycatcher and Canada warbler, 400 m for loggerhead shrike, 250 m Sprague's pipit, 300m for golden winged warbler, and 100 m for rusty blackbirds), and is to be applied to construction zones in southern Manitoba if they intersect with species at risk habitats and active breeding areas; and
- Night-time activities will be avoided during the nesting season to minimize disturbance to common nighthawk and whip-poor-will.

Based on the above mitigation measures, residual effects on common nighthawk, whippoor- will, olive-sided flycatcher, loggerhead shrike, Sprague's pipit, golden-winged warbler, Canada warbler and rusty blackbird during construction are characterized as negative in direction, small magnitude, limited to the Local Study Area, short-term in duration, regular/continuous in frequency, and reversible, and therefore considered not significant."

Operation

"…"
Mitigation

"The following mitigation measures are proposed minimize and mitigate effects of the transmission and ac collector lines on species at risk during the operation phase:

- Shrubby vegetation will be maintained on the rights-of-way where possible to impede transportation via ATV and some foot traffic, to minimize access to the area and to reduce sensory disturbance (see Bipole III Birds Technical Report for potential habitat and locations);
- Shrubby vegetation will be maintained on the right-of-way where possible as potential olive-sided flycatcher and Canada warbler habitat;
- Vegetation management will be limited in areas where common nighthawk, whippoor-will could occur from April 1 to July 31 to minimize the risk of nest destruction and sensory disturbance during the nesting season (see Bipole III Birds Technical Report for potential habitat and locations);

- Searches for nests will be undertaken prior to spring or summer vegetation management if the timing of maintenance activity overlaps with sensitive time periods and locations;
- Setback distances (see Construction section) will be applied if the timing of vegetation management overlaps with sensitive time periods;
- Night-time maintenance activities will be avoided in species at risk habitats during the nesting season to minimize disturbance to common nighthawk; and
- Where feasible, maintain golden-winged warbler habitat by selective basal spraying (Askins 1994) for vegetation management on the southern portion of the right-of-way.

Based on the above mitigation measures, residual effects on common nighthawk, whippoor- will, olive-sided flycatcher, loggerhead shrike, Sprague's pipit, golden-winged warbler, Canada warbler and rusty blackbird during operation are characterized as negative in direction, small magnitude, limited to the Local Study Area, medium-term in duration, sporadic/intermittent in frequency, and reversible, and therefore considered not significant."

Keewatinoow Converter Station and Area

Waterfowl and Waterbirds VECs (Mallard, Sandhill Crane and Yellow Rail)

Construction

"Project-related effects on mallard mortality, sensory disturbance, and disruption of movements during construction of the Keewatinoow Converter Station will be similar to those on the rights-of-way. It is estimated that less than 0.01% of the existing mallard habitat … [and] less than 0.01% of sandhill crane habitat will be lost from the clearing and construction of the Keewatinoow Converter Station. …sewage lagoon in proximity to Keewatinoow Converter Station … is expected to temporarily increase a small amount of mallard habitat. There is no mitigation required for habitat loss at the converter station. Mitigation measures for clearing and construction of the Keewatinoow Converter Station are as follows:

- Hunting and harvesting of wildlife by Project staff will be limited … restrict firearms at construction sites…;
- Project clearing activities during bird breeding and brood rearing months will be restricted from April 1 to July 31, …; and
- Vegetated buffers will be maintained in riparian areas to minimize the effect of habitat alteration.

… residual effects on mallard and sandhill crane during construction are characterized as negative in direction, small magnitude, limited to the Local Study Area, short-term in duration, regular/continuous in frequency, and reversible, and therefore are not considered significant."

Operation

"Sensory disturbances from the operation of the Keewatinoow Converter Station may occur year round and consequently may affect the breeding, nesting, and daily movements of mallards and sandhill cranes. Although highly unlikely, increased birdwire collisions may result in a few mallard mortalities. No mitigation measures are proposed. Following the decommissioning of the sewage lagoon in proximity to Keewatinoow Converter Station for the construction camp, it is expected that this temporary waterfowl habitat will be lost. No direct Project-related effects on yellow rail are anticipated, as no habitat for this VEC has been identified in the vicinity of the Keewatinoow Converter Station. Residual effects on mallard and sandhill crane are during operation are characterized as negative in direction, small magnitude, limited to the Local Study Area, medium-term in duration, sporadic/intermittent in frequency, and reversible, and therefore are not considered significant."

Colonial waterbirds (Great Blue Heron and Least Bittern)

"No direct Project-related effects on great blue heron are anticipated, as limited habitat for this VEC has been identified in the vicinity of the Keewatinoow Converter Station. No direct Project-related effects on least bittern are anticipated, as the Keewatinoow Converter Station is beyond the northern extent of this species' range."

Birds of Prey VECs (Bald Eagle, Ferruginous Hawk, Burrowing Owl and Shorteared Owl)

Construction

"Project-related effects on bird of prey mortality, sensory disturbance, and disruption of movements during construction of the Keewatinoow Converter Station will be similar to those on the right-of-way. There is no bald eagle habitat at the Keewatinoow converter station site.

No direct Project-related effects on ferruginous hawk and burrowing owl are anticipated, as the Keewatinoow Converter Station is beyond the northern extent of these species' ranges. No direct Project-related effects on short-eared owl are anticipated, as no habitat for this VEC has been identified in the vicinity of the Keewatinoow Converter Station. …."

Operation

"Sensory disturbances from the operation of the Keewatinoow Converter Station may occur year round and consequently may affect the breeding, nesting, and daily movements of birds of prey. No mitigation measures are proposed. … Residual effects on bald eagle during operation are characterized as negative in direction, small magnitude, limited to the Local Study Area, medium-term in duration, sporadic/intermittent in frequency, and reversible, and therefore are not considered significant."

Upland Game Bird VECs (Sharp-tailed Grouse and Ruffed Grouse)

Construction

"Project-related effects on sharp-tailed grouse … similar to those on the rights-of-way. It is estimated that less than 0.08% of sharptailed grouse habitat will be lost from the clearing and construction of the Keewatinoow Converter Station.

No direct Project-related effects on ruffed grouse are anticipated, as limited habitat for this VEC has been identified in the vicinity of the Keewatinoow Converter Station.

… residual effects on sharp-tailed grouse during construction are characterized as negative in direction, small magnitude, limited to the Local Study Area, short-term in duration, regular/continuous in frequency, and reversible, and therefore are not considered significant."

Operation

"Sensory disturbances from the operation of the Keewatinoow Converter Station may occur year round and consequently may affect the breeding, nesting, and daily movements of sharp-tailed grouse. No mitigation measures are proposed.

No direct Project-related effects are anticipated for ruffed grouse, as limited habitat is available in the vicinity of the Keewatinoow Converter Station. …."

Woodpecker VECs (Pileated Woodpecker and Red-headed Woodpecker)

"No direct Project-related effects on pileated woodpecker are anticipated, as limited habitat for this VEC has been identified in the vicinity of the Keewatinoow Converter Station. No direct Project-related effects on red-headed woodpecker are anticipated, as the Keewatinoow converter station is beyond the northern extent of this species' range."

Songbirds and Other Bird VECs (Common Nighthawk, Whip-poor-will, Olivesided Flycatcher, Loggerhead Shrike, Sprague's Pipit, Golden-winged Warbler, Canada Warbler and Rusty Blackbird)

Construction

"Project-related effects on common nighthawk, olive-sided flycatcher, and rusty blackbird, in terms of mortality, sensory disturbance, and disruption of movements during construction of the Keewatinoow Converter Station will be similar to those on the rights-of-way. … less than 0.03% of common nighthawk habitat [,] … less than 0.02% of olive-sided flycatcher habitat [and] … less than 0.04% of rusty blackbird habitat will be lost from the clearing and construction of the Keewatinoow Converter Station.

No direct Project-related effects on loggerhead shrike, Sprague's pipit, golden-winged warbler, and Canada warbler are anticipated, as the Keewatinoow Converter Station is beyond the northern extent of these species' ranges.

There is no mitigation required for habitat loss at the converter station. Mitigation measures for clearing and construction of the Keewatinoow Converter Station are as follows:

- Project clearing activities during bird breeding and brood rearing months will be restricted from April 1 to July 31, to reduce the risk of nest destruction and sensory disturbance.

… residual effects on common nighthawk, olivesided flycatcher and rusty blackbird during construction are characterized as negative in direction, small magnitude, limited to the Local Study Area, short-term in duration, regular/continuous in frequency, and reversible, and therefore are not considered significant."

Operation

"Sensory disturbances from the operation of the Keewatinoow Converter Station may occur year round and consequently may affect the breeding, nesting, and daily movements. No mitigation measures are proposed. Residual effects from operation on common nighthawk, olive-sided flycatcher, and rusty blackbird during operation are characterized as negative in direction, small magnitude, limited to the Local Study Area, medium-term in duration, sporadic/intermittent in frequency, and reversible, and therefore are not considered significant"

Borrow Sites, Excavated Material Disposal Area and General Borrow Areas

Construction

"Effects of clearing and construction of the borrow sites and excavated material disposal areas and general borrow areas on VECs are expected to be the similar as for the Keewatinoow Converter Station, with the exception of the degree of habitat alteration, as the area affected by the borrow sites and excavated material disposal areas and general borrow areas could be much larger."

Riel Converter Station…

Construction

"Effects of clearing and construction of the borrow sites and excavated material disposal areas and general borrow areas on VECs are expected to be the similar as for the Keewatinoow Converter Station, with the exception of the degree of habitat alteration, as the area affected by the borrow sites and excavated material disposal areas and general borrow areas could be much larger. The Bipole III Birds Technical Report documents an analysis of potential borrow sites and excavated material replacement areas, … In general, the largest borrow sites were found to have the greatest potential for habitat effects and borrow sites that intersect creeks are potentially at a higher risk for project related effects due to the higher degree of bird diversity associated with riparian zones. In addition, the larger excavated material disposal areas were found to have the greatest potential for habitat effects. … Sensory disturbance is expected to have a greater effect at the Keewatinoow Converter Station due to blasting. Mitigation measures proposed for the Keewatinoow Converter Station should be followed. …residual effects … characterized as negative in direction, small magnitude, limited to the Local Study Area, short-term in duration, regular/continuous in frequency, is and therefore are not considered significant."

Operation

"… includes site rehabilitation. Selection, development and reclamation of new borrow sites will be undertaken in accordance with provincial … exposed soils will be reclaimed by promoting re-growth of native vegetation and other mitigation measures … There is however, a moderate level of uncertainty as to the timing of borrow site rehabilitation due to the potential need for the construction of Conawapa generating station if it is approved …habitat alteration or fragmentation effects may result in small but long term changes to the local bird community where habitat has been altered."

Ground Electrodes and Lines

8.2.7.5 Summary of Residual Environmental Effects and Significance 8-177

"Potential residual effects from the Project include the following:

- Small increase in mortality to some bird populations in the local study area from increased predation, hunting, and/or bird-wire collisions;
- Small decrease in productivity to some local bird populations due to brood parasitism by brown-headed cowbird and possibly by opportunistic invasive species such as blue jay and American crow, which are known to occasionally consume eggs or young;
- Small alteration of habitat and its use by birds along the right-of-way and the electrode sites, and a small loss of habitat at the base of towers, and at the Keewatinoow and Riel converter stations;
- Small increases to nesting and foraging opportunities for some bird species, and small decreases of nesting and foraging opportunities for other bird species;
- Sensory disturbances resulting in temporary displacement into alternate habitats for local birds; and
- Small decrease in local movements of some bird species across the right-of-way mainly along the ac collector lines rights-of-way, and limited to the breeding season.

… residual effects are largely reversible based on decommissioning of Project components. … loss of many individual birds could potentially have an irreversible effect on local populations during construction and operation. However, mortality of a few individuals as may be anticipated from the proposed project will result in negligibly reduced local populations. With the implementation of federal recovery strategies, these potential effects are considered reversible and will likely fall within the range of natural variability.

… A summary of the residual effects of the Bipole III Project are outlined in Table 8.2-9, which indicates the significance of residual effects on bird groups based on specific Project components. … In addition, species at risk found along the Project route were also considered based on potential residual effects. After mitigation, the Project is expected to have no significant adverse residual effects on bird populations or their habitats."

8.2.7.6 Follow-up 8-183

"In order to determine the long-term effects of the Project on birds, the effectiveness of mitigation measures, and where there is higher uncertainty in predicting Project effects, follow-up monitoring will be required. Recommended follow-up includes monitoring of listed species populations, assessment of bird-wire collisions, evaluations of the persistence of sharp-tailed grouse leks, and monitoring of previously identified bird colonies in proximity to the right-of-way.

…Pre-project monitoring surveys and nest searches are required in areas where summer construction is anticipated. Evaluation of the effectiveness of buffer zones and set-back distances for listed species will be assessed where construction occurs during the nesting season…

…there is a paucity of data for Manitoba, and as there is some level of uncertainty with the effects predictions…"

8.2.8 Amphibians and Reptiles 8-185
8.2.8.1 Overview 8-185

General

"… In general, several issues may contribute to declines of amphibian and reptile species. For species at risk, habitat loss or alteration is one of the biggest concerns, resulting in fragmentation and changes in microclimate…"

Amphibian and Reptile Groups

"There are 15 amphibian species with distributions within Manitoba. Of these, 12 have ranges overlapping or in close proximity to the Project Study Area. The COSEWIC lists two Manitoba amphibian species as being at-risk, one of which can be found in the Project Study Area. The northern leopard frog is listed by COSEWIC as a species of special concern. It is not listed under the MESA. Additionally, the plains spadefoot is found within the Study Area and is listed as protected under Division 6 of *The Manitoba Wildlife Act*. It is not listed under COSEWIC or MESA. In addition to the more common wood frog, both of these species have been selected, based on assessment of key criteria described below, as representative amphibians in the evaluation of environmental effects of the Project.

There are eight reptile species with distributions within Manitoba, all of which have ranges overlapping or in close proximity to the Project Study Area. COSEWIC lists two Manitoba reptile species, both of which can be found in the Project Study Area. The northern prairie skink is listed by COSEWIC as Endangered and as Protected under Division 6 of *The Manitoba Wildlife Act*. The common snapping turtle has recently been listed as a species of Special Concern by COSEWIC, but is not listed under the SARA. Neither species is listed under MESA. Additionally, the plains hognose snake is found within the Study Area and is listed as protected under Division 6 of The Manitoba *Wildlife Act*. It is not listed under COSEWIC or MESA. Of these three at-risk species, the northern prairie skink has been selected, based on assessment of key criteria described below, as a representative reptile in the evaluation of environmental effects of the Bipole III Project; garter snake hibernacula were also selected, due to their dependency on overwintering den sites leaves these concentrations of snake populations vulnerable to disturbance, degradation and local extirpation…"

8.2.8.2 Potential Effects and Key Topics 8-187

"Potential effects of all Project-related activities can generally be divided into two broad categories:

- Alteration of habitat resulting from right-of-way, collector lines, and construction power line clearing and maintenance, electrode site clearing, construction of a converter station, and installation of permanent towers; and
- Effects of increased use of seasonal access trails and right-of-way and other machinery-related effects.

In general, key sensitive areas include sandy soil habitats, wetlands, and garter snake hibernacula."

….

Other Miscellaneous Potential Effects

"Additional potential effects relate to ground electrodes, and include ground potential rise and leaching in imbedded coke. Although literature is limited on effects on amphibians and reptiles, modeling analysis of ground potential rise from ground electrodes along nearby water courses concluded that electrical fields would not reach levels that will affect aquatic biota (Exponent 2011)…"

8.2.8.3 Valued Environmental Components 8-189

"VEC species were selected for conducting the assessment of the project on the amphibian and reptile group of species. Some of the criteria used in the selection of VEC species included: current or historical distribution ranges within or in close proximity to the Bipole III right-of-way; presence of suitable habitat within the Local Study Area; listing by COSEWIC, SARA, or MESA; and/or sensitivity to habitat loss/alteration, disturbance, and population changes. In addition, connectivity of populations and associated habitats, and professional judgment were used. Information on potential VEC species was gathered using existing literature, habitat classification data, habitat models, field surveys and opportunistic observations.

The following amphibian species were selected as VECs:

· Plains spadefoot toad:
- Isolated population occurring north of Riding Mountain National Park near the Dauphin Lake area;
- Strong affinity for sandy soils, resulting in limited breeding opportunities; and
- Vulnerable to alteration and destruction of suitable habitat.

· Wood frog:
- Only anuran species found throughout Manitoba, and as far north as the Northwest Territories;
- Studies have found the species sensitive to fragmentation effects; and
- Studies have found the species sensitive to fragmentation effects; and
- Good representation of forest-dwelling anuran.

· Northern leopard frog:
- Hibernation sites are limited; and
- The only federally or provincially-listed at-risk anuran species within Manitoba.

The following reptiles were selected as VECs:

· Red-sided garter snake:
- The dependency on overwintering den sites leaves snake populations vulnerable to disturbance, degradation and local extirpation.

· Northern prairie skink:
- Manitoba's only true lizard;
- Manitoba's only endangered or threatened herptile;
- Associated with isolated/fragmented sandy-soil prairies;
- Habitat loss results from succession of prairie to Aspen Parkland, invasion by the exotic leafy spurge, cultivation, tree planting programs, and construction; and
- Dependency on such a limiting and fragmented habitat type and its reliance on underground habitat leave the skink vulnerable to disturbance and habitat alterations."

8.2.8.4 Environmental Effects Assessment and Mitigation 8-190

HVdc Transmission and ac Collector Lines

Plains Spadefoot

Construction

"The plains spadefoot has an isolated distribution range within the Bipole III Local Study Area… A total of 20.51 km2 of habitat is found within the Local Study Area, 0.28 km2 (or 1.38%) of which is contained within the HVdc transmission line right-of-way (Map 8-6)…

…

Mitigation measures that will help minimize potential effects on the plains spadefoot include strategic timing of construction, as well as retention of microhabitats and stream and wetland buffers. Specific measures are as follows:

- Construction at wetland habitats will occur in fall or winter, outside of peak breeding periods, occurring June 1 to August 15; or suitable buffers maintained according to forest management guidelines;
- Where possible, riparian buffers of 30 m will be retained around any identified suitable breeding/ wetland areas, within which disturbance, vegetation removal, and vehicular traffic will be limited;
- Where overstory/tall-growth vegetation (i.e. trees) need to be removed within buffers for transmission line clearance, removal methods that best minimize disturbance to soil and ground cover will be used; and
- Where feasible, right-of-way tower installation in wetlands and associated buffers will be avoided if occurring during the non frozen season.

After the application of mitigation recommendations, residual effects on the plains spadefoot from construction activities will include the fragmentation of sensitive areas where habitat polygons are larger than the distance between towers, and mortality and vehicle-related effects associated with the increases use of seasonal access trails and rights-of-way. Such residual effects during construction are characterized as negative in direction, moderate in magnitude, geographically confined to the Local Study Area, short-term in duration, infrequent, reversible, and therefore considered not significant."

Operation

…

"Mitigation measures that will help minimize potential effects on the plains spadefoot during operation-related activity include strategic timing of maintenance, as well as retention of microhabitats and stream and wetland buffers during maintenance. Specific measures are as follows:

- Right-of-way maintenance along wetland habitats will occur in fall or winter, outside of peak breeding periods, occurring June 1 to August 15;
- Where possible, riparian buffers of 30 m will be retained around suitable breeding/wetland habitat, in which disturbance, vegetation removal, and vehicular traffic is to be limited; and
- Where overstory/tall-growth vegetation (i.e. trees) needs to be removed within buffers for transmission line clearance, removal methods that best minimize disturbance to soil and ground cover will be used.

Residual effects on the plains spadefoot during operation include continued fragmentation of suitable habitat, and mortality and vehicle-related effects associated with increased use of seasonal access trails and rights-of-way, and are characterized as negative in direction, small in magnitude, geographically confined to the Local Study Area, medium-term in duration, sporadic/intermittent in frequency, reversible, and therefore considered not significant."

Wood Frog

Construction

"**…** In order to minimize impacts on local anurans, mitigation measures will assist in prevention or reversal of any habitat alteration effects that may occur during Project activities. Such mitigation measures include strategic timing of construction, as well as retention of microhabitats and stream and wetland buffers. Specific mitigation recommendations include the following:

- Construction at wetland habitats will occur in fall or winter, outside of peak anuran breeding periods, occurring April 1 through the end of May, for the wood frog;
- Where possible, a buffer of 30 m will be retained around any identified breeding/wetland areas that occur along the Project right-of-way, in which disturbance, vegetation removal, and vehicular traffic is limited;
- Where overstory/tall-growth vegetation (i.e. trees) needs to be removed within buffers for transmission line clearance, removal methods that best minimize disturbance to soil and ground cover will be used; and
- Construction at wetland habitats will occur in fall or winter, outside of peak wood frog breeding periods, i.e. not between April 1 and May 31.

As with the plains spadefoot, residual effects of construction after the application of mitigation recommendations, will include the fragmentation of sensitive areas where suitable wood frog habitat polygons are larger than the distance between towers, and mortality and vehicle-related effects associated with the increases use of seasonal access trails and rights-of-way. Such residual effects on the wood frog during construction are characterized as negative in direction, small in magnitude, geographically confined to the Project Site/Footprint, short-term in duration, infrequent, reversible, and therefore considered not significant."

Operation

"… Mitigation measures that will help minimize potential effects on the wood frog during operation-related maintenance activities include strategic timing of construction, as well as retention of microhabitats and stream and wetland buffers. Specific mitigation recommendations include the following:

- Right-of-way maintenance at wetland habitats will occur in fall or winter, outside of peak wood frog breeding periods, occurring April 1 through the end of May;
- Where possible, a vegetation buffer of 30 m will be retained around any identified breeding/wetland areas that occur along the Project right-of-way, in which disturbance, vegetation removal, and vehicular traffic is to be limited; and
- Where overstory/tall-growth vegetation (i.e. trees) needs to be removed within buffers for transmission line clearance, removal methods that best minimize disturbance to soil and ground cover will be used.

Residual effects on the wood frog during operation are similar to the plains spadefoot and are characterized as negative in direction, small in magnitude, geographically confined to the Project Site/Footprint, medium-term in duration, sporadic/intermittent in frequency, reversible, and therefore considered not significant."

Northern Leopard Frog

Construction

"Project-related construction effects include potential loss of breeding and summering habitat with clearing of the right-of-way, as well as vehicle-related effects such as direct mortality and pollution during the summering stage, and ground vibrations during the overwintering stage.

… For the northern leopard frog, such mitigation measures focus on wetland habitat, and are the same as with the wood frog mitigation strategies.

Following the application of mitigation recommendations, as with the wood frog, residual effects on the northern leopard frog will include the fragmentation of sensitive areas where suitable breeding habitat polygons are larger than the distance between towers, and mortality and vehicle-related effects associated with the increases use of seasonal access trails and rights-of-way. Such residual effects during construction are characterized as negative in direction, moderate in magnitude, geographically confined to the Local Study Area, short-term in duration, infrequent, reversible, and therefore considered not significant.

Operation
Project-related operation effects include potential changes to breeding and summering habitat with operation-related maintenance activities along the right-of-way, as well as vehicle-related effects such as direct mortality and pollution if maintenance is to occur during the summering stage and ground vibrations if maintenance is to occur during the overwintering stage…

Specific recommended mitigation measures are the same as for the wood frog.

As with the wood frog, residual effects during operation on the northern leopard frog include continued fragmentation and increased use of seasonal access trails and rights-of- way, and are characterized as negative in direction, small in magnitude, geographically confined to the Local Study Area, medium-term in duration, sporadic/intermittent in frequency, reversible, and therefore considered not significant."

Red-Sided Garter Snake

Construction

"…Mitigation measures include the following:
- Where suitable garter snake hibernacula habitat and associated buffers fall between two permanent tower sites, avoidance of habitat during tower installation is recommended;

- A buffer of 200 m will be maintained around garter snake hibernacula habitat year round, especially from permanent tower sites, within which blasting, ground disturbance, vegetation removal and vehicular traffic will be limited;
- Where removal of tall-growth vegetation is necessary at suitable hibernacula habitat and buffers, ground disturbance will be minimized wherever possible; and
- If avoidance of tower installation is not possible at suitable hibernacula habitat, tower installation will occur during the summer months (from June 1 to August 31), outside of the hibernacula activity period, or summer field investigations will be conducted, prior to tower placement.

Following the application of mitigation recommendations, residual effects on the garter snake will include habitat alteration/disturbance as a result of right-of-way clearing and tower installation, possible fragmentation of sensitive areas, mortality and vehicle-related effects associated with increased use of seasonal access trails and the right-of-way, and the creation of a movement corridor along the right-of-way. Overall, residual effects during construction are characterized as negative in direction, moderate in magnitude, geographically confined to the Local Study Area, short-term in duration, infrequent, reversible, and considered not significant."

Operation

"Operation-related effects related to this Project and the red-sided garter snake are limited to the Project right-of-way, as suitable habitat was not identified near electrode sites or converter stations… Mitigation measures will include the following:

- A buffer of 200 m will be maintained around identified garter snake hibernacula habitat during the growing season, where maintenance activities will be planned to avoid disturbance or damage; and
- Where removal of tall-growth vegetation is necessary, ground disturbance will be minimized.

Following mitigation recommendations, residual effects on the garter snake during operation will include possible fragmentation of sensitive areas, and the maintenance of a movement corridor along the right-of-way. Overall, residual effects are characterized as positive in direction, small in magnitude, geographically confined to the Local Study Area, medium-term in duration, regular/continuous in frequency, reversible, and therefore considered not significant."

Northern Prairie Skink

Construction

"In general, construction-related effects associated with the northern prairie skink are limited to the southern portion (i.e. Prairie Ecozone) of the Local Study Area and associated 66 m right-of-way (Map 8-8) and are associated predominantly with the clearing of the right-of-way and the installation of transmission towers within potential sandy-soil habitat…

The modeled habitat that exists in the preferred route right-of-way represents 2.5% of the total found in the local study area…

Overall, the construction of a transmission line overhead of sandy-soil habitat will likely result in minimal habitat alteration and vehicle/machinery-related effects. Mitigation recommendations include the following:

- A 100 m buffer will be maintained around sandy-soil habitat polygons where intercepted by the Project right-of-way, within which disturbance, vegetation removal, and vehicular traffic will be limited;
- Avoidance of modeled habitat will occur during tower installation where the habitat polygons are shorter than the distance between towers;
- As the installation of permanent structures is considered a high level activity, towers will be located 200 m from any observed or located skink nests; and
- Where polygons plus associated buffers span greater than the distance between two towers, site-specific summer field surveys will be undertaken in sandy-soil habitat polygons prior to permanent tower placements.

Following the application of mitigation recommendations, residual effects on the northern prairie skink will include habitat alteration/disturbance at the tower footprint and from transmission line right-of-way construction in sensitive areas where polygons span the distance of two towers. Such residual effects during construction are characterized as negative in direction, moderate in magnitude, geographically confined to the Local Study Area, short-term in duration, infrequent, reversible, and considered not significant."

Operation

"As with the construction phase, potential environmental effects of the Project associated with the prairie skink are limited to the sandy-soil habitat present within the Local Study Area and associated 66 m right-of-way…

Mitigation recommendations include the following:

- A 100 m buffer will be maintained around sandy-soil habitat polygons where intercepted by the Project right-of-way, in which disturbance, vegetation removal, and vehicular traffic is to be limited; and
- A 200 m buffer will be maintained around any observed or located prairie skink nests.

Following mitigation recommendations, residual effects on the northern prairie skink may include alteration or disturbance of suitable habitat where maintenance occurred in the vicinity of suitable habitat polygons, as invasive plant species such as leafy spurge are at risk on encroaching on native vegetation following right-of-way maintenance. Residual effects during operation are characterized as negative in direction, small in magnitude, geographically confined to the Local Study Area, medium-term in duration, infrequent, reversible, and therefore considered not significant."

8.2.8.5 Keewatinoow Converter Station Area 8-202

"…"

Wood Frog

"Mitigation measures will include the following:

- Construction at wetland habitats will occur in fall or winter, outside of peak wood frog breeding periods, (i.e. not between April 1 and May31).

Following mitigation recommendations, residual effects on the wood frog will include fragmentation of suitable habitat and mortality and vehicle-related effects associated with increased traffic. Residual effects are characterized during construction and operation as negative in direction, small in magnitude, geographically confined to the Project Footprint, medium-term in duration, regular/continuous in frequency, reversible, and therefore considered not significant."

8.2.8.6 Riel Converter Station 8-203

[MWL: Habitat for the plains spadefoot, wood frog, northern leopard frog, red-sided garter snake or northern prairie skink was not found in close proximity to the Reil Converter Station. As such, no construction effects or mitigation recommendations are presented]

8.2.8.7 Ground Electrodes and Lines 8-204

[MWL: Known historical distribution range of the plains spadefoot, red-sided garter snake or northern prairie skink was not found in close proximity to the Ground Electrodes and Lines. As such, no construction effects or mitigation recommendations are presented]

Wood Frog

"Specific recommended mitigation measures include the following:

- Construction will occur in fall or winter, outside of peak anuran breeding periods, occurring April 1 through the end of May for the wood frog.

Following mitigation recommendations, residual effects on the wood frog from construction will include fragmentation of suitable habitat and mortality and vehicle related effects associated with increased traffic. Residual effects from construction are characterized as negative in direction, small in magnitude, geographically confined to the Project Site/Footprint, short-term in duration, infrequent, reversible, and therefore considered not significant."

Northern Leopard Frog

"… Project-related effects, recommended mitigation measures, and residual effects are the same as with the wood frog…"

8.2.8.8 Summary of Residual Environmental Effects and Significance 8-206

"Potential negative residual impacts are associated with the habitat alteration along the transmission right-of-way, as well as traffic-related mortalities and pollution. The utilization of buffers used to minimize disturbance, vegetation removal, and vehicular traffic around sensitive sites along the Project right-of-way is expected to help minimize effects incurred by habitat degradation in VEC habitats.

Additionally, careful storage and removal of any hazardous materials and the infrequent use of seasonal access trails and the right-of-way will further alleviate impacts on VEC species. Summaries of residual effects assessments are presented in Table 8.2-10."

Plains Spadefoot

"Residual environmental effects of the Project on the plains spadefoot are limited to the right-of way, and are associated with the clearing and maintenance of the right-of-way, and the installation of permanent transmission towers. In general, construction-related activity of the Project is expected to have a negative effect on the plains spadefoot. Following mitigation recommendations, construction-related residual environmental effects will include fragmentation of suitable habitat, habitat alteration/disturbance, and mortality and vehicle-related effects associated with increased use of seasonal access trails and rights-of-way. Residual effects are not significant. Following mitigation recommendations, operation-related residual environmental effects will include continued fragmentation of suitable habitat, and mortality and vehicle-related effects associated with increased use of seasonal access trails and rights-of-way. Operation related activity of the Project are not significant."

Wood Frog

"Residual environmental effects of the Project on the wood frog are associated with the clearing and maintenance of the right-of-way, the installation of permanent transmission towers, the construction and operation of the Keewatinoow Converter Station, the construction of the north electrode site, and borrow area excavations and at excavation material placement sites. In general, construction-related residual environmental effects will include fragmentation of suitable breeding habitat, habitat alteration/disturbance, and mortality and vehicle-related effects associated with increased use of seasonal access trails and rights-of-way. The Project is expected to have small, negative effects on the wetland habitat associated with wood frog habitat, and the residual environmental effects, including continued fragmentation of suitable habitat, and mortality and vehicle related effects associated with increased use of seasonal access trails and rights-of-way, are not significant."

Northern Leopard Frog

"Residual environmental effects of the Project on the northern leopard frog are associated with the clearing and maintenance of the right-of-way, the installation of permanent transmission towers, the construction and operation of the Keewatinoow Converter Station, the construction of the north electrode site, and borrow area excavations and at excavation material placement sites. In general, the Project is expected to have negative effects on wetlands associated with the northern leopard frog, and the residual environmental effects are concluded to be the same as with the wood frog."

Red-Sided Garter Snake

"Residual environmental effects of the Project on red-sided garter snake hibernacula are limited to the right-of way, and are associated with the clearing and maintenance of the right-of-way, and the installation of permanent transmission towers. Specifically, these effects include habitat alteration/disturbance, possible fragmentation of sensitive areas, as well as mortality and vehicle-related effects associated with increased use of seasonal access trails and the right-of-way, and the creation of a movement corridor along the right-of-way. In general, construction-related activity associated with the Project is expected to have negative effects on the red-sided garter snake hibernacula, and the residual environmental effects are concluded to be not significant. As discussed above, small positive effects are possible for garter snakes where clearing of the right-of-way occurs within forest habitat. As such, operation-related activity associated with the Project is expected to have positive effects on red-sided garter snake, and the residual environmental effects are concluded to be therefore not significant."

Northern Prairie Skink

"Residual environmental effects of the Project on the northern prairie skink are limited to the right-of way, and are associated with the clearing and maintenance of the right-of-way, and the installation of permanent transmission towers. Specifically, residual effects include habitat alteration/disturbance at the tower footprint and from transmission line right-of-way construction in sensitive areas where polygons spanned the distance of two towers. Construction-related activity associated with the Project is expected to have negative effects on the northern prairie skink, and the residual environmental effects are concluded to be not significant. Operation-related activity associated with the Project is expected to have negative effects on the northern prairie skink, with similar effects as construction, and the residual environmental effects are concluded to be not significant."

8.2.8.9 Follow-up 8-210

"No follow-up anuran habitat surveys are expected. In the case of northern prairie skinks and garter snakes, where tower placement may overlap suitable habitat, summer field surveys will be conducted prior to tower installation… Standard inspection and effects monitoring will be sufficient to determine whether wetland mitigation recommendations are adhered to… Standard inspection and effects monitoring will be used to determine whether recommended mitigation measures were followed for both potential red-sided garter snake habitat and prairie skink habitat polygons…"

8.2.9 Terrestrial Invertebrates 8-210
8.2.9.1 Overview 8-210

"… Currently there are eleven terrestrial invertebrate species in Manitoba that are listed as atrisk, nine of which have present or historical distributions overlapping or in close proximity to the Bipole III Study Area. Of these nine species, three have been selected based on assessment of key criteria described below, as representative terrestrial invertebrates in the evaluation of environmental effects of the Project:

- The Dakota Skipper;
- The Uncas Skipper; and
- The Ottoe Skipper."

8.2.9.2 Potential Effects and Key Topics 8-211

"Project design and avoidance of areas has already been used to help minimize potential environmental effects, through the process of choosing the preferred route from three alternate routes and subsequent variations. The mitigation recommendations below will further help in minimizing potential environmental effects. In general, effects of all project-related activities can generally be divided into two broad categories:

1. Alteration of habitat resulting from right-of-way construction and maintenance, and installation of permanent towers; and
2. Effects of increased use of seasonal access trails and rights-of-way and other machinery-related effects.

Project specific effects, as they relate to the two broad effect categories listed above, are further described in following sections within individual Project components. Overall, key sensitive areas where such effects occur include sandy soil habitats and prairie habitats. The Project Study Area is primarily composed of sandy-soil habitats and little to no high-grade prairie habitat was found within the Project footprint. As a result, no environmentally sensitive sites were identified for that category…"

8.2.9.3 Valued Environmental Components 8-213

"All three terrestrial invertebrate VEC species [Dakota skipper, Otte skipper and Uncas skipper] have current or historical distribution ranges in close proximity to the Bipole III HVdc transmission line right-of-way and may be sensitive to habitat loss and/or alteration, disturbance, and population changes as a result of Project activities. Although known populations do not overlap the Local Study Area, suitable habitat exists for these species within the Project Footprint. The Ottoe and Uncas skippers have similar habitat requirements and as such, will be discussed together within the Environmental Effects Assessment and Mitigation section below…"

8.2.9.4 Environmental Effects Assessment and Mitigation 8-213

HVdc Transmission and ac Collector Lines

Dakota Skipper

Construction and Operation

"… no environmentally sensitive sites were identified at suitable Dakota skipper habitat located within the Local Study Area. Consequently, potential environmental effects of the Project on the Dakota skipper are considered to be negligible and mitigation recommendations are not associated with any identified environmentally sensitive areas…"

Ottoe and Uncas Skippers

Construction

"Mitigation measures will include the following:

- Suitable habitat patches will be avoided, where feasible;
- A 30 m vegetation buffer will be maintained around sandy-soil prairie habitat where intercepted by the Project right-of-way, in which disturbance, vegetation removal, and vehicular traffic is to be limited;

- Where removal of high-growth vegetation is required in sandy-soil prairie habitat and associated buffer, it is recommended that methods be used that minimize ground disturbance;
- Suitable habitat will be avoided during installation of permanent towers, where feasible; and
- Where polygons plus associated buffers span greater than the distance between two towers, site-specific summer field surveys will be undertaken in sandy-soil habitat polygons prior to permanent tower placements.

Following mitigation recommendations, residual effects on the Ottoe and Uncas skippers include habitat alteration and disturbance as a result of right-of-way construction, including at tower footprints. Residual effects are characterized as negative in direction, moderate in magnitude, geographically confined to the Local Study Area, short-term in duration, infrequent, reversible, and therefore considered not significant."

Operation

"…Mitigation measures described above for construction will also mitigate activities of the operation phase of the project…."

Keewatinoow Converter Station and Area

[MWL Summary: Known historical distribution range of the Dakota skipper, Ottoe and Uncas Skipper were not in close proximity to the Keewatinoow Converter Station. As such, no construction effects or mitigation recommendations are presented.]

Riel Converter Station

[MWL Summary: There was no suitable Dakota skipper, Ottoe or Uncas Skipper habitate identified within the Riel Converter Station footprint. As such, no construction effects or mitigation recommendations are presented.]

Ground Electrodes and Lines

[MWL Summary: Known historical distribution range of the Dakota skipper, Ottoe and Uncas Skipper were not in close proximity to the Ground Electrodes and Lines. As such, no construction effects or mitigation recommendations are presented.]

8.2.9.5 Summary of Residual Environmental Effects and Significance 8-218

"Potential negative residual impacts are associated with the habitat alteration along the transmission right-of-way. The preservation of existing low-growth vegetation along the right-of-way and buffers around sensitive sites is expected to minimize effects incurred by habitat degradation in these VEC habitats. Additionally, careful storage and removal of any hazardous materials and the infrequent use of seasonal access trails and the right-of- way will further alleviate impacts on terrestrial invertebrates. Summaries of residual effects assessments are presented in Table 8.2-11."

Dakota Skipper

"Potential environmental effects of the Project on the Dakota skipper are restricted to the right-of-way and are negligible. In general, the retention of desired low-growth plant cover resistant to tree invasion within prairie habitat along the right-of-way may aid in preserving desired key adult and larval food resources for potential Dakota skipper populations. There are no residual project effects on the Dakota skipper."

Ottoe and Uncas Skippers

"Residual environmental effects of the Project on the Ottoe and Uncas skippers are limited to the right-of way, its clearing and maintenance, and the installation of permanent transmission towers. In general, construction-related activities are expected to have negative effects on the Ottoe and Uncas skippers, however, the residual environmental effects are concluded to be not significant.

Operation-related activities are expected to have negative effects on the Ottoe and Uncas skippers, and the residual environmental effects are concluded to be not significant. In particular, if minimal right-of-way clearing is expected in areas with low growth vegetation at prairie habitats associated with suitable skipper habitat, residual effects will be restricted to permanent tower footprints within suitable habitat and where tall-growth vegetation is cleared and maintained."

8.2.9.6 Follow-up 8-219

"A monitoring program is not anticipated for terrestrial invertebrates. As Dakota, Ottoe, or Uncas skipper individuals were not found, nor were they expected during 2010 field surveys…Field studies at sandy-soil prairie habitats are recommended prior to tower installation for the northern prairie skink. At this time, observations will be made to determine whether recommendations for mitigation measures were adhered to for terrestrial invertebrates."

8.3 SOCIO-ECONOMIC EFFECTS ASSESSMENT 8-219

"…The socio-economic effects assessment includes the following broad environmental components:
- Land Use;
- Resource Use;
- Economy;
- Services;
- Personal, Family and Community Life; and
- Culture and Heritage Resources."

8.3.1 Land Use 8-221

8.3.1.1 Potential Effects and Key Topics 8-221

"… Site-specific land use issues such as First Nation Reserve lands, communities and rural residences are generally avoided through the SSEA process…"

8.3.1.2 Valued Environmental Components 8-221

"… The following VECs were selected to assess project effects on land use:

- Land tenure and residential development;
- Private forest lands (shelterbelts, managed private woodlots);
- Aboriginal lands (Reserve Lands and Treaty Land Entitlement selections);
- Designated Protected Areas and Protected Areas Initiative (Areas of Special Interest, enduring features);
- Infrastructure (aerodromes, communications towers, roads, rail, pipelines, drains, culverts); and
- Agricultural land use/productivity.

…"

8.3.1.3 Environmental Effects Assessment and Mitigation 8-222

"… During the construction stage, potential effects are expected to include disturbance and nuisance effects such as noise, dust and traffic. These effects are discussed under Personal, Family and Community Life… during the construction phase, effects can include loss of private woodlots and shelterbelts… loss of agricultural land use/productivity…

… EnvPPs for operations of the Project will include measures to reduce the effects of the Project components on land use (e.g., where possible, observing municipal and local protocols and by-laws).

Upon completion of transmission line construction, relevant site decommissioning for the Project can include: temporary right-of-way access trails, marshalling yards, borrow sites, and mobile construction camp locations…"

HVdc Transmission Line

"In northern Manitoba, the Bipole III line will require a 66 m right-of-way obtained via easement through a Crown land reservation (which will be converted to easement). In southern agricultural Manitoba, the 66 m right-of-way for the Bipole III line will utilize a combination of easements adjacent to the public road allowance, in-field alignments or will generally be centred on the half-mile line (subject to the development of possible site-specific mitigation measures)…

Two tower types have been selected for use in the Project…can be adjusted to difficult or shifting foundation conditions… reduce the Site/Footprint and property acquisition requirement, and to minimize potential impact on agricultural land use/productivity."

Land Tenure and Residential Development

Construction

"… A number of concerns with respect to the potential effects of the line on private property and rural residences were raised during the EACP. These concerns are consistent with Manitoba Hydro's past experience with SSEA studies and include:

- Proximity to residences and built-up areas, and avoidance of residences and residential development including areas of potential future residential development;
- Impacts on residential property values: potential decrease in the value of properties in proximity to a transmission line;

- Aesthetic impacts: concerns about impacts on residences and the landscape itself in relation to the presence of a transmission line (e.g., view shed); line placement interfering with the image of a property or attractiveness of the landscape; and
- Concerns about health and safety: health effects and EMFs and other electrical effects (e.g., interference with television and radio reception, audible noise, and interference with other electrical devices such as GPS).

… aesthetics, health and safety, and electrical effects are addressed under Personal, Family and Community Life, and access is addressed under Domestic Resource Use.

… the easement required for the line (assuming structures centered along the half-mile line, on an in-field alignment or adjacent to the road allowance) would affect a total of approximately 540 private properties… Of the total number private properties affected, the easement would pass along on the same side as the road allowance of approximately 165 properties and split approximately 370 properties…

… The final preferred route was selected to avoid displacing or passing within close proximity to rural residences (i.e., within 100 m) to the maximum extent possible. One rural residence is located within 100 m from the final preferred route for the Bipole III line (SW16-39-24WPM). An additional 18 rural dwellings are located between 101 and 200 m of the final preferred route, while an additional 12 are located between 201 and 270 m…

Measures to mitigate project-related construction effects will include the following:

- Subject to detailed engineering analysis, tower location (tower "spotting") will be used, where feasible, to reduce potential negative effects, and location preferences identified… where technically and economically feasible…

…

A compensation policy of land acquisition is in place for those rural residences located on properties within 75 m of the centre of the right-of-way…

Given these mitigation measures, potential effects on land tenure and residential development during construction are anticipated to be negative, small in magnitude, Project Site/Footprint in geographic extent, short-term in duration and are therefore not significant."

Operation

"… In terms of property values decreases, Manitoba Hydro's position is that the presence of transmission lines does not significantly affect residential property values. Since 2000, Manitoba Hydro has undertaken an annual
Property Value Monitoring Program in the Birds Hill and Lister Rapids areas… Real estate transactions for residential properties have been tracked over the period from January 1, 1992."

Private Forestlands (Managed Private Woodlots, Shelterbelts)

Construction

"The effect of the Bipole III line on managed private woodlots is limited to a direct impact to three of 837 woodlot management plans registered by Manitoba Agriculture Foods and Rural Initiatives (MAFRI) and the Manitoba Forestry Association (MFA). This represents 0.36 % of the registered woodlots in Manitoba. A total of 21.24 ha are overlain by the Project Site/Footprint, which represents 4.7% of the total area (453.25 ha) of the three affected woodlots… the effect to an individual affected woodlot owner is dependant on their specific perspective…

Approximately 19 ha of shelterbelts within the agricultural zone (south of Mafeking) will be affected by the line… The effects on shelterbelts are minimal at the provincial level, but are likely much more important at the individual landowner level.

… Meetings will occur with each individual owner to discuss and negotiate mitigation measures (i.e., replanting shelterbelt) that are reflective of management objectives and investments during the easement negotiation phase…"

Aboriginal Lands (Reserve Lands and Treaty Land Entitlements)

Construction

"Construction effects may occur from a transmission line being located in different land ownership and tenure areas, including unorganized Crown lands where TLE selections have been made. No existing First Nation Reserve lands or Federal lands are crossed by the final preferred route for the Bipole III line.

Opakwayak Cree Nation (OCN) identified a TLE (May 2011) along the final preferred route for the Bipole III line. The TLE will be subject to ongoing discussions between Manitoba Hydro and the OCN.

The potential for effects on Aboriginal lands (reserve lands and TLEs) during construction of the Bipole III line are anticipated to be negative, small in magnitude, Project Site/Footprint in geographic extent, short-term in duration, and therefore not significant. Other Aboriginal interests are discussed further under Domestic Resource Use."

Designated Protected Areas and Protected Areas Initiative (Areas of Special Interest, Enduring Features). The final preferred route for the Bipole III line does not cross through any designated protected areas."

Provincial Parks

"The closest designated protected areas from the route are two provincial parks ─ Clearwater and Red Deer River ─ in which their boundaries fall within the 4.8 km (3.0 mile) Local Study Area centered on the final preferred route… No negative effects are anticipated."

Areas of Special Interest (ASIs)

"The final preferred route crosses through one ASI (ASI 114 Stephens Lake) under the Protected Area Initiative (PAI). The final preferred route crosses through approximately 76 km of the ASI and was selected to avoid enduring features where possible ─ where interaction occurs, the route affects a small percentage of the overall representation (Bipole III Lands of Special Interest and TLE Lands Technical Report). Within the ASI, two rare occurrence PAI enduring features are intersected by the line, as follows (Bipole II Terrain and Soils Technical Report):

- **Rare Occurrence Deep Basin / Eutric Brunisol:** Approximately 36 ha, or 2% of this 1,657 ha rare occurrence PAI enduring feature, located within the ASI east-northeast of Little Limestone Lake, is intersected by the line. Rare occurrence PAI enduring features not affected by the Project Footprint/Site are located within and beyond the ASI to the northeast and southeast of the line, occupying 9,476 ha, 56 ha and 2,110 ha of land. This feature is predominantly a soil feature, rather than a topographic feature and therefore, effect to terrain integrity is considered minimal. It is estimated that the representation or total proportion of the Deep Basin / Eutric Brunisol feature which would remain available for protection (i.e., not affected by the line) within and outside the ASI is 13,263 ha or 99.7% of this feature type.

- **Rare Occurrence Glaciofluvial Deposits / Organic Cryosol (mesic woody forest) Moraine:** Approximately 42 ha, or 3% of this 1,441 ha rare occurrence PAI enduring feature, located within the ASI southwest of Little Limestone Lake, is intersected by the line. The majority of this feature is within the Local Study Area. Two similarly described enduring features not affected by the line are located within and outside the ASI, occupying 2,755 ha and 456 ha, respectively. Therefore, it is estimated that the representation or total proportion of Glaciofluvial Deposits / Organic Cryosol (mesic woody forest) Moraine feature which would remain available for protection (i.e., not affected by the line) within and outside the ASI is 4,611 ha or 99% of this feature type."

Wildlife Management Areas and Forest Reserves

"Although not formally protected, WMAs and forest reserves are of interest to the PAI. The final preferred route crosses approximately 14 km of the Churchill WMA and 50 km of the Tom Lamb WMA. In terms of the Churchill WMA, Manitoba Conservation has indicated that this area crossed by the final preferred route will be excluded from the WMA as the Province moves forward with plans to increase the protection status of the WMA.

… The final preferred route crosses approximately 15 km of the Swan-Pelican Provincial Forest Reserve although it has been set aside for harvesting and development.

Southeast of The Pas, the PAI is planning a number of new WMAs. In this area, the final preferred route crosses the proposed Red Deer WMA for a distance of approximately 27 km. In addition, two portions of the proposed Summerberry WMA are crossed by the final preferred route, which has both a protected and an unprotected component. The proposed protected portion (under PAI) is crossed for a distance of approximately 29 km, while the unprotected portion of the WMA is crossed for a distance of approximately 17 km. Within Tom Lamb WMA and Summerberry proposed WMA, one rare and one single occurrence PAI enduring soils features are intersected by the right-of-way, as follows:

- **Single Occurrence Alluvial Deposits/Organic Mesisol (mesic sedge):** Approximately 67 ha, or 0.2% of this 36,396 ha single occurrence PAI enduring feature, located within the Tom Lamb WMA and Summerberry Proposed WMA along the Saskatchewan River, east and southeast of The Pas, is intersected by the route. This feature is primarily a soil feature, rather than a terrain feature and therefore, disturbance in this feature is considered to have a relatively low effect to the landscape. Avoidance of this feature was not possible based on limited routing ptions in this area. It is estimated that the representation or total proportion of Alluvial Deposits / Organic Mesisol (mesic sedge) feature which would remain available for protection (i.e., not affected by the line) within and outside the ASI is 36,329 ha or 99.8% of this feature.

- **Rare Occurrence Alluvial Deposits/Organic Mesisol (mesic woody forest):** Approximately 16 ha, or 0.6% of this 2,485 ha rare occurrence PAI enduring feature, located within the Tom Lamb WMA Summerberry Proposed WMA between the Saskatchewan River and Kelsey Lake southeast of The Pas, is intersected by the- route. A similarly described enduring feature not affected by the route is located immediately northwest of this feature within and extending beyond the ASI, occupying 288 ha. Therefore, it is estimated that the representation or total proportion of Alluvial Deposits/Organic Mesisol (mesic woody forest) feature which would remain available for protection (i.e., not affected by the line) within and outside the ASI is 2,757 ha or 99.4% of this feature type.

Ecological Reserves, Crown Lands and Conservation Districts

"The final preferred route for the line avoids all Ecological Reserve lands, but the 4.8 km (3.0 mile) Local Study Area is in close proximity to the existing and proposed addition to Lake Winnipegosis Salt Flats Ecological Reserve… Manitoba Conservation has identified a salt spring that provides salt water to the flats within the 4.8 km (3.0 mile) Local Study Area around the route, and wants to avoid any impacts to the spring as it may result in negative impacts to the existing and proposed ecological reserve.

… The preferred route is adjacent to the boundaries of three community pastures ─ the Lenswood/Birch River Community Pasture for approximately 7.5 km, the Alonsa Community Pasture for approximately 4.0 km, and the Lakeview Community Pasture for approximately 5.0 km. Although not formally protected, both the Crown lands and community pastures in this area are of interest to the PAI as they represent some of the only available lands which represent the prairie ecosystem.

The final preferred route crosses several conservation districts: Kelsey, Swan Lake Watershed, Intermountain, Alonsa, Whitemud Watershed, La Salle Redboine, Seine-Rat River, and Cooks Creek. There are no properties owned by the conservation districts along the final preferred route. No negative effects are anticipated."

Unique Terrain Features

Construction

"Unique terrain features crossed by the route will be affected by the construction and physical presence of the line during operations, including off-right-of-way activities. This could result in a total impairment or loss of approximately 561 ha of landscape integrity, comprised of 161 ha of PAI enduring features and 400 ha of other identified unique terrain and soil features. The affected PAI enduring features are located in the Stephen's Lake ASI, Tom Lamb WMA and Summerberry Proposed WMA.

… Measures to mitigate or minimize the effects of Project-related impacts on areas of interest to the PAI and unique terrain features includes the following:

- Subject to detailed engineering analysis, tower location (tower "spotting") will be used, where feasible, to reduce adverse effects;
- Where technically and economically feasible structure placement decisions will incorporate more detailed preconstruction evaluation of the right-of-way as well as location preferences identified through discussions with Manitoba Conversation PAI representatives. To date, this request has been made with respect to potential issues relating to the salt spring in the Lake Winnipegosis Salt Flats Ecological Reserve. Similar discussions will be held respecting the Stephens Lake ASI;
- Ongoing discussions will be held with Manitoba Conservation PAI representatives to provide Manitoba Hydro with the permanent right to access, use and maintain the right-of-way for the line;
- Construction within enduring features will be conducted in the winter, under frozen conditions, to protect site-specific features, such as organic deposits;
- No off-right-of-way activities, including construction of access trails or establishment of new borrow sources, will be conducted within any of the unique terrain and soil features crossed by the line;
- Off-right-of-way activities will maintain a 100 m buffer distance from unique terrain and soil features identified in;

…

…Construction effects on lands for consideration under the PAI are anticipated to be negative, moderate in magnitude, Local Study Area in geographic extent, short-term in duration, and therefore not significant."

Infrastructure

Construction

"The Bipole III line will cross existing roads, railway lines, natural gas/oil pipelines and a water aqueduct. Agencies responsible for infrastructure crossed by the transmission line (i.e., HBR, CPR, CNR, GWWD, Trans Canada Pipeline, MIT and MTS) have been consulted at various stages of Project planning. Results of reviews to date are provided below.

Review of the Project with TransCanada Pipelines Limited (TCPL)… Issues raised by TCPL included potential interference due to conductor-to-ground fault on the powerline and the potential for risk of DC interference on the powerline towers from TCPL's cathodic protection system…

Discussions took place with Omni-Trax representatives responsible for the HBR railway line from The Pas to Churchill during the preliminary preferred routing stage. Issues of potential concern expressed by Omni-Trax officials related to safety constraints during Project construction (e.g, towers potentially falling over), scheduling of transmission operations and maintenance activities, and access issues affecting their operations…

A review of the preferred route alignment was conducted by Transport Canada according to their navigation standards and the potential to affect registered aerodromes. The review conducted confirmed that the final preferred route would not adversely affect any of the registered operations… One private airstrip was identified on a north-south alignment in proximity to the preferred route in the RM of Hanover… there is potential for interference from the construction of the line…

There are 14 communication towers within 4.8 km of the centre line of the route…

Anticipated effects on infrastructure from construction are considered to be negative, small in magnitude, Project Site/Footprint in geographic extent, short-term in duration, and therefore not significant."

Agricultural Land Use/Productivity

Construction

"… Concerns raised with respect to the line during the EACP were potential impacts on field operations, livestock, and health and safety. Impacts on field operations included removal of agricultural lands from production, field severances, inconvenience and increased costs to farming, working around towers, weed control, interference with irrigation systems and restricted aerial spraying. Concerns were also raised with respect to property damage (farm machinery, fences, etc.), displacement of residences/farm buildings and/or farm shelterbelts, health and safety concerns, including human and livestock…

… minimize the impact of the line on agricultural land use/productivity by identifying agricultural factors as a routing issue, and by using half-mile alignments wherever possible to limit interference with agricultural operations. Based on comments provided by landowners during the EACP, Manitoba Hydro altered the alignment of the preferred route for the Bipole III line to remove approximately 47.5 km of diagonal routing through intensively cropped areas to minimize potential impacts. Diagonal line placement remains in areas with limited annual cropping and where no or limited agricultural use…

… The agricultural portion of the route for the Bipole III line is approximately 585 km in length… Approximately 230 km of the route will be on an in-field alignment, removed from road allowances and field edges, while approximately 250 km will be on a diagonal alignment and approximately 105 km is on a half mile line alignment. Field severances will affect approximately 245 km of the line. In agricultural Manitoba, approximately half of the final preferred route for the line crosses through cultivated land, while the remaining portion crosses uncultivated pasture land, native hay land and wetlands (Bipole III Agriculture Technical Report).

… Final decisions respecting the location of the transmission line towers and determination of compensation for the impact of the towers on agricultural operations are normally made during the course of property acquisition…

… If construction activities result in physical damage (i.e., crop loss, ruts, etc.), Manitoba Hydro will pay compensation to the affected landowners or have physical damages restored.

… Manitoba Hydro considers impacts on aerial spraying operations on a site-specific basis where owners or operators can demonstrate that the presence of the line will adversely affect the cost and/or feasibility of aerial spraying or alternative ground applications.

With respect to interference with irrigation systems, Manitoba Hydro considers impacts on a site-specific basis…

…Clearing of bush and scrub in poorer quality agricultural lands may also be a positive effect in terms of livestock production.

Manitoba Hydro compensates for impacts to agriculture through its Property Compensation program. Compensation for establishing easements across private property recognizes that residual impacts on agricultural practices will remain after mitigation measures have been applied. Manitoba Hydro's Property Compensation program is discussed in Chapter 3.

Given these mitigation measures, during construction of the line, potential effects on agricultural land use/productivity are anticipated to be negative, small in magnitude, Project Site/Footprint in geographic extent, short-term in duration, and therefore not significant.

Operation

… compensation will be paid for any physical damages that may occur during operations and maintenance of the line although these activities are generally scheduled to occur when crops are off the fields…

…In terms of EMF and livestock, research has not shown that static fields associated with dc transmission lines such as Bipole III adversely affect livestock.

During operations, the potential effects to agriculture are anticipated to be negative, small in magnitude, Project Footprint/Site in geographic extent and medium-term in duration given the ongoing presence of the line, and are therefore considered not significant.

Keewatinoow Converter Station and Associated Facilities (Including Construction Camps, Construction Power Station, Construction Powerline, 230 kV ac Collector Lines, and Ground Electrode and Line)

Land Tenure and Residential Development
"There are no issues of concern… as there are no privately-owned lands or residences in the area. No adverse effects are anticipated."

Private Forestlands (Shelterbelts and Managed Private Woodlots)

"There are no issues of concern… as there are no shelterbelts or managed private woodlots in the area. No adverse effects are anticipated."

Aboriginal Lands (Reserve Lands and Treaty Land Entitlements)

Construction

"The Keewatinoow Converter Station site and sites/routes for the associated facilities are not located on and do not cross any existing First Nation Reserve lands or Federal lands. The Keewatinoow Converter Station site has been identified as a TLE (July 2011) by Fox Lake Cree Nation. Manitoba Hydro will acquire the property rights for the Keewatinoow Converter Station and associated facilities from the Crown (excluding mineral rights). Ongoing discussions with Fox Lake Cree Nation with respect to these facilities and the TLE at the Keewatinoow Converter Station site will continue. Other Aboriginal interests are discussed further under Domestic Resource Use.

The potential for effects on Aboriginal lands during construction are anticipated to be negative, small in magnitude, Local Study Area in geographic extent, short-term in duration, and are not expected to be significant."

Operation

"… Effects are anticipated to be no negative, small in magnitude, Project Study Area in geographic extent, medium term in duration, and therefore not significant."

Designated Protected Areas and Protected Areas Initiative (Areas of Special Interest, Enduring Features)

Construction

"There are no issues with construction of the Keewatinoow Converter Station and associated facilities from the perspective of designated protected areas or the PAI. With the exception of portions of the collector lines and construction powerline, the sites for these facilities are currently located in the Churchill WMA. Manitoba Conservation has indicated (G. Suggett, pers. comm. 2010) that Manitoba Hydro's Water Power Reserve, which is located southwest of the site for the converter station, as well as the area identified for the Bipole III infrastructure will be excluded from the Churchill WMA as the Province moves forward with plans to increase the protection status of the WMA. No adverse effects are anticipated during construction."

Infrastructure

Construction

"... Measures to mitigate or minimize the effects of construction-related impacts include the following:

- Agencies responsible for infrastructure crossed by the transmission line (i.e., HBR, MIT) will be consulted…
- The locations of infrastructure crossed will be identified in a Project-specific construction EnvPP; and
- Where possible, local protocols and by-laws will be respected, including maintaining adequate buffers.

… the anticipated effects for construction are considered to be negative, small in magnitude, Project Footprint/Site in geographic extent, short-term in duration, and therefore are not expected to be significant."

Agricultural Land Use/Productivity

"... No adverse effects are anticipated."

Riel Converter Station & Associated Facilities

Land Tenure and Residential Development

Construction

"The property required for the construction of the Riel Converter Station (excluding mineral rights) has been obtained by Manitoba Hydro for the development of the Riel Station (Chapter 3)…

Manitoba Hydro will be acquiring a full section of land (640 ac) for the Riel ground electrode with the ground electrode ring sited at the centre of the property. That portion of the ground electrode site will be permanently removed from the land base…

Construction-related impacts associated with the ground electrode potentially involve nuisance effects, including noise, vibration and dust…

… Effects on the acquired properties of the ground electrode site are expected to be negative, small in magnitude, Local Study Area in geographic extent, short-term in duration, and therefore not significant. To minimize potential effects, Manitoba Hydro is proposing routing the ground electrode line on existing road allowances and other rights-of-way."

Operation

"… No effects are expected on land tenure and residential development during operations.

…The extent of the effects from the electrode line will be minimized by routing it along existing road allowances and other rights-of-way.

… Anticipated effects on land tenure and residential development during operations are considered to be negative, small in magnitude, Project Site/Footprint in geographic extent, medium-term in duration, and therefore not significant."

Private Forestlands (Shelterbelts, Private Managed Woodlots)

Construction

"The construction of the Riel Converter Station and ground electrode will affect two private forestlands in terms of shelterbelts. Effects are anticipated to be negative, moderate in magnitude, Project Site/Footprint in geographic extent, short term in duration, and therefore not significant…"

Aboriginal Lands (Reserve Lands and Treaty Land Entitlements)

"The construction and operations of the Riel Converter Station will not affect any existing Reserve Lands or TLE lands. No adverse effects are anticipated. In the case of the ground electrode site, only private and/or municipal lands are involved. No adverse effects on Aboriginal lands during construction or operations are anticipated.

Designated Protected Areas and Protected Areas Initiative (Areas of Special Interest, Enduring Features) …will not affect any designated protected areas or lands for consideration under the PAI. No adverse effects are anticipated."

Infrastructure

Construction

"Potential construction-related impacts from the development of the Riel Converter Station on area infrastructure will be principally confined to the area drainage systems and Deacons Reservoir…

…No adverse effects on the surrounding land drainage systems are anticipated due to the development of the Riel Converter Station, as water in this area that currently drains through the Bibeau system will continue to do so. The development of the site will not alter the land drainage characteristics of the surrounding region…"

Operation

"As with construction of the Riel Converter Station, operation concerns could potentially involve drainage systems and Deacons Reservoir. Project related effects will be mitigated through proper site planning and final design parameters, and through adherence to standard operating procedures and protocols for operations…"

Agricultural Land Use/Productivity

Construction

"… There will be no effects on agricultural productivity as a result of the construction of the Riel Converter Station. No adverse effects are anticipated.

… Most of the remaining land outside the [Ground Electrode] site of the electrode ring within the section can remain in agricultural production. Manitoba Hydro will pay compensation to the property owner for the lands taken out of agricultural production by the ground electrode or the electrode line through its Landowner Compensation Policy (Chapter 3).

During construction, potential effects on agricultural productivity are anticipated to be negative, small in magnitude, Project Site/Footprint in geographic extent, short-term in duration and therefore not significant."

8.3.1.4 Summary of Residual Environmental Effects and Significance 8-246

"Table 8.3-1 provides a summary of residual effects related to land use for the Project…

… In terms of land use, construction of the Bipole III line and the Riel ground electrode will result in residual effects on private forestlands and agricultural land use/productivity because of the loss of private forestlands and agricultural lands. In addition, construction of the Riel ground electrode will result in the loss of two residences. There is one residence within 75 m of the Bipole III right-of-way which Manitoba Hydro is prepared to purchase if the owner so desires.

With respect to land use, during operations, the residual effects in terms of the loss of private forestlands and agricultural land use/productivity will remain. In addition, the physical presence of the facilities will be a residual effect on residences in proximity to the line. The presence of these facilities will alter the landscape for as long as they are in operation."

8.3.1.5 Follow-up 8-248

"A listing of Environmentally Sensitive Sites (ESSs) associated with the Project… will be documented in the Project-specific EnvPPs. Some of these situations may require that areas be flagged in the field to ensure construction crews are able to distinguish boundaries and locations…"

8.3.2 Resource Use 8-249

8.3.2.1 Potential Effects and Key Topics 8-249

"… Transmission lines and facilities have the potential to impact domestic and commercial resource harvesting (including fishing, hunting, trapping, gathering of medicinal and other plants, berries and fuel wood, wild rice harvesting, outfitting, mining, forestry, recreation and tourism)by Aboriginal people and others. This can occur through a direct impact on the resource as a result of temporary noise and activity related disturbances, and habitat loss. It can also occur through undesired access to resources adjacent to or along the rights-of-way.

… Increased access can also be a positive effect when access to a resource is improved."

8.3.2.2 Valued Environmental Components 8-249

"… The following VECs were selected to assess Project effects on resource use:

- Commercial forestry (Productive Forestland, High Valued Forest Sites, Research & Monitoring Sites);
- Commercial fishing;

- Mining/Aggregates;
- Trapping;
- Wild rice harvesting;
- Recreation and Tourism; and
- Domestic resource use."

8.3.2.3 Environmental Effects Assessment and Mitigation 8-250

HVdc Transmission Line

Increased Access

"The issue of increased access along transmission line rights-of-way was raised during the EACP for the Project by resource users and leadership in Aboriginal communities, particularly in northern Manitoba. For construction of transmission lines, Manitoba Hydro uses existing highways, municipal and forestry roads, trails and man-made linear features where possible, thereby minimizing the need to develop new access routes to the right-of-way. Access is required along the right-of-way and will be restricted to the right-of-way as much as possible, with deviations from the right-of-way limited to natural terrain features such as rock outcrops, excessively steep slopes, and where ingress and egress to stream crossings are logistically challenging and/or environmentally risky.

As outlined under Land Use, paralleling existing linear facilities will lessen the opportunities for increased access…

…With respect to the Bipole III line, the issue of increased access is not expected to be an issue in agricultural Manitoba. In northern Manitoba, the relatively remote location of the right-of-way in some areas will limit access, particularly during the spring and summer months. Concerns with increased access relate to increased harvesting activities leading to a decrease in the animal and plant populations for resource users, as well as increased chances of vandalism on cabins and traps in the case of trapline holders. In several instances, during the EACP, communities expressed an interest in increasing access in terms of trapping, hunting and gathering for their own community members, but restricting access from those outside of the community.

Where the issue of increased access potential is important to a community in relation to managing potential negative impacts on the environment, an Access Management Plan will be prepared prior to construction of the line. The plan(s) will identify access management objectives, the approach during both construction and operations, the means of communicating the plan to various affected parties, and a monitoring component."

Commercial Forestry

Construction

"Potential effects on commercial forestry for the Project are divided into three categories: productive forestland, high valued forest sites, and research and monitoring sites. The northern portion of the Project Study Area is referred to by Manitoba Conservation as the Non-Commercial Forest Zone because of the existing environmental limitations and its distance from markets (Bipole III Forestry Technical Report)…"

Productive Forestland

"Productive forestland forms the basis for all forest management planning for Manitoba Conservation, Forestry Branch and the forest industries that use the resources. It is the basis from which Manitoba Conservation determines sustainable harvest levels for Crown lands, including Forest Management License (FML) areas allocated to the forest industry. Where the land use on productive forestland changes from forest management to an alternative use, such as a transmission line, the affected lands are withdrawn from the productive forestland base. Loss of productive forestlands affects sustainable harvest levels, reduces the amount of productive forestlands within FML areas and the available amount of standing timber…"

Sustainable Harvest Levels (Annual Allowable Cut)

"… The Project will remove productive forestland from the land base… The effects of the Project on Annual Allowable Cut (AAC), by FMU and FS, are very small, as shown in Table 8.3-2. In terms of volume reductions, the highest effect is on the softwood AAC in the Nelson River Forest Section (FS) and on hardwood in the Mountain FS. Percentage wise, all effects on AAC at the FS level (softwood and hardwood) are fractions of 1.0% with the exception of the softwood AAC in the Churchill River FS (FMU 74), where the effect equates to 1.5% of the existing. Of note is that Manitoba has no timber commitments in FMU 74… A marginal reduction in the hardwood annual harvest level may be realized in FMU 10 where the AAC is currently fully committed to FML #3 and Timber Sale Agreement holders."

Forest Management License (FML) Areas

"… The Project intersects the FML areas of Tolko Industries Ltd. (FML #2) and Louisiana Pacific Canada Ltd. (FML #3). The effect of the Project on FML #2 and #3 regarding productive forestland withdrawal are shown in Table 8.3-3… In terms of area affected at the FML level, reductions will amount to 1,165 ha and 465 ha for Tolko Industries Ltd. (FML #2) and Louisiana Pacific Canada (FML #3) respectively. The aforementioned areas equate to 5.4% of the FML #2 allowable withdrawal limit (21,420 ha or 0.5%) within the 10-year period 2009 to 2019. For FML #3, the Project related reduction amounts to 28.3% of the allowable withdrawal limit (1950 ha or 0.5%) within the 10-year period 2004 to 2014. These effects have to be taken in context with other productive forestland withdrawals occurring on the FMLs and within these time frames. On their own, the effect of productive forestland withdrawal from FML areas is minimal."

Standing Timber

"The Project Footprint area will be cleared of all trees…Effects on standing timber volumes in those FMUs intersected by the Project are shown in Table 8.3-4. The effect on standing timber over the entire Project Area/ Footprint within the commercial forest zone equates to approximately 88,600 m3 of softwood, 37,900 m3 of hardwood for a combined total of 126,600 m3. This represents an estimated 0.1% of the total standing in the affected FMUs. The volume of timber found on the Crown-owned portion of the Project footprint will be used in the Forest Damage Appraisal and Valuation (FDA&V) assessment to determine financial compensation due to Manitoba Conservation."

High Value Forest Sites

"Forestry Branch requires that all commercially harvested forest sites be regenerated to specific forest renewal standards (Manitoba Conservation, 2001)… The highest concentrations of high value forest sites, in proximity to the Project footprint, are located in FMUs 83, 84 and 85 in the Nelson River FS. Of the 8,072 ha within the Project's local study area, 81% are located within the Nelson River FS between Partridge Crop Lake and Ponton.

… Of the 8,072 ha of high value forest sites found within the Project local study area (4.8 km buffer around the preferred route), 126 ha (1.6%) will be directly affected and therefore lost. Although considerable in area, it is small (0.4%) relative to the almost 30,000 ha reported reforested by the two FML holders Tolko Industries Ltd. And Louisiana Pacific Canada Ltd. within the five year period April 2001 to March 2006 (Manitoba Conservation, 2006)…"

Research and Monitoring Programs

"Manitoba Conservation, Manitoba's forest industry, the Canadian Forest Service (CFS) and other federal government agencies, have established forest research and monitoring programs across Manitoba's forested areas… Those in proximity to the Project Footprint have been documented, including their precise location and required buffers, to enable their continued protection.

As a result of considerations during the routing process, no research and monitoring sites are directly affected by the Bipole III line. Three research and monitoring sites are located in close proximity to the Project Site/Footprint. These sites are listed as environmentally sensitive sites and are to be included in all Project-related EnvPPs. They will be safeguarded under the mitigation measures prescribed below."

Summary of Forestry Assessment

Construction Phase

"The potential direct and indirect effects of clearing the line include mechanical damage and scorching adjacent vegetation while clearing and burning debris, localized infestations of white spotted sawyer beetle as a result of debris accumulations, the spread of DED through improper disposal of elm wood, increased risk of wildfires as a result of debris burning and improved public access, localized sunscald to some species, microsite climatic changes immediately adjacent to the right-of-way, spread of non-native plant species, localized altered drainage patterns and forest fragmentation.

An EnvPP will be developed for the construction phase of the Project which will identify all ESSs and specify mitigation measures to be applied. These include:

- Where possible and practical, clearing and construction activities will be limited to frozen ground conditions;
- The removal of stumps will be limited where possible;
- As much as possible, Project-related activities will be limited to the Project Site/Footprint;
- Where practical, all merchantable timber will be salvaged;

- Where demand exists, an opportunity for local salvage of fuelwood will be provided to local communities;
- Debris from clearing will not be pushed into standing timber;
- Debris piles will be placed on mineral soil where possible and well removed from the right-of-way edge to avoid scorching adjacent vegetation;
- Burn piles will be monitored to ensure all fires are extinguished prior to spring breakup;
- Cleared woody debris will be disposed of to prevent infestations of sawyer beetles;
- All elm wood will be immediately burnt, chipped or disposed of at designated disposal sites to prevent the spread of DED;
- All equipment will be thoroughly washed before being transported to the clearing/construction site to minimize the spread of non-native plant species;
- All hazard trees (on and off right-of-way) will be removed at the time of clearing and construction;
- All disturbed sites that are not required for the operations and maintenance phase of the Project (e.g. borrow pits, access trails, marshalling yards) will be rehabilitated;
- On-site supervision of all activities will be provided during construction;
- As soon as is practical, all forest lands used temporarily (e.g. borrow pits, marshalling yards, access routes, etc.) during the construction phase of the Project will be rehabilitated and return them to the productive forest base;
- Manitoba Hydro compensate Manitoba Conservation for the effects on productive forestlands as specified in the FDA& V Policy (Manitoba Conservation 2002);
- All high value forest sites within 500 m of the Project Site/Footprint will be considered ESSs and included in the construction, operations and maintenance, and decommissioning EnvPPs; and
- All high value forest sites located adjacent to the Project Site/Footprint will be safeguarded from damage (e.g. errant equipment) during all phases of the Project.

Given these mitigation measures, construction effects to forestry are assessed as negative, small in duration, Project Footprint/Local Study Area in geographic extent, short-term in duration, and therefore not considered significant."

Operation

"The potential direct and indirect effects of operating the Bipole III line include increased risk of wildfires as a result of improved access, localized sunscald to some species, blowdown, micro-site climatic changes immediately adjacent to the right-of-way and the spread of non-native plant species.

An EnvPP will be developed for the operations phase of the Project…"

Commercial Fishing

Construction

"The line crosses few water bodies where commercial fishing occurs. However, a number of commercially fished waters do lie within the Project Site/Footprint. Most commercially fished water bodies are larger lakes, but also include medium to large rivers such as the Burntwood, Saskatchewan and Overflowing rivers. Bait fishing occurs on two water courses crossed by the line, the Saskatchewan River and the Red River.

Potential impacts to fishing as a result of constructing the line include:

- Negative impacts to fisheries as a result of habitat degradation;
- Impacts to surface water quality as a result of erosion or pollutants; and
- Increased access to and exploitation of fish resources.

Potential impacts to habitat and water quality will be negligible with mitigation implemented at water courses crossings. The presence of a large workforce during construction can lead to an increase in fish harvest from water bodies along the transmission line. The line follows, or is in close proximity to existing linear facilities through much of its length and therefore access to remote water bodies will not be increased. Where access becomes an issue to a community it will be managed through development of an Access Management Plan. Therefore, the impact of construction of the line on commercial and bait fishing is expected to be negative, small in magnitude, Project Footprint/Local Study Area in geographic extent, short-term in duration, and therefore not significant. …"

Mining/Aggregates

Construction

"Route selection has minimized the potential effects on mineral interests to the extent possible. In terms of the Bipole III line, additional liaison with the Mining Association, principally-affected companies and the Mines Branch resulted in the final preferred route being adjusted to avoid crossing numerous mining claims affecting three principal claim areas in the Thompson Nickel Belt area…

The final preferred route crosses five mining claims, involving two different companies, and nine mineral license areas involving five separate companies. No known operating mine sites and other properties are crossed by final preferred route for the line…

The line also crosses nine commercial quarry lease areas involving five different companies, several aggregate deposits of varying potential economic quality and is located in proximity to existing sand and gravel pits. Potential concerns relate to the ability to develop the quarry lease areas and deposits for commercial extraction and/or the potential for interference with operations of the quarry or aggregate deposit. One of the quarry leases, located to the west of Stephens Lake, is held by Manitoba Hydro.

… Measures to mitigate or minimize the effects of Project-related impacts will and include the following:

- Mineral claim and licence holders crossed by the final preferred route will be provided with information… to minimize potential interference with exploration activities…
- … additional possible mitigation measures will include placement of towers to lessen/avoid interference with operations (i.e., quarries, pits) at those locations; and
- Manitoba Hydro will consult with the affected stakeholders (operators)… to avoid adverse intereference from the transmission line with any future plans.

Given these mitigation measures anticipated adverse effects during construction are expected to be negative, small in magnitude, Project Site/Footprint in geographical extent, short-term in duration and therefore not significant."

Operation

"No adverse effects are expected from operations of the line on any existing mines, properties, or quarry operations. The provision of increased access through the right-of way could potentially result in increased mineral exploration activity… Operations of the line could have an adverse effect on future exploration activities for individual company mining claim or lease holdings through disruption or interference with electro-magnetic surveys used to search for mineral anomalies…"

Trapping

Construction

"The final preferred route for the Bipole III crosses 45 registered traplines (Bipole III Resource Use Technical Report). Registered trapline holders were contacted through the EACP for the Project. Construction activities may temporarily displace wildlife from areas in proximity to the right-of-way. Manitoba Hydro has a Trapper's Notification/Compensation Policy in place for registered trapline holders (www.hydro.mb.ca). Mitigative measures which are part of the notification policy are outlined below. In terms of compensation, the program is intended to provide compensation to holders of registered traplines whose lines are affected by the construction of transmission facilities 115 kV or greater. Prior to construction, a compensation amount will be determined with eligible holders of registered traplines for the disturbance during the period of construction. Compensation would also be paid for any damage to equipment, buildings and trails uses for trapping during construction activities.

Applicable legislation, regulations and guidelines will be adhered to. Measures to mitigate or minimize the effects of project-related impacts will include the following:

- Prior to construction activities, registered trapline holders will be notified as to the schedule for construction activities; and
- Trapline holders will be notified to remove trapping equipment as required.

Given these mitigation measures and the duration of construction activities in any one area the effects are anticipated to be negative, small in magnitude, Project Footprint/Local Study Area in geographic extent, short-term in duration and therefore considered not significant."

Operation

"… Anticipated effects are expected to be small in magnitude, Project Footprint/Local Study Area in geographic extent, medium-term in duration, and therefore not significant."

Recreation and Tourism (Lodges, Outfitting, Fishing, Hunting, Recreation Sites/Trails) Construction

"… The route, where feasible, was selected to avoid displacing or passing within close proximity to lodges, cottage subdivisions, cabins/remote cottages and recreation sites/trails.

There are no lodges in immediate proximity to the route for the Bipole III line. The closest lodge to the final preferred route is Trapper Don's Lodge & Outfitting Service located in the RM of Mountain (South) along PTH 20, approximately 2.3 km east of the route. Services offered by Trapper Don's that could potentially be affected include: guiding, fishing and hunting (for non-resident black bear and whitetail deer in Game Hunting Areas (GHA) 14/14A [both of which are crossed by the final preferred route]).

There are three additional lodges within 10 km of the final preferred route for the line whose activities may be potentially affected…

… Twenty GHAs are intersected by the final preferred route for the line and the 4.8 km (3.0 mile) wide Local Study Area. Ninety-nine outfitters are operating in these GHAs. In terms of outfitting, winter construction, which is planned for the northern part of the transmission line, is concentrated in months in which outfitting activity (e.g., big game hunting) is limited by closed hunting seasons. This will minimize potential effects.

…Many of the water courses crossed by the line are fished recreationally. Potential impacts to sport fishing as a result of constructing the line include:

- Negative impacts to fisheries as a result of habitat degradation;
- Impacts to surface water quality as a result of erosion or pollutants; and
- Increased access to and exploitation of fish resources.

Potential impacts to habitat and water quality will be negligible with mitigation implemented at water courses crossings…

No cottage subdivisions are in close proximity (within 0.8 km) to the final preferred route. The route does cross through three quarter-sections of Crown-encumbered land where two remote cottages and one recreational lot are located… The final preferred route for the line crosses through five quarter-sections of Crown-encumbered land where four campgrounds and one fish camp are located…

The final preferred route crosses the Grass River which is a designated canoe route. The crossing point along the Grass River was reviewed with Manitoba Conservation Regional representatives. No concerns were raised with the crossing point on the Grass River. The route crosses the Middle Track and Hayes River designated canoe route at two locations, southeast of Little Cormorant Lake and east of The Pas on the Saskatchewan River. Other designated canoe routes crossed by the final preferred route include: Mossey River… and the Rat River… The route also crosses the Red River… which is a designated Heritage River under the Canadian Heritage Rivers System.

The Bipole III line is located adjacent to or crosses a number of designated snowmobile trails in the vicinity of communities…

Adventure travel and eco-tourism (ATE) activities within the Project Study Area are limited… Rivers Run Wild is one operator that offers canoe trips throughout a number of northern rivers which include the Limestone, Hayes, and Churchill Rivers. The Limestone River is located in the vicinity of the final preferred route.

… Measures to mitigate or minimize the effects of Project-related impacts include the following:

- Lodge owners and recreational resource users, including Crown land encumbrance holders, and snowmobile associations will be notified in advance as to the schedule for clearing and construction;
- Information signs and the placement of warning markers will be used to identify the right-of-way where it intersects with a recreational trail;
- Care will be taken to protect the natural landscape surrounding work activity sites; construction activities will be conducted to prevent any unnecessary damage outside the required rights-of-way and other disturbed/developed areas (e.g., borrow pits);
- If site-specific issues of concern arise, mitigation may be possible through minor route adjustments or maintaining a buffer of trees between a site/trail and the transmission line right-of-way; and
- Where access becomes an issue to a community, it will be managed through development of an Access Management Plan.

Given these mitigation measures, in general, construction-related effects on recreation and tourism are considered to be negative, small in magnitude, Project Footprint/Local Study Area in geographic extent, short-term in duration, and therefore not significant."

Operation

"… Operations have less potential for disturbance to recreation and tourism than construction activities. The most effect on recreation and tourism during the operations phase is the permanent physical presence of the line. The line will be a net addition to the landscape and any adverse effect will be incremental in nature, particularly in areas where other infrastructure facilities are present…"

Wild Rice Harvesting

Construction

"The final preferred route for the line crosses in proximity to two lakes/creeks identified for commercial harvesting of wild rice, ranging from approximately 100 to 300 m distant respectively…

… The adverse effects on wild rice harvesting operations expected to occur during construction are associated with the potential for increased access to the resource. Depending on the availability of access, the level of resource harvesting may increase. Where access becomes an issue to a community it will be managed through development of an Access Management Plan.

… anticipated effects on wild rice harvesting from construction activities are considered negative, small in magnitude, Project Footprint/Local Study Area in geographic extent, short-term in duration and therefore not significant."

Domestic Resource Use

Construction

"The importance of domestic resource use in the Project Study Area to Aboriginal people was identified by a number of First Nation communities, Northern Affairs Communities (NACs) and the Manitoba Metis Federation (MMF). During construction, there is potential to have an effect on domestic resource harvesting (e.g., hunting, fishing, plant and berry harvesting). Trapping is discussed above. Effects can arise through direct impact on the resource as a result of Project construction or through undesired access to resources by other parties. These concerns were raised by some communities through the ATK process, which included workshops and self-directed studies, as well as through the EACP (Chapter 5).

A portion of the final preferred route is located in the Fox Lake Resource Management Area (RMA) and the Fox Lake Traditional Territory… Approximately 226 km of the Bipole III transmission line is located within the Split Lake Resource Management Area (SLRMA). Approximately 15 km of the Bipole III transmission line is also located in the broader Split Lake Resource Area, just outside the SLRMA… The Bipole III line also crosses through the Cormorant RMA… In addition, the Crown has an obligation arising from Section 35 of the Constitution, to consult with Aboriginal communities regarding the potential impact of the Project on the exercise of Treaty and Aboriginal rights.

In terms of domestic hunting, it is anticipated that wildlife/game species sensitive to disturbance may move away from sources of disturbance during construction of the line which may impact domestic harvesting levels in the area. This movement is anticipated to be short-term in duration, with the majority of mammal populations returning to the area once construction has been completed. Disturbance to game will be mitigated through conducting construction during off seasons for hunting (e.g., winter) which this is consistent with construction plans for the northern portions of the line, and the desired approach for the southern portions of the line.

With respect to mammals, another concern expressed by resource harvesters was the removal of prime hunting areas. Removal of habitat is expected to be limited to a relatively small amount of moose, elk, boreal woodland caribou, barren-ground and coastal caribou, marten and beaver habitat (Bipole III Mammals Technical Report and the Bipole III Caribou Technical Report). The removal of habitat is not expected to affect the overall health of mammal populations and, as noted above, species that require forest cover may become displaced due to clearing of the right-of-way, while species which use rights-of-way for grazing and travel may persist and/or move into the area once construction has concluded.

In terms of domestic hunting and fishing, resource harvesters raised the issue of increased access to hunting and fishing areas, and the effects on desired wildlife and fish species. There were a variety of perspectives regarding the effects of increased access on wildlife and fish. Some resource harvesters felt that the development of the right-of-way and construction access trails may benefit resource users through increased access to resource use areas and, thus, improving their chance of an increased harvest. However, some were of the opinion that greater access increased the risk of theft, vandalism and potential reduction of their harvest due to others accessing the resource base.

Nineteen traditional plant harvesting locations were identified along the final preferred route for gathering food and medicines, and for harvesting plants and trees for cultural and other purposes. From the self-directed studies, general botanical resource areas have also been identified along the route. Potential effects include the disruption or loss of plant species and communities important to Aboriginal people (as identified through the ATK process).

Plant species/communities have been considered important as these areas are used for gathering plants for medicinal, cultural and spiritual purposes. More than 80 species of traditional value were noted as being used through the ATK process. During plant surveys conducted for Swan Lake First Nation, approximately 95% of the greater than 200 species identified are known as medicinal plants or have other uses by the
community (Reeves 2011).

Nineteen locations that are used for traditional plant gathering and berry picking will be affected by the final preferred route. The total area potentially affected within the transmission line right-of-way for traditional plant harvesting and gathering is approximately 760 ha. Fox Lake Cree Nation, TCN, Long Plain First Nation, Swan Lake First Nation, Wuskwi Sipihk First Nation, and the MMF have also identified general plant harvesting areas along the route. However, no calculations for areas of these sites are available.

As with domestic hunting and fishing, construction of the transmission line has the potential to increase access. This can result in a potential loss of important plant species and communities to Aboriginal people through pressure on the resource by noncommunity members. It can also increase access to resource areas…

Domestic forest resource utilization is limited primarily to the personal use of fuelwood and, to a limited extent, the production of lumber for personal needs… The estimated combined domestic annual utilization, from Timber Permits and estimated First Nation fuelwood gathering, is less than 8,400 m3/yr for all of the Forest Management Units (FMUs) overlain by the Project.

A review of the ATK forestry values identified nine areas that are adjacent to or overlain by the Project Site/Footprint. Four of these sites are commercial timber harvest areas under authority of Tolko Industries Ltd. 1997- 2009 Forest Management Plan. Another five sites include fuelwood gathering areas, access trails and a domestic timber harvesting area intersected by the Project Site/Footprint. Project-related construction activities may temporarily restrict access to some areas for domestic timber resource use activities for safety reasons. The Project will not interfere with the collection of wood products from the forest for craft purposes.

… The following mitigation measures have been identified to reduce effects on domestic resource use during construction:

- Construction and site decommissioning activities in northern Manitoba will be carried out during the winter months;
- Where construction and site decommissioning activities do not occur during winter months, disturbances will be minimized in areas of plants used by Aboriginal people as identified through the ATK process;
- Whenever possible, existing trails, roads and cut lines will be used as access routes;
- Access controls adjacent to PTH 6 and other access points from main roads will be applied, including ditching and access road retirement;

- Hunting and fishing by Project personnel will be prohibited, and firearms restricted in work camps;
- Understory stratums will be maintained during construction and site decommissioning activities;
- Manitoba Hydro will work with individual communities that have identified important resource use sites that are in close proximity to the Project Site/Footprint to minimize potential effects;
- Where demand exists, cleared timber that is not otherwise practically salvageable, will be made available to communities for fuelwood. Manitoba Conservation is responsible for timber allocation on Crown lands. Within those areas under FMLs, the Licensee has the first right to all merchantable timber under license. Manitoba Hydro will endeavour to salvage merchantable where practical to do so; and
- Where the issue of increased access is important to a community (i.e., effect of increased access to areas deemed important for domestic resource use), Manitoba Hydro will work with directly affected communities to prepare Access Management Plans prior to construction of the line.

Based on the mitigation measures provided, effects on domestic resource use during construction are anticipated to be negative, moderate in magnitude, Project Footprint/Local Study Area in geographical extent, short-term in duration, and therefore is not considered significant."

Operation

"Operations of the line may result in an increase in access to domestic resource use areas…

The operations of the line may result in a benefit to resource users (e.g., hunter and fishers) through increased access to resource use areas… However, there is also the potential for improved access to resource use areas to result in increased pressure on the resource base if more people frequent an area. In addition, there could be an increase in disturbance to wildlife/game populations along the right-of-way. This may result in a low level of avoidance by game and furbearers sensitive to repeated disturbance to these areas, and thus a possible negative effect to hunting in the area.

There is the potential for operations of the line to negatively affect plants valued by Aboriginal people. Effects include the loss of plant species/communities as a result of the use of maintenance equipment outside of winter months, as well as the use of herbicides to control undesirable species. As a result of plant loss, Aboriginal people may have to travel further from current traditional areas to locate sites supporting favorable plants for food and medicine…"

Keewatinoow Converter Station and Associated Facilities (Including Construction Camps, Construction Power Station, Construction Powerline, 230 kV AC Collector Lines, and Ground Electrode and Electrode Line)

Commercial Forestry

"… there are no issues of concern… No adverse effects are anticipated."

Commercial Fishing

"There is no commercial or bait fishing… No adverse effects are anticipated…"

Mining/Aggregates

"The development of the proposed Keewatinoow Converter Station and associated facilities will not have an adverse effect on any mining claims and mineral leases.

Identified borrow source locations have been identified by Manitoba Hydro as potential granular sources for Project use during construction. Ongoing discussions with respect to use of the borrow sources will continue with Fox Lake Cree Nation. In March 2011, Manitoba Hydro submitted quarry lease applications to the Mines Branch for the identified source locations…"

Trapping

Construction

"Construction activities could temporarily affect trapping in the area of the proposed Keewatinoow Converter Station and associated facilities. There is one registered trapline in the area (Trapline 5 of the Limestone RTL) that is directly affected. The routes for the 230 kV ac northern collector lines and construction powerline will cross two registered traplines in the Split Lake RMA and one in the Fox Lake RMA. Under Manitoba Hydro's Trapper's Notification/Compensation Policy, compensation will be paid to the registered trapline holder for the period of construction. Compensation would also be paid for any damage to equipment, buildings and trails uses for trapping during construction activities…"

Wild Rice Harvesting

"There are no issues of concern… No adverse effects are anticipated."

Recreation and Tourism

Construction

"Construction activities for the development of the Keewatinoow Converter Station and associated facilities are not expected to result in adverse effects on lodges and outfitters. There are no lodges in the area and no outfitter allocations are located in the immediate area. The closest outfitter utilizes an area west from Long Spruce Generating Station and extends to the area around Kettle Generating Station.

Goose Creek, immediately adjacent to the Keewatinoow Converter Station site, is recreationally fished and supports brook trout. Potential impacts to sport fishing from construction of the Keewatinoow Converter Station include habitat degradation, impacts to water quality and increased access and exploitation of the fish resources. The ground electrode line crosses Goose Creek and Swift Creek, both of which support brook trout and recreational fisheries, and the collector lines and borrow areas are in close proximity to watercourses used for recreational fishing. Potential impacts to habitat and water quality will be negligible with mitigation implemented at the converter station site and water courses.

Goose Creek is currently readily accessible from the Conawapa Road, and therefore the construction of the converter station will not increase access. However, there will be an increase in people during construction and the potential for increased harvest. Existing sport fishing regulations in addition to restrictions to fishing by contractors will be sufficient to address any changes in fishing pressured. Therefore, the impact of construction of the Keewatinoow Converter Station and facilities negative, small in magnitude, Project Footprint/Local Study Area in geographic extent, short-term in duration, and therefore are not expected to be significant."

Operation

"….Effects on sport fishing from the operations and maintenance of the Keewatinoow Converter Station and associated facilities are expected to be negative, small in magnitude, Project Footprint/Local Study Area in geographic extent, mediumterm in duration, and therefore not expected to be significant."

Domestic Resource Use

"The Keewatinoow Converter Station, construction power station, northern ground electrode and electrode line, as well as portions of the collector and construction power lines are located in the Fox Lake RMA and the Fox Lake Traditional Territory… The Keewatinoow Converter Station and related facilities are also located in the broader Split Lake Resource Area, just outside the Split Lake RMA…

… the Crown has an obligation arising from Section 35 of the Constitution, to consult with Aboriginal communities regarding the potential impact of the Project on the exercise of Treaty and Aboriginal rights.

Fox Lake Cree Nation has raised concerns about the effects of the Keewatinoow Converter Station and associated facilities on domestic resource use... *(see background papers referenced in Chapter 5)*"

Construction

"... there is a potential for increased harvest of wildlife and fish. The loss of important plants and plant communities important is non-mitigable and has been identified as a residual effect. As a result of plant loss, Aboriginal people may have to travel further to find sites supporting suitable quality plants. Mitigative measures to minimize potential effects will include the following:

- Keewatinoow camp rules will prevent Project personnel from having firearms on site and limit them from exiting the site to harvest resources;
- Development and implementation of the Keewatinoow Access Management Plan in conjunction with Fox Lake Cree Nation. This will allow existing resource users to access the Keewatinoow construction area as appropriate and safe; and
- Development and implementation of environmental reclamation and rehabilitation measures.

Effects from construction on domestic resource use are considered negative, moderate in magnitude, Project Footprint/Local Study Area in geographical extent, short-term in duration, and therefore is not considered significant."

Operation

"There is the potential for improved access to resource use areas to result in increased pressure on the resource base if more people frequent an area. In addition, there could be an increase in disturbance to wildlife/game populations in the area which may result in a low level of avoidance by game and furbearers sensitive to repeated disturbance to these areas, and thus a possible negative effect to hunting in the area.

Maintenance activities for the northern ground electrode site and lines may cause the loss of valued plants and plant communities… Aboriginal people may have to travel further to find sites supporting suitable quality plants.

Measures to mitigate or minimize potential effects during operations include:

- Manitoba Hydro will work with Fox Lake Cree Nation to reduce pressure on the resource base;
- Maintenance activities will be carried out during the winter months to minimize surface damage, rutting and erosion;
- Where maintenance activities do not occur during winter months, soil and vegetation disturbance will be minimized in areas of plants used by Aboriginal people;
- Understory stratums will be maintained during maintenance activities;
- Existing access roads and trails will be used to the extent possible; and
- Development and implementation of the Keewatinoow Access Management Plan for operations in conjunction with Fox Lake Cree Nation.

Based on the mitigation measures, effects during operations are expected to be negative, moderate in magnitude, Project Footprint/Local Study Area in geographic extent, medium-term in duration and therefore not significant."

Riel Converter Station & Associated Facilities

Commercial Forestry

"There are no issues of concern… No adverse effects are anticipated."

Commercial Fishing

"There is no commercial or bait fishing… no effects are anticipated."

Mining/Aggregates

"There are no issues of concern… No adverse effects are anticipated."

Trapping

"There are no issues of concern… No adverse effects are anticipated."

Recreation and Tourism

"There are no issues of concern… No adverse effects are anticipated."

Wild Rice Harvesting

"There are no issues of concern… No adverse effects are anticipated."

Domestic Resource Use

"There are no issues of concern… No adverse effects are anticipated."

8.3.2.4 Summary of Residual Environmental Effects and Significance 8-282

"Table 8.3-5 provides a summary of residual effects related to resource use for the Project…

In terms of resource use, construction of the Bipole III line will result in residual effects on commercial forestry, commercial fishing, mining, trapping, wild rice harvesting, recreational fishing and hunting, wild rice harvesting and domestic resource use. In terms of commercial forestry, the residual effect is related to loss of productive forestlands. This will continue through operations of the line. In terms of fishing, hunting and trapping, the residual effect is the loss/degradation of habitat and temporary displacement of wildlife. With respect to plants and plant communities of importance to Aboriginal people, the residual effect is the loss of plants.

With respect to the Keewatinoow Converter Station and associated facilities, there will be a residual effect during construction with respect to trapping, recreational fishing, as well as domestic resource use. With respect to trapping and hunting, the residual effect is the loss of habitat and the temporary displacement of wildlife. As with the Bipole III line, there will be a loss of plants and plant communities of importance to Aboriginal people. Construction and operations of the Riel Converter Station and associated facilities will not result in any residual effects in terms of resource use.

With respect to resource use, the main residual effect during operations is the physical presence of the facilities and the potential for increased access. The presence of these facilities will alter the landscape for as long as they are in operation. With some resource uses (i.e., commercial fishing, trapping, some recreation activities, wild rice harvesting and some domestic resource uses), the presence of the facilities and, in particular, the transmission lines may have a positive residual effect in terms of increased access to undertake resource use activities."

8.3.2.5 Follow-up 8-285

"…A listing of ESSs associated with the Project… will be documented in the EnvPPs. Some of these situations may require that areas be flagged in the field to ensure construction crews are able to distinguish boundaries and locations. Sites/areas identified from a resource use perspective will include: locations of high valued forest sites, and research and monitoring sites, recreational sites/trails, including snowmobile trails and other trails crossed or in the vicinity of the line. In addition, where the issue of increased access is of concern to a community, Access Management Plans for construction and operations will be prepared in consultation with the directly affected community."

8.3.3 Economy 8-285

8.3.3.1 Potential Effects and Key Topics 8-285

"… Transmission line construction activities typically result in modest economic benefits in the Project Study Area through employment and business opportunities. In northern Manitoba… job and business opportunities are short-term in duration… in agricultural Manitoba may occur at any time of the year… the workforce for converter stations and associated facilities typically peaks in the third year of construction…"

8.3.3.2 Valued Environmental Components 8-286

"… One VEC was identified for inclusion in the economic environmental assessment for the Project — Economic Opportunities (jobs and business opportunities, training, and enduring benefits)."

8.3.3.3 Environmental Effects Assessment and Mitigation 8-286

"…"

HVdc Transmission Line and ac Collector Lines

Construction

"… Economic benefits could arise directly from contracting and other business opportunities and employment opportunities, and indirectly through the provision of goods and services to the construction workforce.

Construction of the Bipole III line will require five years to complete. Construction for the northern portion of the line, along with the collector lines will occur during the winter months. Construction of the line in southern Manitoba may occur at any time of the year if conflict is unavoidable due to schedule constraints…"

Actual workforce numbers will be decided by contract negotiations, methods of clearing and construction, and sequencing of clearing and construction for the lines…Although the number of jobs will fluctuate, jobs for clearing may be in the range of 15 to 40 per transmission line segment…. total positions per segment for the Bipole III line is expected to range between 10 and 200 workers at peak periods.

The 230 kV ac collector lines… Workforce requirements are expected to range from 20 to 150 persons over the period of clearing and construction.

Total transmission line employment (Project-direct in Manitoba) including the Bipole III line, the ac collector lines and construction powerline is estimated to total 4,819 person years during the construction phase of the Project (Bipole III Economic Impact Assessment Technical Report). In Manitoba, labour income is estimated to be $201.7 million, while tax revenue for all levels of government is estimated to be approximately $131.9 million.

… the Contractor in selecting persons (other than supervisory personnel) to be employed on the Project who meet the Contractor's requirements in training, experience and other qualifications for the work to be performed, shall give preference to Aboriginal and local residents.

Communities in the vicinity of the line will experience indirect benefits through the purchase of meals, gasoline and accommodations by the Contractors when work is being done…

Manitoba Hydro developed an extensive pre-project training initiative… the Hydro Northern Training and Employment Initiative (HNTEI)… the initiative has trained Northern Aboriginals in jobs that are applicable to the construction of the Project.

… approximately 60 communities will be eligible for the Community Development Initiative (CDI), including First Nations, community councils, rural municipalities, and towns and villages. CDI funds are to be used to support community development projects that benefit a broad segment of the community…

Effects on economic opportunities from construction of the lines are considered positive, small/moderate in magnitude, short-term in duration and Project Study Area in terms of geographic extent. The positive effects are considered to be potentially significant."

Operation

"… For operations and maintenance for the Bipole III line and the ac collector lines, the average annual workforce requirement (average over the life expectancy of the Project) is estimated to be 11.5 persons… Maintenance activities could consist of limited, short-term contracts for brush clearing… These opportunities could be periodically available to local communities.

Effects on economic opportunities from operations of the line are considered positive, small in magnitude, Project Study Area in geographic extent, medium-term in duration, and therefore are not significant."

Keewatinoow Converter Station (including the Ground Electrode and Electrode Line)

Construction

"… estimated to total approximately 920 person years not including contractor supervisory and management staff or Manitoba Hydro staff.

Two types of contracts will likely be used… The conventional contracts generally involve a substantial component of general labour and construction trades, and will offer a variety of employment opportunities. Contracts related to the assembly and installation of the HVdc and 230 kV as switchyard equipment will substantially involve highly specialized workers…Local employment opportunities will be less significant for these contracts.

Employment opportunities will generally be based on the hiring preferences defined in the Burntwood Nelson Agreement (BNA).

These will be available to qualified individuals and will include construction and service jobs in:
- Catering and security (for both the camp and construction sites) extending for the duration of the construction schedule;
- Site and camp development (labourers, operators and teamsters for clearing, grubbing, excavation and earthmoving) extending for a period of approximately four months;
- Foundation preparation (labourers, carpenters, and steelworkers for construction of building, structure and equipment foundations) extending for a period of approximately four months; and
- Buildings and services development (labourers, carpenters, electricians and pipefitters for construction of camp).

… Under the BNA (Section 2.9), if Direct Negotiated Contracts (DNCs) are negotiated with a Northern Aboriginal business for activities, the business can directly hire northern Aboriginal residents for their workforce. Once the supply of qualified northern Aboriginal workers has been exhausted, employment opportunities must be filled using a job-order process (Section 12.1.1.3 of the BNA) according to the following sequence:
- Northern Aboriginal residents of the Churchill-Burntwood-Nelson (CBN) area…
- Northern residents (unionized);
- Northern Aboriginal person; and
- Northern resident.

The workforce estimates for the Keewatinoow construction power station are estimated to peak at about 55 workers excluding Manitoba Hydro senior contract supervisory staff during the approximately one year construction term…

The workforce for Keewatinoow construction will be in the order of 250 through mid-2013, until installation of the construction power substation is complete — tentatively scheduled for October 2013…

…The workforce during this period will peak in excess of 300 in late 2013 and early 2014, and taper gradually down to less than 100 by late 2016. Through to completion of construction in late 2017, the total will decline from about 55 to 30, as the emphasis shifts from construction to commissioning. The construction workforce will wind down entirely by mid-2018.
….
Effects on economic opportunities from construction of the Keewatinoow Converter Station and associated facilities are considered positive, moderate in magnitude, shortterm in duration and Project Study Area in geographic extent. The positive effects are considered to be potentially significant."

Operation

"It is currently estimated that 42 Manitoba Hydro staff will be employed at the Keewatinoow Converter Station with perhaps 30 on-site on a daily basis. In addition, there will be perhaps 30 contractor staff present during station maintenance periods…

Effects on economic opportunities from operations of the Keewatinoow Converter Station and associated facilities are considered positive, small in magnitude, Project Study Area in geographic extent, medium-term in duration, and therefore not significant."

Riel Converter Station & Associated Facilities (Ground Electrode and Electrode Line)

Construction

"Over the duration of construction, employment associated with the development of the Riel Converter Station is estimated to total approximately 640 person years not including contractor supervisory and management staff, or Manitoba Hydro staff…

Preliminary workforce estimates indicate that from project commencement in September 2012, the Riel-related workforce will ramp up gradually from about 50 people in late 2012 to peak at about 260 in the first quarter of 2014. It will continue at a relatively high level, tapering down to about 150 by the end of 2015, and to less than 100 by the beginning of 2016. It will continue to decrease gradually, tapering off to only about 15 by mid-2017 as the emphasis shifts from construction to commissioning…

Effects on economic opportunities from construction of the Riel Converter Station and associated facilities are considered positive, small in magnitude, Project Study Area in terms of geographical extent, short-term in duration, and therefore not significant."

Operation

"… Total operations and maintenance staff has been estimated at 45 persons including the Riel ground electrode."

8.3.3.4 Summary of Residual Environmental Effects and Significance 8-293

"Table 8.3-6 provides a summary of residual effects related to economic opportunities during construction and operations for the Project by component…

With respect to economic opportunities, and jobs in particular, the main residual effect of the Project will be job skills acquired through employment and training which may be applied to other employment opportunities. Similarly, contractors will benefit from participation in the Project and local businesses will benefit from spending because of the Project. Effects of the Project during construction and operations in terms of economic opportunities are considered to be positive. With respect to construction of the Bipole III and ac collector lines, as well as the Keewatinoow Converter Station and associated facilities, these positive effects are considered to be potentially significant."

8.3.3.5 Follow-up 8-295

"Manitoba Hydro typically conducts monitoring of employment and business outcomes associated with the development of its new facilities…"

8.3.4 Services 8-295

8.3.4.1 Potential Effects and Key Topics 8-295

"… Community-based services (emergency, health and social) are critical to meeting a wide range of human needs. Potential effects on community-based services will only occur in Project Study Area communities in close proximity to the various project components. Given the location of the northern Project components, community-based services are extremely important as is transportation infrastructure. In terms of the Bipole III line, community services are of lesser importance given the smaller magnitude of the workforce and the use of mobile construction camps. Similarly, with the Riel Converter Station and associated facilities, transportation infrastructure is important whereas community services are of lesser importance given the magnitude of the workforce and proximity to the City of Winnipeg."

8.3.4.2 Valued Environmental Components (VECs) 8-296

"… Two VECs were identified for inclusion in the services assessment for the Project. These are:
- Community services (emergency, health and social); and
- Travel and transportation (traffic, transportation services)."

8.3.4.3 Environmental Effects Assessment and Mitigation 8-296

…

HVdc Transmission Line

Community Services

Construction

"Construction workers for the line may be housed in mobile construction camps or, where feasible and practical, in suitable accommodations available in local communities. Mobile camps are generally located along the right-of-way as the various construction activities proceed and are removed from local communities. There is the potential that construction activities could result in increased pressure on local community, health and emergency response services… effects are anticipated to be negative, small in magnitude, Project Study Area in geographic extent, short-term in duration, and therefore not significant."

Operation

"Manitoba Hydro conducts inspections of transmission lines annually once they are operational… Operations effects on community services from the Bipole III line are expected to be negative, small in magnitude, Project Study Area in geographic extent, medium-term in duration, and therefore not significant."

Travel and Transportation

Construction

"Construction-related impacts associated with travel and transportation for the development of the line will generate additional traffic on an extensive area of the Provincial Road network (Bipole III Transportation Technical Report). Three types of traffic are anticipated to occur ─ local traffic, workforce traffic and shipping of materials…

... Given that future road works are planned along PTH10, the construction phase of the Bipole III line is short-term in duration, and that the traffic volumes are only marginally above the design capacity, no additional works on PTH10 or other PRs are required for the construction of the line."

Navigable Waters Protection Act (Transport Canada)

"Overhead transmission lines are of potential interest to Transport Canada under the *Navigable Waters Protection Act* (NWPA). The principle aim of The NWPA is to ensure unimpeded navigation on navigable waters…

… Hydro transmission lines are considered for their impact to navigation under the NWPA. Manitoba Hydro will be adhering to all CSA clearance guidelines for the construction and operation of all transmission lines for the Project and as such believes that there will be no significant impact to navigation in accordance with Sec 5(3) of the NWPA. All stream crossings will be clear span with sufficient clearance for navigation as required by the CSA guidelines.

… Effects on travel and transportation from the construction of the Bipole III line are considered to be negative, small in magnitude, Project Study Area in geographic extent, short-term in duration and therefore not significant. No mitigative measures are required."

Keewatinoow Converter Station & Associated Facilities (Including Construction Camps, Construction Power Station, Construction Powerline, 230 kV AC Collector Lines, and Ground Electrode and Electrode Line)

Community Services

Construction

"Construction of the Keewatinoow Converter Station and associated work would take place in two stages… During the first stage of construction, the start-up camp workforce would consist of approximately 350 workers. Once the main camp has been constructed, the workforce could peak at up to 500 workers.

Fox Lake Cree Nation has raised concerns about the effects of the Keewatinoow Converter Station and associated facilities on community services and traffic. As noted in Chapter 5, two background papers, one which was drafted by Manitoba Hydro with Fox Lake Cree Nation's participation, input and review, and the second summarizing only Fox Lake's perspective are included with the Bipole III Aboriginal Knowledge Technical Report."

Emergency Medical and Ambulance Services

Start-up Camp

"… The Gillam Hospital will likely experience an increase in its emergency caseload, although it is not possible to specify the size and characteristics (e.g., injury severity or frequency) associated with this increase. This situation should be manageable…"

Main Camp

"Once constructed, the main construction camp will have a first-aid building and its own ambulance, which should largely eliminate the requirement to use the Gillam ambulance service…

Additional demands on Gillam emergency medical and ambulance services will be reduced or addressed by the following measures:

- Ambulance services and a fire truck will be provided at the 'start-up' camp; and
- A coordination system will be established between the camp, Gillam, and other emergency services in the area (e.g., Henday Converter Station)…"

Policing Services

"Emergency police services in Gillam are currently sufficient to meet the needs of the community and surrounding area. A large influx of population to the RCMP's detachment service area will strain current resources, which would be the case for both the 'start-up' camp and the larger main camp…

Given the multiple potential sources of increased requirements for police services associated with the construction of the Keewatinoow Converter Station, existing police resources may not be sufficient to meet the needs of the detachment's service area…

Additional demands on Gillam's police services will be reduced or addressed by the following measures:

- Visits to Gillam by workers during their leisure time will be reduced during both the 'start up' and main camp stages;
- Workers will be provided transportation to and from the construction site to avoid the use personal vehicles;
- Training camp security personnel will deal with issues of impaired driving and intoxication;
- Camp behaviour and disciplinary policy will be established to discourage workers from engaging in inappropriate behaviours; and
- Rigorous enforcement for impaired driving will be implemented between the construction camp and Gillam, carried out in coordination with security personnel at the camp access gate."

Housing

"... In terms of construction workers, the vast majority are not expected to have an interest in living in Gillam due to one or a combination of the following factors:

- A daily commute to and from the work camp of about two hours;
- Reduced "off" time due to long work days and daily commuting time;

- Increased cost of living since room and board are free at work camp, and Manitoba Hydro is considering providing off-site housing allowance to existing residents only; and
- Due to its variety of services, living in Gillam might likely be preferable to families. However, the short duration of most jobs would make it impractical to relocate one's family to the region.

… Effects on community services on Gillam from the construction of the Keewatinoow Converter Station and associated facilities are considered negative, moderate in magnitude, Project Study Area in geographic extent, short-term in duration and therefore are considered potentially significant…"

Operation
"In terms of operations, it is currently estimated that 42 Manitoba Hydro staff will be employed at the Keewatinoow Converter Station with perhaps 30 on-site on a daily basis. In addition, there will be perhaps 30 contractor staff present during station maintenance periods.

Effects on community services from the operations of the Keewatinoow Converter Station and associated facilities are considered negative, small in magnitude, Project Study Area in geographic extent, medium-term in duration and therefore not significant."

Travel and Transportation

Construction

"Potential construction-related impacts associated with travel and transportation for the development of the Keewatinoow Converter Station and associated facilities will be principally confined to the area highways and railway systems…

… Loaded trucks required to travel on the existing Conawapa access road to the construction site are not subject to provincial weight restrictions as the road does not fall under MIT jurisdiction…

Measures to mitigate or minimize the effects of Project-related impacts include the following:
- Manitoba Hydro will consult with appropriate agencies and government authorities (e.g., MIT, HBR, and the Town of Gillam) and will comply with all relevant government regulations and by-laws;
- Manitoba Hydro will notify the appropriate agencies and infrastructure operators as to the schedule for equipment and material deliveries during the period of construction;
- Level railway crossing safety would be ensured through the presence of flagpersons and appropriate warning devices; and
- All related movements will be subject to regulations governing load restrictions and transport of dangerous goods.

Traffic Effects

"The development of Keewatinoow Converter Station will result in an increase in traffic along the road between Gillam and Fox Lake (Bird), and concerns have been raised regarding a potential increase in accidents and related strain on emergency services in Gillam."

Workers travelling to and from Gillam

“The development of Keewatinoow Converter Station will lead to an increase in worker related traffic on PR 280 and PR 290 between Gillam and Fox Lake (Bird)…”

Truck Traffic

“Truck traffic operating between Gillam and Fox Lake (Bird) en route to the converter station construction site is expected to be relatively low. The same is true for truck traffic originating in other locations (e.g., Thompson, Winnipeg) [Bipole III Transportation Technical Report]. The vast majority of shipments related to materials and equipment for the converter station would move through the Henday Rail Yard (less than one trip per day on average).”

Additional Traffic

“Some additional traffic in the region may also be associated with worker and truck traffic travelling to and from Thompson. This traffic will travel along PR 280 to PR 290 and is therefore not expected to travel further along PR 280 to Gillam.

Additional traffic generated from all sources identified above (workers, truck and additional traffic) during peak construction activities at Keewatinoow has been estimated to be approximately 20% to 30% higher on PR 280, and more than double the trips on PR 290 (Bipole III Transportation Technical Report)… No capacity concern exists with the access road.

The increased traffic volumes could put local drivers at greater risk of being involved in an accident…

With respect to reducing worker travel to and from Gillam, a number of features are already incorporated into planning for the Project, including the following:

- Having a lounge and recreational facilities at the main camp;
- Restricted use of company vehicles for leisure activities;
- Length of shifts and shift rotation will serve to limit worker trips to Gillam;
- Workers will be prohibited from using Manitoba Hydro vehicles to travel to Gillam for recreational purposes;
- Controlling entry and exit through a staffed security gate; and
- Operating a shuttle to transfer incoming and outgoing workers from and to Gillam.

…

Monitoring

“A monitoring plan will be implemented, in discussion with First Nations in the vicinity, and will include the following:

- Tracking of vehicles going through the access gate including type of traffic (worker, truck, etc.);
- Tracking of number of vehicle accidents that occur as construction proceeds, through coordination with the Gillam RCMP;
- Tracking of incidents involved in impaired driving, at the security gate and through RCMP incident reports; and
- Implementation of a traffic monitoring program.

Air Travel

"Many of the workers travelling to and from the Keewatinoow Converter Station construction site are expected to travel by air via the Gillam Airport… Some of the potential effects with an increase in air travel are:

1. Fewer number of seats for local residents in northern Manitoba communities causing inconvenience; and
2. Inability of the infrastructure at the airport in Gillam to accommodate increased air travel.

… Overall, there should be minimal effect on the infrastructure at the airport. Regarding airline services, Calm Air is the major provider for commercial flights in the region… For the Wuskwatim Generation Project… Manitoba Hydro entered into an arrangement with Calm Air to combat the potential problem of reduced number of seats for local residents in the north… – a similar approach will be adopted for the Bipole III Project…

The following mitigation measures will minimize the effects of the Keewatinoow Converter Station and associated facilities:

- A regular charter service (weekly, bi-weekly or other regular time) will be implemented to accommodate the workforce especially during peak construction periods to ensure that scheduled flights are still available for local residents.

Effects on travel and transportation from the construction of the Keewatinoow Converter Station and associated facilities are considered negative, moderate in magnitude, Project Study Area in geographic extent, short-term in duration and therefore are considered potentially significant…"

Navigable Waters Protection Act (Transport Canada)

"… Manitoba Hydro will be adhering to all CSA clearance guidelines for the construction and operation of all transmission lines for the project and as such believes that there will be no significant impact to navigation in accordance with Sec 5(3) of the NWPA. All stream crossings will be clear span with sufficient clearance for navigation as required by the CSA guidelines.

… Given the mitigation provided, effects on travel and transportation from the operations of the Keewatinoow Converter Station and associated facilities are expected to be negative, small in magnitude, Project Study Area in geographic extent, short-term in duration, and therefore not significant."

Riel Converter Station and Associated Facilities (Ground Electrode and Electrode Line)

Community Services

Construction

"Preliminary workforce estimates for the Riel Converter Station indicate that from project commencement in September 2012, the Riel-related workforce will ramp up gradually from about 50 people in late 2012 to peak at about 260 in the first quarter of 2014. It will continue at a relatively high level, tapering down to about 150 by the end of 2015, and to less than 100 by the beginning of 2016. It will continue to decrease gradually, tapering off to only about 15 by mid-2017 as the emphasis shifts from construction to commissioning.

Given the proximity of the Riel Converter Station site to Winnipeg, and the relatively small workforce numbers, effects on community services from the construction of the station are considered negative, small in magnitude, Project Study Area in geographic extent, short-term in duration, and therefore not significant. No mitigative measures are required."

Operation

"In terms of operations, it is currently estimated that a total of 45 Manitoba Hydro staff will be employed at the Riel Converter Station…"

Travel and Transportation

Construction

"Construction labour traffic levels for the Riel Converter Station will involve a peak workforce of 368 persons during the period of maximum construction activities (Year 3)… Based on the traffic review, it was determined that traffic likely generated by Project construction (i.e., total trips generated by workers and material delivery) is unlikely to increase base traffic volumes to beyond acceptable design capacity levels. Therefore, no upgrades or contributions to upgrading the provincial road network are considered necessary (Bipole III Transportation Technical Report).

… Construction activity and vehicle movement will be subject to an EnvPP for station construction. Measures to mitigate or minimize the effects of Project-related impacts include the following:

- Manitoba Hydro will notify the appropriate agencies and infrastructure operators as to the schedule for equipment and material deliveries during the period of construction;
- Level railway crossing safety will be facilitated through the presence of flagpersons and appropriate warning devices; and
- All related movements will be subject to regulations governing load restrictions and transport of dangerous goods.

… Effects are anticipated to be negative, small in magnitude, Project Study Area in geographic extent, short-term in duration and therefore not significant."

Operation

"Effects from the operations of the Riel Converter Station and associated facilities are expected to occur on an infrequent basis and only when required…"

8.3.4.4 Summary of Residual Environmental Effects and Significance 8-311

"Table 8.3-7 provides a summary of residual effects related to services for the Project… During construction and operations of the various Project components, there will be residual effects in terms of increased stress on community services, as well as travel and transportation at certain periods of time."

8.3.4.5 Follow-up 8-313

"No follow-up monitoring with respect to Services is anticipated for the Bipole III line, Riel Converter Station, ground electrode and electrode line. With respect to the Keewatinoow Converter Station and associated facilities, in term of community services, monitoring will focus on the frequency at which the construction workforce demands on Gillam's emergency services and whether these instances stressed available resources beyond a reasonable limit…

No monitoring is required in the case of housing in Gillam as few, if any workers would choose to live in Gillam. With respect to visitors from the camp, there is some uncertainty concerning the utilization of services by Project construction workers, particularly medical services. Appropriate monitoring processes will be implemented…"

8.3.5 Personal, Family and Community Life 8-314
8.3.5.1 Potential Effects and Key Topics 8-314

"Personal, family and community life can be affected by the accumulated effects of a variety of Project-related effects (e.g., physical changes to the land, noise and nuisance effects during construction) and will vary for the different Project components. The lives of individuals, families and communities, and the quality of peoples' lives, are shaped by many factors. Personal, family and community life is generally looked at in terms of economic well-being, physical well-being (e.g., personal health and safety), social wellbeing (social supports and services) and the environment. The experience of changes will vary for individuals, families and communities as a whole depending on their experience of the effects of the Project. Culture, which is also important particularly in Aboriginal communities, is discussed under Culture and Heritage Resources."

8.3.5.2 Valued Environmental Components (VECs) 8-314

"Three VECs was identified for inclusion in the services assessment for the Project.
These are:

- Public safety;
- Human health (Noise, Vibration, Dust, EMFs, Herbicides); and
- Aesthetics."

8.3.5.3 Environmental Effects Assessment and Mitigation 8-314

"…"

HVdc Transmission Line

Public Safety

"…"

Human Health

"…"

Operation

"…Human health issues during operations primarily concern electic and magnetic fields (EMFs), and noise from the line.

Electric and Magnetic Fields

"The issue of EMFs and health effects was raised throughout the EACP for the Project (Chapter 5). EMFs are invisible lines of force surrounding any wire carrying electricity, and are produced by all electric tools and appliances, household wiring and transmission lines. Both electric and magnetic fields diminish rapidly as the distance from the source increases. Transmission lines produce an electric field, a magnetic field and corona. Corona and electric fields can cause electrical effects, the most common of which are audible noise, radio and television interference, and induction on nearby metallic objects. These are discussed below under Noise, Vibration and Dust. Most objects partially block electric fields, including trees, cars and buildings, while magnetic fields are not shielded by these objects. Since magnetic fields are more pervasive, they have been the focus of health research.

Numerous studies have been conducted with respect to health effects and EMFs. National and international scientific agencies responsible for public health have convened multidisciplinary groups of scientists to evaluate the research and to determine if health effects are associated with exposure to EMFs. Such groups include the World Health Organization (WHO) in 2006, the National Radiological Protection Board of Great Britain (NRPB) in 2004 and the International Agency for Research on Cancer (IARC) in 2002. These organizations have concluded that there are no known adverse health effects associated with ac EMFs or with low levels of static EMFs such as those associated with dc transmission lines.

In Canada, the Federal Provincial Territorial Radiation Protection Committee (FPTRPC)… concluded that "there is insufficient scientific evidence showing exposure to EMFs from power lines can cause adverse health effects such as cancer"… In addition, the Manitoba Clean Environment Commission developed a Health and EMF Expert's Consensus Statement on the Human Health Effects of ELF EMF in 2001 which concluded that "The weight of scientific evidence does not support the conclusion that extremely low frequency EMFs such as those produced by power lines are a cause of adverse effects on human health. …"

Predicted EMF Levels for the HVdc Bipole III Line

"Electric fields from transmission lines are generally measured in kilovolts per metre (kV/m), while magnetic fields are generally measured in milligauss (mG). EMFs have been predicted for the operation of the Bipole III line under typical load, and contingency load conditions using guyed and self-supporting towers (Table 8.3-8 to Table 8.3-11) [Bipole III Environmental and Health Assessment of the DC Electrical Environment Technical Report].

Under normal load conditions (2000 MW), predicted electric field levels at the edge of the right-of-way (33 m) would be approximately 6.6 kV/m under fair weather conditions and 9.5 kV/m under foul weather conditions for self-supporting steel towers. Predicted electric field levels at edge of the right-of-way for guyed towers would be approximately 6.5 kV/m under fair weather conditions and 9.3 kV/m under foul weather conditions. Under normal load conditions, corresponding maximum magnetic fields at the edge of right-of-way would be approximately 51.5 mG for self-supporting towers and 49.8 mG for guyed towers."

"…"

8.3.5.4 Summary of Residual Environmental Effects and Significance 8-340

"Table 8.3-16 provides a summary of residual effects related to Personal, Family and Community Life for the Project…

In terms of public safety, the primary residual effect during construction is construction site risks/accidents and worker interaction with local community members. During operations, there is still a risk of both accidents and worker interaction although it is greatly diminished. In terms of human health, there will be noise and other disturbance effects such as dust during construction, but these are short-term in duration. Although disturbance effects will also occur during operations, as with public safety, these will be diminished during operations. The locations of the Keewatinoow and Riel Converter Stations will minimize disturbance effects on people. With respect to aesthetics, the main residual effect is the physical presence of the new facilities. The presence of these facilities will alter the landscape for as long as the facilities are in operation."

8.3.5.5 Follow-up 8-343

"As noted above, considerable uncertainty exists concerning the number of visits by Keewatinoow Converter Station construction workers to Gillam, the types of mitigation measures to be implemented, and the number and types of adverse occurrences. In these circumstances, a monitoring and adaptive management program is necessary…

In terms of health effects and EMFs, Manitoba Hydro will continue to monitor studies and make information available to the public. As well, measurements of magnetic field will be made available on request."

8.3.6 Culture and Heritage Resources 8-344
8.3.6.1 Potential Effects and Key Topics 8-344

Culture

"Culture is the learned, socially acquired traditions and lifestyles of the members of a society, including their patterned, repetitive ways of thinking, feeling, and acting (Harris1987:6). All cultures contain recurring patterns or themes. For the Project, nine recurring themes were examined: traditional knowledge, language, kinship, worldview and spirituality, cultural practice, cultural products, law and order, health and well being and leisure/recreation. An understanding of these themes was obtained through ATK study workshops, self-directed studies and Key Person Interviews (KPIs) conducted for the Project. In the Project Study Area, there are many cultural affiliations, including First Nations and the Metis. Language is a distinctive identifying feature of these groups. There are some similarities in subsistence patterns, with seasonal hunting, fishing and gathering taking place.

The effects assessment for culture was derived from the Bipole III ATK process. ATK workshops were conducted by the Bipole III study team and self-directed ATK studies were conducted by specific First Nations and the Manitoba Metis Federation (MMF) (Chapter 5)…

Though definitions vary, ATK is generally seen as the foundation of a way of understanding (perceiving) based on observations, experiences and events over time (cognition). Non-Aboriginal culture tends to view and appreciate the ecosystem for its commercial, recreational and aesthetic qualities and as a result, the landscape is not as strongly linked to cultural identity…"

Heritage Resources

"Heritage resources are non-renewable resources. They are tangible objects of human endeavour that have survived the rigors of time and which indicate evidence of past human activities…

In Manitoba, all heritage resources are protected by HRA, which requires that an assessment of the effects of a project be conducted when it is the opinion of the minister that heritage resources may be affected by development (Section 12(2))… Heritage resources include:
· A heritage site;
· A heritage object; and
· Any work or assembly of works of nature or of human endeavour that is of value for its archaeological, palaeontological, pre-historic, historic, cultural, natural, scientific or aesthetic features, and may be in the form of sites or objects or a combination thereof (*Manitoba Heritage Resources Act* 1986, Definitions: i)…."

8.3.6.2 Valued Environmental Components (VEC) 8-346

"Two VECs were selected for Culture and Heritage Resources: Culture and Heritage Resources."

Culture

"Culture is described as a VEC because the human relationship with the natural environment is expressed through the recurring themes described above. Culture is the expression of the ways in which groups of people collectively know and understand their natural and social experience… The approach taken for the Bipole III Project independently paralleled and surpassed the methods and indicators identified in the UNESCO framework (UNESCO 2007:27). For the communities participating in the Bipole III Project ATK process, nine indicators were selected to represent the Culture VEC because of their universal application: language, worldview and spirituality, kinship/family ties, traditional knowledge, cultural practices, cultural products, leisure/recreation, law and order, and health and well-being. Within this framework, a code book of over 200 categories was developed through which the indicators, acting as themes, were quantitatively and qualitatively examined. "

Heritage Resources

"Heritage resources are non-renewable resources and are considered a VEC based on their status as defined under the *HRA* and because of their intuitive value. Since all heritage resources are protected under the *HRA*, there are no limitations in describing these resources as VECs. Heritage resource sites can be categorized as being of high, medium or low priority depending on their current status. Events such as site disturbance may lower the priority for further investigations. However, this cannot be determined except by a site visit…

… sites such as burials, pictographs and designated heritage sites were considered to be of highest value because of their heritage significance to Manitoba and, as in the case of burials, provincial policy and legislation provides additional protection of these sites. Pictographs (rock paintings) are not only representations of cultural expression, but are also integral to an ancient cosmology that forms the cultural core of many First Nations (Chapter 6)."

8.3.6.3 Environmental Effects Assessment and Mitigation 8-348

"For the environmental effects assessment of culture and heritage resources, ATK was provided by 19 participating communities in the Bipole III ATK Project and seven selfdirected ATK studies by Fox Lake Cree Nation, Tataskweyak Cree Nation, Opaskwayak Cree Nation, Wuskwi Sipihk First Nation, Long Plain First Nation, Swan Lake First Nation and the MMF. ATK played an important role in identifying areas of potential cultural and heritage concern for the Project."

Culture

"Construction activities such as excavation and clearing can cause changes to the physical environment which could potentially affect culture. Potential effects include: · Changes to the cultural landscape such as excavation of soils can potentially inhibit certain activities that sustain culture, desecrate areas of cultural and spritiual value; and destroy landmarks or mnemonic features that sustain continuity of cultural expression and thought; · Direct and indirect effects on culturally sensitive sites, such as areas wheremedicinal plant are gathered, which identified during the ATK studies. Some medicinal plant gatherers view transmission lines (and EMFs) as contaminants to the power of the plant; and · Permanent loss of cultural landscapes that would inhibit the ability of First Nation, Metis and local people to orally recount history which, in turn, could effect culture and spirituality.

Operations have the potential to cause ongoing and/or inadvertent disturbance to cultural processes and the Aboriginal historic record as it has been identified through the Bipole III ATK workshops and self-directed studies."

Heritage Resources

"Construction activities can cause changes to the physical environment that could potentially affect known and undiscovered heritage resources and sites. Potential effects include:

- Dislodgement of surface and sub-surface heritage resources during construction

- clearing that represent the cultural chronology of human occupation;
- Fragmentation and destruction of known and undiscovered heritage resources
- during construction and grading for access roads through land features;
- Dislodgement or change in the provenience of known and undiscovered heritage
- resources during in-ground drilling activities;
- Destruction of known and undiscovered heritage resources and/or burials during
- excavation and soil removal;
- Destruction of known and undiscovered rock features such as burials, petroforms,
- tepee rings, thunderbird nests, caches and waymarkers, palaeontological
- representations and other culturally sensitive sites during borrow/quarry
- excavations, grading and construction; and
- Damage to known or undiscovered heritage resources within material placement
- areas due to spoil piling of excavated soils, rock etc.

In addition, construction can cause direct and indirect effects on known heritage resources sites that have been identified through the Provincial heritage resource inventories, ATK and predictive modeling. Undiscovered heritage resources may be inadvertently affected by these activities and can result in the following:

- Permanent disturbance or destruction of heritage resources and burial sites. During
- the course of construction heritage resources that are currently recorded may be
- irreparably disturbed or destroyed;
- Permanent loss of future heritage resources data. The loss of heritage resources and
- burial sites may occur instantly with little time to record pertinent data;
- Permanent loss of heritage objects or sites. Heritage objects and sites are nonrenewable
- resources and loss of same will result in an incomplete historical record;
- Permanent changes in the interpretive capacity of the region which reduces the
- ability to provide a complete record of both Manitoba and Aboriginal history; and
- Permanent loss of cultural landscapes and the ability of First Nation, Metis and local people to orally recount history may have an effect on the culture and spirituality.

Operations have the potential to cause inadvertent disturbance to known heritage resources that have been identified through the Provincial heritage resource inventories and those that are as yet undiscovered."

HVdc Transmission Line

"No heritage resources were found during archaeological field investigations within the final preferred route. Field studies were conducted both aerially and on the ground in the summer of 2011. Most areas were inaccessible due to ground conditions or because landowner permission had not been obtained. Further fieldwork will be conducted in these areas prior to construction once access is available.

Ninety-four provincially registered heritage resources sites are located within the 4.8 km (3.0 mile) Local Study Area centered on the final preferred route for the Bipole III line (Table 8.3-17). No federally designated sites were identified in the vicinity of the route. In addition to the provincially registered sites, 194 environmental areas of heritage concern were identified through predictive modeling and ATK identified heritage areas;…

…Temporary mobile camps will be located at unknown locations along the route. These camp locations will not be established within 100 m of known archaeological sites or in areas identified by ATK as having heritage or cultural value, or potential site locations identified through the predictive model….

…ATK assisted in providing cultural context to three of the five main areas (Keewatinoow Converter Station region; Cormorant Bottleneck; Red Deer River Bottleneck) of heritage concern along the final preferred route (Table 8.3-18). In addition two self-directed studies provided cultural context to the Assiniboine River crossing.

Two heritage resource sites were identified within the Project Site/Footprint of the Keewatinoow Converter Station during a routine Heritage Resource Impact Assessment (HRIA) (NLHS 2010, 2011). Meetings and on-site visits with Fox Lake Cree Nation Elders assisted in providing cultural information regarding the stone features that were identified by Project Archaeologists. Appropriate cultural mitigation was suggested by the Elders and immediately implemented by Manitoba Hydro. These sites are discussed under the Keewatinoow Converter Station and Associated Facilities. In the Cormorant area, a petroform is situated within 16 m of the centre line of the final preferred route for the Bipole III line… The main undisturbed petroform is located approximately 50 m east of the existing Herblet Lake to Rall's Island 230 kV transmission line right-of-way and within the Bipole III right-of-way. The site will be mitigated with appropriate permanent protection if the route cannot be realigned through this area to avoid the site. Discussions will occur with the Province of Manitoba Historic Resources Branch (HRB) and the community of Cormorant regarding the petroform.

The Red Deer River crossing was identified as a bottleneck area where ATK, heritage resources and resource use were located. The Bipole III right-of-way may pass through historic salt springs that have been archaeologically (Petch 1990) and locally (through the ATK workshops 2010) confirmed. Heritage discussions will occur with the HRB and the communities within the Barrows and Dawson Bay areas regarding the salt springs and Red Deer River crossing.

The Red Deer River, Cowan-Briggs Spur area and the Assiniboine River crossing were not investigated because landowner permission was not provided…The Red Deer River was noted by at least five communities as being of historic interest… Cowan-Briggs Spur and the area to the east were noted by at least three communities as having great cultural importance to the local people….

… Assiniboine River Crossing was identified by Long Plain, Dakota Tipi, Swan Lake and Dakota Plain as an area of concern. The famous Yellow Quill Trail crosses the River nearby. Yellow Quill was the first Chief of these First Nations and was signatory to Treaty 1. Swan Lake First Nation has completed some heritage field work, but the area will require detailed survey by the Project Archaeologist working with the Swan Lake First Nation archaeologist prior to construction."

Mitigation Measures

"…The following lists outline mitigation measures to ensure those impacts and their effects to culture and heritage resources are addressed in a manner that is culturally appropriate."

Culture

- EnvPPs for the construction and operations of the Project will include mitigation Measures… Further liaison with communities that have identified cultural concerns will occur to assist in identifying additional mitigation measures… opportunities for employing local Aboriginal people to assist in monitoring Project construction.
- The EnvPPs will contain heritage protection measures which will be developed in collaboration with First Nations, Metis and local interested parties for Project components that will ensure protection of Aboriginal and non-Aboriginal cultural interests.
- …Manitoba Hydro will continue to liaise with First Nations, the MMF and other communities to review concerns that arise about the Project and opportunities for cultural preservation occasioned by the Project…
- Concerns regarding the effect of EMF on the natural environment and on humans were expressed through the Bipole III ATK process and the EACP (Chapter 5). Manitoba Hydro is exploring ways to share information about EMF in a meaningful way with Aboriginal people.
- The loss of the ability to conduct traditional activities such as trapping, hunting and fishing was noted in the ATK workshops and self-directed studies as potentially impacting culture It must be understood however, that culture goes beyond these subsistence activities. As far as is practicable and in accordance with established laws and regulations overseen by Manitoba Conservation, Manitoba Hydro will respect and abide by local hunting protocols and cultural practices during construction and operation of the Project."

Heritage Resources
"

- EnvPPs for the construction and operation of the Project will include mitigation measures to minimize potential effects… Manitoba Hydro anticipates employing local Aboriginal people to assist in monitoring Project construction. The heritage protection measures… developed in collaboration with First Nations, Metis and local interested parties for Project components…
- During construction, the Project Archaeologist will work with the Construction Supervisor and Site Manager to ensure that all in-field staff and workers are informed of and understand the process of implementing heritage protection measures and *The Heritage Resources Act*.

Because of the development of the Heritage Protection measures in the EnvPPs, the effects on heritage resources during construction of the Bipole III line are expected to be negative, small in magnitude, Project Site/Footprint in geographic extent, short-term in duration, and therefore not significant.

Given the mitigative measures for the Project effects on culture during construction are expected to be negative, small in magnitude, Project Study Area in geographic extent, short-term in duration, and therefore not significant."

Keewatinoow Converter Station & Associated Facilities

"The Keewatinoow Converter Station area contains heritage resources that are regarded as archaeologically and culturally important. Two archaeological sites were found during Heritage Resource Impact Assessment (HRIA) investigations for the Project (Table 8.3-19). Because of the potential importance of these sites, culturally appropriate recommendations from Fox Lake Cree Nation Elders were implemented immediately.

With respect to site HdK1-01, this included:

- Erecting a snow fence around the parameter of the site;
- Posting signage at the four openings of the snow fence;
- Clearing deadfall and debris from the site;
- Declaring the site an off-limits area;
- Planning to direct excess water flow from drilling for water away from the site; and
- Conducting geophysical survey of the potential burial sites.

At HdKl-02, a site impacted by construction of a winter road:

- Barricades of cut trees were placed at the north and south ends of the site, a permanent barrier is required; and
- The northwest extension of the site was identified as a no-go zone for equipment.

… Site HdK1-01 was determined to be located near proposed fencing, drainage ditches and the possible access road to the site… The site contains a potential Palaeo-Inuit occupation and three possible burial features. The HRB has indicated that permanent fencing must be established around this site prior to construction.

Site HdKl-02… consists of three possible tent rings that have been somewhat displaced by the grading of a winter road through the centre of the site and installation of a drill well… It will require permanent fencing to protect the site from construction, and operations and maintenance activities.

The configuration of the Keewatinoow Converter Station has been modified to avoid these two sites; therefore no salvage of archaeological sites will be required unless there is potential for construction or operations activities in this area.

No heritage resources were identified for other facilities associated with the Keewatinoow Converter Station during field studies conducted in the summers of 2010 and 2011…"

Mitigation Measures

"Manitoba Hydro anticipates that all of the following mitigation measures will be discussed with local communities as appropriate methods, in addition to further fieldwork, to minimize effects of the Project on culture and heritage resources:

- Preparation of construction and operations EnvPPs which will include mitigation measures to minimize potential cultural effects, and the discovery of known and undiscovered heritage resources. Liaison with Fox Lake Cree Nation and Tataskweyak Cree Nation will occur to assist in the development of the EnvPPs.
- Preparation of heritage resources protective measures to be included in the EnvPPs…
- During construction, the Project Archaeologist will work with the Construction Supervisor and Site Manager to ensure that all in-field staff and workers are aware of the process of *The Heritage Resources Act*.

… Manitoba Hydro and Fox Lake Cree Nation will be continuing efforts to identify potential adverse effects and conclude an Adverse Effects Agreement, pursuant to the process set out in Article 8 of the

ISA. Manitoba Hydro and Tataskweyak Cree Nation are also continuing discussions towards a jointly developed set of principles to address, among other things, Project impacts."

Riel Converter Station

"There does not appear to be any potential impact to culture at the Riel Converter Station site. Two archaeological sites (DlLf-10 & DlLf-11) were identified in the vicinity of the Riel Converter Station site during HRIA investigations in 2008 (Table 8.3-20). Both sites were determined to be disturbed by former homesteading and agricultural activities and therefore are low priority…

The selected southern ground electrode site is not anticipated to impact culture and does not impact existing heritage sites. Archaeological field investigations in the summer of 2011 identified no sites of heritage concern as the site is under cultivation."

8.3.6.4 Summary of Residual Environmental Effects and Significance 8-357

"Table 8.3-21 provides a summary of residual effects related to culture and heritage resources for the Project…

With respect to heritage resources, the residual effect of the Project is the potential discovery of unknown heritage resources particularly during the construction phase of the Project. With the preparation of Project specific EnvPPs, which will include heritage resources protective measures, unknown heritage resources will be protected during Project construction and operations.

Culturally, the Project may be viewed as another impact on Aboriginal traditions, culture and practices. The ATK workshops, self-directed studies and KPIs associated with resource use indicate that many aspects of traditional culture may be lost if the opportunity to carry out certain activities is removed. The on-going liaison and communications Manitoba Hydro intends to maintain with First Nations, the MMF and Aboriginal communities with respect to the Project will facilitate the identification of potential lost opportunities and mutually agreeable ways to avoid such loss and to maintain important cultural activities."

8.3.6.5 Follow-up 8-359

"The best form of mitigation is avoidance; however, this may not be possible in some areas…

Apart from the preparation of EnvPPs which will contain heritage resources protective measures… additional field work will occur prior to construction of the Bipole III line, as well as monitoring as outlined below. Monitoring requirements will be further identified in a Heritage Resources Monitoring Plan.

Culturally, monitoring and follow-up of participating communities will assist in future projects since a baseline has now been established…. Manitoba Hydro will continue to liaise with directly affected Aboriginal communities about concerns regarding the Project, and will give on-going consideration to community concerns. In addition, Manitoba Hydro anticipates opportunities for employing local Aboriginal people to assist in Project monitoring."

HVdc Transmission Line

"Although no heritage resources were recovered during the HRIA field investigation of the Bipole III line, water crossings along larger rivers will be examined prior to and during construction of the line… the Project Archaeologist will examine and monitor sites that are ranked of high or medium priority. The EnvPPs which will contain heritage resources protective measures will to provide direction as to the process for protecting heritage resources."

Keewatinoow Converter Station & Associated Facilities

"Monitoring at key construction points… will occur at, and in areas in proximity to the two known archaeological sites. Monitoring will occur at the ground electrode site if heritage resources are identified… The EnvPPs will contain heritage resources protective measures and provide instruction as to the process of protecting heritage resources."

Riel Converter Station & Associated Facilities

"The Riel ground electrode site is found within agriculturally modified lands and therefore any previous remains of heritage resources may have been disturbed or destroyed over the years… The EnvPPs will contain heritage resources protective measures and will protect any found heritage resources…"

8.4 ACCIDENTS AND MALFUNCTIONS 8-360

"This section reviews the potential for accidents or malfunctions that could affect primarily the biophysical environment… Accidents are discussed mainly in the context of hazardous materials and malfunctions in the context of fire response and emergency preparedness…

… With respect to the Project, there are a number of components and stages where this risk exists and, depending on the nature and magnitude of the contingency event, there is a resulting potential for an effect on the biophysical environment including soil, groundwater, surface water, and the aquatic environment if materials such as fuel, lubricants, solvents or herbicides enter a water course. Other contingency events could include accidental fires which may affect air quality or result in wildlife and habitat loss. If any of these contingency events occurs, it may create a risk to public health and safety or may potentially affect wildlife, fish and terrestrial and aquatic habitat…

Spills in and adjacent to wetlands, waterbodies and water courses are of the greatest concern to fish and wildlife…

Some of the general mitigation measures to prevent and respond to accidental spills/releases of hazardous materials include:

- Construction crews will be adequately trained in spill prevention and clean-up procedures;
- Fuel, lubricants and other potentially hazardous materials will be stored and handled within dedicated areas at work sites and marshalling yards in full compliance with regulatory requirements;
- Harmful substances, such as fuels, chemicals and herbicides will be stored greater than 100 m from the ordinary high water mark (HWM) of any waterbody;

…

- Marshalling yards will be located on low permeability soils and upland sites, where possible (i.e., areas of well drained soils, as identified soils maps [Chapter 6] and locally by Manitoba Hydro's Construction Supervisor or Site Manager);
- …
- Machinery will remain above the HWM, unless fording is required to transport equipment across the watercourse;
- …
- All soil is to be remediated or disposed of in a manner approved by regulatory authorities and Manitoba Hydro;
- Hazardous materials, fuel containers and other materials will be removed from the site and disposed of according to Manitoba Hydro's Hazardous Materials Management Handbook and in accordance with regulatory requirements; and
- The Canadian Wildlife Service (CWS) will be informed of all incidents where the spill of toxic pollutants will harm or potentially harm wildlife species and/or species at risk. In accordance with the National Policy on Oiled Birds and Oiled Species at Risk (Environment Canada 2011).

The operation of oil containing electrical equipment, the burning of trees and brush for disposal, and other potential sources of ignition creates a risk for accidental fires to start… There is substantial design mitigation to be prepared for potential station fires and to collect and separate oil contaminated water from such an event (Chapter 3 Project Description)… In the event of a station or other construction site fire, follow-up monitoring would be required."

8.5 EFFECTS OF THE ENVIRONMENT ON THE PROJECT 8-363

8.5.1 Context 8-363

"… Concerns were expressed through the EACP about the risks to the Project and to the Manitoba Hydro transmission system from increased frequency of extreme weather events due to climate change.

… research broadly suggests that the probable outcome of current trends will be higher mean temperatures and precipitation, with changes expected to be most pronounced in the winter. These changes could affect the existing environment and its susceptibility to the potential environmental effects of the Bipole III Project…

… This section addresses the prospective effects of climate change on the Bipole III Project and, more importantly, on the Manitoba Hydro transmission system."

8.5.2 Potential Effects 8-364

"Recent research commissioned by Manitoba Hydro characterizes the present situation as follows. "In summary, the existing weather record is not conclusive, though highly suggestive and consistent with current climate change theory. The world appears to be in the early phases of a fundamental shift towards a climate in which extremes of many kinds are more prevalent though there remains a small possibility that the present cluster of extreme events is a temporary phenomenon. Changes in the frequency and intensity of extreme events is expected to be one of the most significant effects of continuing climate warming, but the natural variability in these phenomena precludes easy detection of the signal, and so must await the passage of time and more detailed analysis" (Dr. John Hanesiak, Appendix B, in Teshmont, 2011)."

8.5.3 Significance 8-365

"… The prospect of outages arising from severe weather events, though significant, is of greatest concern from a system rather than a project perspective. The separation of the Bipole III HVdc line and stations from those of Bipoles I and II will substantially reduce the risk of such outages. As well, the reliability based design criteria for the Bipole III HVdc line are for higher wind and ice loading than the deterministic design methods applied to Bipoles I and II. The return period of severe weather exceeding the design parameters of the Bipoles I and II HVdc transmission lines has been estimated to be 1 in 90 years in the case of wind loading, 1 in 20 years in the case of combined wind and ice loading. The development of Bipole III will improve the estimated return period for a common failure of all three Bipole HVdc lines to 1 in 560 years or more for wind loading and to 1 in 200 years or more in the case of combined wind and ice loading…"

9.0 CUMULATIVE EFFECTS ASSESSMENT 9-1

[MWL: Overall this section only provides a very high level overview of potential cumulative effects, with little explanation on how they have arrived at some of their conclusions especially when they which socio-economic environment sub-component is subject to 'negligible' or 'potentially non-negligible' cumulative effects. Language used does not provide clear understanding of potential impacts and reference to 'adaptive management' is too open-ended without any concrete examples.]

9.1 INTRODUCTION 9-1

"Cumulative effects are changes to the environment that are caused by an action in combination with other past, present and future human actions (Hegmann et al. 1999).

…The foregoing Scoping Document directed that the framework for this cumulative effects assessment be based upon the work of the Canadian Environmental Assessment Agency (CEAA). Accordingly, it is not inappropriate to note that the CEAA requires that a cumulative effects assessment include any cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out and their significance."

9.2 SCOPING CUMULATIVE EFFECTS ASSESSMENT 9-2

"The spatial boundary considered for the cumulative effects assessment is the broad, regional Bipole III Project Study Area (see Map 1-1). Cumulative effects of the Project are assessed for the construction and operations phases as reviewed in Chapter 4, and residual effects significance continues to be evaluated as set out in Chapter 4, section 4.2.10.

The cumulative effects assessment approach considers those adverse residual effects of the Project on Valued Environmental Components (VECs) (as identified in the effects assessment provided in Chapter 8) that have the potential to act in concert with the effects of other past, existing or potential future projects or human activities…"

9.2.1 Past and Existing Projects and Activities 9-3

"…Projects were not considered further in the cumulative effects assessment where there was no expected spatial or temporal overlap with the Project…

Manitoba Hydro was a proponent for a number of past/existing projects included in Table 9.2-1. Where relevant, this allows for coordination of mitigation and monitoring measures to help ensure any cumulative effects resulting from these projects are identified and addressed. For example, mitigation, monitoring and follow up measures have been identified for the Wuskwatim generation/transmission and Riel Reliability Improvement Initiative projects as part of the planning and development of each of those projects.

In summary, Table 9.2-1 identifies the following past and existing projects with effects that overlap with the residual adverse effects of the Project (and notes that potential cumulative effects of the Project in combination with these past and existing projects have been primarily addressed as part of the earlier Chapter 8 effects assessment):

· Wuskwatim Transmission Project (230 kV transmission lines, Thompson-Birchtree Station);

[Table 9.2-1…Spatial overlap and potential to contribute to fragmentation of habitat in a regional context…]

· Upgrades and/or rehabilitation of existing northern hydroelectric projects. (Kettle Generating Station);

[Table 9.2-1…Potential modest risk of cumulative socio-economic effects on Gillam and other communities and on regional infrastructure during construction activity…]

· Riel Sectionalization Project - The Riel Reliability Improvement Initiative;

[Table 9.2-1…may result in temporal overlap… may generate other residual effects including disturbance and aesthetic effects on rural residences in the vicinity…]

· Multiple existing (utility) corridors, such as water pipelines, fibre optics line and Provincial Highways and Roads, winter road development;

[Table 9.2-1…corridors may result in habitat disruption and fragmentation effects; contribute to direct mortality of VEC individuals and increased access to adjacent areas by recreational users; Existing corridors are considered where relevant as part of the existing environment (Chapter 6) and in the effects assessment in Chapter 8 and are not considered further in Chapter 9.]

· Forestry operations and road development (Tolko, Louisiana Pacific); and

[Table 9.2-1…Tolko and Louisiana Pacific are responsible for all forest management activities in FML # 2 and #3 respectively. The BP III transmission line will pass through FML #2 and #3… Timber harvesting in areas overlapping the Project Footprint would result in a temporary cumulative effect (beyond the permanent effect of clearing and vegetation management within the Project rights-of-way). Development of access roads might, where the roads run through forested areas, contribute cumulatively to density of linear features and a corresponding fragmentation effect. The duration of the effect is similar to the life span of the access trail/road.]

· Mineral licence area exploration, mineral lease, mining claim, and quarry lease developments (Crowflight Minerals Inc., HudBay Minerals Inc., Vale Inc.).

[Table 9.2-1… Route adjustment has located the HVdc transmission line outside areas of concern regarding effects on mining; potential for interactions with quarry operations.]"

9.2.2 Future Projects and Activities 9-7

"…Manitoba Hydro is participating in several of the future projects considered in the cumulative effects assessment. This facilitates Manitoba Hydro management and/or reduction of potential cumulative effects. As part of the licensing process for these other projects, Manitoba Hydro will be required to develop sufficient mitigation measures, monitoring and follow-up programs to ensure there will not be significant residual adverse effects for these projects.

- Keeyask Generation; (includes northern camp; southern camp; infrastructure): Keeyask Transmission: includes transmission lines and a switching station. Temporal overlap of socio-economic effects with effects of Project related to construction activities.

In summary, Table 9.2-2 indicates that the following future projects and activities have residual adverse effects that would overlap with the residual adverse effects of the Project and these projects therefore are addressed further in this cumulative effects assessment:

- Keewatinoow wastewater management;
  [Table 9.2-2…temporal and spatial overlap]
- Keeyask Generation (includes northern camp; southern camp; infrastructure);

[Table 9.2-2…construction will occur only after comprehensive site selection and environmental impact assessment, extensive public consultation and approval and licensing by the relevant regulatory authorities…Potential socio-economic effects may extend to the region…]

- Keeyask Transmission (includes right-of-way, interconnection facilities, line and towers); and

[Table 9.2-2…Temporal overlap of socio-economic effects with effects of Project related to construction activities]

- Urban residential development - plans for residential development within the Town of Gillam.
- Construction activities associate with PR 280… effects expected to be beneficial rather than adverse."

9.2.3 Prospective Future Projects and Activities 9-10

"In summary, Table 9.2-3 indicates that the following prospective future projects and activities could have residual adverse effects that would potentially overlap with the residual adverse effects of the Project (each of these prospective future projects and activities are not yet approved or are not currently in a planning/approvals process preparatory to being constructed/carried out):

- Conawapa Generating Station Projects (includes northern camp; southern camp; infrastructure; transmission);

[Table 9.2-3…Potential socio-economic effects associated with the overlap of construction activities (and all of the related northern workforce and infrastructure implications).]

- Forestry operations including road development (Tolko, Louisiana Pacific);

[Table 9.2-3…Potential effects where activities include clearing and vegetation management within the Project right-of-way, where these overlap the FML; Development of access roads may, where the roads run through forested areas, entail a cumulative contribution to density of linear features and a corresponding fragmentation effect.]

- Mineral licence area exploration, mineral lease, mining claims, and quarry lease developments; and

[Table 9.2-3…Future mining/exploration operations may provoke additions to the density of linear features (e.g., access roads) but the actual mine sites are likely to be relatively
confined spatially and unlikely to entail cumulative biophysical effects; …adverse environmental effects to those experienced from similar past activity, including changes in water quality, ground disturbance and access.

- Current and future agricultural activities.

[Table 9.2-3…residual effects of agricultural development on key VEC habitats are expected to be reduced.]

…Given that these projects and activities are prospective, and the timing and spatial extent of effects are not well understood at this time, they are addressed only to a limited extent in this cumulative effects assessment, i.e., to note prospective overlap issues to be addressed in the future when and if these other projects are subject to regulatory review."

9.3 ASSESSMENT OF CUMULATIVE EFFECTS ON VECS 9-12

"Valued Environmental Components (VECs) identified in Chapter 4 were selected for the cumulative effects assessment if there was:

- A residual negative effect of the Project on that VEC as identified in Chapter 8…
- A spatial and temporal overlap of the effects of the Project on that VEC with the effects of the other projects and human activities specified in Section 9.2."

9.3.1 Biophysical Environment 9-12

"Table 9.3-1: Potential Coincidence of Effects on Biophysical Environment

[MWL Summary : *– adapted from Table 9.3-1*:

- Mammals and Habitat are the Bio-physical Environmental Sub-component that is have the most potentially non-negligible cumulative effects
- Groundwater has negligible cumulative effects for most of the project components
- Kettle Generation/Transmission and Station Upgrades of the Bipole III Project create the most negligible cumulative effects for all bio-physical environmental subcomponents including soil, air, groundwater, aquatic environment, terrestrial ecosystems, mammals and habitat, birds, amphibians and reptiles and terrestrial invertebrates.]

9.3.2 Site-Specific Residual Effects 9-15

"In addition, cumulative effects of the Project on the following VECs in combination with other projects and activities that may overlap with the Project Footprint are expected either not to occur or to remain minimal:

- Soils and Terrain (soil productivity, terrain stability);
- Groundwater (aquifer productivity);
- Terrestrial Ecosystems and Vegetation (plant species and communities of conservation concern; native grasslands/prairie areas); and
- Mammals and Habitat (effects primarily related to construction and operation of Keewatinoow Converter Station, borrow sites and ground electrode and line as they relate to American Martin, Beaver, Wolverine, Moose, Wood Frog and Northern Leopard Frog)."

9.3.2.1 Local Study Area Residual Effects Primarily Related to Presence of HVdc Transmission Line 9-16

"...In summary, as a result of the other identified projects and activities, a small magnitude, medium-term cumulative effect is expected on the biophysical VECs identified above from the Project due to impacts on habitat in the Local Study Area and consequent fragmentation and other effects as noted. Habitat fragmentation is likely to adversely affect species with large home ranges, such as moose and elk. Marten and other species that avoid cleared areas will also be affected by habitat loss and fragmentation. Fragmentation and habitat impacts can also affect amphibians and reptiles and terrestrial invertebrates as noted.

…Access management and provincial harvest management strategies that regulate hunting are the responsibility of Manitoba Conservation and will play a key role in monitoring changes in mammal population numbers and status related to many of these cumulative effects…

…In conclusion, Local Study Area incremental cumulative effects of the Project during construction and operation on mammals and mammal habitat (with the exception of caribou) and other biophysical components and VECs due to factors discussed above were considered to the extent feasible in the Chapter 8 assessments and are not considered to be significant."

9.3.2.2 Project Study Area Residual Effects related to Boreal Caribou (Wabowden, Reed Lake and Bog Ranges) 9-18

"Boreal Caribou are listed as Threatened under both provincial Endangered Species Act and the federal Species at Risk Act. The current Threatened status of boreal woodland caribou in western Canada is a result of a number of biological and ecological pathways of decline which are spatially and temporally influenced by a combination of human disturbances (including transmission lines, access roads to facilitate forestry and mining operations, and other linear disturbances).

…As noted in Chapter 8, both the Province and the federal government are presently working on new recovery strategies for boreal woodland caribou, which are to be finalized in early 2012. The assessments of caribou in this EIS will have to be reviewed when those strategies are finalized and published.

…Access-related sensory effects from transmission lines are expected to be less than those associated with all weather or winter roads. Indirect ecological impacts from transmission lines are also expected to be minor compared to those associated with other human caused or natural landscape disturbances…

The SSEA process provided an opportunity for avoiding the majority of potential effects through the selection of the Final Preferred Route away from a number of boreal woodland caribou core winter and summer ranges, and where possible the HVdc transmission and ac collector lines were routed in proximity to existing linear features to reduce expected effects of additional fragmentation.

…With implementation of mitigation measures as described in Chapter 8, the Project is not anticipated to have significant residual effects on boreal woodland caribou. The expected residual effects relate primarily to potential increase in predation rates, especially in areas where the HVdc line bisects or intersects known core winter use areas and known calving areas.

…there is concern identified in Chapter 8 regarding a risk of unsustainable losses in the population (particularly in the Wabowden range) from the incremental effects of the Project due to the risk of increased predation, increased hunting and increased presence of bears. The nature of effects will be monitored and adaptive management applied as required in the Wabowden range (and potentially in the Bog range)."

9.3.2.3 Coastal and Barren Ground Caribou 9-20

"…There are no impacts on habitat and functional loss of habitat due to the effects of paralleling the existing rights-of-way is minor…."

9.3.3 Socio-Economic Environment 9-20

"…In summary, Table 9.3-2 indicates where no cumulative effect is expected on a socioeconomic subcomponent, and where likely cumulative effects beyond what was assessed in Chapter 8 are expected to be negligible. Potentially non-negligible cumulative socioeconomic effects are identified in relation to effects of construction of the northern portion of the HVdc transmission line and the Keewatinoow Converter Station on services; personal, family and community life, and cultural and heritage resources subcomponents by the Project in combination with other listed projects and activities to be undertaken…"

9.3.3.1 Construction Phase Non-negligible Adverse Cumulative Effects in Project Study Area 9-23

"In the last 60 years, the First Nations and Aboriginal people living in the regions roughly corresponding to the Split Lake Resource Management Area (RMA) and the Fox Lake RMA have experienced significant, adverse disruptions in their traditional ways of life as a consequence of a number of factors including, importantly, the development of major hydro-electric generating and transmission facilities by Manitoba Hydro; the opening up of the region to major mining projects and forestry development; the continued application, in the initial part of this period, of the residential school policy; and widespread poverty. In the case of the foregoing projects and industries, there have been corresponding effects on a number of biophysical components of the environment, fish, mammals, birds and forests that have made it more difficult to maintain traditional practices and the world view of closely interrelated relationships between people and the environment which is central to all Aboriginal cultures.

...in the Split Lake RMA and the Fox Lake RMA, for example, significant adverse effects agreements have been entered into with Manitoba Hydro to address the effects of past projects and, in the case of the Keeyask Generating Station Project, the Keeyask Hydropower Limited Partnership is committed to the payment of millions of dollars, some of which is already being paid, to fund a variety of innovative programs and facilities whose purpose is to reverse the adverse impacts experienced in the past…

…As noted in Chapter 8, the Project's Keewatinoow Converter Station and associated facilities are expected to have moderate residual adverse effects on community services, travel and transportation, and public safety in the Project Study Area near this activity due to the influx of workers, interactions between visiting workers and residents of the Gillam area and consequent increased stress on community services (emergency, health and social) in the Gillam area. Based on these effects, concerns may also exist with regard to cumulative effects to these VECs and to culture in the Project Study Area.

Construction of Keewatinoow Converter Station and associated facilities will require a large workforce relative to the existing population… there is potential for cumulative adverse effects related to worker interactions with the community of Gillam due to the increase in construction workers generally in the Project Study Area….

…Since September 2009, Manitoba Hydro and Tataskweyak Cree Nation have been engaged in a process to reach shared understandings of the impacts of the Bipole III Project on the rights and interests of Tataskweyak Cree Nation and are currently working towards an Agreement in Principle to address a range of issues associated with the Bipole III Project. Manitoba Hydro and Tataskweyak have negotiated a Keeyask Adverse Effects agreement to address impacts of that development…

The 2004 Impact Settlement Agreement (ISA) between Fox Lake Cree Nation, Manitoba Hydro, and Manitoba sets out processes for addressing Fox Lake's rights and interests with respect to future developments. Manitoba Hydro established a Working Group process…"

9.3.3.2 Operation Phase Non-negligible Adverse Cumulative Effects in Project Study Area 9-27

"There are some residual effects of operation that include habitat alteration and fragmentation from creation of the right-of-way, improved access to new areas for hunters and predators, bird line-strikes, noise and potential disturbance from lines, maintenance vehicles and equipment. These residual effects have the potential to combine with similar effects from other projects and activities in the area including activities associated with forestry, mineral exploration, and other Manitoba Hydro developments as previously discussed in relation to construction activities."

10.0 SUSTAINABILITY ASSESSMENT 10-1

"…chapter responds to Section 9.0 … examines how Manitoba Hydro's corporate sustainable development policies are incorporated into the planning, design, construction, operation and maintenance, and eventual decommissioning of the Project, as well as how Manitoba's Principles and Guidelines of Sustainable Development, as scheduled under The Sustainable Development Act (SDA), have been met."

10.1 SUSTAINABLE DEVELOPMENT 10-1

"Manitoba Hydro uses a Plan-Do-Check Environmental Management System (EMS), registered to the ISO 14001 Environmental Management System standard… A keystone of this system is Manitoba Hydro's Environmental Management Policy that guides all of the corporation's operations (Manitoba Hydro 2008). The policy and its 13 principles are based on the principles and guidelines initially developed by the Manitoba Round Table on the Environment and the Economy.

1. Stewardship;
2. Shared responsibility;
3. Integration of environmental and economic decisions;
4. Economic enhancement;
5. Efficient use of resources;
6. Prevention and remedy;
7. Conservation;
8. Waste minimization;
9. Access to adequate information;
10. Public participation;
11. Understanding and respect;
12. Scientific and technological innovation; and
13. Global responsibility (Manitoba Hydro 1993).

Manitoba Hydro is also a member of the Canadian Electricity Association (CEA) Sustainable Electricity Program. … As a participant in the program Manitoba Hydro reports on sustainability indicators covering social, environmental and economic performance. Although not presented at a utility or regionally specific level, the CEA releases an annual report of industry performance relative to these sustainability indicators."

10.2 BIPOLE III PROJECT SUSTAINABILITY ASSESSMENT 10-3
"Table 10.2-1 indicates how Manitoba Hydro and the Province of Manitoba's sustainable development principles and guidelines are incorporated into the planning, design, construction, operation and maintenance, and eventual decommissioning of the Project, where applicable."

[MWL: Table 10.2-1 goes over the following principles and guidelines:
-Integration of Environmental and Economic Decisions
-Stewardship
-Integrated Decision-Making and Planning
-Shared Responsibility and Understanding
-Efficient Use of Resources
-Prevention
-Rehabilitation and Reclamation
-Waste Minimization and Substitution
-Public Participation
-Access to Information
-Research and Innovation
-Global Responsibility
-Conservation and Enhancement]

10.3 CONCLUSIONS ....

"Based on the analysis undertaken, the Project is an excellent example of sustainable development. … The Project embodies sustainable development principles in ensuring that there is consideration of the environment, economy, health and social well-being through integrated decision-making. Environmental and social effects are avoided, minimized or compensated for as a result of a comprehensive environmental assessment process that included public, stakeholder and Aboriginal participation."

11.0 ENVIRONMENTAL PROTECTION, FOLLOW-UP AND MONITORING 11-1
11.1 INTRODUCTION 11-1

"Mitigation measures, monitoring and other follow-up actions … will be implemented through an Environmental Protection Program… [which] provides the framework for implementing, managing, monitoring and evaluating environmental protection measures … The Draft Environmental Protection Plan (Draft EnvPP) for the Project (Attachment 11-1) is provided as a separate document in support of the EIS submission. The environmental protection program was developed in accordance with Manitoba Hydro's vision, gaols and environmental polices."

11.2 ENVIRONMENTAL PROTECTION PROGRAM 11-2

11.2.1 Overview 11-2

"Manitoba Hydro's Environmental Protection Program provides the framework for the delivery, management and monitoring of environmental and socio-economic protection measures that satisfy corporate policies and commitments, regulatory requirements, environmental protection guidelines and best practices, and input from stakeholders and the Aboriginal community. The Program describes how Manitoba Hydro is organized and functions to deliver timely, effective, and comprehensive solutions and mitigation measures to address potential environmental effects. Roles and responsibilities for Manitoba Hydro employees and contractors are defined, and management, communication and reporting structures are outlined. The Environmental Protection Program includes the what, where and how aspects of protecting the environment during the pre-construction, construction, operation and decommissioning of the Project."

11.2.2 Organization 11-3

"… Manitoba Hydro senior management is responsible for the overall Environmental Protection Program including resourcing, management and performance, and is accountable for regulatory compliance, policy adherence and stakeholder satisfaction. The Environmental Protection Management Team is composed of senior Manitoba Hydro staff and is responsible for the management of environmental protection plans… The Environmental Protection Implementation Team is composed of Manitoba Hydro operational field and office staff and is responsible for the day-to-day implementation of environmental protection plans including monitoring, inspecting and reporting."

11.2.3 Roles and Responsibilities 11-4

"Roles and responsibilities … illustrated in general terms in Figure 11.2-2. The Construction Supervisor/Site Manager … responsibility for the implementation of the environmental protection plans and reports … Licensing and Environmental Assessment Department oversees the development of environmental protection documents … inspection and monitoring programs. … Construction Contractor is responsible for ensuring work adheres to the environmental protection plans … Environmental Officers/Inspectors have the primary responsibility to confirm that environmental protection measures and specifications are implemented … Environmental Monitors assist Environmental Officers/Inspectors and perform biophysical monitoring. Manitoba Hydro Field Safety, Health and Emergency Response Officers are responsible for the development and execution of the safety program and Occupational Health and Safety practices at the various construction sites. Other Manitoba Hydro employees, including engineers and technicians, provide information and advice to the Construction Supervisor/Site Manager."

11.2.4 Resources 11-6

"Ensuring that adequate resources are allocated … Manitoba Hydro commits resources early in the planning cycle … Teams of engineers and environmental professionals develop preventative or avoidance mitigation measures that include design, routing and siting alternatives. In addition, there are resource allocations for the delivery and implementation of specific environmental protection measures to meet corporate policy and government regulatory requirements. Manitoba Hydro is committed to staffing the Environmental Protection Program with sufficient Environmental Inspectors and providing required support including training, financial resources and equipment."

11.2.5 Environmental Management 11-6

"Manitoba Hydro is certified under the ISO 14001 Environmental Management System standard and is the subject to requirements of the standard, including annual audits to verify its environmental performance. … The ISO standard ensures quality, performance and continual improvement in the delivery of Manitoba Hydro's Environmental Protection Program."

11.2.6 Environmental Protection Documents 11-6

"Several environmental protection planning documents … include environmental protection, management and monitoring plans. The level of detail captured in the various plans increases as the project advances through planning, design, construction and operation phases, and the environmental assessment and licensing process (Figure 11.2-3). The Draft Environmental Protection Plan covers the period from submission of the Environment Act Proposal to receipt of an Environment Act License and other approvals for the Project. At that time the Draft Environmental Protection Plan will be updated in "Final" form to include licence terms and conditions, and other regulatory requirements. … Construction Phase Environmental Protection Plans will be prepared. It is anticipated that several environmental protection plans will be prepared, each addressing separate project components or construction contracts… provide … high level of detail … and will cover the construction period from beginning to end. Operation Phase Environmental Protection Plans will be prepared prior to completion of the Project. One or more environmental protection plans will be prepared for this phase of the project, each addressing separate project components. Operation Phase Environmental Protection Plans will cover the period from commissioning to the eventual decommissioning of the Project. A Decommissioning Phase Environmental Protection Plan would be prepared prior to the eventual decommissioning of the Project. Management plans are prepared in response to specific environmental issues identified during the environmental assessment of the Project. Typical environmental issues include road access, erosion control and resource use. … Monitoring plans are prepared in response to specific follow-up requirements identified during the environmental assessment of the Project. Follow-up requirements include… invasive vegetation, water quality, population size, breeding bird nest site abundance and resource use."

11.2.7 Pre-construction Activities 11-8

"Manitoba Hydro will undertake a number of activities prior to commencing construction of the Project … meet with Aboriginal communities in the development of Construction Phase Environmental Protection Plans to ensure concerns with culturally and environmentally sensitive sites identified in the aboriginal traditional knowledge workshops and reports are addressed and mitigated to the extent possible. Manitoba Hydro will obtain all licenses, permits, authorizations and other approvals including property agreements, rights-of-way easements and releases prior to commencement of construction of each individual project component or segment."

11.2.8 Construction Activities 11-9

"…The Project Manager, Construction Supervisor/Site Manager, Environmental Officer/Inspector, and Licensing and Environmental Assessment staff will meet with regulatory authority contacts at the beginning of the Project to outline construction plans and schedules, and will request regular meetings to provide updates on project progress, environmental protection measure implementation and regulatory compliance. Manitoba Hydro will fulfill all regulatory requirements for submission of inspection, monitoring and other reports. Regulators will be notified immediately in case of emergencies situations, environmental accidents or other incidents in accordance with regulatory requirements. Any proposed changes or alterations to the construction project, environmental protection measures or monitoring activities will be reviewed with the appropriate regulatory authorities. Manitoba Hydro will establish a comprehensive integrated environmental inspection program to comply with regulatory requirements, implement environmental protection measures and meet corporate environmental objectives."

11.2.9 Work Stoppage 11-10

"The duty to stop work rests with everyone encountering situations where the environment… threatened by an activity or occurrence …. Work stoppage is also to occur in the event of an environmental accident, extreme weather event or exposed human remains. … Remedial action plans or other environmental protection measures will be developed and implemented immediately after discussion and prior to resumption of work if previously halted. Work is not to resume until the situation is been assessed and responded to and the Construction Supervisor/Site Manager approves the resumption of work. All stop work orders will be documented, reported to regulatory authorities (if applicable) and reviewed at construction meetings."

11.2.10 Emergency and Contingency Response 11-10

"Spills of hazardous substances, fires and explosions, environmental accidents, heritage resource discoveries and other emergency or contingency situations require immediate action and response in accordance with established response plans. Provincial, federal and municipal authorities, and Manitoba Hydro personnel are to be notified in accordance with regulations and emergency and contingency response plans. These plans provide names of emergency responders, up-to-date contact information and notification procedures. Contractors are also required to have emergency response plans outlining contacts and response measures to exigent situations including hazardous materials spills, heritage resource discoveries, environmental accidents and fires or explosions. Manitoba Hydro has emergency response coordinators to deal with spills of hazardous and other substances."

11.2.11 Tools and Resources 11-11

"An Environmental Protection Information Management System (EPIMS) will be developed as a central repository of environmental protection information including but not limited to:

- Environmental protection documents;
- Reference information such as regulations, guidelines;
- Daily, weekly and monthly inspection reports;
- Environmental incident reports; and
- Monitoring program field data and reports.

The environmental inspection program will employ modern electronic recording, reporting and communication systems using field computers, geographic positioning systems and digital cameras. Electronic forms will be transferable to supervisors and project managers thereby enabling rapid communication and response to emerging situations. Field computers will have project and other reference information needed for effective implementation of environmental protection measures including regulations, guidelines, licences, permits, engineering drawings, specifications, maps, reports and data.

The EPIMS will monitor and report on environmental protection implementation, regulatory compliance and incident reporting. EPIMS will be the mechanism to provide reporting and tracking of environmental protection performance, and the foundation of an auditable environmental protection program."

11.2.12 Communications 11-11

"Manitoba Hydro personnel will maintain on-going communications with Manitoba Conservation, other provincial and federal departments, and Aboriginal communities as necessary regarding implementation of Bipole III Transmission Project environmental protection plans. …Contractor and contract staff through daily tailboard meetings and weekly or otherwise scheduled construction meetings at the worksite. Daily, weekly and monthly inspection reports as well as incident, monitoring and other reports will be prepared … Manitoba Hydro will prepare summary information and activity reports related to environmental protection for the Project on an annual basis. These reports will be designed for a general readership and will provide opportunities for interested parties to provide feedback on the Project as it is constructed and eventually operated. Manitoba Hydro will provide Aboriginal communities and the public with on-going opportunities to review and comment on the Project as it is being developed. A dedicated Project website fed with information from the EPIMS will be developed to facilitate communication with the public. All enquiries or complaints received will be recorded and reviewed by the Environmental Protection Management Team for response or action."

11.3 ENVIRONMENTAL PROTECTION PLAN 11-12

11.3.1 Overview 11-12

"The Environmental Protection Plan is the main implementation instrument under the Environmental Protection Program. The draft EnvPP has been submitted to Manitoba Conservation with this Project EIS and is part of the project submission. It is provided as a draft to allow for review and input from the regulatory process before finalization which will occur subsequent to licensing and prior to construction. …The Draft Environmental Protection Plan is a key element in implementing effective environmental protection and minimizing the potential adverse environmental effects identified in the EIS. It also outlines actions to identify unforeseen environmental effects and to implement adaptive management strategies to address them. An important component of an environmental protection plan is monitoring and updating which serves to ensure that environmental protection measures remain current and to provide for continual improvement of environmental performance."

11.3.2 General Environmental Protection Measures 11-13

"General environmental protection measures for the Project include mitigation measures and follow-up actions identified in the EIS including design mitigation, provincial and federal regulatory requirements, best practice guidelines, Manitoba Hydro environmental polices and commitments, and input from stakeholders, Aboriginal communities and the general public. The general environmental protection measures are listed for all major components and activities associated with the Project. Project components include transmission lines, access roads, construction camps, marshalling yards, converter stations and ground electrode facilities. Project activities include blasting, burning, clearing, draining, drilling, etc. General management measures are also provided that relate to all environmental protection categories."

11.3.3 Specific Environmental Protection Measures 11-13

"Specific environmental protection measures are provided for environmentally sensitive sites (ESS) identified in the Project EIS. Environmentally sensitive sites are locations, features, areas, activities or facilities along or immediately adjacent to the five kilometre transmission line corridor and other project components that were determined to be ecologically, socially, economically or culturally important and sensitive to disturbance by the Project and, as a result, require site-specific mitigation measures. … The Interactive Mapping Application is intended to provide am overview of ESS that Manitoba Hydro intends to integrate into its Construction, Operation and Decommissioning Phase Environmental Protection Plans. Through Aboriginal Traditional Knowledge workshops and self-directed Aboriginal community reports, many culturally and environmentally sensitive sites were identified. Due to the highly sensitive nature of this information, Manitoba Hydro has not included it in the Interactive Mapping Application. Manitoba Hydro will be working with Aboriginal communities prior to the start of construction to further identify and map these sites and develop mitigation measures to minimize the effects of the project on them. …"

11.3.4 Follow-up Activities 11-14

"Follow-up is an activity carried out to verify the accuracy of the environmental assessment of a project, assess the effectiveness of measures taken to mitigate adverse effects and determine compliance with regulatory requirements. Follow-up identified in Chapter 8 Environmental Effects Assessment will be implemented through inspection, monitoring, management and auditing actions."

11.3.4.1 Inspection 11-14

"… Inspection provides an essential function in environmental protection and implementation of mitigation measures. Much of the success in environmental protection will be attributable to how well environmental inspection is carried out during the construction phase of a project. …Trained inspectors visit work sites daily and inspect for compliance with license terms and conditions, and adherence to environmental protection measures. Inspection activities are recorded in journals and daily inspection forms that are submitted to the Construction Supervisor. Weekly and monthly summary reports are also submitted to the Manitoba Hydro Project Manager and senior management as required or requested."

11.3.4.2 Monitoring 11-15

"… Two main types of monitoring are typically undertaken for environmental assessments: **1) environmental monitoring** to verify the accuracy of the predictions made and the effectiveness of the mitigation measures implemented; and **2) compliance monitoring** to verify whether a practice or procedure meets legislated requirements. … Monitoring plans will describe parameters to be monitored, methods to be used, roles and responsibilities, and reporting schedules. Monitoring will be carried out by Manitoba Hydro and may be contracted to environmental consultants who possess the necessary expertise, equipment and analytical facilities. Monitoring plans and reports from monitoring programs will be submitted to regulatory authorities, Aboriginal communities and placed on the project website for the Project. Environmental monitoring plans for the Project will be prepared to address follow-up actions identified in the EIS as well as specific environmental protection, best practice and regulatory requirements, including:

- Biophysical environmental effects monitoring plan;
- Socio-economic monitoring plan; and
- Heritage resources monitoring plan."

11.3.4.3 Biophysical Monitoring 11-15

"… To illustrate how Manitoba Hydro intends to monitor the mitigation prescribed to minimize the potential effects of the Project, a Biophysical Environmental Effects Monitoring Framework (Appendix H of Draft Environmental Protection Plan) has been developed. The framework outlines the environmental effects that need to be addressed and monitored, how the Biophysical Environmental Effects Monitoring Plan will be developed, and the process in which the results of the monitoring plan will be shared with regulators, stakeholders, Aboriginal communities and the public."

11.3.4.4 Socio-Economic Monitoring 11-16

"Monitoring key components of the socio-economic environment will be undertaken during the construction and operation and maintenance phases of the proposed Project. Manitoba Hydro has experience undertaking such activities and has gained valuable insight through recent developments (e.g., Wuskwatim Generating Station and Transmission Projects). Similar to other projects undertaken by Manitoba Hydro, socioeconomic monitoring plans will be developed and submitted to the regulator in advance of all project phases. All results from the socio-economic monitoring program will be reported to regulatory authorities annually. Two streams of socio-economic monitoring will be undertaken for the project – economic monitoring and social monitoring.
The purposes of the socio-economic monitoring program for the Project will be to:

- Confirm effects predictions documented in the Environmental Impact Statement;
- Monitor the effectiveness of mitigation measures;
- Identify unanticipated effects;
- Identify other actions necessary to mitigate adverse effects or enhance positive
- effects; and

- Provide socio-economic information for other uses."

11.3.4.5 Heritage Resources Monitoring 11-16

"A Heritage Resources Monitoring Plan will be developed for monitoring of the discovery of heritage sites during construction along with the ongoing monitoring of known heritage sites for disturbance. All results from the heritage resources monitoring program will be reported to the regulatory authorities and Aboriginal Communities as required and annually."

11.3.4.6 Management 11-16

"… Management plans will be prepared to address important management issues, regulatory requirements and corporate commitments identified in the Project EIS. ... The following management plans will be prepared prior to the construction of the Project:

- Access management plan;
- Hazardous substances management plan;
- Erosion protection and sediment control plan;
- Emergency preparedness and response plan;
- Solid waste/recycling management plan;
- Rehabilitation management;
- Vegetation management plan; and
- Decommissioning plans (Construction Sites)."

11.3.4.7 Auditing 11-17

"…An environmental audit typically involves a methodical examination of evidence … Environmental protection plans for the Project will be subject to audits… conducted by accredited environmental auditors. The results of the audits will help to evaluate the effectiveness of environmental protection measures, learn from inspection and monitoring programs, and improve project planning, environmental assessment performance and sustainability appraisal."

11.3.5 Review and Updating 11-17

"Construction Phase Environmental Protection Plans will be reviewed annually or at the end of each construction season. Reviews will be conducted by Manitoba Hydro personnel in consultation with the Contractor, regulators and stakeholders. Checklists will be used to ensure that reviews address all required information in a consistent manner. The results of each review will be summarized in a report that documents the issues addressed and provides recommended updates to the environmental protection plan."

11.4 SUMMARY 11-18

"This section outlined the Environmental Management Program … Implementation of follow-up actions including inspection, management and auditing are discussed. Specific environmental management and monitoring plans are also identified."